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. . . BRIEFS . . .

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W.F. Thompson and the W.F. Thompson Award

When a recipient of the W.F. Thompson Best Student Paper Award for a publication based on student research asked who W.F. Thompson was, it was suggested that a brief biography of W.F. Thompson and a history of the Award would be appropriate in BRIEFS. Accordingly, William H. Bayliff (AIFRB Fellow 1971), chair of the AIFRB Awards Committee, prepared the following article covering the history of the Award and a summary of Awards given from 1963 to 1990:

The W.F. Thompson Award was established by the AIFRB as a tribute to Dr. W.F. Thompson, an outstanding fishery biologist and one of the founders of the AIFRB. Dr. Thompson is perhaps best known for his pioneering studies of catch, effort, and catch-per-unit-of-effort data for assessment of Pacific halibut, but he produced outstanding work with many other investigations as well. After graduation from Stanford University in 1911, where he studied under Dr. David Starr

Jordan, he worked for several years on halibut for the Province of British Columbia. This was followed by seven years with the California Department of Fish and Game. In 1924 he was selected as the first director of the International Fisheries Commission (later the International Pacific Halibut Commission). In 1938, after having assured the success of the halibut commission, he was selected as the first director of the International Pacific Salmon Fisheries Commission. In 1943 he became director of the School of Fisheries at the University of Washington. In 1947 he organized the Fisheries Research Institute at the University of Washington and served as its director until he retired in 1958. He died in 1965. Since its inception in 1963, 16 students have received this award.

Published records concerning this award are incomplete, so the following list has been compiled to prevent this aspect of the history of the AIFRB from being lost. Additions or corrections for this list are welcomed; they should be sent to William H. Bayliff, Inter-American Tropical Tuna Commission, 8604 La Jolla Shores Drive, La Jolla, California 92037-1508.

W.F. Thompson Awards, 1963-1990

Year of Award	Recipient	Paper	Year Published
1963	Edmund S. Hobson	Feeding behavior in three species of sharks. <i>Pacif. Sci.</i> , 17 (2): 171-194	1963
1964	Paul N. Sund	The chaetognaths of the waters of the Peru region. <i>Inter. Amer. Trop. Tuna Comm., Bull.</i> , 9 (3): 113-216	1964
1965	Kenneth J. Fischler	The use of catch-effort, catch-sampling, and tagging data to estimate a population of blue crabs. <i>Amer. Fish. Soc., Trans.</i> , 94 (4): 287-310	1965
1966-1968	William H. Bayliff	Population dynamics of the anchoveta, <i>Cetengraulis mysticetus</i> , in the Gulf of Panama, as determined by tagging experiments. <i>Inter-Amer. Trop. Tuna Comm., Bull.</i> , 11 (4): 173-352	1966
1969	Quentin J. Stober	Underwater noise spectra, fish sounds and response to low frequencies of cut-throat trout (<i>Salmo clarki</i>) with reference to orientation and homing in Yellowstone Lake. <i>Amer. Fish. Soc., Trans.</i> , 98 (4): 652-663	1969
1970	William W. Fox	An exponential surplus-yield model for optimizing exploited fish populations. <i>Amer. Fish. Soc., Trans.</i> , 99 (1): 80-88	1970
1974	Dean E. Arnold	Ingestion, assimilation, survival, and reproduction by <i>Daphnia pulex</i> fed seven species of blue-green algae. <i>Limnol. Ocean.</i> , 16 (6): 906-920	1971
1980	J.M. Redding	Possible adaptive significance of certain enzyme polymorphisms in steelhead trout (<i>Salmo gairdneri</i>). <i>Fish. Res. Bd. Canada, Jour.</i> , 36 (5): 544-551	1979
1978-1980	Richard B. Deriso	Harvesting strategies and parameter estimation for an age-structure model. <i>Canad. Jour. Fish. Aquat. Sci.</i> , 37 (2): 268-282	1980

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W.F. Thompson Awards cont.

Year of Award	Recipient	Paper	Year Published
1982	Lewis S. Incze	Relationships between effects of environmental temperature and seston on growth and mortality <i>Mytilus edulis</i> in a temperate northern estuary. <i>Mar. Bio.</i> , 57 (3): 147-156	1980
1985	Katherine W. Myers	Temporal use of an Oregon estuary by hatchery and wild juvenile salmon. <i>In</i> Kennedy, V.S. (editor), <i>Estuarine Comparisons</i> , Academic Press, New York: 377-392	1982
1986	Terry K. Sowden G. Power	Prediction of rainbow trout embryo survival in relation to groundwater seepage and particle size of spawning substrates. <i>Amer. Fish. Soc., Trans.</i> , 114 (6): 804-812	1985
1987	Robert J. Olson Christofer H. Boggs	Apex predation by yellowfin tuna (<i>Thunnus albacares</i>): independent estimates from gastric evacuation and stomach contents, bioenergetics, and cesium concentration. <i>Canad. Jour. Fish. Aquat. Sci.</i> , 43 (9): 1760-1775	1986
1985-1988	Kathleen S. Mayer	Waste transformer oil and PCB toxicity to rainbow trout. <i>Amer. Fish. Soc., Trans.</i> , 114 (6): 869-886	1985
1989	pending		
1990	Carole C. Baldwin	Morphology of the larvae of American Anthiinae (Teleostei: Serranidae), with comments on the relationships within the subfamily. <i>Copeia</i> , 1990 (4): 913-955	1990

W.F. Thompson Award Nominations

Nominations for the W.F. Thompson Award for the best paper based upon research conducted by a student and published in 1991 are now being solicited. The requirements are as follows:

1. The research must have been conducted while the nominee was a student at an institution of higher learning in the western hemisphere.

2. Papers which are considered for the award must be concerned with freshwater or marine biological resource problems. They will be judged on the basis of originality, development and organization, and interest to current problems.

3. The results of the research must have been published in a recognized scientific journal, or as all or part of a book, within three years of termination of student status. (If an outstanding paper does not meet this requirement, due to a technically uncontrollable reason, such as military service, etc., it may still be considered.)

4. Authors may nominate their own papers.

5. Multiple authorship is permissible, provided a student is the senior author.

6. A résumé, including details of the student author's employment history in fisheries or fisheries-related science and his status as a student, must accompany the nomination.

7. The papers will be judged by a Committee, chaired by an AIFRB fellow or member appointed by the President of the AIFRB. The Chairperson will select the other members of the Committee, who need not be members of the AIFRB.

8. The award will consist of a certificate and a monetary award of \$750. A faculty advisor co-authoring an award-winning paper will receive a certificate, but no money.

9. If the winning paper is based upon research carried out independently by two or more student co-authors, each will receive a certificate, and the monetary award will be divided equally among them.

10. In most cases the award will be given once each year, but if none of the papers nominated for the award is judged

to be outstanding the Committee is not obliged to select a winner of the award for that year.

11. Persons who have won the award are eligible to receive it a second time, provided the two awards are based on two distinctly different pieces of research.

Persons wishing to nominate papers for the W.F. Thompson Award should send six reprints or photocopies of each paper to Dr. William H. Bayliff, Inter-American Tropical Tuna Commission, 8604 La Jolla Shores Drive, La Jolla, California 92037-1508. In addition, as noted above, a résumé, including details of the student author's employment history in fisheries or fisheries-related science and his status as a student, must accompany each nomination.

Our People

Vaughn C. Anthony (AIFRB Fellow 1980 and current AIFRB President) had the feature article in the March 1993 issue of *Fisheries*, entitled *The State of Groundfish Resources off the Northeastern United States*.

Norman Bartoo (AIFRB Member 1980) has received the Department of Commerce Bronze Medal for his significant role in organizing and directing research on North Pacific albacore.

William W. Fox, Jr. (AIFRB Fellow 1984), the recipient of AIFRB's Outstanding Achievement Award for Individuals for 1992, has received the U.S. Department of Commerce's Gold Medal for his leadership and exceptional contributions to his agency. Bill, the Assistant Administrator for Fisheries for the National Oceanic and Atmospheric Administration, was awarded this highest honor granted by the Secretary of Commerce; the medal was given in appreciation for Bill's work in rebuilding the U.S.'s severely depleted fisheries, expanding opportunities for significant economic growth and recreational fishing, and other achievements.

Delano Graff (AIFRB Member 1973), **Nick Parker** (AIFRB Fellow 1989), and **Bill Taylor** (AIFRB Fellow 1991) have won American Fisheries Society 1992 Distinguished Service Awards. Bill is also the new science editor for *Fisheries*. Formerly an associate editor for the *Transactions of the American Fisheries Society* and president of the Michigan Chapter and the North Central Division of AFS, he is professor and chair of the Department of Fisheries and Wildlife at Michigan State University as well as chair of the Board of Technical Experts of the Great Lakes Fishery Commission.

Carolyn Griswold (AIFRB Member 1981) has been elected President-elect of the Northeastern Division of the American Fisheries Society.

In Reading, England, **Walter T. Momot** (AIFRB Fellow 1982) was named an Honorary Life Member of the International Association of Astacology. He has written numerous articles for American Fisheries Society publications.

Stan Moberly (AIFRB Fellow 1984) is the chair of the F.I.S.H. Coalition, which focuses on aquatic education and political activism to achieve clean water and productive fish habitats in North America.

John Pearce (AIFRB Fellow 1975) has responded to the American Society of Landscape Architects' request for speakers from the fishery community. John has offered to speak on sustainable development, a topic about which he has written several papers for the United States Environmental Program that were used as annexes or appendixes for the second United Nations report on the world's oceans.

Jeffrey Polovina (AIFRB Fellow 1987) returned last September from a 3-month Fulbright Research Scholar Program in Kenya, where he worked with Kenya biologists to build and deploy artificial shelters to help the lobster fisheries. He also worked with a statistician to develop a computer simulation model to describe the dynamics of a Nile perch population and fishery. In addition, Jeffrey worked with another biologist to attempt to relate climatic changes to changes in the marine ecosystem.

Richard Ridenhour (AIFRB Member 1963) is the President-elect of the Humboldt Chapter of the American Fisheries Society.

Bill Sigler (AIFRB Fellow 1960) and son **John** (AIFRB Member 1989) have been busy with their pens. They are just finishing their *Fishes of Utah: A Natural History Review*, to be published by the Utah State University Press. Bill is also finishing the 4th edition of his *Wildlife Law Enforcement*. They also had a chapter, *Aquatic Resources of the Arid West: Perspectives on Fishes and Wilderness Management in Wilderness Issues in the Arid Lands of the Western United States*.

Wally Whitworth (AIFRB Member 1973), Past-president of the Southern New England Chapter of the American Fisheries Society, recently received from **Carlos Fetterolf** (AIFRB Fellow 1973 and current President of the American Fisheries Society) the Chapter's Award of Excellence for his leadership in fisheries education and outstanding contributions to fishery science.

Jack Wingate (AIFRB Member 1980) has been elected Second Vice-president of the American Fisheries Society.

Salmon Fisheries of the Kamchatka Peninsula, Russia

Gregory T. Ruggerone (AIFRB Member 1993)

Surprisingly little is known about commercial salmon fisheries in the former Soviet Union. Communication between Soviet biologists and those in the West has been so poor that even catch, escapement, and age composition data are difficult, if not impossible, to obtain. However, along with the collapse of the Soviet Union in August 1990, communication with Russian scientists has begun to improve. In late 1991, several scientists from the Fisheries Research Institute, University of Washington, arranged to visit the Kamchatka Peninsula, which supports major salmon populations. Kamchatka Peninsula was previously closed to foreign visitors because strategic military and missile sites were located there. (In 1983 a Korean passenger jet was shot down by Soviet military planes for straying over the sensitive Kamchatka region.) Our delegation included Kate Myers, Robert Walker and Steven Ignell (NMFS), who investigate salmon issues on the high seas, and Don Rogers and me, who investigate salmon fisheries in Alaska.

Pink salmon is the dominant salmon species in Russia, followed by chum and sockeye salmon. Coho, chinook, and masou salmon, and steelhead trout, are much less abundant. Native salmon runs in Russia have been exceptionally strong in recent years, as they have been in North America. For example, in 1991 a record tonnage of Russian pink salmon was harvested (216,000 mt or ~209 million fish; data are not available to accurately estimate numbers of fish from weight). Runs of sockeye salmon to Lake Kuril, Russia's largest sockeye lake, have also been large (e.g., 12 million fish in 1990.) During these large runs, fishermen were unable to control the escapement of these fish to the spawning grounds.

We visited Russia during 10-19 August 1992. Our itinerary took us from Anchorage to Khabarovsk (on the Russia/China border), then to Petropovlovsk-Kamchatsky, the regional base of Russia's fishery agency—Pacific Research Institute of Fisheries and Oceanography (TINRO). At the airport in Khabarovsk, a city of 500,000 residents, we easily passed through customs and were greeted by Dr. Sergie Sinyakov, a limnologist studying the fertilization of sockeye lakes and effects of pollution on lakes. His generosity, which was common among most Russians, was demonstrated by his gift of flowers to Kate.

After a day of touring Khabarovsk, we prepared for the 0100 h Aeroflot flight to Petropovlovsk. We waited 3 hours at the terminal before walking across the staging area and boarding the plane. We were the last to climb the stairs leading to the 200-passenger jet, which was warming its ear-shattering engines. Although we were assigned seats, they were taken by other passengers, so we separated to find seats. Tired, weathered faces of unfamiliar Russians stared straight ahead. Just before takeoff, I found the last available seat.

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Salmon Fisheries cont.

As I sat in my seat, a mother and her two young daughters greeted me with smiles. No safety instructions were given before the plane lifted off the rugged runway.

We arrived at Petropovlovsk (pop. ~250,000) at 0530 hrs (0330 hrs in Khabarovsk or 0130 hrs in Seattle during the previous day). Two men greeted us as we walked away from the jet, then drove us to our hotel located near TINRO and the center of the city. The beds at the hotel offered a pleasant relief to the previous long night, although we soon discovered the hotel was without hot water. Apparently the entire city had been without hot water for some time because the centralized hot water system failed.

During the next two days we visited an experimental salmon hatchery and a chum salmon hatchery, both under construction. The facilities were being built with Japanese equipment and money. The production hatchery for chum salmon was the first of five to be built in Kamchatka. Each hatchery will release 20 million juvenile chum salmon into relatively pristine salmon rivers. Apparently, the Japanese Driftnetters Association, which has been pushed from the high seas, negotiated a deal with Russia that exchanged hatchery construction for fishing rights.

Aware of the numerous problems of locating hatcheries near native salmon runs in North America, we were surprised by the construction of hatcheries on productive, pristine rivers in Russia. The need to construct hatcheries was not apparent; production by native salmon runs in Russia during recent years has been exceptional. Most habitat throughout the region appeared to be untouched by civilization, i.e., no people; hydroelectric dams; logging; or mining, although small lakes near Petropovlovsk were obviously polluted by nutrient runoff from adjacent agriculture fields. Furthermore, the capacity of Russian fishermen and processing plants was already overwhelmed by recent large salmon runs. When I asked salmon scientists about problems associated with management of mixed native and hatchery salmon stocks, they replied that little thought had been given to this problem. The decision to allow construction of these hatcheries was apparently made in Moscow.

We spent considerable time at the TINRO laboratory, which supported ~180 scientists. Because the lab was next to a building formerly occupied by the KGB, some scientists joked about "proper behavior" when exposed to the view of KGB personnel. A 100-ft statue of Lenin stood stoically across the street and greeted ships that entered port. Some Russians discussed the need to tear down this and other statues and change names of public places that referred to Karl Marx or Vladimir Lenin.

Most scientists seemed to welcome their new freedom, but it was obvious that they wished the economic hardships would end soon. Inflation in Russia has been tremendous. For example, the number of rubles needed to equal \$1 was 1 ruble in 1990, 162 rubles in August 1992, and about 340 in October 1992. Along with the transition to a free market economy, growing poverty and crime, inconsistent and rapidly changing wages, and food and energy shortages challenged Russian citizens. Young kids mobbed us at the airport hoping to receive a dollar after carrying our bags, and young men attempted to sell us souvenirs as we walked along streets. During our flight between Khabarovsk and Petropovlovsk, a few small items (mostly gum and

candy we planned to give to kids) were taken from our suitcases.

TINRO scientists described the daily operation of salmon fisheries. Fishery openings are made by another agency (SovRybFlot), which is equivalent to our state Department of Fisheries. TINRO provides run forecast data and recommendations for management. Because annual funding of TINRO operations is directly related to fishery harvests, several scientists expressed concern over the unexpectedly weak pink salmon run in 1992. The harvest forecast of pink salmon for eastern Kamchatka was 30 million fish, but only 2 million were captured. The forecast was based on parent spawning density, emerging fry abundance, and fall surveys for juveniles in coastal waters. Dr. Vladimir Karpenko thought the unexpectedly low return might be due to environmental changes in the high seas because coastal surveys during fall 1991 indicated good abundance and growth. No information exists on the status of Russian and North American salmon in offshore waters during the critical period from October to May. Dr. Karpenko expressed to Kate, Robert, and Steven his desire for increased joint-venture research on the high seas with the United States.

Most salmon are taken by fish traps placed along the coast near salmon rivers. On Sakhalin Island, 10-12 men may operate 3-4 traps. Near Ozernaya River, which drains Lake Kuril, several gillnet boats catch salmon in addition to fish captured by traps. Salmon entering the rivers to spawn are enumerated by daily helicopter surveys or by visual counts at a weir or fence. Fishery managers attempt to achieve a fixed spawning density or escapement of salmon. Fisheries are regulated, in part, by limiting the number of government-issued permits for each area. The method in which individuals receive permits is changing. Presently, non-native fishermen, which represent the majority, cannot sell or transfer their permits, whereas native fishermen can now transfer the permit to family members. Fishermen appear to be relatively wealthy and privileged individuals.

The highlight of our visit came during the trip to Lake Kuril. A number of Russian scientists joined us on the 1.5 h trip by helicopter. (Most commuter air travel is by helicopter, which was invented in Russia). Unfortunately, the day was overcast and views of spectacular volcanoes along the Kamchatka Peninsula were limited. About 1 hr into the flight, we encountered strong winds and turbulence, so the pilots turned back to Petropovlovsk without reaching Lake Kuril.

Before reaching Petropovlovsk, the helicopter began descending near several houses, which were occupied by several TINRO biologists and their families. We landed ~100 m from Lake Dalnee, a small sockeye lake (~5 km²) that we thought was still closed to foreigners (and Russians without permits) because the lake is located on a military base with nuclear submarines. Although some research is still conducted here, the main function of the station appeared to be maintenance of the cabins used by F.V. Krogus and E.M. Krokhin, Russia's pioneering salmon scientists. In the 1940s, these scientists published important research on factors influencing salmon production. Inside the cabin, personal notebooks and Russian publications remained on desks and bookshelves as if the scientists were still living there today.

Two days after our failed attempt to reach Lake Kuril, the weather improved and we reached the lake. Lake Kuril

(90 km²) is a deep (300 m) caldera lake with an active volcano on the northern shore. Although ash and runoff from this volcano provide nutrients to the mesotrophic lake, TINRO has been experimenting with periodic additions of phosphate since 1981 in order to increase growth of juvenile sockeye salmon. This research was particularly interesting because oligotrophic rather than mesotrophic sockeye lakes are typically fertilized in North America and because most sockeye in Lake Kuril spend two rather than one year in fresh water. Dr. Sinyakov, project limnologist, said fertilization did not increase production of adult sockeye salmon. Most of the increased phytoplankton production was consumed by protozoa and rotifers not eaten by sockeye. Fertilization led to increased growth of juvenile sockeye but caused proportionately more sockeye to emigrate after one winter (age 1.x) rather than two winters (age 2.x) in the lake. During lake enrichment, age 1. sockeye experienced reduced marine survival relative to those that migrated without the influence of fertilization, presumably because the fish were small. In other words, fertilization caused a shift in the freshwater age-composition of sockeye which led to reduced marine survival of the earlier migrating juvenile sockeye salmon.

We left Russia two days after our visit to Lake Kuril. During our brief visit to the Russian far-east we met many scientists who were eager to talk with us and develop cooperative research projects. We believe that our visit marked the beginning of a productive and communicative relationship between Russian and Western salmon scientists.

Walleye Hooking Mortality

The use of size limits in walleye management is increasing in most jurisdictions. The success of this type of regulation is dependent on the survival of most of the catch-and-release protected size-classes.

Recent studies on tournament mortality rates have raised concerns about survival of regular sportfishing caught-and-released walleye.

To investigate mortality, volunteer anglers were invited to fish on three separate weekends during the summer at Sturgeon Lake in Alberta. Tests were scheduled June 20, July 18, and August 15. It was felt that water temperature was likely the greatest factor that would influence mortality. Anglers were instructed to keep all sizes of walleye, and use their preferred fishing lures and techniques. Each boat was given a cooler and bucket if they didn't have a livewell, and a flag to signal the pick-up boats. Walleye were transported in oxygen-aerated tanks in pick-up boats. Fishermen were confined to a designated area to reduce transport time. Anglers completed a form on each walleye captured. Data on capture time, seconds played, terminal gear, location of hook, bleeding, depth of capture, and comments, ie, "I dropped the fish", were recorded. Pick-up boats affixed numbered alligator-clip floy tags to the posterior end of the soft dorsal to link angler data to the fish. Walleye were caged within 20 minutes of capture at a density of 10 per cage. Ten cages were used in each test fishery. Cages were made of 2-inch black nylon mesh, plastic conduit collapsible framing, and measured 2 m x 1 m x 1 m. Cages were sunk on hard substrate in 4-m depth, and checked on days 3 and 5.

Results were surprising. Mortality rates for June, July, and August were 1%, 0% and 0%, respectively. The only walleye that died was deeply hooked in the roof of its mouth, and had problems when unhooked.

The volunteer component of this program was the critical aspect of the project. Word of mouth (friends asking friends), three Fish and Game Associations, and regular articles and requests for help in the local paper and radio all contributed to organizing the 189 volunteer anglers (about 22 boats per weekend). Letters describing the program, example fish forms, and meeting places were given to each volunteer in advance of fishing. A half-hour orientation was held before each fishery. Letters to participants as well as media reports were used to communicate the results. Hats were given to each boat captain and pins to all fishermen. Two local sports stores provided tackle for prizes to reward involvement.

Despite the considerable effort in the program, the co-management approach was most rewarding. Public participation from four communities helped spread the word of this work and the results.

From Newsletter of the Mid-Canada Chapter of the AFS, Oct. 1992

Save the Bull Trout

In a rare action and after exhausting all alternatives the Oregon Chapter of the American Fisheries Society petitioned the U.S. Fish and Wildlife Service to conduct a status review of the bull trout (*Salvelinus confluentus*) of the Upper Klamath River Basin to assess whether it should be listed as a threatened or endangered species. Also, if listed, the petition requested the concurrent designation of critical habitat as essential for the recovery of the species.

Within the petition the Oregon Chapter stated that "threats to the Klamath bull trout include habitat degradation from livestock grazing, timber harvest, and water withdrawals. Drought conditions in the basin have further aggravated these conditions. In addition, existing land and water management regulatory mechanisms have failed to protect populations or to prevent adverse modifications of their habitat." The petition stated that 7 of the 11 known populations of bull trout in the Klamath River Basin have either gone extinct or are at a high risk of extinction. Available data suggest that fewer than 5,000 total fish remain in these 7 populations and that all but one of the existing populations number less than 1,000 fish.

Request for Information

AIFRB has received a request for information on the Australian red claw lobster (*Cherax quadricarinatus*), the Caribbean spider crab (*Mithrax spinosissimus*), or the stone crab (*Menippe mercenaria*).

It would be appreciated if members having information on culture techniques for these species would correspond with Tony Buono, 08804-018, Mon-E, F.P.C., Maxwell A.F.B., Alabama-36112.

Meetings and New Publications

Conference—Aquatic and Wetland Sciences

The *International Conference of Aquatic and Wetland Sciences* will take place at the University of Alberta, Edmonton, Alberta, Canada on May 30-June 3, 1993.

For detailed information, telephone the Conference Secretariat, Environmental Research and Studies Centre, University of Alberta, Biological Sciences Building CW-40L, Edmonton, Alberta at 403-492-6659.

1993 Western Conference

The Western Association of Fish and Wildlife Agencies and the Western Division of the American Fisheries Society will sponsor the *1993 Western Conference*, to be held on July 23-30, 1993 at the Red Lion Inn in Sacramento, California. Meetings of directors, commissioners, fisheries chiefs, committees, and workshop participants will occupy the first four days, and the general sessions and technical sessions will begin on July 26.

The Changing Face of Conservation will be the topic of the general session, and the technical sessions will address a variety of timely subjects, most of which will deal with aquatic matters. Trade shows, receptions, a barbecue, a beer tasting party, and luncheons will offer changes from the formal activities.

For information on registration and other details, write or call Ms. Jennifer Nielsen, Dept. of Molecular & Cell Biology, 410 Barker Hall, University of California, Berkeley, CA 94720, (510) 642-7525.

California Marine Resources

Sea Grant has published *California's Living Marine Resources and Their Utilization*, edited by William S. Leet, Christopher M. Dewees (AIFRB Member 1981), and Charles W. Haugen. This 257-page book contains information on all of the important species of fishes and invertebrates caught by commercial and sport fishermen in marine waters of California. It also has chapters on marine plant resources, aquaculture, underutilized species of fish and invertebrates, marine recreational fishing, marine mammals, marine birds, and economic utilization of ocean resources.

Copies are available from the Sea Grant Extension Program, Department of Wildlife and Fisheries Biology, University of California, Davis, California 95616-8751. The price is \$15, softcover, and checks should be made out to "UC Regents."

Marking Fish and Shellfish

Methods of Marking Fish and Shellfish is a 1992 book of 274 pages, authored by Larry A. Nielsen (AIFRB Fellow 1989) and published by the American Fisheries Society. This volume is a practical synthesis of current ways to tag and mark fish, crustaceans, and mollusks for later identification. It has been crafted to be equally useful as a textbook or a working manual.

Topics covered include external and internal tags; biotelemetry; styles and uses of marking; designing a marking program; natural, external, and chemical marks; and genetic identification and marking.

Order from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199. The price is \$31 for Society members and \$39 for others. Add \$3 per book for postage outside the U.S.

Fish Kill Investigation

The Pollution Committee of the Southern Division of the American Fisheries Society has prepared *Investigations and Valuation of Fish Kills*, a 92-page paperbound book published in 1992 as Special Publication 24 of the American Fisheries Society.

This book presents the latest methods for determining the economic consequences of fish kills. It revises, updates, and extends the information in *Monetary Values of Freshwater Fish and Fish-Kill Counting Guidelines* (AFS Special Publication 13). The new volume guides fishery managers and assessment biologists from the moment a kill occurs until the final fishery value is calculated, and it stresses legally defensible data acquisition and analysis.

The volume costs \$28 (\$22 for AFS members) and can be ordered from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814.

Dissertation and Thesis Abstracts

Spatial and Temporal Patterns of Growth and Mortality of Juvenile Weakfish (*Cynoscion regalis*) in Delaware Bay: Assessment Using Microincrement Analysis

Richard Paperno, Ph.D. 1991

University of Delaware

Field and laboratory analyses were conducted on 0-age weakfish, *Cynoscion regalis* (Bloch and Schneider), to determine if deposition rate of otolith increments was daily; to examine the relationship among otolith increment growth, feeding rate, growth rate, and condition factor; and to examine the spatial and temporal patterns of distribution, recent growth, overall growth, and mortality within Delaware Bay, USA.

Tetracycline-marked juveniles ($N=58$) had a mean deposition rate of 0.98 otolith increments day^{-1} . Feeding rate had a significant effect on otolith increment width and was positively correlated with somatic growth rate and final condition factor. Continuation of otolith growth during periods of negative fish growth reflects the conservative nature of otolith growth and lack of otolith resorption. Size stratification of juvenile weakfish in Delaware Bay appears to be more the result of slow growth than a 'conveyor belt' movement of fish down the estuary with growth. Spatial and temporal patterns in recent growth rate and condition factor were similar, following the general pattern of being highest in the middle bay, lowest in the upper bay, and intermediate in the lower bay, and likely are closely related measures of the quality of the fishes' local environment.

Overall growth rates ranged from 0.68 to 0.97 mm day^{-1} and analysis of back-calculated length-at-age data from 1986 suggests that conditions that influence growth were both temporally and spatially stable. During the early part of 1986 and 1987, mortality rates were greatest in the lower bay (7.1 and 6.5% day^{-1} , respectively). Comparison of growth rates and mortality rates between spawning groups suggests that processes controlling growth and survival of juvenile weakfish on spatial, seasonal, and annual scales are highly variable.

Factors Affecting Dungeness Crab (*Cancer magister*) Year-Class Strength Along the Washington Coast

Robert Alan McConnaughey, Ph.D. 1991

University of Washington

A conceptual model is proposed that relates Dungeness crab (*Cancer magister*) year-class strength to variable advection during the pelagic larval phase, restrictive juvenile habitat requirements, and density-dependent effects during the first (0+) year of benthic life. Systematic trawl ($n=2,218$) surveys were conducted along the southern Washington coast during 1983-1988 to provide estimates of juvenile crab abundance. The study area, composed of nearshore and estuarine (Grays Harbor and Willapa Bay) components, was sampled monthly from May to September. Abundance of 0+ varied nearly 40-fold and settlement was confined to a relatively narrow (≤ 15 km) band along the coast and in estuaries. Strong (weak) settlement was associated with relatively weak (strong) northward transport and, to a lesser degree, strong (weak) landward transport during the preceding 4- to 5-month pelagic larval phase. A similar analysis, using time-lagged and discretized landings data from Washington (1951-1990), corroborated these hypotheses. Persistent landward and net northward flow characterized the circulation of near-surface waters during the larval periods studied (1947-1986). This suggests that larvae are retained nearshore after hatching and that Washington *C. magister* populations receive a significant fraction of recruits from southern (upstream) sources. In addition, substantial numbers of Washington larvae may be advected northwards and lost from the California-Oregon-Washington coastal system.

A mechanism for progressive seaward transport of larvae through ontogeny (the species paradigm) was not apparent. Successful settlement, however, is only the first of several factors which may ultimately influence *C. magister* year-class strength. A statistical comparison of abundance at adjacent stages in five (1983-1987) juvenile cohorts demonstrated that year-class strength did not stabilize until age 1+. As such, there may be a series of critical stages in the *C. magister* life history, each of which can influence future fishery production.

**Spatial and Temporal Variation in the Growth and Mortality
of Larval Yellowfin Tuna, *Thunnus albacares*, about the
Mississippi River Plume**

Kathy L. Lang, M.S. 1991

Louisiana State University

A total of 768 larval yellowfin tuna was collected from shelf and frontal waters about the Mississippi River discharge plume during July and September, 1987. Daily growth increments were counted on the sagittal otoliths and measured via an image analysis system. Larvae ranged in age from 3 to 14 days over a size range of 2.57 to 7.48 mm SL and were spawned in July and August. Mean individual growth rate (length/age) and observed growth rate (slope of SL on age regression) were both estimated to be 0.47 mm/day. There was significant temporal variation in growth rates, with larvae collected in July growing slower than those from September (0.37 vs 0.48 mm/day, respectively).

There was no significant spatial variation (plume vs frontal stations) in growth within the September samples. Instantaneous daily mortality rates also showed significant temporal variation. Larvae collected in July had lower mortality rates ($Z = 0.16$) than those collected in September ($Z = 0.41$). Optimum temperature for larval growth appears to be approximately 29°C in the Gulf of Mexico. A multiple regression model suggested that larval growth is most affected by temperature and food availability.

**The Relationship of Habitat and Spatial Scale
Upon the Developmental State and Settlement of
Blue Crab Postlarvae in Chesapeake Bay**

Karen S. Metcalf, M.A. 1991

College of William and Mary in Virginia

Developmental state of blue crab postlarvae was identified in planktonic and benthic megalopae from within and outside Chesapeake Bay on various spatial scales. Planktonic megalopae advanced significantly in developmental state from the continental shelf, off the Chesapeake Bay mouth, through upriver stations in the York River, a tributary of Chesapeake Bay. This developmental evidence supports the export-reinvasion theory of blue crab recruitment, and is inconsistent with a retention hypothesis for blue crab larval recruitment. In the tributary, benthic megalopae were significantly more advanced in developmental state than planktonic megalopae. Temporal variation in developmental state was also observed over days and months. In addition, time to metamorphosis was significantly and positively correlated with developmental state. These results suggest that advancement in developmental state of megalopae during reinvasion of the estuary may act as a predictor of likelihood of settlement on a baywide scale.

**Role of Habitat Features and Chemical Cues
in Substrate Selection by Blue Crab Megalopae:
Evidence from Laboratory Experiments**

Bruce C. Layman, M.A. 1992

College of William and Mary in Virginia

Submerged aquatic vegetation (SAV) in lower Chesapeake Bay serves as a primary nursery habitat for juvenile blue crabs, *Callinectes sapidus* Rathbun, yet mechanisms regulating habitat selection by postlarvae remain unclear. Two experiments investigated the role of eelgrass (*Zostera marina*) characteristics in substrate selection by megalopae. Mesocosm experiments addressed the relative importance of physical and biological attributes of *Z. marina* in substrate selection. Macrophyte structure (both living and inert) appeared to influence substrate selection by megalopae; the addition of a periphytic community to *Z. marina* did not influence this response, refuting it as a proximal cue directing the behavior of megalopae.

Microcosm experiments investigated the response of megalopae to species-specific chemical stimuli associated with *Z. marina* and several grass bed macrofauna.

Positive orientation toward chemical cues associated with *Z. marina* in two of four trials suggests that exudates of *Z. marina* aid megalopae in remote habitat recognition and location. Neutral responses by megalopae to both soft-shelled clam (*Mya arenaria*) and toadfish (*Opsanus tau*) cues indicate little potential for influencing *in situ* behavior of megalopae. Conversely, conspecifics at high biomass per unit area, both extremely high juvenile densities and high adult densities, elicited a negative orientation in megalopae.

However, these responses may have been due to artifactually high concentrations of excretory products or low dissolved oxygen concentrations, rather than avoidance of conspecific cues. Thus, chemical cues can initiate substrate selection in megalopae prior to physical contact and macrophyte structure appears to be of potential importance in substrate selection in close proximity to nursery habitats.

In Memoriam

Harvey R. Bullis, Jr.

AIFRB Fellow 1974

November 15, 1992

Dr. Harvey Raymond Bullis, Jr. was born on June 14, 1924 in Milwaukee, Wisconsin and died at his home in Princeton, Florida on November 15, 1992 after a bout with cancer.

A long and distinguished fisheries career began with his work as a Fisheries Research Biologist at the Pascagoula Fisheries Laboratory of the former Bureau of Commercial Fisheries after he received a Master of Science degree in Marine Biology from the University of Miami in 1950. Harvey later became Director of the Pascagoula Laboratory. His research at Pascagoula, Mississippi resulted in discovery of important calico scallop beds, royal red shrimp grounds off the east coast of Florida, and grouper and snapper areas. He also added to our knowledge of the limitations of shark populations and the extensive potential of pelagic schooling fishes.

Bullis served as Deputy Director of the National Marine Fisheries Service in Washington, D.C. where, along with his administrative and managerial duties, he served on international negotiations missions to better use marine resources. In 1971, he became Director of the Southeast Fisheries Center in Miami, Florida, was named a Senior Scientist, and retired from the federal service in 1979.

During his travels for fishery exploration, Harvey increased his knowledge of tropical botany and became a knowledgeable force in the study of bromeliads. After retirement, he and his family built and operated Bullis Bromeliads, the only nursery ever to produce large, high-quality bromeliads. Hurricane Andrew almost destroyed the nursery in 1992, but Harvey and his family began to rebuild it.

Fishery science, bromeliad enthusiasts, and family and friends miss Harvey Bullis.

Edwin B. Joseph

AIFRB Fellow 1981

Edwin Bibb Joseph, a retired director of the South Carolina Wildlife and Marine Resources Division, died in 1992.

Dr. Joseph was born in Jacksonville, Florida, a son of Charles W. Joseph and Elizabeth Jones Joseph. In 1951, he received a bachelor's degree from the University of Florida, a master's degree in 1953 and a doctorate in 1956 from Florida State University.

He was director of the Marine Resources Institute, 1971-1974; director of the Marine Resources Division, 1974-1984; and director of the Office of Regional, National and Science Affairs, 1984-1992. He was also director of the S.C. Sea Grant Program, 1971-1979; and served as the state's representative to the South Atlantic Fishery Management Council, 1973-1992, and its chairman 1975-1977, 1977-1978, and 1987-1988.

Dr. Joseph was a member of Beta Theta Pi Fraternity, Sigma Xi, and Springfield Presbyterian Church of Jacksonville, Florida.

Membership Report

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Direct membership inquiries to the Membership Chairman.

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

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Lehman College, Biology
Bedford Park Boulevard West
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American Institute of Fishery
Research Biologists

President's Comments No. 1

It is with a great deal of pride and respect that I become the next President of AIFRB for the period 1993 and 1994. To follow the many fine individuals who have occupied this chair is a great honor. It is especially so because of what AIFRB stands for and who began it all. As a young graduate student in 1961 (very young), I worked for W.F. Thompson in the library of the Fisheries Research Institute at the University of Washington. My little work area was next to his office and social area where he took his tea breaks religiously twice a day. I was coding Pacific salmon articles at the time for 20 hours a week, assisting on a small project for the Bureau of Commercial Fisheries. This provided the opportunity for me to talk with him on a variety of issues and I found him to be a very fascinating individual. He looked at things in a different light, or so it seemed to this young graduate student. When I thought that I knew the answer to a particular issue and would mention it to him, I was amazed that there were different sides of the issue that I had not considered. He had completely different slants on conventional subjects that I soon realized made him very special. I would often walk away from a discussion with him realizing that I had never really thought the problem through from all angles. He affected other people the same way when he presented a rare seminar at the College of Fisheries. He taught us that no matter how well we thought we knew a subject, there was always a different and legitimate point of view worth considering.

These encounters taught me how useful it is for young scientists to have someone to talk with during a developing career. This was the first lesson that I learned from W.F. Thompson.

When W.F. Thompson was a young graduate student, he worked for David Starr Jordan (the father of ichthyology) at Stanford. Thompson was, at the time, becoming well versed in the use of statistics to separate subspecies and races of fishes based on meristic counts and morphometrics. Thompson told me that he was quite proud of the early skills he was achieving in the art of basic statistics (this was 80 years ago, remember). He knew discrete distributions from continuous ones and knew when to use chi-square and when to plot out the distribution and test for significant differences. I don't know how he tested for differences in continuous distributions, but chi-square had already been proposed by Karl Pearson in 1900. When Jordan returned from one of his field trips, he would place all of his specimens on a large table and separate them into groups with much arm waving but with careful inspection. One group would be a

genus and another a species. Other fish would become a group or race based on some predetermined mental significant difference. When he would finish sorting the table of fish into its categories, he would turn to W.F. Thompson and instruct him to do the necessary measuring, counting, and application of statistics to prove whether the groups were significantly different or not. Were the separations that David Starr Jordan had imposed supportable based on statistics? Nights, weekends, and weeks would pass with W.F. Thompson doing prodigious amounts of measuring and counting and applying his new-found statistics. With obvious respect and amazement, he would say with a funny puzzling smile how impressed he was with David Starr Jordan. No matter how carefully he applied his statistics to the problem, David Starr Jordan was almost always right. It was frustrating to W.F. Thompson to meet a man of David Starr Jordan's ability who could solve a problem without all the necessary statistics and hard work. Thompson knew he could not do it and didn't try. In a matter of minutes, David Starr Jordan classified the table top of fish through his trained eye and all the statistics Thompson could bring to bear on the problem did not change the outcome. Thompson made the point to me that all the careful structured training in scientific disciplines, proper scientific method, and their application to a problem can occasionally be matched by the experienced and highly trained eye of a man like David Starr Jordan. Jordan knew the value of statistics, however, and never separated fish groups again without confirmation through statistics. This also made the point that the best trained eye in the world is of little value unless it is applied to a problem and then tested for its usefulness.

This attitude of applying information to a problem and determining its value was one of the driving forces in developing AIFRB, I feel. W.F. Thompson felt that while basic research led to a broad understanding of what was going on, the application of that science separated the professional from the journeyman biologist. He felt that the true professional communicated the results of his/her science in such a way that managers (people) could determine the value of the science and then could use the science to manage fish (or make other decisions.)

Another characteristic of W.F. Thompson that was very obvious was his fear of someone stealing his ideas or data and publishing them. This, in fact, happened to him at some time in his career and (I felt) jaded him for life. His desk and office were always locked and the doors to the library carefully checked and locked after he personally made sure

Presidents Comments cont.

that the building was empty every day. He was always the last person out of the building and his most important ideas and data were in a briefcase that went home with him every night. He often talked of ethics; how we should do things properly with our own data and ideas and to give credit where it belongs. I think his strongest attribute was his drive to be honest with science and with your fellow scientist. I, again, was much impressed. I suspect the founding of AIFRB which was strongly based on proper ethics was, at least partially, a result of these unpleasant memories in W.F. Thompson's past. Only as I grew older and witnessed the unethical behavior of individuals in our profession have I become appreciative of what W.F. Thompson was trying to tell me way back then. There are people in our profession today who are dishonest to themselves and to their profession in their attempt to play the "grant game" or increase their own status among their peers. We should all be aware of and practice the "Principles of Professional Conduct for Fishery Biologists" which is the first policy statement of AIFRB. AIFRB was certainly founded on a strong set of professional ethics which could be treated as commandments for everyday duties. Like any good set of commandments, we need to pull them out and look at them from time to time.

(By the way, the policy statements of AIFRB are currently being rewritten to remove the strong gender bias to males. Malin Babcock and Bruce Wing have already begun the process.)

The Articles of Incorporation clearly state the Purposes (Article IV) of AIFRB and the first of the four relate to the advancement of the science of fisheries research and the promotion of conservation and utilization of our fishery resources. The second, however, is to maintain high professional standards in fishery research biology by recognition of achievement and by adherence to a code that we know as "Principles of Professional Conduct for Fishery Biologists". The third is to do everything necessary, suitable and proper for the accomplishment for any of the purposes listed in 1 and 2. The last "Purpose" reminds us 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. Knowing W.F. Thompson early on and carefully reading the Articles of Incorporation, the bylaws, and the policy statements, it seems clear to me that the beginnings of AIFRB arose more to set up principles of professional conduct for fishery biologists and improving how we conduct ourselves, rather than anything else. In fact, the "Principles of Professional Conduct for Fishery Biologists" are laid out in great detail covering Professional Life, Relations with the Public, Relations Between Employers and Employees, and Relations with Fellow Scientists. There are 22 principles that the founding members felt should be followed. I feel that we need to condense the principles to a manageable number so that they can perhaps be put on a single page (or two) that can be placed on a wall behind our desks for all to see. The second step is to make them available to young graduate students or young scientists and perhaps we can make a difference in how our people behave.

As your new President, I would like to suggest that we use BRIEFS as a forum for a dialogue on a variety of issues. Some that come immediately to mind that could use airing

are: more on ethics, the role of advocacy and involvement of AIFRB, communication, gray literature, the management process and social science for management. We need to finalize a logo for AIFRB this year that we can use to let people know who we are and what we stand for.

The question of advocacy is a hot item these days which the American Fisheries Society appears to be firmly embracing. Other people are pushing for us to join AFS. While most people I have talked with are against joining AFS, there are some surprisingly strong opinions for becoming a subset of the American Fisheries Society. Some of us feel, however, that there is a continuing need for an independent, fully-professional organization with certain characteristics. Don't forget that the AIFRB was founded when AFS was in existence, but it was felt at the time that it did not provide what AIFRB stands for.

Comments to me on these subjects would be very helpful. I've asked that the addresses of the officers of AIFRB be placed in BRIEFS so that you can communicate easily with us. I would encourage you to do so on any ideas on how to improve the Institute. In fact, it already appears that we may want to have an extra session at our Board of Control meeting in Portland this fall to discuss a variety of ideas on ethics, conduct, young scientists, and how we do business in AIFRB. I am looking forward to an exciting two years as President. I have a few ideas that bear discussion—I hope you do too.

1992 Outstanding Group Achievement Award

The American Institute of Fishery Research Biologists awarded its OUTSTANDING GROUP ACHIEVEMENT AWARD for 1992 to the Cooperative Fish and Wildlife Research Units Center, U.S. Fish and Wildlife Service, Department of the Interior and to the collective Cooperative Research Units at universities throughout the country. This Award was presented to the Cooperative Fish and Wildlife Research Units for their outstanding contributions to the education of fisheries scientists and managers and for their outstanding contributions to the field of fisheries science.



The Institute praised the role played by the Cooperative Research Units Program in the lives of fish and wildlife students since the Wildlife Units inception in 1932 and the Fisheries Units inception in 1960. Many of the Units have subsequently been combined into Cooperative Fish and Wildlife Research Units. Currently there are 31 Cooperative Fish and Wildlife Research Units, 6 Cooperative Fishery Research Units, and 4 Wildlife Research Units.

Each Unit is located on a university or college campus with a strong fish and/or wildlife graduate program. The U.S. Fish and Wildlife Service provides funding for two or three Service employees whose function it is to direct research being conducted by graduate students; in effect, these employees become faculty. The housing university provides space and clerical assistance as well as the cooperating services of additional faculty members. The state fish and wildlife agencies become the third party to the organization of the Units and provide additional financial support, which assists graduate students in providing research needed to answer state and regional fish and wildlife resource problems. Fisheries students have provided background studies for resolving power plant controversies, have been closely involved in ongoing studies on rare and endangered species, have assessed the interactions between commercial and recreation competitors for scarce fisheries resources, and on goes the list.

The relationship among federal, state, and university members, as in any other human institution, has not always been a smooth one, but one only need examine the products of these graduate programs to realize they are the fish and wildlife leaders now populating not only the state and federal agencies but also many of the non-governmental agencies. Whatever roles they currently play in managing, directing, and researching natural resource issues, they owe their educational background to that provided by their universities and to the Cooperative Units from which they worked.

The American Institute of Fishery Research Biologists (AIFRB) voted unanimously at its September 1992 Annual Meeting to present its **OUTSTANDING GROUP ACHIEVEMENT AWARD** to the Cooperative Fish and Wildlife Research Units program in recognition for its outstanding service to the fish and wildlife resources of North America.

W.F. Thompson Awards for Best Student Papers of 1991 and 1992

An announcement concerning the W.F. Thompson Award for the best student paper of 1991 appeared in BRIEFS for April 1993. The deadline for nominations for this award is August 1, 1993. Each nomination should be accompanied by six copies of the paper and a résumé, including details of the student author's employment history in fisheries or fisheries-related science and his status as a student. These should be sent to the Chairman, Dr. William H. Bayliff, Inter-American Tropical Tuna Commission, 8604 La Jolla Shores Drive, La Jolla, California 92037-1508.

Nominations are now being accepted for the 1992 W.F. Thompson Award. The deadline for nominations for the 1992 Award is December 1, 1993. Six copies of the paper and a résumé, as specified above, should be sent to the Chairman for the 1992 Award, Dr. John B. Pearce, 54 Upland Avenue, Falmouth, Massachusetts 02540-2324.

Fox Receives Award



Dr. William W. Fox, Jr. (left) receives the AIFRB 1992 Outstanding Achievement Award for Individuals from Dr. Vaughn Anthony, AIFRB President.

Scalloped Hammerhead Shark Food Habits

An understanding of the food and feeding habits of sharks is crucial to determining the impact that these large predators have on available fisheries resources. In evaluating the bioenergetic requirements and the predator-prey relationships of sharks, we attempt to determine the annual food requirements of the various shark species and the prey items that are most important in their diets.

Our past studies have shown that a 139-pound mako shark will consume about 4 pounds of food per day, or just over 10 times its body weight per year. In contrast, a 75-pound sandbar shark will average about two-thirds of a pound of food per day, which is three times its weight per year. The main reason for the difference between these two species is that the mako has a fast-swimming, high-energy life-style compared with the slower swimming, less active sandbar shark.

Our study of the food, feeding habits, and energetics of the scalloped hammerhead is incomplete, but we present here a preliminary analysis of our progress to date.

The scalloped hammerhead, *Sphyrna lewini*, is one of the more numerous species of large sharks found in the world's oceans. It is primarily a circumglobal resident of coastal, temperate, and tropical waters, and is found from the surface to depths of at least 150 fathoms. In the Western

cont. on page 4

Shark Food Habits cont.

Atlantic, it is observed seasonally in the continental waters from about the area of New Jersey south to the coast of Brazil. In the northern part of its range (north of Cape Hatteras), this hammerhead is most available to U.S. fishermen from early spring through late August. In spite of the relative high abundance of the scalloped hammerhead, very little is known about its food and feeding habits. Available published information consists simply of listings of the various food items found in the stomachs. The present food habits research conducted by the National Marine Fisheries Service is a more comprehensive study relating to the food, feeding habits, predator-prey relationships, and differences in diet relative to area and sex.

In the northern area, samples were collected at shark fishing tournaments held annually in New York, New Jersey, Massachusetts, and Rhode Island, and during cruises aboard research and commercial fishing vessels operating in the offshore waters between Cape Hatteras, NC and the Tail of the Grand Banks (Canada). Most sharks were captured by hook and line gear (rod and reel, longlines, handlines), and a few were taken by harpoon and drift gill net. To analyze the data for differences in diet related to depth zones, stomach samples were divided into those from sharks caught inshore of the 100-fathom contour and those from sharks caught offshore beyond 100 fathoms.

Three hundred and one scalloped hammerheads were examined. They ranged in size from 2.4 to 7.3 feet in fork length, and averaged 5.2 feet in fork length and 102 pounds in body weight. Food remains were found in 178 (59%) of the stomachs examined. The major food categories occurred in both the inshore and offshore stomach samples.

Teleosts were the major prey species in the diet, occurring in 48% of the stomachs, and consisted primarily of flatfish (fluke and flounder), mackerels (including small tuna-like species), bluefish, hakes, cod, goosefish, and butterfish. The list of fish prey found in the stomachs included midwater and bottom-dwelling species, an indication that the scalloped hammerhead feeds selectively from the surface to the bottom.

Cephalopods constituted the second most important prey group, occurring in more than 30% of the stomachs. The long-finned, or summer, squid (*Loligo peali*) occurred in the inshore samples while the short-finned squid (*Illex illecebrosus*) was the most important food offshore. Squid beaks were often the only indication that cephalopods had been consumed because the beaks are resistant to digestion. Remains of elasmobranchs occurred in 7% of the stomachs, and were more important inshore.

In stomachs containing prey, the average stomach content volume amounted to just over a half pound of food and was equal to 0.6% of the average body weight. The daily ration for sharks in general averages about 1% of their body weight (ranging from 0.6 to 3% depending on the species). These data for the hammerhead fall in the lower part of this range. In additional studies on the hammerhead, we will attempt to determine more precisely the daily and annual food requirements and to compare these results with data for other seasons and from other geographical areas.

From The Shark Tagger 1992 Summary

Our People

David Beauchamp (AIFRB Associate 1985) has joined the Utah State University Department of Fisheries and Wildlife as a fisheries ecologist.

Chuck Coutant (AIFRB Fellow 1978) is a candidate for the office of Second Vice-president of the American Fisheries Society. If elected, Chuck would be inducted at the Annual Meeting in Portland, Oregon in August.

Bill Fox (AIFRB Fellow 1984), Director of the National Marine Fisheries Service during the Bush administration, is now in charge of the NMFS Office of Protected Resources.

Churchill Grimes (AIFRB Member 1990) is now President of the Marine Fisheries Section of the American Fisheries Society.

Stan Moberly (AIFRB Fellow 1984) has been nominated for the 1993 Alexander Calder Conservation Award.

Alex Wertheimer (AIFRB Associate 1982) is the immediate Past-president of the Alaska Chapter of the American Fisheries Society.

Donate to Historic Fish Hatchery

The D.C. Booth National Historic Fish Hatchery is currently accepting donations of old equipment, clothing, field notebooks, journals, diaries, ship logs, hatchery records, photographs, unpublished reports, autographed publications, and personal papers dealing with fisheries (especially fish culture). The Curator can arrange for free shipping if necessary. If you have anything you would like to donate for future scholars in historical fisheries work, please contact: Randi S. Smith, Curator, D.C. Booth National Historic Fish Hatchery, 423 Hatchery Circle, Spearfish, SD 57783, phone (605) 642-7730, FAX (605) 642-2336.

Meetings and New Publications

Siberia Bound

Siberia Bound—An Environmental Adventure to Lake Baikal has been developed for the Society for the Protection of New Hampshire Forests.

"Siberia Bound" will leave Boston on July 23 and return on August 7, 1993. Registration is open to anyone, but there is a limited number of spaces available. A single fee covers all costs, including transportation, lodging, meals, and entertainment. More detailed information can be obtained by calling trip organizers Diane Schaefer or David Harrigan at SPNHF, (603) 224-9945.

Accompanied by Forest Society staff and English-speaking Russian naturalists, participants will have the option of seeing the lake entirely by chartered ship or hiking and camping part of the time. The trip will focus on Lake Baikal and stress local conservation and forestry issues. It is intended to increase understanding and appreciation of the global environment.

Here is a unique opportunity to (1) learn more about Siberia and (2) explore the fascinating ecosystem of Lake Baikal, the world's deepest freshwater lake—home to more than 1800 species—including fresh-water seals and the elusive Omul salmon. Noted for its natural beauty, varied landscape, magnificent forests, many rivers, and wide variety of wildlife, Lake Baikal dominates central Siberia and holds 20% of the world's fresh water. Though a 1970's ecological movement to protest chemical dumping in the lake ended in victory for Siberian conservationists in 1988, Lake Baikal, today, remains ecologically fragile.

The trip will feature (1) seven nights in the Lake Baikal area; (2) nature talks on the wildlife of Lake Baikal; (3) a supervised visit to a forestry operation in the Lake Baikal area; (4) three nights in Moscow, including meetings with local representatives to discuss critical conservation and forest supply issues facing Russia today; and (5) four nights in glorious St. Petersburg, renowned for its culture and beauty.

New Journal—Reviews in Fisheries Science

This new journal, co-published by the CRC Press and the American Fisheries Society, had its first issue appear in March 1993. Robert R. Stickney (AIFRB Fellow 1983) is the editor and is supported by an international Editorial Advisory Board of 12 distinguished fishery scientists representing many facets of fishery biology. Each volume will consist of four issues.

Reviews in Fisheries Science provides an important forum for the publication of up-to-date reviews, historical articles, and original research covering the broad range of subject areas in fisheries science. These areas include management, aquaculture, taxonomy, behavior, stock identification, genetics, nutrition, and physiology. Issues concerning finfish and aquatic invertebrates prized for their economic or recreational importance, their value as indicators of environmental health, or their natural beauty are addressed.

An important resource that will keep you apprised of the latest changes in the field, each issue of **Reviews in Fisheries Science** presents unique information that will be useful to fisheries scientists in academia, state and federal natural resources agencies, and the private sector.

The rates for individual subscriptions are \$79.95 and \$39.00 for American Fisheries Society members. Order from CRC Press, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431.

Salmonids in Columbia River Tributaries

The U.S. Fish and Wildlife Service in 1992 issued its Monograph I, *Production and Habitat of Salmonids in Mid-Columbia River Tributary Streams*. The 508-page volume was written by James W. Mullan (AIFRB Member 1970); Kenneth R. Williams, Granville Rhodus; Tracy W. Hillman (AIFRB Associate 1989), and John D. McIntyre.

The construction of Grand Coulee Dam in 1939 blocked anadromous salmonids of 1,140 miles of the upper Columbia River. To preserve the runs, returning salmon and steelhead were trapped at downstream Rock Island Dam and relocated to upstream tributaries or to new fish hatcheries. Goals of this Grand Coulee Fish Maintenance Project were to maintain the production of salmon and steelhead in the mid-Columbia as it existed when Grand Coulee Dam was built. This was to be achieved by restoring natural propagation in the Wenatchee, Entiat, Methow, and Okanogan rivers below Grand Coulee Dam, supplemented with hatchery fish, if needed.

In this report the authors evaluate the Project, quantifying rearing areas and numbers of salmonid spawners in tributary drainages, observing standing crop to estimate production, and assessing the impacts of settlement on production and habitat. Some conclusions reached are: mid-Columbia River tributaries represent harsh environments for fish; the tributaries studied exhibited the lowest mean salmonid biomass in the western U.S.; smolts of naturally produced summer/fall chinook from mid-Columbia River tributaries were 8-17 times as viable as tagged hatchery smolts released from lower Columbia River hatcheries; most rainbows that do not emigrate downstream early in life from the coldest environments are thermally-fated to a resident life history regardless of whether they are the progeny of anadromous or resident parents; stock recruitment curves point to overfishing in the lower Columbia River; sizes at given ages of trout species are the lowest ever reported from streams elsewhere; and there is no evidence that historical abundance of salmon and steelhead in the Wenatchee, Entiat, and Methow rivers differed markedly from now.

Key conclusions are that total production should increase, while single-species production should decline, should coho salmon be restored; despite some abuse from recent activities of humans, there appears to be little or no net loss of the functional features of mid-Columbia River tributaries; massive enhancement with hatchery fish threatens wild stocks with extirpation or population reduction from such efforts as negative interactions, stock mining for eggs, and increased predation (including fish harvest); mid-Columbia River reservoirs offer unexplored possibilities for anadromous

salmonid management; and a new way of seeing and asserting the coherence of the existing Columbia River ecosystem is needed—tributaries as well as mainstem impoundments, anadromous salmonids as well as other fish, and wild as well as hatchery fish.

Dispersal of Organisms

Dispersal of Living Organisms into Aquatic Ecosystems, edited by Aaron Rosenfield and Roger Mann, examines a number of case studies of translocating aquatic plant and animal species in the context of issues that scientists, entrepreneurs, and habitat and resource managers must take into account. Aquatic ecosystems serve many purposes—from irrigating crops to cooling power plants to receiving discharge of human, industrial, and agricultural wastes. These varied uses have led to widespread introductions of biotic and abiotic substances into coastal waters, estuaries and lakes. In some cases, the introductions have been deliberate, in others inadvertent. While many introductions have had commercial and social benefits, there are numerous instances where they have had a detrimental impact on the environment. The continuing development of aquaculture throughout the world, with its transfer of species from one ecosystem to another, makes it critical that we are able to predict the effect of introductions on aquatic ecosystems in order to prevent devastating and irreversible alterations. Moreover, the increasing use of genetically altered micro-organisms and the prospect of transgenic species will require that scientists, entrepreneurs and resource managers develop a more sophisticated understanding than in the past in order to estimate the potential environmental effects of such introductions.

The need for more effective policy, protocols, standards, and guidelines for product testing is perhaps stronger than ever before. *Dispersal of Living Organisms into Aquatic Ecosystems* takes on a number of these issues, examining broad policy questions while considering case studies of exotic species, the impact of pathogens, and the dispersal of genetically manipulated organisms. This 496-page hardcover book is available for \$35.00 from Maryland Sea Grant College, Skinner Hall, University of Maryland System, College Park, Maryland 20742; (301) 405-6371. When ordering be sure to include reference number UM-SG-TS-92-04.

Reef Sharks and Rays of the World

Reef Sharks and Rays of the World, by Scott W. Michael, is a guide to the identification, behavior, and ecology of these fishes. It is the first color field guide to cover guitarfishes, electric rays, stingrays, and manta rays, as well as sharks, that occur around the world's temperate and tropical reefs. The extensive introduction includes sections on ecology, feeding habits, reproduction, predation, symbiosis, shark attacks, and keeping in home aquaria. The book has a pictorial key to families and has species narratives that include identifying characters, maximum size, geographical range, reproductive types, and notes on biology.

The paperback volume has 112 pages and 164 color plates, and sells for \$24.95 + \$3.50 shipping. Order from Sea Challengers, 4 Somerset Rise, Monterey, CA 93940.

Lewis Publishers Books

The following new books can be ordered from Lewis Publishers, 2000 Corporate Blvd., N.W. Boca Raton, Florida 33431:

Practical Handbook for Wetland Identification and Delineation, by John G. Lyon, is a book of 208 pages.

Identification and delineation of wetlands have become increasingly important topics as wetland laws are applied in new manners and enforcement by government regulatory agencies has increased. *Practical Handbook for Wetland Identification and Delineation* defines wetlands, describes their functions, and presents a variety of methods used to assess the extent of wetlands. This easy-to-use book offers solutions to real-world problems and covers important subjects such as methods for identifying and delineating wetland boundaries, evaluating wetlands, using area photography, hydrology, chemical and biological processes, soil surveys, and plant measurements. The book also discusses methodological approaches to optimizing wetland delineation and permitting.

The contents include: Introduction. Background: What is a Wetland? The Federal Definition and Criteria for Identification of Wetlands. Methods:

cont. on page 6

Meetings and New Publications cont.

Selecting a Method of Analysis and Level of Detail. Additional Background and Details: Soils. Soil Surveys. Munsell Color Charts. Plant Measurement. Additional Methods and Considerations: Topographic Maps. Aerial Photos and Remote Sensor Data. Aerial Photos for Characterizing Soils. Large Area Wetland Evaluations. National Wetland Inventory Products. Surveying and Mapping of Wetland Boundaries. Discussion: The Permitting Process. Environmental Attorneys. The Potential for Change. Bibliography and Other Wetland References: Bibliography of General Wetland and Wetland Related Literature. Bibliography of Plant Related Literature. Appendices: Sources of Data Including Aerial Photos, Maps, and Other Data Sources. Sample Intermediate Level Wetland Report and Data Records.

The price is \$59.95.

Zebra Mussels: Biology, Impacts, and Control, edited by Thomas F. Nalepa and Donald W. Schloesser, is a 832-page volume that sells for \$69.95.

The recent introduction and rapid spread of the zebra mussel in North American waters has caused great concern among industrial and recreational users of these waters. This bivalve mollusc is a biofouler that attaches to any firm substrate (e.g., rocks, piers, water intake pipes, boat hulls) and has already created significant problems for raw water users such as water treatment plants and power plants.

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

The 47 articles are arranged in sections entitled Ecology and Life History, Morphology and Physiology, Effects, Mitigation, and General.

Chemical Dynamics in Freshwater Ecosystems, by Frank A.P.C. Gobas and John A. McCorquodale, has 232 pages and costs \$69.95.

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

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

Dissertation and Thesis Abstracts

Modelling of Zinc Accumulation in the American Oyster, *Crassostrea virginica* (Gmelin)

Cheol Mo, Ph.D. 1992

College of William and Mary in Virginia

A model of zinc accumulation by the American oyster, *Crassostrea virginica*, is developed by relating in-situ zinc body burden to time-integration of uptake. Short-term uptake rates are estimated in laboratory by introducing ^{65}Zn to three groups of 12 oysters of various weights in aquaria with salinities of 18‰ and 12‰. It is found that the uptake of ^{65}Zn by an oyster (1) varies as a power function of the body weight

(soft tissue dry weight) of the oyster ($\frac{dy}{dt} = kW^b$), (2) is inversely related to the salinity of ambient water, and (3) increases linearly with ambient concentration. Zinc body burdens of oysters of various weights from oyster beds with three different salinity regimes of the James River and of the Rappahannock River are measured. When the zinc body burden of oysters is fitted to a power function of body weight ($y = aW^b$), the values of power, b , are 1.33, 1.30, and 1.06 for salinities of 13, 15, and 20‰, respectively, in the James River and 1.16 for a nominal salinity of 18‰ in the Rappahannock River. The values of b agree with the values of power, β , derived from the ^{65}Zn uptake experiments; $b = \beta + 1$.

The model is calibrated using data for Horsehead Shoals and Nansemond Ridge, two sites in the James River having average salinities roughly the same as those used in ^{65}Zn laboratory studies. The model is verified by the use of data for Wreck Shoal, a mid-salinity sampling site of the James River, and the pooled data for the Rappahannock River sampling sites. The weight-specific zinc concentration of an oyster increases continuously, but rate of the increase is reduced as the oyster grows larger. Both uptake parameters, k and β vary with salinity.

It is suggested that the body weight effects, and their variation with salinity, should be incorporated in the design of monitoring programs for trace metals as well as in experimental studies.

In appendix, (1) three sources of variability in measurements that can be eliminated are identified and discussed, and (2) zinc body burden data for the hooked mussels, *Ischadium recurvum* Rafinesque, from the Rappahannock River, Virginia are compared to those for oysters.

Stock Interrelationships of Sockeye Salmon Runs, Alitak Bay District, Kodiak Island, Alaska

Charles Orrin Swanton, M.S. 1992

University of Washington

An investigation was undertaken to evaluate the accuracy of freshwater scale patterns and discriminant functions for identifying individuals from sockeye stocks endemic to Alitak Bay District lake systems. Age-specific scale pattern variables were measured with quadratic and linear discriminant functions employed for estimating stock proportions from the 1985-1988 Alitak Bay District sockeye catches. Analyses were also conducted to assess the use of scale pattern analysis in-season. Migratory timing statistics and total run estimates were calculated.

Scale pattern analysis was a viable technique for separating Alitak Bay District sockeye stocks both post- and in-season. Quadratic discriminant functions and an all-variable forced approach increased classification accuracy when compared to linear discriminant functions and a stepwise variable selection process. A test fishery and in-season stock separation program were initiated in 1988. Calculated migratory timing statistics are considered speculative for several stocks because of a limited database. Stock-specific total run estimates derived from scale pattern analysis were compared to Alaska Department of Fish and Game estimates generated from tagging data. Differences ranged from 1,000 to 100,000 fish for several stocks and years.

**Distribution, Abundance, Growth,
and Mortality of Striped Anchovy,
Anchoa hepsetus Larvae
(Pisces: Engraulidae),
About the Discharge Plume
of the Mississippi River**

Gregory Richard Day, M.S. 1993
University of West Florida

Striped anchovy larvae collected in the vicinity of the Mississippi River discharge plume were examined to determine distribution, abundance, growth, and mortality along environmental gradients associated with the plume. While larvae and small juveniles were ubiquitous in the sampling area, they were concentrated in the 6-8 km-wide frontal region between Mississippi plume water and Gulf of Mexico shelf water. Whole sagittae from 497 striped anchovies were examined at 400X with a compound microscope-microcomputer-video system to determine age.

Overall growth was best represented by the least-squares linear regression of standard length (SL, mm) on age (d) ($SL = 3.73 + 0.58 \text{ age}$, $r^2 = 0.79$, $n = 497$). Regressions for plume ($SL = 3.46 + 0.51 \text{ age}$, $r^2 = 0.90$, $n = 120$), front ($SL = 2.70 + 0.67 \text{ age}$, $r^2 = 0.78$, $n = 132$) and shelf waters, ($SL = 3.61 + 0.63 \text{ age}$, $r^2 = 0.79$, $n = 245$) indicated that larvae grew faster in frontal waters. Instantaneous daily mortality rates estimated from survivorship curves for plume, front, and shelf waters, and overall were 0.231, 0.128, 0.087, and 0.150, respectively.

Chevron Conservation Awards

Creative environmental solutions—ranging from a rehabilitation center for orphaned orangutans in Indonesia to students using telecommunications networks to share environmental research data—characterize the accomplishments of America's "unsung environmental heroes" being recognized by the 1993 Chevron Conservation Awards Program.

A total of 25 awards were presented to environmental achievers from across the United States on May 13 in Washington, D.C., when the nation's oldest privately sponsored program for recognizing environmental role models held its 39th annual awards presentation banquet.

Each honoree received \$1,000 and a bronze plaque acknowledging their efforts to protect and enhance renewable natural resources. Since 1954, the program has honored more than 850 individuals and organizations for their conservation efforts.

It has been pleasing to note that many recipients have been rewarded in the past few years for their efforts on behalf of aquatic animals and aquatic environments. It seems obvious that many AIFRB people deserve one of these awards, especially in the *Professional* category.

Candidates are nominated in three categories—Professional, Citizen Volunteer and Nonprofit Organization/Public Agency. Each nomination is accompanied by two letters of endorsement, a brief biographical sketch and supporting materials. Honorees are selected by an independent judging panel of distinguished conservationists.

Additional information on nominating procedures can be obtained by writing to: Chevron Conservation Awards Program, P.O. Box 7753, San Francisco, California 94120-7753.

The 1993 winners honored for their work in the aquatic area were:

Robert Eberhardt, Stockton, CA, a bank president, avid outdoorsman and wetlands advocate, helped to convince skeptical farmers, developers and government officials of the practical value of wetlands preservation in the Central Valley. He contributed his personal airplane and escorted policy decision-makers and wildlife management experts on scores of trips to wetlands. As a result of his leadership in fund raising, approximately a half-million dollars was raised for wetlands restoration projects.

Ruth Lansford, Playa del Rey, CA, has led a 15-year effort to preserve and restore the last remaining wetlands area in Los Angeles County, a principal stopover for thousands of migrating waterfowl. By enlisting 1,500 volunteers in her grassroots coalition, she forged agreements among property owners, developers, government officials and conservation groups to preserve and expand the wetlands.

Bonnie Ross, Fair Oaks, CA, made freshwater ecology come alive for Students in the Sacramento area by designing a "Living Creeks" curriculum to encourage interactive environmental education. She also designed an annual "Nature Bowl" quiz competition for hundreds of students from 70 elementary schools in eight counties.

Robbins Barstow, Wethersfield, CT, is a former public school teacher who launched a grassroots effort 20 years ago to save whales, dolphins and porpoises. Branching out from the local level, he organized a global conference and sustained momentum for the ongoing campaign by creating a nonprofit organization dedicated to protecting cetaceans. The Cetacean Society International now has representatives in 20 countries.

Hanauma Bay Educational Programs, Honolulu, HA, is a volunteer-driven effort to reverse overuse and damage to the marine life of the island's second most popular tourist attraction. The volunteers' cleanup patrols and educational efforts helped to reduce pollution of the bay and stem the degradation that had killed 90% of the nearshore reef.

The Illinois Rivers Project, Edwardsville, IL, is an innovative, multi-state program involving thousands of high school students who use telecommunications networks to share data on river ecosystems. The students' research data is also transmitted to scientific researchers and the U.S. Fish and Wildlife Service, which uses the information to monitor the quality of midwestern rivers.

Coy Johnston, Summerville, SC, has been a catalyst in persuading diverse groups to work together on behalf of the ACE Basin Conservation Project for the protection of this estuarine system. His accomplishments include negotiating for conservation easements and acquisition of thousands of acres of wetlands from willing landowners to establish wildlife refuge areas and protect habitat.

Robert Putz, Sheperdstown, WV, (retired FWS biologist) helped small farms in Appalachia by developing viable processes for farming catfish, bass and other captive fish. As founder of the Freshwater Institute, he has also spearheaded ongoing research and educational projects designed to provide innovative solutions to freshwater conservation problems.

In Memoriam

Bruce P. Snyder

AIFRB Member 1978

February 12, 1993

On the 12th of February, 1993, Bruce Snyder passed away after a courageous battle against cancer. Bruce had a rich and varied career in fisheries and salmonid aquaculture. In 1968, after graduating from Oregon State University, he and his new wife, Sallie, joined the Peace Corps, serving in Chile for four years. They were stationed about 500 miles south of Santiago, where Bruce's job was to help the Chilean government establish a self-sustaining run of Pacific salmon. His advisor was Ernie Salo, who became a lifelong friend and colleague. After leaving Chile, Bruce worked with Ernie at the University of Washington's Big Beef Creek Fish Research Station, located on the eastern shore of Hood Canal. His first task at the University was to help coordinate and run a large Pacific salmon aquaculture program sponsored by the Weyerhaeuser Co. Later he performed some of the first experiments that examined how rugose substrates affected yolk material utilization in developing salmon and also invented a very efficient incubation box for salmon eggs and alevins. Along with these duties he assumed the responsibility of managing the Big Beef Creek station, which in those years was used as a research facility or base of operations by a large number of graduate students.

In the mid 1970's, the University began a complex series of studies that examined the impacts of the U.S. Navy's Trident Submarine base on migrating juvenile salmon. Bruce helped coordinate much of the field work that took place during these investigations. After the Trident studies were completed, he became interested in Atlantic salmon culture and for a number of years helped refine how this species could be cultured in the Pacific Northwest. After almost 20 years at Big Beef Creek, Bruce left the University and began working for Scan Am, a private grower of Atlantic salmon. While with Scan Am, he was responsible for hauling and acclimating smolting

salmonids to seawater—a risky art at which he excelled. As part of this job, he learned how to fly a single-engine plane and was just starting to log a few hours when it was discovered he had cancer. Bruce loved working with fish and often labored long hours to complete projects; consequently, I wasn't surprised to hear that one week before he died he was helping haul fish.

Bruce, who is survived by his wife, Sallie, and two sons, Greg and Mark, was an unfailingly generous man who always seemed to have a twinkle in his eye. He is sorely missed by his many friends in the aquaculture and fisheries professions. Remembrances can be sent to the Ernie Salo Memorial Scholarship Fund of the School of Fisheries, University of Washington, Seattle, WA 98195.

Steve Schroder

Membership Report

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

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

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

*American Institute of Fishery
Research Biologists*



American Institute of Fishery Research Biologists

. . . BRIEFS . . .

VOL. 22, NO. 4

AUGUST 1993

Board of Control Meeting—1993

The annual meeting of AIFRB (also known as the Board of Control Meeting), to be held at the Red Lion Jantzen Beach Hotel, Portland, Oregon on August 27-28, 1993, will follow the agenda shown here.

President Vaughn Anthony invites the AIFRB membership to submit additional agenda items to him before the meeting, and urges all members to attend the meeting.

1. Call to order by the President, 9:00 a.m., Friday, August 27.
2. Introductions
3. Determination of Quorum
4. Review and Adoption of Agenda
5. Approval of minutes of 1992 Annual Meeting at Rapid City, SD (Myers)
6. Secretary's Report (Myers)
 - a. AIFRB archives
 - b. History of AIFRB
7. President's Report (Anthony)
8. Treasurer's Report (Rachlin)
 - a. Review of assets and investments
 - b. Review of tax status
 - c. Problem of delinquent dues
 - d. Change in dues
9. Report of Membership Committee (Ray)
 - a. Review of Demographics (Anthony)
 - b. Membership Drive
 - c. Criteria for Member (Ray)
 - d. Criteria for Fellow (Ray)
 - e. Emeritus Status Candidates
10. Report of *BRIEFS* Editor (Cope)
Material for 1994
11. Report of Publishing Editor (Merriner)
12. Reports from District Directors
13. Overhaul and Publication of Charter
 - a. Rewrite of By-laws
 - b. Rewrite of Policy Statements
 - c. Other possible changes in By-laws
(Vice President, 3-year term for President, etc.)
14. Reports on Awards
 - a. Travel Assistance Awards (Rachlin)
 - 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
 - g. Kinds of Certificates (Wren)
15. Agreement on Logo (Merriner)
16. Interaction with Universities (Adelman and Anthony)
17. Interaction with AFS (Anthony and Brouha)
Focus group
18. Nominations for President-elect (Committee)
19. Other Business
 - a. American Men (Women?) of Science Listing
 - b. Advocacy and Ethics
 - c. Executive Secretary
20. Arrangements for 1994 Meeting

President's Comments No. 2

The President's remarks at this time of the year generally have two objectives. One is the status of the Institute and the other is to provide background for the Board of Control Meeting to be held in conjunction with the American Fisheries Society meeting. The first thing that struck me, as the new President on the block, is how well AIFRB is and has been served by its officers. The work of Ollie Cope, John Merriner, Sammy Ray, Judy Wren, Joe Rachlin and Kate Myers is certainly underappreciated by the membership of AIFRB, but not by any new President who has to examine the basic system for any flaws that he or she might wish to correct. AIFRB has been led by some able individuals and is doing very well. I found very few flaws in the system and no flaws in the people.

There are problems, of course — many problems. Most people, even those who have been members for a long time, don't really understand what the Institute is all about, why it was formed, and what each member should do to further the objectives of AIFRB. Communication is always a problem and it's no different here, even though we have *BRIEFS*, which is an excellent newsletter that is timely, well written, and informative. A young scientist doesn't get a sense for what AIFRB stands for and why it was formed until he/she reads the charter and the policy statements therein. The Members and Fellows should also reread the policy state-

cont. on page 2

Presidents Comments cont.

ments from time to time to maintain their appreciation of the standards and goals of AIFRB. This charter has not been updated or published for 10 years and we will address that in Portland. The policy statements, especially Statement No. 1, Principles of Professional Conduct, are very sexist in the way they were written, and this certainly does not do credit to the women in our profession. The By-laws suffer from some of the same problems and they will also be addressed. Malin Babcock and Bruce Wing have already redrafted this material for our review at Portland.

My first duty as President of this Institute was to work with the Past President Jack Helle on the Outstanding Achievement Awards for 1992. These awards take time; they have to be well written and published widely to give proper credit to the individuals, and the awards need to be presented in such a way as to reflect their value. The Achievement Award for Individuals was presented to Dr. William Fox at National Marine Fisheries Service (NMFS) headquarters in Silver Spring, MD. I sneaked into his Monday morning staff meeting and was able to secure the microphone for an ulterior purpose and announce the award to NMFS Fisheries Centers throughout the country at the same time that I presented the award to Bill. Jack Helle did an even better job of presenting the Outstanding Group Achievement Award to the Cooperative Fish and Wildlife Research Units Center and to the Cooperative Research Units at Universities around the country. He personally presented the awards at five universities. Currently there are about 40 cooperative units in all, either fishery or wildlife, or both.

We also have made great progress on the W.F. Thompson paper awards. Bill Bayliff has done yeoman's service in speeding up the process and bringing us up to date. He has selected the 1989 and 1990 awards and is receiving nominations for the 1991 award which will close on August 1st of this year. Jack Pearce of the NMFS Northeast Fisheries Science Center has agreed to handle the W.F. Thompson Best Student Paper Award for 1992 and he is now receiving nominations for that award which will close on December 1st of this year. The requirements for this award have been overhauled by Bill Bayliff and published in the April 1993 issue of *BRIEFS*. There are still a few minor changes to be made, however, and these will be handled at the Board of Control Meeting in Portland. The monetary award for these papers has been set at \$750 since 1979. I think it's time for a change in that amount.

A striking feature of the presidency of AIFRB is that about the time the new President feels comfortable with the job and feels that he/she can make a contribution, the term is over. As I write this comment, I have already been in office for about half of my appointment and it has taken 6 months or so to get a feel for what the real contributions are that a President can make—and I'm not sure yet. It is clear to me, however, that the terms of the succeeding Presidents should be extended to, perhaps, 3 years. This also will be discussed in Portland.

It is also clear to me that AIFRB and what it stands for has never been as needed as it is today. I am appalled by the way professional standards have decayed in the attempts to manage fish around the country. Because grant monies, etc., have become difficult to obtain in the last few years, more and more scientists are prostituting themselves to keep their jobs. Scientists who have become administrators now disavow the science in order to further the personal-professional-political goals of the individual. Scientists hold back information in order to maintain funding and some even lie before Congress. Einstein said "The right to search for truth implies also a duty".

I recently attended a fishermen's meeting where a university professor stated in front of fisheries managers and fishermen that maybe there is no need to manage because one of his students did a 100-year simulation and found little change in the final resource mix in spite of heavy fishing. He later confessed to taking this approach because he needed funding to continue the research. An economist did likewise at the same meeting by stating that we need a new management system because the science was insufficient. If funding had been sent in his direction, things would have been much better. Here are cases where fisheries are badly in need of immediate management, they are badly overfished, managers are not quite sure what to do, and scientists are willing to forego the benefits of proper management by raising clouds of dust to further their own professional ambitions. Such individuals are not members of AIFRB, nor should they be. When was the last time that we threw individuals out of AIFRB?

As the number of unethical scientists increases in the fisheries world, it means that more and more we must recruit scientists of high standards to become members of AIFRB. We must encourage them to maintain high professional standards to make up for the unethical individuals who would tear us down. We need to increase our high standards for becoming a Fellow and even a Member of AIFRB, and this will be discussed at Portland.

We have 21 Principles of Professional Conduct in our AIFRB Charter that I think cover all contingencies. We need to disseminate them to graduate students as well as to Members and even Fellows as a reminder to ourselves of what proper conduct really is in a professional fisheries society. We need to put these Principles on the walls of our offices where they can be readily seen daily and we need to make our employers and our employees well aware of the principles by which we are obliged to conduct our daily affairs. How do we rewrite these Principles, however, to put them in a brief format that can be listed on an office wall?

In Portland, if you attend, you'll hear that the total assets of AIFRB are at record levels in excess of \$60,000 and have steadily increased from about \$38,000 in 1988. Our excess revenues over expenses was \$13,000 for 1992, which compares to \$96,000 for AFS. We don't have the journal subscription or contributions that they have, either. Much of this is due to superb management by people like Joe Rachlin. But, what do we do with the money? Should we sit on it or should we put it to use? Should we sponsor

symposia, training sessions, increase amounts of money for awards, add additional awards, or recognize people in different ways? Come to Portland and tell us. As President, I have my own ideas and our energetic Board of Control has theirs and we will act accordingly, but we want the ideas and feelings of the members as a group (perhaps it's time for another survey). Perhaps we should print up the Principles of Professional Conduct and send them gratis to every fisheries student in the country. While I am President, don't expect our total assets to increase!

People who retire from AIFRB become people of Emeritus status and continue to receive *BRIEFS* at no charge. Perhaps we should charge them a fee of \$10 since the percentage of our members has been increasing, and will continue to increase.

Welcome to Dr. Gregory T. Ruggerone, the new Director of the Northwest Washington District. This is a good, active district with over 200 names on the state roster (which also includes part of the Oregon/Washington S.W. District). There is a rumor that this district is held together by Ken Chew's annual Chinese dinner at the House of Hong, but I doubt it. I wish we had stronger leaders in other states so that we could have active Districts in areas such as in the northeast and in the central part of the country. Barbara Warkentine (bless her heart!) has agreed to represent the entire Northeast Region. We need a membership drive in certain areas of the country and hopefully plans for this will be generated at our annual meeting. My attitude will be, however, that I'm not interested in just having anyone in AIFRB. The Members and Fellows of this Institute should be those individuals exhibiting the highest professional standards of our profession that we can recruit. At the associate level, it is very difficult to determine who is going to become an outstanding professional scientist and who isn't. But by the time that they are members, certainly, and are aspiring for Fellows, we should know and we should have very strong criteria for acceptance to the category of Fellows for this Institute. Perhaps it is time for us to create another category called "super-fellow".

The subject of advocacy, of course, will have to be discussed again at Portland. We all believe in good management, habitat protection, good science, motherhood, etc., and I certainly believe in advocating high scientific principles and proper science and communication. We would not be doing our job if we did otherwise. This is far different, however, from advocating certain uses of our natural resources or adopting one option over another or recommending one individual for a job over another because we are making social decisions for which we are seldom qualified.

Each District Director should think long and hard for nominations for the Outstanding Achievement Award for Individuals and the Group Award of Excellence. These are very important awards that do not have to be presented annually and should only be presented when they are duly deserved. People who make a difference, however, should be recognized and we should make every attempt to congratulate those who are deserving for such awards. We must be sure that we don't miss anyone or any group that is doing

an outstanding job for the advancement of our profession and the understanding and management of our resources. The District Directors should know best who in their area might qualify.

By the time you read this, I hope that you will have submitted an idea for a logo for AIFRB. I want to agree on a logo at Portland and get on with pins, ties (?), hats, underwear, etc. to advertise our Institute (and to spend some of Joe's money).

So, the state of the AIFRB is pretty good, although I feel that the state of our profession is not. I guarantee that our membership will increase in the coming year and I hope we can make a difference in improving the professional conduct of our scientists. I've given you enough background for our Portland meeting and perhaps I've alarmed you enough with some of my statements so that you will attend and provide some spark to our debates.

1993 AIFRB Associates' Research Award Program

Dr. Joseph W. Rachlin, Chairman of the Associates' Research Award Program, announces that selections have been made for awards to eight associate members of AIFRB to help the recipients present papers at national and international meetings. \$2,000 will be distributed among the winners. The selectees, their affiliations, and abstracts of their papers are presented here:

Steven A. Fischer, an associate member currently working as a Fisheries Research Biologist with the Missouri Department of Conservation, will present a paper which summarizes research he conducted as a Research Associate under the direction of Dr. Lenwood W. Hall, Jr. of the University of Maryland, at the 1993 annual meeting of the American Fisheries Society in Portland, Oregon, 26 August - 2 September.

RELATIONSHIPS BETWEEN TWO HABITAT ASSESSMENT INDICES AND IBI FROM MARYLAND COASTAL PLAIN STREAMS

Steven A. Fischer, Lenwood W. Hall, Jr.,
William D. Killen, Jr., and Elgin Perry

Human population growth and concurrent land-use activities will likely result in deterioration of Maryland's aquatic habitats if adequate planning and structural habitat assessment programs are not initiated. To provide a framework for assessing the ecological status of Maryland's coastal plain streams, physical and biological assessment techniques need to be identified. Therefore, relationships between two lotic habitat indices, the Qualitative Habitat Evaluation Index (QHEI) and EPA Rapid Bioassessment Protocol (RBP), and a modified Index of Biotic Integrity (IBI) were assessed among three seasons (spring, summer, fall) for 24 coastal

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Associates' Research Awards cont.

plain streams. Mean QHEI (55.2) and RBP (67.6) scores were significantly lower during summer, whereas mean IBI (38.0) was greatest during the summer. Data pooled across seasons indicated that highly significant correlations existed between IBI and the habitat indices (QHEI, $r = 0.86$; RBP, $r = 0.90$). When data were analyzed by season, correlations between IBI and QHEI decreased from spring ($r = 0.51$) to fall ($r = 0.22$). Correlations between IBI and RBP were highest in summer ($r = 0.43$) and also lowest during fall ($r = 0.17$). Thus it appears the relation between IBI and habitat indices (QHEI and RBP) was improved by collecting data between several seasons and averaging.

Martin Gutowski, a Ph.D. candidate in the Intercollege Program in Ecology at The Pennsylvania State University working under the direction of Dr. Jay Stauffer, will be presenting a paper on aspects of his research at the 1993 annual meeting of the American Society of Ichthyologists and Herpetologists in Austin, Texas, 27 May-2 June.

CONCEPTS OF ECOSYSTEM INERTIA AND ELASTICITY AND THE MONITORING OF STREAM HEALTH

M.J. Gutowski

Ecosystem assessment has evolved from the presentation of flora and fauna lists to the use of a series of classification schemes. A comprehensive technique which centers on ecological and management parameters could predict the amount of stress a particular system could assimilate (inertia) and the potential of a system to recover once a structural or functional change of the biota was effected (elasticity). Such a technique was used to compare fish collections made in and around four national parks in Pennsylvania: Upper Delaware Scenic and Recreational River, Gettysburg National Military Park/Eisenhower National Historic Site, Valley Forge National Historical Park, and Hopewell Furnace National Historic Site. A protocol with which to classify the monitor stream "health" and assess future environmental impacts upon stream fauna was developed. I compared each park's streams to reference streams in the same drainage and used detrended correspondence analysis to determine the similarity of the faunas of these sites. Results show that investigations of inertia and elasticity may allow management agencies to monitor stream health.

Ms. Polla S. Hartley, a candidate for a Masters Degree at Oregon State University working under the direction of Dr. Michael T. Morrissey, will be presenting a paper on the results of her research at the Institute of Food Technology (IFT) meeting in Chicago, Illinois, 10-14 July, 1993.

OCCURRENCE AND PROCESSING EFFECTS OF PROTEOLYTIC ACTIVITY IN PACIFIC WHITING (*MERLUCCIVUS PRODUCTUS*)

P.S. Hartley, H. An, and M.T. Morrissey

Domestic use of Pacific whiting (*Merluccius productus*) has been limited, in spite of abundance, because of soft

texture associated with proteolysis of muscle proteins. This muscle degradation has been considered to be due to the action of a protease related to a Myxosporidian spore infection in the muscle flesh.

Proteolytic activity observed in whiting fillet sections showed significantly higher levels in the head and middle sections than tail. There was also a correlation between the degree of black Myxosporidian pseudocyst infestation and the levels of activity. Several species, including squawfish and red snapper, showed no protease activity. However, arrowtooth flounder, which has a similar tissue softening phenomenon, showed a concurrent proteolytic activity pH profile.

High variation of proteolytic activity was observed among individual fish. Preliminary results demonstrated that significant amounts of protease were removed during the washing steps of surimi processing. Residual protease in the washed mince was considerably less than the unwashed flesh. Implications of these findings for the rapidly expanding Pacific whiting seafood industry will be discussed.

Jonathan Heifetz, an associate member employed by the National Marine Fisheries Service of Alaska and a graduate student at the University of Alaska working under the direction of Jeffrey T. Fujioka, will be presenting a paper on aspects of his work at the 1993 annual meeting of the American Fisheries Society in Portland, Oregon, 26 August-2 September.

CHOOSING A HARVEST STRATEGY FOR PACIFIC OCEAN PERCH BASED ON UNCERTAIN LIFE HISTORY PARAMETERS AND RECRUITMENT

Jonathan Heifetz and James N. Ianelli

In the past, harvest rates for Pacific ocean perch (*Sebastes alutus*) in the Gulf of Alaska have been determined by a variety of strategies that include equilibrium yield, subjective risk adverse projections, MSY exploitation rates, and fishing rate set equal to natural mortality. The most recent method to determine acceptable biological catch (ABC) is to use a harvest rate that changes in relationship to the ratio of current spawning biomass to a target level of spawning biomass. This harvest strategy is designed to provide increased caution when the stock is at low levels. The target spawning biomass level is assumed to be 35 percent of the unfished level. This target level is based on results that are appropriate for a range of typical groundfish life history parameters. We examine alternative target levels and fishing rates based on life history parameters of Pacific ocean perch. Uncertainty and variability in parameter estimates and recruitment patterns are examined within the context of examining alternatives for rebuilding the depleted stock of Pacific ocean perch in the Gulf of Alaska.

Ms. Dongdong Lin, a graduate student in Food Science and Technology at Oregon State University working under the direction of Dr. Michael T. Morrissey, will be presenting a paper on aspects of her research at the Institute of

Food Technology (IFT) meeting in Chicago, Illinois, 10-14 July, 1993.

CHARACTERISTICS AND STABILITY OF WASHED AND UNWASHED SQUAWFISH MINCE DURING FROZEN STORAGE

D. Lin, L. Richardson, and M.T. Morrissey

Production of deboned fish mince could be an effective method for utilization of fresh water Northern squawfish (*Pytychocheilus oregonensis*). The objectives of this study were 1) to determine the characteristics of mechanical deboned squawfish mince, 2) to compare gel forming properties of washed and unwashed mince made from fresh and frozen fish, and 3) to evaluate the stability of squawfish mince during frozen storage.

The yield of mince from whole fish ranged between 26.3-31.4% and the proximate composition showed a moisture content close to 78%, protein content at 17%, and fat content 2-3%. Gel forming ability of the mince was analyzed by torsion which measures gel strength (stress) and gel cohesiveness (strain). Torsion tests showed that washing the mince increased the gel strength of the samples and that fish freshness had a positive correlation with initial gel strength. Torsion values for both washed and unwashed mince did not decrease significantly during frozen storage. Gel samples made from frozen fish had a decreased strain value compared to gels made from fresh fish. The addition of cryoprotectants to mince was effective in maintaining gel-forming abilities of Northern squawfish during frozen storage.

Robert M. Neumann, a Ph.D. candidate in the Department of Wildlife and Fisheries Sciences at South Dakota State University working under the direction of Dr. David W. Willis, will be presenting results of his research at the 1993 annual meeting of the American Fisheries Society in Portland, Oregon, 26 August-2 September.

SEASONAL CHANGES IN BIOLOGICAL AND SAMPLING DATA FOR NORTHERN PIKE COLLECTED FROM A SHALLOW PRAIRIE LAKE

Robert M. Neumann and David W. Willis

Northern pike (*Esox lucius*) were collected monthly from July 1991 to July 1993 in Lake Thompson, South Dakota using experimental gill-nets. Female northern pike length-at-age was significantly greater than for males ($P < 0.0001$). Northern pike exhibited significant differences in growth in length and somatic weight among seasons ($P < 0.05$). Little or no growth in length or somatic weight occurred during summer (July and August). Growth in length and somatic weight of age-1 males and females occurred during fall and spring, while age-2 males and females also increased in somatic weight during winter. Gonadosomatic index (GSI) was significantly different among sampling periods for males and females ($P < 0.0001$). Male GSI values peaked during fall and pre-spawn periods (spring); female GSI values peaked during pre-spawn. GSI values were lowest during summer for both sexes.

Body condition (relative weight; W_r) of males and females differed significantly among sampling periods for males ($P < 0.001$) and females ($P < 0.003$) and was highest during late winter/early spring for both sexes. Catch per effort (number/h) was significantly different among sampling periods ($P < 0.0001$) and was highest during spring and fall, and lowest during winter. Length distributions of northern pike caught in gill-nets were significantly different among seasons ($P < 0.0001$) and were highest during spring and fall, and lowest during winter. Length distributions of northern pike caught in gill-nets were significantly different among seasons ($P < 0.0001$) and were highest during winter and lowest during summer and early spring. Percentage of females to males (F:M) caught was significantly different among sampling periods ($P < 0.0001$). Ratios ranged from approximately 25:75 during spring to 50:50 during winter. These ratios may affect sample length distributions caught because males were smaller than females.

Trent M. Sutton, a candidate for a Masters Degree at Michigan Technological University working under the direction of Dr. Stephen H. Bowen, will be presenting a paper on his research project at the 1993 annual meeting of the American Fisheries Society in Portland, Oregon, 26 August-2 September.

SEASONAL VARIATION OF FEEDING IN LARVAL SEA LAMPREY (*PETROMYZON MARINUS*) AND NORTHERN BROOK LAMPREY (*ICHTHYOMYZON FOSSOR*)

T.M. Sutton and S.H. Bowen

Larval lampreys are burrowing suspension feeders having a diet consisting of organic detritus, algae (primarily diatoms), bacteria, and mineral matter. The objectives of this study were to determine seasonally: (1) the percent contribution of each of these components to the diet and (2) the assimilation efficiency for the utilizable portion of the diet. Throughout the year, organic detritus comprised the majority of the diet. Percent detritus in the diet was at a low in early summer (80-97%) as a result of algal blooms. However, during the remainder of the year, the amount of detritus in the diet varied little (95-99%). Assimilation efficiency varied with water temperature, ranging from 30% during winter to 97% during summer (mean = 73%). These are the highest assimilation values reported for any fish species feeding on predominantly organic detritus. These results indicate that larval lampreys are able to utilize efficiently a diet composed almost entirely of organic detritus during months when temperatures are more favorable to growth and metabolism.

Ms. Laura R. White, a Ph.D. candidate in the Inter-college Program in Ecology at The Pennsylvania State University working under the direction of Dr. Jay Stauffer, will be presenting a paper on aspects of her research at the 1993 annual meeting of the American Society of Ichthyologist and Herpetologists in Austin, Texas, 27 May-2 June.

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Associates' Research Awards cont.

ELUCIDATING HOST-PARASITE RELATIONSHIPS BETWEEN FRESHWATER MUSSEL GLOCHIDIA AND THEIR HOST FISHES USING THE POLYMERASE CHAIN REACTION (PCR) AND RESTRICTION FRAGMENT LENGTH POLYMORPHISMS (RFLPs)

L.R. White

North America's freshwater mussel (unionid) fauna is declining precipitously in richness and abundance. Sizable gaps in knowledge of unionid reproductive requirements hamper current preservation efforts; information on the identities of the host fishes upon which unionid glochidia larvae are obligate parasites is especially inadequate. I am developing a new method for identifying host fishes used by various unionid species in French Creek, a tributary to the upper Allegheny River in northwestern Pennsylvania. Using the polymerase chain reaction (PCR) followed by restriction enzyme digests, I am searching for a genetic "fingerprint" unique to each of the 25 unionid species in the drainage. I will then use this "fingerprint file" of diagnostic characters to identify unknown glochidia attached to fishes.

Working with tissue from single individuals of twelve mussel species, I have identified combinations of primers and restriction enzymes that enable me to distinguish mussel DNA from fish DNA and to determine the tribe to which each mussel belongs; currently, six of the twelve mussels can be identified to species. I have also extracted and amplified DNA from glochidia encysted in fishes, cut the amplified products, and arrived at tentative identifications of the glochidia.

W.F. Thompson 1989 Award Winner

Matthew G. Mesa, a fishery biologist with the U.S. Fish and Wildlife Service at the Columbia River Field Station in Cook, Washington, has won the W.F. Thompson Award for the best student paper of 1989. Matthew's paper, co-authored by Dr. Carl Schreck, was entitled *Electrofishing Mark-recapture and Depletion Methodologies Evoke Behavioral and Physiological Changes in Cutthroat Trout* and is based on his research while a graduate student at Oregon State University. The paper was published in the Transactions of the American Fisheries Society, 118:(6)644-658.

Matthew's awards are a check for \$750 and a certificate, given for the student paper of 1989 judged to be the best contribution to fishery knowledge among submissions for that year.

Dr. Schreck receives a certificate for co-authoring the article on his student's research. Schreck also received honorable mention in the competition for the W.F. Thompson Award in 1980.

Rachlin Wins Faculty Award

Professor Joseph Rachlin, AIFRB Treasurer and a biologist specializing in understanding the relationships of aquatic organisms to each other and to their environment, is the recipient of a 1993 Faculty Award for Research and Scholarship from Lehman College of the City University of New York.

Dr. Rachlin (AIFRB Fellow 1976), a professor of biology at Lehman, uses an eclectic approach to study aquatic organisms, including fish and algae. His studies range from using mathematical models to understand how fish communities share resources to evaluations of the toxicological effects of heavy metal pollutants on algae, organisms at the base of the food web.

The Award for Research and Scholarship is bestowed by Lehman each year to recognize excellence among the college's faculty. Dr. Rachlin, a professor of biology at Lehman since 1967, has published more than 60 scholarly articles on various aspects of his research, teaches comparative anatomy and biological systematics at Lehman and is a member of the City University's doctoral faculty in biology.

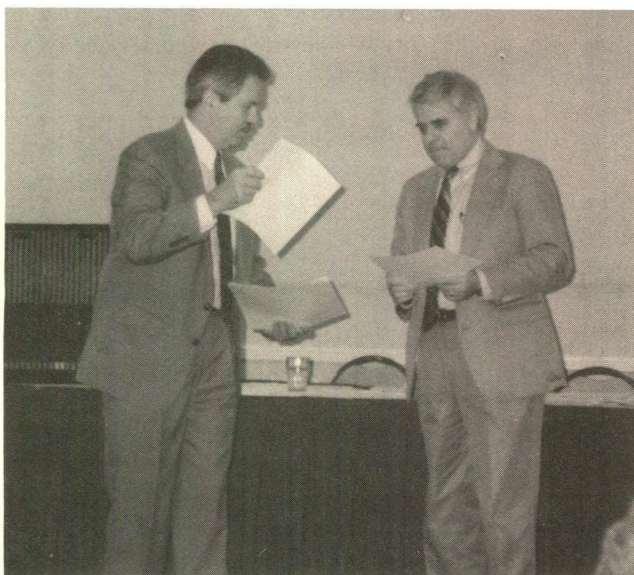


Dr. Rachlin also holds an appointment as research associate in the Department of Ichthyology of The American Museum of Natural History, and is a Fellow of both the International Academy of Fishery Scientists and the American Institute of Fishery Research Biologists. He serves on the editorial board of the international journal, the *Archives of Environmental Contamination and Toxicology* and is an adjunct curator at the New York Botanical Garden.

His research activities have been funded by grants from the U.S. Environmental Protection Agency, The National Institute of General Medical Services, The Research Foundation of the Black Rock Forest Consortium, and from the Professional Staff Congress of the City University of New York.

Dr. Rachlin is currently serving as acting dean of the Division of Natural and Social Sciences at Lehman, which is located in the Bronx and enrolls 10,000 students in 90 undergraduate and graduate programs. He earned his doctorate in biology from New York University, and maintains an affiliation as an adjunct professor in its medical school's Department of Environmental Medicine.

Outstanding Group Achievement Award Presentation



Dr. Gil Radonski (AIFRB Fellow 1984) (left) presents the AIFRB 1992 Outstanding Group Achievement Award to Dr. Edward T. LaRoe, Director of the Cooperative Fish and Wildlife Research Units Center, Fish and Wildlife Service in Washington, D.C. in recognition of the 1932-1992 accomplishments of the Cooperative Research Units. (see *BRIEFS*, June 1993).

Kirk Beiningen—A Versatile Fishery Biologist

Kirk T. Beiningen (AIFRB Member 1972), in the middle of a very successful career as a marine fishery biologist with the Oregon Department of Fish and Wildlife and a man with absolutely no spare time, has undertaken graduate work with the San Francisco Theological Seminary. The degree of Master of Arts in Values was awarded to Kirk on May 22, 1993 (*BRIEFS* Editor's 51st wedding anniversary) after a decade of study on a topic foreign to most fishery biologists.

The Trustees of
SAN FRANCISCO THEOLOGICAL SEMINARY
Presbyterian Church (U.S.A.)
To all to whom these letters shall come, Greeting.
Be it known that

KIRK THEODORE BEININGEN

having completed the studies and satisfied the requirements for the degree of

MASTER OF ARTS IN VALUES

upon recommendation of the faculty, has been admitted to that degree
with all the rights and privileges thereto pertaining.

In witness whereof we have caused this diploma to be signed and our corporate seal to be hereto affixed
at San Anselmo in the State of California

May 22, 1993



Paula S. Kold
CHAIRMAN OF THE BOARD OF TRUSTEES
Jane Deane Hall
SECRETARY OF THE BOARD OF TRUSTEES

J. R. Lipp
PRESIDENT OF THE SEMINARY
Chin S. Ma
DEAN OF THE SEMINARY

Kirk charmed the people of Finland, Russia, and China on the 1984 People-to-People fishery trip sponsored by the American Fisheries Society—he wore his straw cowboy hat everywhere, showing the headware worn in Oregon. For the past year, he has labored as the one in charge of arrangements for the American Fisheries Society annual meeting this August and September in Portland.

The following is an abstract of Kirk Beiningen's M.A. thesis:

Understanding Human Values in Fisheries Management and Conservation

The primary purpose of this project is to assist fisheries professionals in identifying and understanding the impacts of human values and ethics in the conduct of natural resource management and related public policy development. An equally valuable focus is to emphasize values analysis as a positive force in guiding those affected by fisheries conflicts toward more responsible resource stewardship.

The study examines the application of the Endangered Species Act to salmon in the Pacific Northwest's Columbia River basin. The growing awareness of the scarcity of the region's salmon resources, combined with disputes over their continued utilization, upset many traditional cultural and social values. The resulting economic, ethnic, and political controversies have typified the values issues stemming from conflicts between people and their environment throughout history. Values expressed by early inhabitants of the region, both emigrants and native American Indians, are discussed and compared with those of the current period.

Fisheries management, as a product of public policy, is examined from its early mode of accommodating maximum benefits to be derived from resource use, to more recent efforts to balance severe resource declines against escalating demands for their use. Fisheries management and conservation problems encountered in resource use conflicts are examined in the context of values issues faced by fishers, resource managers, and the general public.

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Kirk Beiningen cont.

The project concludes with discussions of (1) the function of values in resource management; (2) challenges confronting fisheries scientists, managers, and administrators in dealing with escalating resource crises; and (3) the opportunities for fisheries professionals to be agents of change as society struggles to resolve serious natural resource problems in the face of conflicting cultural values.

Dr. Basil B. Parrish

An old friend and wonderful colleague, Dr. Basil B. Parrish of Aberdeen, Scotland, passed away June 28 at the age of 71 after a long period of lung problems. Neither his wife Hilda, nor any of his many friends could get him to stop smoking. He had a long and distinguished career in fishery science which began soon after World War II and spanned both national and international spheres. For anyone who worked within the International Commission for North Atlantic Fisheries (ICNAF) or the International Council for the Exploration of the Sea (ICES) or studied Atlantic salmon or Atlantic herring, Basil was a much respected colleague.

During World War II, Basil was on operational research with the Royal Air Force, in a civilian capacity, serving with Bomber Command in Italy and with Transport Command. In 1946 he joined the Marine Laboratory at Aberdeen and rose to become Director of the institution on 1 December 1970. Basil first attended an ICES Council meeting in 1948 and was appointed a coopted member of the Liaison Committee in 1956. He was Chairman of the Herring Committee (1958-1962), the Statistical Committee (1962-1967) and of the Consultative Committee of ICES from 1967 to 1970. He was convener of the Herring Symposium (1961) and of the ICES/ICNAF/FAO Symposium on Stock and Recruitment (1970), and was Chairman of the Joint ICES/ICNAF Working Party on North Atlantic Salmon. He was Chairman of the Assessments Sub-Committee of the Research and Statistics Committee of ICNAF. Basil was a Fellow of the Royal Society of Edinburgh and of the Institute of Biology. He took part in meetings of many international bodies as a British/Scottish expert. Basil was an Expert in fisheries matters to ICES from 1950-1972 and became a Delegate in 1973. He was elected Vice-President of ICES in that year and became First Vice-President in 1975. Basil then became one of the most popular Presidents of ICES during 1976-1979. In 1982, he retired as Director of Fisheries Research for Scotland. Basil joined ICES in 1983 as its General Secretary and held that post for 6 years.

Basil was a bright, energetic and friendly person who was loved and admired by all. He significantly advanced ICES during his reign as President and General Secretary to become the best scientific and management institution in the world. So many of us will remember the festive parties hosted

by Basil and Hilda and how nice all the laughter was after hard days at work. He will be greatly missed by many.

Vaughn Anthony

AIFRB Members Contribute to Exxon Valdez Oil Spill Symposium

Eleven AIFRB members participated in the EVOS symposium held in Anchorage, Alaska on February 2-5, 1993 with presentations made in 6 of the 13 sessions. Southeast Alaska District led in participation, with 6 members contributing to the Plenary, Salmon, Intertidal, Fish, and Poster Sessions. Three members of the Northwest Washington District made presentations in sessions on Clean-up and Treatment Effects, and Intertidal. Northern Alaska District members followed with two members contributing to the Fishery and Salmon sessions. AIFRB members were not authors in sessions on Fate and Toxicity, Subtidal, Birds, Subsistence, Archeology/Human Impacts, Herring, and Mammals, but their research provided direct support to many of the studies in these sessions.

John A. Strand, Director, Southeast Alaska District, described "Restoration Planning Following the Exxon Valdez Oil Spill" for the Plenary Session. The restoration planning process has yielded a number of possible alternatives for restoring resources and human uses (services) injured by the oil spill. They were developed by resource managers, scientists, and the public, taking into consideration the results of damage assessment and restoration studies and information from the scientific literature. The alternatives include no-action natural recovery, habitat acquisition and protection, acquisition of equivalent resources, management of human uses, manipulation of resources, and combinations of the above. Each alternative consists of a different mix of resource- and service-specific restoration actions.

To decide whether to spend restoration funds on a particular resource or service, criteria were first developed to evaluate damage-assessment results for evidence of injury linked to the oil spill and the adequacy and rate of natural recovery. Then, recognizing a range of effective restoration actions, a second set of criteria was applied to determine which restoration actions were most beneficial. These criteria included technical feasibility, potential to improve recovery, cost effectiveness, and potential to restore the ecosystem as a whole. Restoration actions considered most beneficial were grouped together in five of the above alternatives and presented in the *Exxon Valdez Draft Restoration Plan Summary of Alternatives for Public Comment*. It is the intent of the Trustees to use public comment to choose a preferred alternative in preparing a Draft Restoration Plan for publication in Autumn 1993.

John F. Karinen, past-Director, and Malin Babcock, outgoing Director of the Southeast Alaska District, with co-authors Donald W. Brown, William D. MacLeod, Jr.,

L. Scott Ramos, and Jeffrey W. Short, presented a poster entitled "Hydrocarbons in Intertidal Sediments and Mussels from Prince William Sound Alaska. 1977-1980: Characterization and Probable Sources". This research provided the critical background information on baseline levels of hydrocarbons in sediments and mussels in Prince William Sound prior to the EVOS. These data were essential for evaluating the input of hydrocarbons from the spill and were used by both biologists and lawyers to estimate potential impact. The results indicate that, except in areas affected by localized vessel traffic, intertidal sediments and mussels in Prince William Sound were remarkably free of petroleum-contaminant hydrocarbons during the period of this study. There were no detectable polynuclear aromatic hydrocarbons (PAH) in mussels. Natural sources for alkanes (terrestrial plant waxes, marine plankton, and possibly marine macrophytes) were identified. Chronic, low-level hydrocarbon contamination originating from small fuel spills, ballast water discharges and fuel-combustion exhaust emissions were indicated at some of the eight sediment sampling stations adjacent to the oil tanker vessel transportation corridor through Prince William Sound. A 1993 NOAA Technical Memorandum, NMFS-AFSC-9, describing this research was distributed at the meeting.

Malin M. Babcock, John F. Karinen, Jeffrey W. Short, and Christine C. Brodersen also presented data at the Poster Session on "Pre-spill and Post-spill Concentrations of Hydrocarbons in Sediments and Mussels in Prince William Sound". Data for this study were collected immediately following the EVOS at the same sites as the 1977-80 study and at several new sites in the path of the spill prior to impact by oil and following impact over the period 1989-91. John Karinen supervised the collection of samples so as to duplicate the procedures used in the earlier baseline study. Chemical analyses directed by Jeffrey Short followed the procedures used in the earlier study. Results indicated that pre-spill hydrocarbon levels in mussels and sediments in Prince William Sound in 1989 had not changed from levels measured in 1977-80. The pattern of low hydrocarbon levels in both mussels and sediments continued at sites not impacted by the spill. Following the spill, Sleepy Bay, a heavily oiled site, had PAH concentrations in sediments nearly 100 times historical levels (established for other sites in the Sound). Two other oiled sites (Bay of Isles and Elrington Island) showed increases (10-20 fold) of PAH's in sediments in 1989. By August 1990, PAH's in sediments from Elrington Island had decreased to values similar to unoiled sites, but Bay of Isles sediments remained elevated over unimpacted sites. Differences in exposure to wave action probably accounts for these variations in recovery. PAH's in sediments from most of the other sites, Bligh Island, Naked Island, Olsen Bay, Siwash Bay, and Perry Island, were detected at levels not elevated from historical concentrations. Mussels showed high PAH concentrations in 1989 (up to 143,000 ng/g dry weight) at three sites—Sleepy Bay, Bay of Isles, and Elrington Island. Naked Island and Crab Bay had lesser elevated PAH concentrations (2,000 - 7,000 ng/g) in April and May of 1989.

PAH's in mussels from Olsen Bay, Bligh Island, Barnes Cove and Siwash Bay were near the detection limits for individual compounds (about 10 ng/g dry wt.) and by 1990 and 1991 were between 60 and 243 ng/g. Many sites in this study were in protected bays; other, more exposed sites were more heavily impacted by the spill.

J.F. Karinen

District News

NORTHERN ALASKA

Stephen Fried, *Director*

While there has not been much AIFRB news to report in the past several months, it doesn't mean that life for me has been uneventful. I managed to host two speakers last winter, with assistance from Drs. Jim and Lisa Seeb, Alaska Department of Fish and Game Genetics Laboratory. Both talks were given in November 1992 at the Fish and Game building in Anchorage. I sent out notices of these talks to all AIFRB district members as well as general invitations to agencies and organizations. Both talks were very well attended (30-40 people). Dr. F.W. Allendorf, University of Montana, Bozeman, presented a talk on the appropriate use of artificial propagation in the restoration of fish populations. Dr. R. Waples, National Marine Fisheries Service, Seattle, presented a talk on genetic considerations in salmon recovery efforts. On June 25, Michael Bell of the State University of New York at Stony Brook spoke to us on *Genetics and Evolution of Sticklebacks in Alaska*.

I have volunteered, and was selected, to serve on the Continuing Education Committee of the American Fisheries Society. Currently, the committee is in the process of drafting a "How-To" manual for arranging courses. If any of you have suggestions or ideas concerning continuing education (or lack of), please let me know.

The Southern Alaska District contacted me to see if our district would help them support a proposal to the Exxon Valdez Oil Spill Trustee Council. The proposal would be to use oil spill settlement monies to endow several chairs in fisheries at the University of Alaska. About two million dollars would be needed for each position funded, so that enough interest was generated to fund each professorship in perpetuity. Jack Helle made a presentation to the Trustees on this proposal and I noticed that several proposals speaking to this issue were on the list of projects the Trustee Council will be considering for funding. The next meeting of the Trustees will occur this August.

According to the bylaws, my two-year term of office expires in October 1993. I asked everyone to give some thought to nominations for a new director last September. While I didn't hear from anyone by the end of October, I also did not "volunteer" any other members to help me with this. Since we're such a small district, in respect to numbers of members, I decided to enter everyone in the election (a true democracy). I have enclosed an election ballot with the names of all district members. Please mark the member of your choice and return the ballot to me in the self addressed envelope. If there is a tie, I will hold a runoff election to decide the outcome. May the best District member (hopefully with their dues fully paid) win! I have enjoyed serving as your director these past two years, and hope I have served you and AIFRB well.

NORTHERN CALIFORNIA

Thomas R. Lambert, *Director*

The District held dinner meetings with speakers in November, March, and May, attended by an average of 22 members and guests. In January, 24 members and guests enjoyed our annual banquet at a Chinese restaurant in San Francisco. Many thanks to Tom Jow for once again selecting a winner. Vice Director Dick Heimann and Secretary-Treasurer Dan Howard ably conducted the District's business throughout the year.

At our November meeting in Vallejo, California Fish and Game biologist Terry Mills spoke about winter-run chinook salmon management and

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District News cont.

recovery plans. The estimated run of adults at the Red Bluff Diversion Dam on the Sacramento River has plummeted from a high of 117,808 in 1969 to 191 fish in 1991. The winter-run, one of five Central Valley chinook salmon runs, now has endangered species status. The Red Bluff Diversion Dam creates a severe fish passage problem with only two long-term solutions: construction of much larger ladders or replacement of the dam with a pumping plant. The ladder alternative draws criticism because it won't solve the major problem of juvenile salmon being preyed upon by squawfish at the dam's base. Fisheries resource agencies favor replacing the dam with a pumping plant, but this is a very costly alternative because the pump's capacity must be 3,000 cfs.

Terry also described measures to protect winter-run eggs and fry from heat-related mortality during the summer incubation period. The CDF&G recommended minimum pool requirements in Shasta and Trinity reservoirs to allow temperature control in a 30-mile winter-run spawning reach of the Sacramento River. The long-range solution to excessive temperatures is the installation of underwater temperature-control curtains in reservoirs to improve the efficiency of cold water exports to the river. The devices are expected to improve spawning and rearing success of the spring- and fall-run chinook runs, as well as the winter-run.

The Iron Mountain Mine on Spring Creek, which flows into the Sacramento River, poses another threat to winter-run. The mine, a complex of underground cavities, strip mines, waste piles, and fractured bedrock, creates an acid-forming reaction which produces the largest discharge of hazardous materials in the nation. In the winter of 1991-1992 some toxic water escaped treatment, over-flowed a debris dam, and entered the river. About 100,000 acre feet of clean water had to be released from Shasta Dam to dilute the toxic spill. The EPA is considering two pollution-control measures: treatment by a neutralization plant and/or plugging and flooding the mine cavities.

An experimental captive broodstock program for the winter-run was initiated in 1992. Some of the program objectives are to: provide insurance against extinction and irreversible genetic loss, provide an egg and fry source for experimental physical and water quality studies, and insure maximum future options for species recovery. Winter-run juveniles from wild matings of adults will be reared to near sexual maturity at two sites, then transferred back to the hatchery for use as broodstock. All progeny will be released to the Sacramento River.

Other protective measures Terry described included emergency restrictive fishing regulations, restriction of water export to irrigation canals, the screening of some canals, and 2-year suspension of the annual stocking of 1 million striped bass in the Sacramento River delta to minimize predation on winter-run salmon.

At our March meeting, Jim McFarlane of the Monterey Bay Aquarium Research Institute (MBARI) showed spectacular video footage taken in Monterey Bay. As chief pilot for MBARI's remotely operated vehicle (ROV), Jim has spent many hours searching for new forms of marine life with the \$3 million ROV as deep as 3,400 feet. We saw the most astonishing recordings edited from 16,000 hours of video taken from the ROV, including numerous invertebrates, especially many siphonophores, that have never been seen before. The morphology and feeding strategies of many could not have been dreamed up by the most imaginative science fiction writers. We even saw a transparent squid, and a great white shark cruised by at a depth of 3,000 feet. The ROV is capable of capturing organisms, so many previously undescribed species are being collected. And it is not limited to recording only animals; a slide in the Monterey Canyon, triggered by the 1989 Loma Prieta earthquake, was clearly visible.

At our May meeting in Oakland, Pacific Gas and Electric biologists John Warrick and Dave Sommerville presented an overview of 27 years of marine biology studies at Diablo Canyon Power Plant. John and Dave lead a team of 25 marine biologists who conduct intensive, long-term studies and monitoring to determine the effects of operating the twin reactor nuclear power plant. The plant discharges up to 4,000 cfs of sea water warmed a maximum of 22 °F at the shoreline of 38-acre Diablo Cove at mean lower low water level. After the plant began operating in 1986, more filter feeding organisms were observed in Diablo Cove, as well as a reduction in bull kelp. Some fish species also took advantage of this warm "river" entering

the cove. John and Dave showed remarkable video of a virtual bouillabaisse of bat rays, sharks, señoritas, and others in the discharge plume. Other fish species that are usually found more abundantly in warmer water south of Point Conception took up residence in the cove.

Two unforeseen impacts resulted from construction and testing of the plant. Soil used as fill in a temporary coffer dam covered the bottom of the intake cove when the dam was removed; consequently, a long and costly dredging operation was required to remove the sediment from the cove. During testing of the plant, sea water that had been held in copper condenser tubes for several weeks was suddenly discharged to Diablo Cove. The sea water picked up enough copper from the tubes to kill some fish and abalone in the cove. The copper tubes were replaced with titanium condenser tubes to eliminate any chance of recurrence.

Entrainment studies have shown low numbers of adult and juvenile fish are drawn through the power plant, though greater numbers of larvae are entrained. The effect on adult population levels is unknown. Marine life has created some operating problems for the plant's circulating water system: masses of kelp drift to the intake, clogging the trash racks at times, and biofouling of the tunnels and condenser tubes was found to significantly reduce the plant's efficiency. Therefore, various biofouling control techniques have been investigated. The most promising find is a coating that gooseneck barnacles and other biofouling organisms cannot adhere to well. The high-velocity flow through the tunnels dislodges attached organisms before they attain a size large enough to impede flow.

Over all, the long-term studies have shown that large-scale ecological changes occurred because of the extension of the southern sea otter into this section of the coast in the early 1970s, the warm water El Niño years, and storms when swells exceeded 20 feet. These events have had a greater impact on coastal biota than Diablo Canyon Power Plant's localized effects.

NORTHWEST WASHINGTON

Greg Ruggerone, Director

Dr. Rick Brodeur, NMFS, was selected by a narrow margin to be the next Vice-Director of the Northwest District. We thank runner-up Dr. Al Giorgi, Don Chapman Consultants, for his interest in this position. Hal Michael, WDF, was elected as Treasurer. Hal has offered to help organize AIFRB meetings in Olympia.

The April 6 District meeting featured Dr. Don Bevan, Chairman of the Salmon Recovery Team of the College of Fisheries and Ocean Sciences at the University of Washington. Don's presentation focused on *Recovery of Threatened and Endangered Salmon Stocks in the Columbia River Basin*.

On May 27, the District held a meeting in Olympia. The speaker was Bill Frymire, Assistant Attorney General for Fish and Wildlife Issues for Washington, who discussed *Legal Perspectives on Water Issues in Washington*. In his presentation, Mr. Frymire covered recent legal decisions and actions related to Washington water, including minimum flow questions, dam removal, and screening at dams.

Meetings and New Publications

Southeastern Fish and Wildlife Conference

Biologists, outdoor educators, wildlife technicians, wildlife law enforcement personnel, information specialists and others may be interested in attending the 47th Annual Conference of the Southeastern Association of Fish and Wildlife Agencies in Atlanta, Georgia, October 10-13, 1993. The theme of this year's conference is *The Ecology of Growth and Development* and papers will be presented in five subject areas—Fisheries, Wildlife, Nongame Wildlife, Law Enforcement and Information and Education.

The SEAFWA Conference is an outstanding opportunity for all wildlife professionals to meet and discuss the unique problems and solutions associated with natural resources management and education.

In keeping with the conference theme, general and technical sessions will be held addressing the vital role fish and wildlife agencies play through conservation, protection, and management of natural resources. Among the topics discussed will be the negative impacts of population growth on resource management, how to temper economic development with wildlife

habitat management, and how fish and wildlife agencies can promote ecological stability.

The Fisheries Technical Session will include presentations of papers involving fish, shellfish, or crustaceans available for harvest. Topics to be addressed will include fish contaminants, habitat loss or conversion, over-exploitation or resource partitioning, use of chemicals in fish culture, impacts of the aquaculture industry, or impacts of water quality/quantity on fish populations.

A student poster session is also planned for current or completed student projects on fisheries, wildlife, nongame, law enforcement, or information and education.

For more information on the conference or to find out how to submit a manuscript for consideration, contact Tim Hess, Georgia Department of Natural Resources, Game and Fish Division, 2070 U.S. Hwy. 278, S.E., Social Circle, Georgia 30279, (404) 918-6400.

Grouper and Snapper Workshop

The *International Workshop on Tropical Groupers and Snappers* will take place on October 26-29, 1993 in Campeche City, Campeche State, Mexico. The organizers are the Program of Ecology, Fisheries and Oceanography of the Gulf of Mexico (EPOMEX), University of Campeche and the International Center for Living Aquatic Resources Management (ICLARM), Philippines.

The objectives are to assess the state of the art on groupers and snappers as tropical fishing resources; identify the gaps in knowledge; and promote worldwide scientific collaboration. Thematic sessions will focus on biology, ecology, population dynamics, exploitation and management, and cultivation and stock ranching systems.

Coordination and local arrangements are done by Dr. Francisco Arraguin-Sanchez, Programme EPOMEX. Apartado Postal 520. Campeche 24030, Campeche, Mexico.

The workshop will be held in the English language.

Coral Reef Conference Proceedings

Papers submitted by speakers at last year's conference of the Coral Reef Coalition have now been compiled and printed. You can obtain a copy by sending \$6.00 (checks payable to Center for Marine Conservation) to Coral Reef Conference Proceedings, Center for Marine Conservation, 1725 DeSales Street, NW, Washington, DC 20036. This year's conference took place on May 13-15 at the Cheeca Lodge in Islamorada, Florida. Conference planners scheduled workshops and discussions on a variety of topics, including the use of zones to separate conflicting activities in the Keys, the problems of controlling water quality, and physical impacts to the reef ecosystem.

New Journal—Aquaculture International

Aquaculture International, the official journal of the European Aquaculture Society, will be launched in the second half of 1993 as an international, quarterly journal. It will publish original research papers, short communications, technical notes, and review papers on topics which include:

The biology, physiology, pathology and genetics of cultured fish, crustaceans, molluscs and plants, especially new species.

The water quality of supply systems, fluctuations in water quality within farms, and the environmental impacts of aquacultural operations.

Nutrition, feeding and stocking practices, especially as they affect the health, behaviour, appetite, growth rate, and conversion efficiency of cultured species.

The development of economically sound and sustainable production techniques.

Bioengineering studies focusing on important aspects of the design and management of both offshore and land-based systems, as well as the integration and application of improved scientific and engineering technologies.

The improvement of quality and marketing of farmed products.

Each article will, where appropriate, include a clear statement of the practical significance and implications of the results obtained from original research conducted or literature synthesised, in a way that can be readily

appreciated by commercial farmers. Recommendations will be made whenever possible.

Subscriptions in the U.S. and Canada are \$111. Order from Chapman & Hall, 29 West 35th Street, New York, NY 10001.

Stream Analysis and Fish Habitat Design

Stream Analysis and Fish Habitat Design, written by Robert W. Newbury and Marc N. Gaboury, represents an integrated engineering hydrology and fisheries biology field manual that has been prepared for stream analysis and fish habitat restoration in lowland, escarpment, and bedrock-controlled streams in Canada.

The manual is based on 15 designed and monitored projects to restore or enhance fish habitats and stream stability using surveyed habitat preferences and principles of natural stream behavior. The projects and manual were prepared in cooperation with Swan Valley Sport Fishing Enhancement, Inc., Manitoba Fly Fishers Association, Fish Futures, Inc., The Manitoba Habitat Heritage Corporation, and Manitoba Fisheries Branch.

Three projects to restore walleye spawning in channelized streams and two trout habitat enhancement projects were chosen as detailed examples of a 10-step analysis, design, and construction process. The design process and habitat preferences presented in the examples and appendices may be used directly by experienced stream restoration biologists, engineers, and technicians. For fisheries and environmental organizations, background information and theory for each step of the process is presented in three introductory chapters dealing with planning, surveys, and analysis. The analysis and design methods have been applied successfully to a variety of stream and habitat types in North America, Europe, and Australia.

The manual is available from: Newbury Hydraulics Ltd., Box 1173, Gibsons, British Columbia V0N 1V0. Payments may be by money order, check, or through institutional purchase orders. The subsidized cost per copy is \$60.00 (Canadian), including shipping and handling.

Instream Flows for Recreation

Instream Flow for Recreation: A Handbook on Concepts and Research Methods, prepared through the collaborative efforts of researchers from the National Park Service and Oregon State University, provides a "road map" to the ideas and techniques critical to conducting successful flow-recreation studies. Following this analogy, the handbook is viewed as a compact tool for locating important ideas and suggesting how those ideas fit together in the research landscape, much in the same way a road map can help a visitor identify important points of interest and suggest a route for exploring them. The handbook's primary goal is to give researchers and the reviewers of research a common understanding of the issues involved in flow-recreation management. As opportunities to protect or maintain flows become apparent, interest groups, researchers, and resource managers will all need to participate in the development, execution, and review of flow-recreation studies. The more these groups can speak a common language, the better those studies will be. The handbook is intended for use by both researchers and the lay audience who are interested in the technical aspects of streamflow effects on recreation. To obtain a free copy of the handbook, contact: Doug Whitaker, National Park Service, Alaska Regional Office, 2525 Gambell Street, Anchorage, Alaska 99503; (907) 257-2654.

In Memoriam

Leo F. Erkkila

AIFRB Emeritus 1978

May 22, 1993

Leo F. Erkkila passed away on May 22, 1993 after a lengthy illness that took its toll on his body but did not affect his clear mind.

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In Memoriam cont.

Leo was born in San Francisco, California and studied fisheries at the University of Washington, gaining the bachelor's degree in the 1930s. His first fisheries employment was with the Fish and Wildlife Service in California, where he studied trout in the Sierras and salmon in the Sacramento River basin. During World War II Leo was a naval officer, commanding an armed guard detachment in the Pacific.

After the war Leo Erkkila returned to salmon population research with the Fish and Wildlife Service in tributaries of the Upper Sacramento River, and later worked in the Sacramento-San Joaquin Delta, focusing on problems arising in connection with water-use engineering projects. Leo's next step was a move to the Great Lakes Investigations, studying lake trout at Marquette, Michigan; he then moved to the Ann Arbor headquarters, where he ultimately became Assistant Director of the Laboratory, by then part of the National Marine Fisheries Service.

Leo Erkkila was a hard-working, talented, and dependable fishery biologist with an engaging personality. On the 1984 People-to-People delegation sponsored by the American Fisheries Society to confer with fishery people in Finland (Leo's uncle had been President of Finland), Russia, and China, Leo was judged to be the delegation's best ambassador because of his way of interacting with the people of those countries.

After retirement, Leo and Ann Erkkila returned to a rural area in Redwood Valley, California. Ann is still there.

Membership Report

PROMOTION TO FELLOW		ASSOCIATE (Professional)	
Dr. Rudolph A. Rosen	TX	Charles M. Guthrie	AK
PROMOTION TO MEMBER		ASSOCIATE (Student)	
Brian S. Bigler	WA	Andrew M. Shedlock	WA
Dr. Kathleen R. Matthews	CA		
Kevan A. Urquhart	CA	EMERITUS	
		William E. Ripley	CA
NEW MEMBER		Dr. Izadore Barrett	CA
Dr. Louis J. Rugulo	MD		
Michael D. Curtis	CA		
Dr. Vidar Wespestad	WA		

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 Districts, and Members; the results of research; the effects of management; unusual biological events; matters affecting the profession; political problems; and other matters of importance to the fishery community. Comments and contributions should be sent to the Editor, Dr. Oliver B. Cope, 15 Adamswood Road, Asheville, NC 28803. Subscription \$20 a year to Institutions and Non-Members. Officers—Vaughn Anthony, 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

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

*American Institute of Fishery
Research Biologists*

... BRIEFS ...

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OCTOBER 1993

President's Report

The Board of Control, 1993

On August 27-28, the Board of Control, ex-officio members and others, met at Portland, Oregon, at the location of the American Fisheries Society meeting. Kirk Beiningen and Paul Brouha were very helpful in providing excellent meeting facilities (video, coffee, space).

We had a long and productive meeting. I especially appreciate participation from non-Board of Control members who sat through the long sessions and provided many useful comments. Those in attendance heard reports from the President, the Past President, the Secretary, the Treasurer, the Membership Chairperson and Assistant, the Editor, Publishing Editor, and the District Directors. Participation, and other details of the meeting, will be provided by Ollie Cope elsewhere in BRIEFS. I will review our overall status and what I think we accomplished at this meeting.

The total assets of the Institute continue to increase. In 1985, the assets were \$32,541, and are now at \$62,500. Details for 1993 appear elsewhere in BRIEFS. Expenses increased in the last two years from an average of about \$15,000 from 1986 through 1991, to \$19,500 in 1992, and \$21,600 in 1993. Contributions from dues increased dramatically from 1985 to 1988, declined slightly through 1992, and then increased again in 1993. Dues contributions since 1985 have been greater than expenses, except for 1992 and 1993. No changes in dues were felt to be needed at present. While Emeritus members constitute 20% of the membership and officially do not pay dues, they contribute more to the Institute than if they continued to pay the standard dues of \$20.00 per year. Some Emeritus members, who apparently greatly appreciate the value of the AIFRB, contribute very heavily in lieu of paying dues.

cont. on page 2



Board of Control Meeting participants at Portland, Oregon in August, 1993. Front row: Joseph Rachlin, Treasurer; Judy Wren, Review Assistant; Sammy Ray, Membership Chairman; Katherine Myers, Secretary; Tom Lambert, Director, Northern California District. Back row: Barbara Warkentine, Director, New York-New Jersey District; John Strand, Director, Southeast Alaska District; Charles Mitchell, Director, Southern California District; Jack Helle, Past-President; Vaughn Anthony, President; Oliver Cope, BRIEFS Editor; Dick Heimann, Vice-Director, Northern California District; John Merriner, Production Editor; and Wayne Burck, Oregon-Southwest Washington District.

President's Report cont.

One of the greatest accomplishments at Portland was a rewrite of the Bylaws and the Policy Statements. The intent of the overhaul was 1) to remove the sexism, especially in the "Principles" statements, 2) clarify intent, 3) update changes agreed upon by earlier Boards of Control, and 4) make specific changes that would improve the conduct of the Institute. The first of these changes was the criteria for Fellows, Members and Associates. The time requirement for "Members" is now five, four, and two years beyond college for those with a Bachelor's Degree, Master's Degree, and Ph D. respectively, instead of seven, six, and four years. This was agreed about two years ago. I am not so sure that relaxation of time requirements was a good idea. Time is, however, the least important of the criteria, and this was clearly listed in the expanded list of requirements. "Distinguished Achievement" which is required of Fellows was not explained in the original Bylaws. We made an attempt to do so by listing five criteria. We also expanded the definition of "Members" to bring it up to date and explained the difference between a "Student Associate" and a "Professional Associate." These changes were necessary to help both the members and the "Membership Committee" to classify people. I will address the specific details of the changes in future BRIEFS with the hope that people will properly upgrade themselves. Future Presidents of AIFRB can come only from the ranks of Fellows. Many biologists are still listed as Associates and Members when they clearly are not.

The second major change of the Bylaws was the addition of the Secretary and Treasurer to the Board of Control from ex-officio status. Before this action, the voting members consisted only of the President, the Past President, the President-Elect, and the District Directors. Until now, the President-Elect has only been available to vote at one meeting and that was only shortly after being elected.

This leads to the third major change. The President's term was changed from two to three years, with the President-Elect chosen in the second year. This gives both the President and the President-Elect some quality time on the job. (Two nominations were agreed for the next President-Elect, and they will be made known in the December BRIEFS. The election will take place in January/February with the winner announced in the April BRIEFS).

It is now my unfortunate responsibility to report a dastardly deed conducted by your "beloved" Board of Control. It was clearly my intention to begin this extended term of office beginning with the *next* President (see BRIEFS, August, 1993, page 2, 1st column, 3rd line from the bottom; also the 1993 minutes should reflect the clarity of my intent). The other members of the Board of Control, however, pushed by some lowlifes, made the new term of office apply to the existing President. This was legal as the changes in the Bylaws took place immediately after voting. If I do a lousy job as President, I know exactly who to blame, and their names will be made available upon request!

The Production Editor (John Merriner) was added as an ex-officio member of the Board of Control, and so listed in

the Bylaws. No one works harder for AIFRB than John, and the importance of his position requires participation on the Board.

The greatest change in the Charter occurred in Policy Statement I—the "Principles of Professional Conduct for Fishery Biologists." We tried very hard not to change the intent of the Principles as we removed the constant reference to "he", "his" and "him", and reduced the length of each statement. The entire Policy Statement can now fit on one page and can be framed for your office wall. Kate Myers is trying to make the Principles as attractive as possible before they are distributed to the membership. It is our intent, and we will strongly recommend, that each member suitably frame the 22 Principles of Professional Conduct, and place them in a prominent place for all to see and support. The Principles are divided into four areas dealing with: 1) Professional Life, 2) Relations with the Public, 3) Relations between Employers and Employees, and 4) Relations with Fellow Scientists. Calling attention to these principles, particularly to younger biologists, can make a difference. Again, remember this is what AIFRB is all about!

The Awards Program of AIFRB was reviewed, and it was decided to double the potential number of Research Assistance awards. These are given annually to Associates to attend important meetings to present papers. We provided eight awards this past year.

The Outstanding Achievement Awards for Individuals, and for groups, were agreed for 1993. Stay tuned to BRIEFS for this information. The Board of Control also agreed to present a new Distinguished Service Award for people of the AIFRB. This award is for those who excel in promoting the ideals of AIFRB, such as the profession of fishery biology, or the business of the Institute itself. The award can only be presented upon nominations by the Board of Control to the President and Past President who will decide on a recipient, if at all.

The W.F. Thompson Award for best paper for 1992 is still pending. Please send suggestions by December 1 to Jack Pearce at the Northeast Fisheries Science Center, Woods Hole, MA 02543. This award is a cash award of \$750, and a certificate of recognition that is important.

A great achievement this year was the agreement of a logo (it appears elsewhere in BRIEFS). There were 85 entries in 1992 and 1993 and the winner was from an anonymous contribution. The extent of the use of this logo is not yet clear. Initially, it will be made into a pin and distributed free to all present members in good standing. Subsequently, members will have to pay for the pin. Whether it will appear on coffee cups, shirts, hats, etc., depends on how well it is received. The AIFRB needs more visibility and this should help. We hope to get these out to you within a couple of months.

There were several changes in District Directors this year, due to elections and job movements, and I intend to make a few more in areas where the Directors have been inactive and unable to represent their people at the Board of Control meetings. In a subsequent BRIEFS I will outline the duties of District Directors as I see them, and where we need such



The Board at work, wide awake and bearing down on a problem.

Directors in order to properly represent the membership when decisions have to be made. My profound thanks to those who have led their Districts so well for the past two years. Some of you provided excellent leadership.

The President is required to make annual appointments such as Regional Directors. As soon as all positions are accepted, I will announce them in BRIEFS. I am pleased that Kate Myers, Joe Rachlin, Sammy Ray, Judy Wern, Ollie Cope, and John Merriner have agreed to remain as Secretary, Treasurer, Membership Chairperson, Membership Assistant, Editor, and Production Editor, respectively. These people do a wonderful job for the AIFRB.

For those of you who would like to make comments relating to anything appropriate to the Institute, please remember that BRIEFS is available for this service. The deadlines for submission are November 15, January 15, March 15, May 15, July 15 and September 15. Comments sent directly to me will not be ignored.

1993 Board of Control Meeting

At 9:00 a.m. on August 27, President Vaughn Anthony called to order the 1993 annual meeting of the AIFRB Board of Control at the Red Lion Hotel/Jantzen Beach in Portland, Oregon. The 2-day meeting was attended by Vaughn Anthony, President; Jack Helle, Past-President; Katherine Myers, Secretary; Joseph Rachlin, Treasurer; Sammy Ray, Membership Chairman and Texas District Director; Judy Wern, Review Assistant; Oliver Cope, BRIEFS Editor; John

Merriner, BRIEFS Production Editor; John Strand, Southeast Alaska District Director; Tom Lambert, Northern California District Director; Dick Heimann, Northern California District Vice-Director; Charles Mitchell, Southern California District Director; Barbara Warkentine, New York-New Jersey District Director; Bill Wilson, Northern Alaska District; Kirk Beiningen, Wayne Burck, Richard Dudley, and John Palmisano of the Oregon-Southwest Washington District; Richard Schaefer of Bethesda, Maryland; and Dr. and Mrs. Doug Vaughan of the Carolina District.

A quorum being present, the 1993 agenda was approved. Briefing books prepared by President Anthony were distributed as guides to historical background, this year's agenda, and material for consideration of many items to be addressed.

The 1992 Board of Control meeting minutes were approved.

President's Report

President Anthony presented his report for the period September 1992-August 1993, detailing AIFRB accomplishments and problems. The report stressed apathy as a factor in keeping people from getting involved and the need to search for members to find those willing to work and help our profession.

Secretary's Report

Secretary Myers told of progress in assembling and updating the AIFRB archives in Seattle and of the need to prepare a history of AIFRB. Jack Helle is trying to find a member to write the history, and emphasized the importance of having it completed by 1996, the year of AIFRB's 40-year anniversary.

cont. on page 4

1993 Board of Control Meeting cont.

Treasurer's Report

Treasurer Rachlin presented the following fiscal report:

Treasurer's Report, Fiscal 1993 as of 17 August 1993

CREDITS:

Dues + Contributions Receipts 1993	\$15,982.47
Balance Carryover From Fiscal 1992	13,154.06
Rental of Mailing List	465.50
Total Credits	\$29,602.03

DEBITS:

Treasurer's Expenses:	
Insurance Bond	\$ 100.00
Computer Software & Supplies	666.21
Treasurer's Stationery Stock	284.86
Dues Notice Postage	287.39
Bank Service Charges	55.89
Miscellaneous	62.19
Subtotal	(\$ 1,456.54)

BRIEFS:

Production and Postage	\$ 1,750.00
Coastal Press, Printing	4,020.06
Editor's Costs	27.88
Subtotal	(\$ 5,797.94)

Awards :

Associate Member Research Award Program	\$ 2,000.00
W.F. Thompson Award (1993)	
Matthew G. Mesa (1989)	750.00
Subtotal	(\$ 2,750.00)

Other:

AFS 1992 Meeting Contribution	\$ 300.00
President's Duplicating	10.00
Travel to 1992 Board Meeting	4,879.09
Secretary's Presidential Election Costs	247.29
District Reimbursements	250.00
Letterhead Stationery	231.69
Postcards & Postage (Logo Contest)	298.47
Membership Brochures	428.24
Membership Committee Costs	172.12
Assistant to Membership Chair	2,000.00
Membership Diploma Stock (300 pieces)	970.00
Bondwell 310SX, 386 Computer	998.88
HP LaserJet IIP Printer	808.44
Subtotal	(\$ 11,594.22)
Total Debits	(\$ 21,598.70)

ASSETS:

I-Liquid

Prudential Securities Money Market	\$ 250.00
Prudential Securities Cash Account	.20
Checkbook Balance	8,003.33

II-Asset Funds:

AIM Equity Funds Const. Fnd.; 852 sh.	13,393.44
Pru. Muni-Ser Fnd, NJ; 1,456.354 sh.	16,948.68
Pru. Equity Fnd: Class B; 818.514 sh.	11,115.42
Franklin Tax Free Trust, NJ; 566.150 sh.	6,765.36
Putnam Invest. Grade Muni Trust; 425 sh.	6,003.13

Total All Assets \$ 62,479.56

Dr. Rachlin also reported on membership strength and the dues status of AIFRB members. The total membership as of August 17, 1993 was 1,010, of which 203 were Emeritus

Members. There were 140 members delinquent in their dues, and 22 were to be dropped from the roles because of 3-year delinquencies.

Membership Report

Sammy Ray, Chairman of the Membership Committee (composed of Sammy Ray, Kendall Warner, Barbara Warkentine, Joan Browder and Bruce Wing), submitted a report that contained specifics on Committee operations in the past year.

The Committee reviewed 24 applications; 22 were approved by the Committee and 2 were brought before the Board. Of the 22, 9 were approved for Student Associate, 2 for Professional Associate, 9 for Member, and 2 for Fellow. The new membership came from the following areas of employment: U.S. Government, 22%; State Government, 14%; Private, 9%; University-Employed, 14%; and Graduate Student, 41%.

Promotions were granted, as follows: to Member, 10 individuals; to Fellow, 10; and to Emeritus, 16.

The important place of District Directors in recruiting new members and encouraging advancement in rank of members in their Districts was emphasized. The state of new membership suggests a revitalization of our enthusiasm and commitment is needed.

Membership matters were reviewed at length during Board discussions on the overhaul of the AIFRB Charter and By-laws, to be addressed later in this report. Of significance in the membership area were new criteria to be used in assigning membership rank for new members and for promotions. Changes were adopted for Associate, Member, and Fellow status, clarifying the requirements and enabling Membership Committee members to reach better agreement on assignment of rank.

Report on Publications

Oliver Cope submitted the following report covering the publication of BRIEFS during the year:

BRIEFS, in the past year, had six issues come off the press—Volume 21, Numbers 5 and 6, and Volume 22, Numbers 1 through 4. All but one issue had 8 pages each, and the August 1993 issue contained 12 pages; the year's total was 52 pages.

Illustrations were used freely during the year, with 13 halftones and 2 line drawings, perhaps the most figures BRIEFS has ever carried in one year. The quality of the photos submitted was generally good, and the printer was able to reproduce them so the subjects could be recognized. I hope contributors will continue to send good photographs of AIFRB people and activities for embellishing articles for BRIEFS.

Thesis and dissertation abstracts were published in moderate numbers. Previous Board expressions of a desire for emphasis on running these abstracts have not stimulated an increase in submissions; I receive them in about the same numbers each year. This year, we published 15 abstracts from the University of Delaware (1 abstract), Louisiana State

University (1), University of Puerto Rico (1), University of Washington (3), University of West Florida (1), and the College of William and Mary in Virginia (8).

From different geographic areas came submissions on various topics, as follows: South, 48; Mid-Atlantic, 48; West, 39; New England, 30; Mid-West, 14; Canada, 2; and other parts of the world, 4.

AIFRB leaders contributed heavily, as in past years. John Merriner sent 37 items, Kate Myers offered 8, Vaughn Anthony and Joe Rachlin each forwarded 7, Sammy Ray sent 5, Jack Helle offered 4, and Bill Bayliff sent 3. Most Districts were stingy with activity reports for BRIEFS. Northwest Washington sent 6, Northern Alaska transmitted 3, Northern California forwarded 2, and Southern California sent 1. No other District sent items for our *District Reports* section.

In all, 282 items were received for publication in BRIEFS, and 111 were printed. This is a 39.36% use rate, compared with 35.8% for the previous year.

As in the past, I welcome suggestions for ways to improve BRIEFS.

Production Editor Merriner described his many activities on behalf of AIFRB. The distribution of BRIEFS went smoothly, with no problems in mailing in a timely manner. The AIFRB display he designed and prepared last year has been used extensively at fishery meetings around the country and has suffered little from wear and tear. Minor repairs are under way, and we shall continue to enjoy prominent exposure at fishery gatherings in the coming year.

A 1993 version of our brochure describing AIFRB's aims and advantages was designed and distributed in substantial numbers; this has already resulted in increased numbers of applications for membership in our Institute.

The 1992 Membership Directory is in need of updating, and the Board discussed methods of improving the format and securing up-to-date information on individual members.

John Merriner also organized the designs submitted for an AIFRB logo. This will be treated later in this report. He has also been occupied with the preparation of revised bylaws, and has made some progress.

District Reports

Northern Alaska District Director

Bill Wilson, District Past-President, spoke of activities in the District this year. Seminars included one on the use of artificial propagation in restoration of fish populations, one dealing with genetic considerations in salmon restoration, and one on genetics and evolution of sticklebacks in Alaska.

District Director Fried served on the American Fisheries Society Continuing Education Committee, which is preparing a manual for arranging continuing education courses.

A novel process for electing a District Director for the next term was implemented; Steven K. Davis of Anchorage was elected.

Southeast Alaska District

John Strand, District Director, gave the following report:

Meetings and Technical Programs—During the year, the District held three meetings and one social event. In November 1992, Jack Helle briefed the District on the results of the September 1992 Annual Meeting of the Board of Control in Rapid City, South Dakota. Ted Merrell, a retired member from Auke Bay Fisheries Laboratory, presented a technical program on Bureau of Commercial Fisheries (BCF) research in the 1950s and 1960s. Jack Helle presented additional information on BCF pink salmon studies in Olsen Bay, Alaska, and on a "riffle-sifter" device to decrease fine sediments in spawning gravel.

At the February 1993 District Meeting, Tony Gharrett discussed results of his research on the genetics of early- and late-run pink salmon in Auke Creek, Juneau, Alaska. Significant genetic variability was found in fish from different locations within the stream and in fish from early and late runs.

The District met again in April 1993, at which time Bruce Wing described the results of his research on larval distribution of sablefish in the Eastern Gulf of Alaska. Neuston nets captured more and larger sablefish larvae than ring and bongo nets towed obliquely. Neuston tow catches were strongly affected by increased susceptibility of larvae to capture at night, whereas oblique tow catches were not obviously affected by diel migration of larvae. Regardless of net used, greatest numbers of larvae were found offshore, beyond the continental shelf and slope. Larvae may be carried along the continental slope by the Haida Current and into the Alaska Gyre by coastal upwelling or the Sitka Eddy. The effects of onshore transport by coastal downwelling and the Sitka Eddy on immigration of larvae and early juveniles to coastal areas in late summer, however, is unknown.

Finally, in June 1993, the District hosted a salmon bake and potluck picnic for members and their families at the Auke Recreation Area in Juneau.

Annual Meeting—Jack Helle, Malin Babcock and John Strand attended the Board of Control Annual Meeting in September 1992 in Rapid City, South Dakota.

Advocacy—The District continues to promote conservation and wise utilization of natural resources in Southeast Alaska. A letter was written to the Exxon Valdez Oil Spill Trustee Council advocating that restoration funds be spent on endowment of one or more faculty positions (chairs) at the University of Alaska. These positions would provide teaching, public service, and research opportunities leading to a better understanding of relationships among ecological and human components of the affected ecosystem.

A letter also was written to the Regional Forester, U.S. Forest Service, recommending that the Indian Creek watershed near Hollis, Alaska be designated as a research natural area or possibly an experimental forest. Future restoration projects in adjacent watersheds, now in a planning stage, would greatly benefit by maintaining Indian Creek as an unlogged, control watershed for comparison. Records of organic debris, sediment characteristics, other environmental parameters, and salmonid productivity extending back to the

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1993 Board of Control Meeting cont.

1950s also contribute significantly to the value of the watershed as an unlogged control for other logged or soon-to-be logged watersheds in Southeast Alaska.

Articles for BRIEFS—Two articles were submitted to BRIEFS in June 1993. The first was drafted by John Karinen and describes research and restoration planning results presented by Southeast Alaska District members at the recent *Exxon Valdez* Oil Spill Symposium. Six District members contributed to the Plenary, Salmon, Intertidal, Fish, and Poster Sessions. In a second article, John Strand presented the status of restoration planning following the oil spill and described alternative ways to restore injured natural resources and lost or reduced human services.

AIFRB Research Assistance Award Program—One of our Associate members, Jon Heifetz, was selected to receive a travel grant from the Research Assistance Award Program. Jon will attend the 123rd Annual Meeting of the American Fisheries Society in Portland, Oregon, August 29-September 2, 1993. He will present a paper entitled, "Choosing a Harvest Strategy for Ocean Perch Based on Uncertain Life History Parameters and Recruitment."

Treasury—Our treasury as of August 1, 1993 is \$253.28.

Northern California District

District Director Tom Lambert delivered the following report:

Membership—The district gained four members to bring the total District membership to 80. The four scientists joining the institute during the year are: Dr. Joseph J. Cech, Sr., (New Fellow), Daniel F. Howard, (New Member); Paul Ablett and Lisa M. Kerr, Associates. Membership status changes during the year were: Norman J. Abramson and William E. Ripley became Emeritus and Dr. Kathleen R. Matthews and Kevan A. Urquhart were promoted to Member.

The current District officers are: Tom Lambert, Director, Dick Heimann, Vice Director, and Dan Howard, Secretary-Treasurer. Nominations for Vice-Director and Secretary-Treasurer for the next two-year term will be taken at the District's business meeting on September 12, 1993. Vice-Director Dick Heimann moves into the Director's slot for the next term.

The AIFRB exhibit prepared by John Merriner was displayed at the Western Association of Fish and Wildlife Agencies and the Western Division of the American Fisheries Society meeting in Sacramento in July 1993. Many of the 1993 brochures with applications were picked-up. Hopefully this will result in several new members.

Activities—The District's activities began with the annual planning meeting and pot luck dinner held September 26, 1992 at a Marin County beach cabin. Topics and speakers were selected for the year's three dinner meetings. The District's annual get together and holiday banquet was held on January 23, 1993 at a San Francisco Chinese restaurant chosen by the district's epicure, Tom Jow. The strictly social event was attended by 24 members and guests who enjoyed good conversation and a fine dinner.

The speakers and topics at the three dinner meetings were: November 19, 1992; Caesars Restaurant, Vallejo; 25 attendees.

Terry Mills, California Department of Fish and Game, presented "Winter-run Chinook Salmon, Management and Recovery: Who Wins and Who Loses". Terry gave an overview of the recovery planning for the Sacramento River's run which reached a low of only 191 fish in 1991.

March 18, 1993; Pacific Fresh Restaurant, Sunnyvale, 22 attendees.

Jim McFarlane, Monterey Bay Aquarium Research Institute, presented "A Glimpse below Monterey Bay". Jim showed fascinating video taken from a remotely operated vehicle revealing many new life forms existing at depths down to 3,400 feet.

May 20, 1993; Yoshi's Restaurant, Oakland; 17 attendees.

Dave Sommerville and John Warrick, Pacific Gas And Electric Company, presented "Gone Fission—27 Years of Environmental Studies at Diablo Canyon Power Plant, San Luis Obispo County." They documented shifts in the flora and fauna in the plant's discharge plume and major ecological changes from factors unrelated to the power plant.

The District's business meeting and pot luck dinner is set for September 12, 1993 at the same beach cabin as last year's meeting. As an incentive to attend, Kathleen Hubbard will demonstrate the art of kelp weaving with enough instruction and algae for everyone to create his own mucilaginous masterpiece.

Southern California District

The following report was submitted by Jim Allen, District Director:

During the 1992-1993 year the Southern California District conducted three business meetings with speakers, hosted a symposium, gave one award, and elected new officers.

General business meetings were held on 19 November 1992, 6 May 1993, and 4 August 1993. Each dinner meeting consisted of a business meeting and a talk presented by a guest speaker. In general, meetings attracted two groups of fishery biologists, one from San Diego and one from the Los Angeles area. Many of the persons attending the meetings were not members.

District officers during this period were the following: District Director—Dr. M. James (Jim) Allen, MBC Applied Environmental Sciences (first half-year), Southern California Coastal Water Research Project (second half-year); Vice-Director—Ann F. Brierton, Southern California Edison Company/Occidental College Redondo Laboratory; and Secretary-Treasurer—Martin (Marty) Golden, National Marine Fisheries Service, Southwest Regional Office.

The following guest speakers presented talks at the meetings:

November 19, 1992—Dr. Martin Hall, Inter-American Tropical Tuna Commission "Tuna, logs, and FAD's: searching for an ecological solution to the tuna-dolphin problem."

May 6, 1993—Peter L. Haaker, California Department of Fish and Game—"Withering foot syndrome in black abalone in the Southern California Bight."

August 4, 1993—Steve Crooke, California Department of Fish and Game—"CDFG marine recreational fishery research in southern California."

The District held a symposium entitled "Biology of fishes" at the Southern California Academy of Sciences meeting on June 5, 1993. Eighteen speakers presented results of recent research on the biology of fishes. Fisheries management topics included optimum yield of the new sardine fishery, managing commercial fisheries and marine mammals, CDFG shark tagging program and Federal fisheries in southern California. Ecological studies included habitat preferences of California halibut, fluctuations in surfperch abundance, fidelity in kelp-bed fishes, genetics and larval dispersal in kelp bass, life history of spotted sand bass, fluctuations in demersal fish abundance off San Diego, and temporal foraging periods in intertidal fishes. Other biological studies focused on tilapia leukocytes, osmoregulation in desert pupfish, phylogeny of thresher sharks, parasitism in yellowfin tuna, population genetics of razorback sucker, phylogeny of *Cottus* sculpins, and the use of parasites as tags for fish migration. District Director Jim Allen served as moderator for the symposium.

The District presented an award of \$100 for the Best Student Paper in Fishery Biology at the Southern California Academy of Sciences Annual Meeting to J. A. Sisneros of California State University, Long Beach. Mr. Sisneros' paper was entitled "Effect of molecular structure on the shark repellent potency of anionic surfactants."

In the August 4, 1993 general meeting the District elected the following new officers: District Director—Charles T. (Chuck) Mitchell, MBC Applied Environmental Sciences; Vice-Director—Kevin T. Herbinson, Southern California Edison Company; and Secretary-Treasurer—Dr. John L. Butler, NMFS, Southwest Fisheries Science Center.

At present the Southern California District has about 75 members and about 20 additional persons who are likely to attend some meetings during the year. Business meetings generally have 10-30 attendees. We have about \$450 in our treasury as of August 1993. The District hopes to sponsor a symposium on mitigation problems during the next year.

New York-New Jersey District

Barbara Warkentine, District Director and Northeast Regional Director spoke, as follows:

The membership within the New York - New Jersey District is currently 38. During the past year this District only lost one member.

Past NY-NJ District Director and current Treasurer of AIFRB, Dr. Joseph W. Rachlin, NY-NJ Member Dr. Antonios Pappantoniou, and I presented papers on our work with the Enneacanthid sunfish complex at the 49th Annual Northeast Fish and Wildlife Conference in Atlantic City, New Jersey this past April, and despite the fact that some AIFRB members spotted Joe Rachlin at the craps tables one evening,

rest assured he was not gaming with AIFRB funds. This was a good thing as he did not leave the table a happy gambler. Our treasury is still secure.

Dr. C. Lavett Smith (AIFRB Fellow) of the Dept. of Herpetology and Ichthyology at the American Museum of Natural History, NYC, has recently retired as senior curator, but will continue to be active in the field of fishery science and systematics.

All the rest of the district members remain silent and non-responsive to my queries. However since their dues status is current, I can report that they are still alive and I presume still active in the field. I will assume that their silence merely reflects a healthy dose of Northeastern shyness,

As of August 1992 the current membership for the Northeast Region stands at 169.

Four regional members were promoted to Fellow and one was promoted to Member. Congratulations are extended to:

Dr. Ramon J. Conser (MA) ----- Fellow

Dr. Joe Margraf (WV) ----- Fellow

Dr. John J. Ney (VA) ----- Fellow

Dr. Donald J. Orth (VA) ----- Fellow

Dr. Joseph J. Hoey (VA) ----- Member

The Region was pleased to welcome Dr. Katherine A. McGraw (VA) as a new member and Dr. Robert F. Carline (PA) as a new Fellow.

Two of our regional Associate members were selected to receive research awards from the AIFRB's 1993 Research Assistance Award Program. Our congratulations go to Mr. Martin Gutowski of The Pennsylvania State University and Ms. Laura R. White, also of The Pennsylvania State University.

As the Northeast Regional Director and the NY- NJ District Director I represented AIFRB at the 49th Annual Northeast Fish and Wildlife Conference, Atlantic City, New Jersey, this past April. At this meeting I arranged to have our membership brochures and applications placed on the AFS table for distribution. I also spoke to a number of participants about possible membership in AIFRB, many of whom were unfamiliar with our institution.

Texas District

Acting District Director Sammy Ray gave the following report:

Acting District Director Sammy Ray has appointed a nomination committee to select candidates to fill the district offices. The committee composed of Dr. Charles Caillouet, Dr. Jim Nance, Bill Jackson and Sammy Ray will meet at National Marine Fisheries Laboratory, 4700 Avenue U, Galveston at 9:30 am on September 8th.

Once the elections take place, the goal is to revitalize the district. One mechanism will be to sponsor a one-day workshop on a topic which would attract Texas fishery researchers. The workshop will be planned around a larger organization's meetings such as the Texas Academy of Sciences. We will begin talking topics at the nomination meeting and perhaps have some suggestions for the new Director.

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1993 Board of Control Meeting cont.

Northwest Washington District

Katherine Myers of this District gave the following report:

The 1992-1993 year began with the resignation of the Northwest Washington District Director, Bill Royce. With the recommendation of Kate Myers, the vice-director, Greg Ruggerone, assumed the responsibilities of the district director in order to maintain activities. An election was held. Rick Brodeur (NMFS) was elected to the vice-director position and Hal Michael (Washington Dept. Fisheries) replaced Greg Bargmann (WDF) as treasurer. Mike Fredin continued to provide input into our district letter and to assist with seminar logistics. In order to maintain a budget to cover mailing expenses to over 200 members and refreshments at our meetings, we solicited contributions of \$5 from members. Approximately 35 members made contributions.

The goal of the district was to organize seminars that addressed current controversial issues in Northwest fisheries. We looked for hot topics that involved science, policy, and politics. Four meetings were held between October 1992 and May 1993.

The first meeting was perhaps the most controversial. Over 80 members and nonmembers gathered in a small restaurant in the International District of Seattle in order to devour Chinese delicacies selected by Ken Chew, the shellfish expert from the University of Washington. The noise level at the numerous round-table discussions suggested that most issues were never resolved, although I believe everyone agreed that Ken Chew has an amazing touch for selecting fine food. We were entertained by Trey Walker (Fisheries Research Institute, University of Washington), who presented fascinating slides and discussion on fisheries and people of the Kamchatka Peninsula, Russia. Trey and AIFRB members Kate Myers, Don Rogers, and Greg Ruggerone were invited to Russia to exchange information with Russian salmon scientists during August 1992. This dinner event led to at least two new members, including Marsha Landolt (Director, School of Fisheries, UW) and Barry Berejikian (graduate student, UW).

The next two meetings focused on endangered and threatened salmon stocks in the Columbia River, where salmon abundance has declined precipitously following alterations of salmon habitat by hydropower dams, irrigation and farming practices, timber harvests, mining, etc. In spite of a power outage throughout most of the Seattle region, a large number of people arrived to hear Rollie Schmitten (Director, NMFS Northwest Region), John Palensky (Assistant to the Director for Fish and Wildlife, Bonneville Power Administration), and Ted Bottiger (Washington Council Member, NW Power Planning Council) discuss the status of salmon stocks and the Endangered Species Act. During the next meeting, Don Bevan (University of Washington), who chairs the Salmon Recovery Team, described some of the ideas being considered by the Team in order to strengthen runs of endangered and threatened salmon stocks in the Columbia River Basin.

The Northwest District has about 200 members spread over a large region. Many members cannot attend our evening

meetings in Seattle; therefore, Hal Michael arranged the May meeting in Olympia. The seminar was "Legal perspectives on water issues in Washington State" and was presented by Bill Frymire (Assistant to the Attorney General on Fish and Wildlife issues). Hal plans to continue having meetings in Olympia.

Awards

Travel Assistance Awards

Award Committee Chairman Rachlin reported that \$2,000 was expended for these awards in 1993, making it possible to furnish funds to eight Associate Members for delivery of papers on a variety of fishery topics at technical meetings.

For the 1993-1994 year, Tom Lambert will administer the Travel Assistance Awards Program, relieving Joseph Rachlin, who has managed the Program since its inception.

W.F. Thompson Award

The W.F. Thompson Best Student Paper Award for a publication based on student research was brought closer to currency with the selection of the 1989 winner by the committee headed by William Bayliff. The winning student was Matthew G. Mesa, who wrote on electrofishing changes in behavior and physiology in cutthroat trout. Papers for 1991 are being reviewed by Dr. Bayliff, and those for 1992 by John Pearce, who has Bruce Wing, John Strand, and Douglas Vaughan to assist him. The 1993 award program is being managed by Dr. Bayliff.

Outstanding Achievement Award for Individuals

This prestigious award for 1992 was presented to Dr. William Fox for his skill and success as a fisheries researcher and administrator. For this award for 1993, the Board selected a distinguished fishery scientist whose name will be announced in the next issue of BRIEFS.

Group Award of Excellence

During 1993, certificates were presented to elements of the 1992 winner, the Cooperative Fish and Wildlife Research Units of the Fish and Wildlife Service. The award was presented to the Director of the Units in Washington, D.C., and certificates were given to several individual Units in ceremonies at various universities where Units are located.

The Board made no Group Award for 1993.

Distinguished Service Award

President Anthony proposed that a new honor, the Distinguished Service Award, be initiated to recognize an individual who has rendered outstanding service to AIFRB. After discussion, the Board decided that such an award would be appropriate, and that a selection should be made by the President and the immediate Past-President. No winner has been selected for 1993.

In discussions on awards in general, it was brought out that the certificates for the several awards made by AIFRB all look alike. There was agreement that some new styles are needed,

and Judy Wern and Kate Myers will explore the possibilities for improved designs for award certificates.

AIFRB Logo

John Merriner displayed 85 logo designs submitted by AIFRB members in 1992 and 1993. These represented a wide variety of good ideas, artistry, detail, and emphasis, and the Board faced a real challenge in selecting a logo suitable for use on plaques, T-shirts, coffee mugs, pins, and other applications. After much deliberation, the Board voted for a circular design with a green background and gold lettering and embellishments.



Charter Overhaul

As explained in the President's Report in this issue, the Board gave considerable attention to revising the AIFRB charter and bylaws. A word-by-word review of the former charter and consideration of detailed changes recommended by President Anthony and others who have addressed this issue resulted in several revisions. Important changes adopted included new criteria for rating Associates, Members, and Fellows; addition of the AIFRB Secretary and Treasurer to the composition of the Board; extension of the term of the President from two to three years; and reduction of the number on the Membership Committee to four.

The Principles of Professional Conduct, part of the Charter and Policy Statements, were carefully reviewed, and it was emphasized that the 22 Principles should be distributed to the membership, as noted in the President's Report.

Interactions

Barry Johnson, Chairman of the Strategic Planning Committee of the American Fisheries Society, described the work of the 29-member Committee, which is evaluating and reviewing the AFS Long-Range Plan. The work of the Com-

mittee will last six months, and the group has hired a consultant to assist in development of the vision and mission plan for AFS. The Committee seeks information from other people and organizations, and would welcome ideas from AIFRB.

Nominations

Several names were advanced for candidacy for the position of President-Elect for the coming year. The Board voted on the nominees, and the names of the top two candidates will be announced in BRIEFS after discussions with the nominees.

1994 Meeting

The Board of Control Meeting in 1994 will take place in Halifax, Nova Scotia in conjunction with the American Fisheries Society meetings.

Adjournment

President Anthony adjourned the meeting at 9:30 p.m.

The National Biological Survey

Improving the amount, quality and accessibility of information on this nation's biological diversity is one of the most important tasks facing both the scientific community and government. This Nation needs a professional biological science organization, not to make regulatory decisions, but to help the Nation understand and protect threatened ecosystems and carefully use its land and natural resources. To this end, the National Biological Survey has been created within the Department of the Interior by Secretary Bruce Babbitt. Dr. Thomas E. Lovejoy, a distinguished ecologist from the Smithsonian Institution, has joined Secretary Babbitt's team as his Science Advisor to get the NBS started. In a letter to Estuarine Research Federation President D'Elia, Dr. Lovejoy states that he is..."personally committed to bringing the best scientific minds to bear on this problem. We will involve a range of scientific disciplines as well as managers, as we build consensus on the outline of a national biological inventory and monitoring effort, and a long term ecological research agenda."

The National Biological Survey (NBS) will be an important element in a national biodiversity conservation strategy. It aims to provide useful information to improve the quality of our government's resource protection efforts, yet NBS will be free from direct regulatory responsibility. NBS's goal is to improve our understanding of the extent and condition of our living resources, and to shape a scientific agenda that helps us understand how to sustain them.

NBS will consult widely concerning the overall agenda of the Survey; and final decisions about this agenda will be made after engaging in extensive dialogues over the future directions of NBS. Dr. Lovejoy indicated that he is interested in the thoughts of Estuarine Research Federation members as to

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The National Biological Survey cont.

how they should proceed. For more information about actions to date, or to send comments, contact: Dr. Thomas E. Lovejoy, Science Advisor; Office of the Secretary; Department of the Interior; 1849 C St., NW; Washington, DC 20240.

Groundfish Information Needed

Dr. Bob McConnaughey of the Alaska Fisheries Science Center sends the following as part of his effort to secure information on groundfish:

Scientists comprising the groundfish task at the NMFS Alaska Fisheries Science Center engage in research related to the distribution, abundance, and life histories of commercially-important species in the Bering Sea and Gulf of Alaska as well as contiguous waters of the Aleutian Islands and U.S. West Coast. In support of these activities, we are assembling a computerized database consisting of citations (and abstracts) from peer-reviewed and "grey" literature. Hoping to accomplish this project as efficiently as possible, we are soliciting input from fisheries biologists and other individuals who have already entered relevant citations into bibliographic databases for their personal libraries. We are presently compiling citations in PAPHUS, which has a built-in utility for converting a number of other bibliographic database file formats to the PAPHUS format. We also have the support of the software developer to assist with the inevitable format conversions from other products.

Ultimately, we envision a bibliographic database of commercially and ecologically-important fish and invertebrate species which is electronically accessible to the larger scientific community. (This assuming insurmountable copyright issues are not encountered.) If you have such a database and are willing to share it with us, or can refer us to someone (or an institution) that does, please contact us. Also, we welcome any comments or suggestions related to our effort that you may have. Thank you for your assistance.

Dr. Robert A. (Bob) McConnaughey, Alaska Fisheries Science Center National Marine Fisheries Service, 7600 Sand Point Way N.E., Bldg. 4, Seattle, WA 98115-0070; Phone: (206) 526-4150; FAX: (206) 526-6723 OMNET: R.MC-CONNAUGHEY, Internet: mcconnar@rsc.afsc.noaa.gov

Address Change?

AIFRB is preparing to publish errata to the 1992 Membership Directory. Because we seek completeness in this product, we ask that all members forward changes from the 1992 version of the Directory to the AIFRB Treasurer, Dr. Joseph Rachlin, at 0-85 Morlot Avenue, Fair Lawn, NJ 07410. Please also include a telephone number for your new home or office.

Thanks to Emeriti

Treasurer Joseph Rachlin and the rest of AIFRB are grateful to Emeritus members who made contributions to the treasury during 1992-1993. Emeritus members are exempt from paying AIFRB dues, but many volunteer to send money to help support the Institute. More than \$2,000 came in through this avenue last year, strong testimony to the feelings of Emeriti about the important role AIFRB plays in the welfare of the fishery community.

Again, thank you to all who contributed.

Meetings and New Publications

Pacific Salmon Ecosystem Symposium

The University of Washington College of Forest Resources Center for Streamside Studies and the College of Ocean and Fishery Sciences will sponsor *Pacific Salmon and Their Ecosystems*, a symposium to be held on January 10-12, 1994 at the Westin Hotel in Seattle, Washington.

The purposes of the symposium are to assess changes in anadromous Pacific Northwest salmonid populations, examine factors responsible for those changes, and identify options for restoring Pacific salmon in the Northwest.

The agenda will feature an introduction to a complex problem, status of Pacific Northwest salmonids, salmon policies and politics, technological solutions—cost-effective restoration, institutional solutions—effective long-term planning and management.

Invited speakers will make presentations, and there will be poster exhibits. The proceedings of the symposium will be published.

For more information, write Continuing Education, College of Forest Resources, AR-10, University of Washington, Seattle, WA 98195.

Inland Fisheries Management

Christopher C. Kohler and Wayne A. Hubert are the editors of *Inland Fisheries Management in North America*, a 600-page, clothbound volume inspired by the Fisheries Management and Education Sections of the American Fisheries Society.

The principle of fisheries management is to provide people with a sustained, high, and ever increasing benefit from their use of living aquatic resources. Since the 1980s, the emphasis in state, provincial, and federal agencies has been on setting specific objectives for fisheries management and monitoring the achievement of those objectives.

Inland Fisheries Management in North America provides a description of the conceptual basis and current management practices being applied to freshwater and anadromous fisheries in North America with a focus on the decision-making process. Both sport and commercial fisheries are discussed; sport fishery management is emphasized. Each chapter is fully referenced to allow reader access to more advanced, detailed information.

The book is organized into five sections: Introduction, Fishery Assessments, Habitat Manipulations, Community Manipulations, and Common Management Practices. Twenty-three chapters address: law, fish population dynamics, practical use of statistics, socioeconomic, stocking for sport fisheries enhancement, undesirable species, introduced fishes, watershed, stream habitat, lake and reservoir habitat, and estuarine management, history, natural lakes and large impoundments, regulations, the management process, communication, endangered species, coldwater and warmwater streams, large rivers, and small impoundments.

This comprehensive textbook has contributions by 35 outstanding leaders in the fishery community.

Order from the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199. The price is \$33 for AFS members and \$41 for others.

On the Dynamics of Exploited Fish Populations

First published in 1957 but long out of print, Beverton and Holt's great work remains the most frequently cited fisheries book ever produced. It

established the basis for modern age-structured approaches to fisheries management, and it remains a deep source of inspiration and insight for scientists today.

The book's value to fisheries students and professionals has been limited by its scarceness. Now, *On the Dynamics of Exploited Fish Populations* is back in print, issued by Chapman & Hall (London) as Number 11 in its "Fish and Fisheries" series. The American Fisheries Society is the designated distributor of this book in North America.

Beverton and Holt's text is reproduced exactly. Preceding it are new forewords written by Tony Pitcher and Daniel Pauly. A useful addition is a list of corrections to the original text, compiled by John Hoenig for the AFS Marine Fisheries Section and approved by Professor Beverton.

This classic belongs on the bookshelf of all serious fisheries professionals.

The volume is priced at \$67 for AFS members, \$84 for nonmembers, and \$59 for student members and Marine Fisheries Section members. Mail orders to the American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199.

Directory of Mexican Fisheries Biologists and Ichthyologists

The International Fisheries Section of the American Fisheries Society announces the publication of the *Directory of Mexican Fisheries Biologists and Ichthyologists* by Dean A. Hendrickson, Hector Espinosa-Perez and Francisco Abarca-Gonzalez (1992; 27 pages; map of Mexican states). This directory contains names, addresses, phone and fax numbers, and disciplines for more than 400 fisheries scientists residing in Mexico. It is the most comprehensive document of its kind available on fisheries scientists in Mexico.

Regular price - \$10 for AFS members, \$20 for others. Checks should be made out to AFS International Fisheries Section. Mail to Gary Sakagawa, c/o Southwest Fisheries Science Center, P.O. Box 271, La Jolla, California 92038-0271 U.S.A.

A Treatise on Limnology

A Treatise on Limnology. Volume IV, The Zoobenthos, by the late G. Evelyn Hutchinson, edited by Yvette H. Edmondson—is the final volume of the late Hutchinson's *Treatise on Limnology*, a major reference work in this field.

Reflecting Hutchinson's creative and novel insights, this work deals with the insects that were his personal special interest. It presents ideas, hypotheses, and a synthesis that places the facts in a larger context of ecological theory. This book will prove to be a valuable work from this exceptionally distinguished author

Contents: Introduction to the Zoobenthos. The animal haptobenthos and its associated fauna. Gastropod molluscs. The insects of inland waters: general introduction. The insects of inland waters: lower insects, aquatic only in their juvenile stages. The insects of inland waters: orders having aquatic adults. Bibliography and index of authors. Index of lakes and rivers. Index of genera and species I of organisms. General index.

Volume IV has 1,160 pages and costs \$125. It can be ordered from Patricia Ledlie Booksellers, Inc., Natural Science Books, One Bean Road, P.O. Box 90, Buckfield, ME 04220.

Membership Report

PROMOTION TO FELLOW

Dr. Richard L. Ridenhour CA

ASSOCIATE

David R. Stanley LA

Judy O. Wern TX

NEW MEMBER

Dr. Kevin Friedland MA

Sammy M. Ray, *Membership Chairman*

Texas A&M University at Galveston

5007 Avenue U

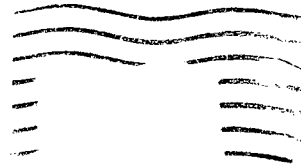
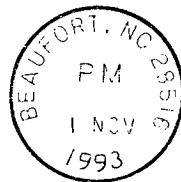
Galveston, Texas 77551

Direct membership inquiries to the Membership Chairman

*American Institute of Fishery
Research Biologists*

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

Address Correction Requested



FIRST CLASS

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

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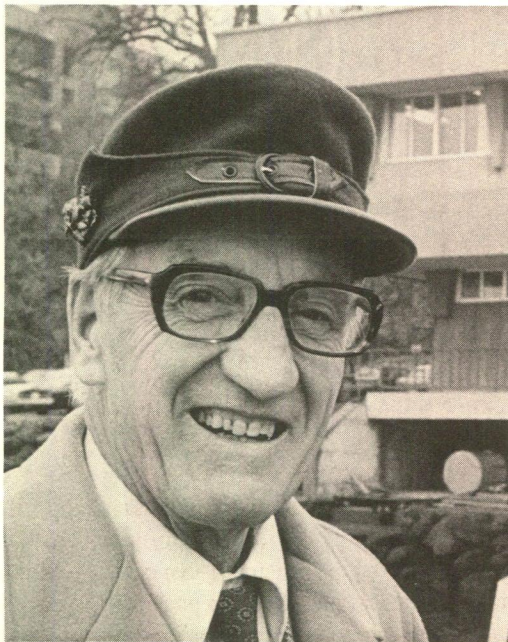
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DECEMBER 1993

**Arthur Hasler Wins
Outstanding Achievement Award**

Dr. Arthur Hasler (AIFRB Emeritus 1978), retired from the University of Wisconsin, has been named as the recipient of AIFRB's Outstanding Achievement Award for 1993.

Arthur Davis Hasler is an internationally known limnologist with a distinguished teaching and research career at the University of Wisconsin-Madison. He has made substantial and enduring contributions to the environmental sciences through his leadership in research, education, and service.



Among his accomplishments are pioneering research efforts in three areas:

1. Discovering the role of olfactory imprinting in the homing migrations of anadromous salmon. The use of Hasler's technique, developed in part with support from the University of Wisconsin Sea Grant College Program, has increased the efficiency of salmon management and contributed to salmon ranching for food production.

2. Establishing the role of land-water interactions in the nutrient budget of lakes and recommending remedial actions necessary for reversal of cultural eutrophication. His continuing efforts in both the scientific and policy-making contexts resulted in widespread development of successful water quality improvement programs.

3. Creating an experimental paradigm for dealing with whole ecosystems. The protocol for experimental limnology established by Hasler and colleagues resulted in development of both rigorous scientific practices and a network of sites of immense benefit to current and future generations.

During his 41 years as a professor in the Department of Zoology at the University of Wisconsin-Madison, Hasler advised more than 115 graduate students, including 52 doctoral candidates, and served as a role model and mentor for countless undergraduates. Many of his students have become well known for professional contributions in their respective fields.

Hasler secured state and federal funds to develop and build the University of Wisconsin's Center for Limnology, consisting of the Laboratory of Limnology on the Madison campus and the Trout Lake Station in northern Wisconsin. The center has grown to international status and provides support and facilities for scores of researchers and students. The Trout Lake Station serves as the field site for the National Science Foundation's Long-Term Ecological Research Project on North Temperate Lakes. It also serves as the research base for an extensive experimental program on acidification of Little Rock Lake, a project patterned directly after the protocol established in Hasler's research.

Among the most enduring of Hasler's contributions is the number of institutions and organizations that owe their development to his efforts and dedication. He served as officer and editor of a variety of professional societies and publications. He was elected to the National Academy of Sciences in 1969 and the American Academy of Arts and Sciences in 1972. Hasler has taken an aggressive and active role at both the national and international levels. He served as president of the American Society of Limnology and Oceanography, the Ecological Society of America, and the American Society of Zoologists. He was instrumental in developing both the Institute of Ecology, serving as its first director from 1971 to 1974, and the International Association for Ecology, serving as its president from 1967 to 1974. He holds memberships in honorary societies in Finland, the Netherlands, and the United States. He won an Award of Excellence from the American Fisheries Society in 1977, the national Sea Grant Association Award in 1980, and the Naumann-Thienemann Medal from the International Society of Limnology in 1992.

Along with his other major contributions, Hasler has authored or co-authored more than 200 publications, including several books. He earned a Bachelor of Arts degree from Brigham

cont. on page 2

Arthur Hasler Wins Outstanding Achievement *cont.*

Young University in 1932 and a Ph.D. from the University of Wisconsin in 1937. He was a Fulbright Research Scholar in Germany in 1954-55. He received honorary degrees from Memorial University of Newfoundland in 1967 and Miami University, Oxford, Ohio in 1988.

Arthur Hasler has created a legacy of fundamental scientific achievements, concern for and active participation in environmental issues, highest standards for quality of research, responsibility to the public interest, and institutions that provide for a strong future. These serve our current and future generations in ways that merit his recognition.

National Institute for the Environment

The Federal environmental research infrastructure is in serious need of an overhaul. After careful consideration of the problems, a group of scientists from various disciplines has proposed that Congress create an independent, non-regulatory, grant-making agency designed to support problem-focused research on environmental issues. The proposed National Institute for the Environment (NIE) would be the only federal agency whose sole mission would be to improve the scientific basis for making decisions on environmental issues. The NIE is designed to complement the research functions of existing agencies.

The agency's mission would be carried out through four integrated activities:

Peer-reviewed extramural research would be organized around environmental problems rather than disciplines, with research priorities set by panels drawn from government, industry, academia, and citizens' groups.

To link research to policy, the NIE would carry out ongoing assessments to indicate the state of knowledge on particular environmental issues, determine policy and management implications of that knowledge, and identify additional research needed to improve the scientific basis for making environmental decisions.

The NIE would include an electronic National Library for the Environment (NLE) to broaden and facilitate access to credible environmental information.

The NIE would strengthen the nation's capabilities in fields related to the environment by supporting curriculum development, fellowships and training grants.

The efforts to establish an NIE are expanding. Your interest and involvement in the NIE process can make a real difference. To learn more, call or write the Committee for the NIE at 730 11th Street, NW, Washington, DC 20001-4521. Ph.(202)628-4303. Fax(202)628-4311.

The Question of District Directors

Vaughn C. Anthony, AIFRB President

AIFRB has had as many as 13 districts and District Directors at one time in the past. As time changes and today's apathy creeps in, more and more of them have turned the "job" over to someone else. This is not peculiar to AIFRB; the same

lethargy is plaguing other organizations. People are willing to follow now rather than lead.

Part of our problem with districts and Directors has been perceptions of duties. Most Directors have held seminars, dinners, and meetings of various kinds in order to cement ties within AIFRB. This is feasible in some districts where people are concentrated. This is a lot of work and, to many, amounts to just more meetings. When people are spread over large areas, which is the case in most districts, it is difficult to get together just for AIFRB activities. Holding an AIFRB meeting in conjunction with other meetings is often the only efficient way to discuss AIFRB business face to face. It is often not critical to hold these meetings even though in some districts they do provide a very useful function. *cont. on page 4*

Outstanding Group Achievement Award

Jack Helle, AIFRB Past-President, visited several Cooperative Fish and Wildlife Research Units to present awards as part of the Outstanding Group Achievement Award for 1992 given to the Cooperative Fish and Wildlife Research Units of the U.S. Fish and Wildlife Service. Two of the ceremonies are shown in the photos below, with personnel of the Idaho and Montana Units.

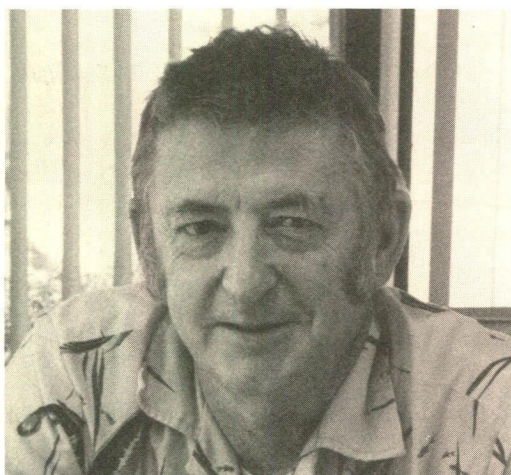


At the University of Idaho, Dr. Jack Helle with Idaho Unit personnel, Dr. Ted Bjornn, Fishery Unit Leader; Dr. John Ehrenreich, former Dean, College of Forestry, Range, Wildlife, and Fishery Science; and Dr. Michael Scott, Wildlife Unit Leader.



Jack Helle presents the award to Dr. Robert White, leader of the Montana Fishery Unit. On the left is Dr. Robert Swanson, Vice-President for Research at Montana State University, and, on the right, Dr. Robert Moore, Head of the Department of Biology at MSU.

AIFRB President-Elect Candidates



Clark Hubbs

Clark Hubbs is retired as Clark Hubbs Regents Professor in the Department of Zoology of the University of Texas at Austin. In this capacity he had teaching and research responsibilities; the research he supervised was designed to answer questions regarding the reasons fishes are able to live in their environments and how they became adapted to succeed there.

Clark was born on March 15, 1921 in Ann Arbor, Michigan and received the A.B. degree from the University of Michigan in 1942. After 3 1/2 years in the U.S. Army in World War II, he returned to academia and received the Ph.D. degree from Stanford University in 1951.

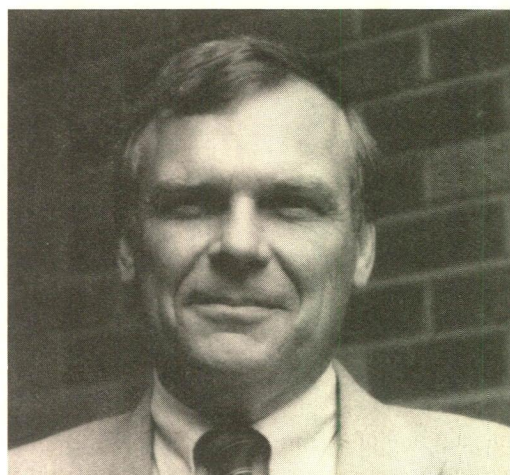
Hubbs' extensive teaching career began at Hopkins Marine Station in 1942 and includes ranks from Instructor to Professor at the University of Texas; Visiting Professor, University of Oklahoma; Member of the Graduate Faculty, Texas A&M University; Chairman, Division of Biological Sciences, University of Texas; Chairman, Department of Zoology, University of Texas; Curator of Ichthyology, Texas Memorial Museum.

Clark's society memberships include the American Institute of Biological Science; American Society of Ichthyologists and Herpetologists (President, 1987); American Fisheries Society (Chairman, Environmental Quality Committee, 1970-72; Chairman, Endangered Species Committee, 1970-72; Chairman, Exotic Species Committee, 1975-76); Society of Systematic Zoologists; National Audubon Society; Texas Academy of Science (President, 1972-73); Southwestern Association of Naturalists (President, 1966-67); Ecological Society of America; American Society of Naturalists; American Society of Zoologists; Desert Fishes Council (Chairman, Chihuahuan Desert, 1974-76); Southeastern Fishes Council; Ichthyology Society of Japan; AIFRB; International Society of Ecology; Texas Organization of Endangered Species (President, 1978-79); and American Elasmobranch Society.

Clark Hubbs' professional activities and honors have included: Managing Editor of *Copeia*, 1971-84; Editor of the *Texas Journal of Science*, 1957-61; Award of Excellence, American Fisheries Society, 1988; Advisory Committee, Fish, Wildlife, & Parks, U.S. Department of the Interior, 1975-77; Fish Advisory Committee, Union Internationale pour la Conservation de la Nature, 1976-; Leader, Rio Grande Fishes Recovery Team, U.S. Department of the Interior, 1978-; Consultant, Pan American Health Organization, 1981-82; U.S. Representative, European Ichthyological Congress, 1985-88; Director, Sea World Research Institute, 1985-; Biology Advisor, Board of Higher Education, State of Mississippi, 1983; Biology Consultant, Board of Higher Education, State of Arkansas, 1987; Trustee, Texas Nature Conservancy, 1988-.

Clark has an extensive list of publications dealing with ichthyology, fishery, biology, and ecology.

Clark Hubbs joined AIFRB in 1970 as a Fellow.



Robert Stickney

Robert Stickney is a Professor at the School of Fisheries (SOF), University of Washington, Seattle, Washington, having been Director of the SOF from September 1985 to June 1991. He was Professor and Director of the Fisheries Research Laboratory at Southern Illinois University, Carbondale, Illinois from January 1984 to August 1985. In the Department of Wildlife and Fisheries Science at Texas A&M University in College Station, Texas he was Professor from September 1983 to January 1984; Associate Professor from September 1978 to August 1983; and Assistant Professor from April 1975 to August 1978. At the Skidaway Institute of Oceanography in Savannah, Georgia Bob was Assistant Professor from September 1973 to April 1975; Research Associate from May 1971 to August 1973; and Research Assistant from March 1970 to April 1971.

Bob Stickney received the B.S. degree in Zoology from the University of Nebraska in 1967, the M.A. degree in Zoology from the University of Missouri in 1968, and the Ph.D. degree in Oceanography from Florida State University in 1971.

Dr. Stickney belongs to the American Fisheries Society, the American Society of Limnology and Oceanography, the National Geographic Society, the National Shellfisheries Association, the World Aquaculture Society, and the American Institute of Nutrition. He became a Fellow in AIFRB in 1983, and served as Secretary of the Texas District from 1980 to 1982.

Recent professional activities include membership in the Board of Directors of the Western Regional Aquaculture Consortium (1986-present), NASULGC Title XII representation for the University of Washington (1990-present), university representative to the National Association of University Fish and Wildlife Programs (1990-present), editor of *Reviews in Fisheries Science* (1992-present), and editor of the Fisheries Book Series, Lewis Publishers, Inc (1992-present). Some of his other recent professional activities include: Chairman of the Board of Directors for USAID-supported Fish Stock Assessment CRSP (1988-1993); Member of the Board of Directors of the World Aquaculture Society (1987-1993); Chairman of Nominating Committee, 1993; Program Committee for Aquaculture '93, 1992-1993; President of World Aquaculture Society, 1991-92; President-Elect of the World Aquaculture Society, 1990-91; Chairman, Education Section, American Fisheries Society nominating committee (1993); President, Educational Section, 1990-1991; President-Elect, Education Section, 1989-1990; and Co-editor, *Reviews in Aquatic Sciences*, CRC Press (1986-1992).

He is the author of over 100 books and professional journal articles on aquaculture, estuarine ecology, and fishery sciences.

The Question of District Directors cont. from page 2

What is important is that the Director knows his/her people, their problems and general activities, and be prepared to act on their behalf in an intelligent and knowledgeable way. Each Director should know the people within the area sufficiently well to advise when a promotion to a Member or Fellow is in order. She/he should be able to serve as a Regional Director occasionally. A Director must know what is going on in his/her area regarding professional problems, ethics, quality of science, equal pay for equal work, proper applications of work standards, training, and opportunities. She/he must be responsible for directing and promoting the programs and projects of their respective regions and districts. The District Director must constantly talk with people within the area to be sufficiently aware of any problems plaguing the profession. Remember that this is the only society/institute specifically created for the professional fisheries biologist.

District Directors are responsible for the recruitment of new members and advancement in rank of members in their districts. They report annually to the Board of Control. District Directors are full voting members of the Board of Control, and share in administering the affairs of the Institute. They must be able to devote at least two days a year at a Board of Control Meeting. Travel funds are provided, if needed.

District Directors should also recruit new members if the membership is not properly representative of the scientists in the district. A large membership is not needed and recruitment activities generally do not require much time. We want scientists to join who truly care about the fishery biology profession and are willing to support it. There are some unethical scientists and those who could care less about the quality of their profession; we don't want them to join and the Directors should know which scientists in their region are unethical and those who take from the profession rather than give.

The District Director is very important, and that importance comes from knowledge of people and the local fisheries profession. This means that the Director must have considerable experience in the district so that she/he has had time to acquire the broad knowledge required. University professors and members working in large state or federal laboratories should be ideal, for example.

Most important is that the District Director believes in and promotes the Principles of Professional Conduct, the advancement of the fisheries profession, and its people.

A district may be designated by the President upon petition by Fellows and Members residing therein, subject to approval by the Board of Control. Approval shall be granted, provided that the proposed district is a logical geographical unit and its recognition will further the purpose of the Institute. For example, Ed Irby advises that Florida could logically be divided into 3 districts or subdistricts if getting together for meetings is required. These districts are based on 3 concentrations of fishery professionals, the large size and shape of Florida, and the fact that Florida contains the third largest number of Members by state.

If you are interested in forming or supporting a district in your Region, and are willing to serve as a Director, please

write to me expressing your interest. The Board of Control and I will decide who will be the new District Directors for the next two years.

Our People

Andrew Doloff (AIFRB Associate 1984), research biologist, has been appointed as Project Leader of the Coldwater Fisheries Research Unit of the U.S. Forest Service Southeastern Forest Experiment Station. He is located in Blacksburg, Virginia in the Department of Fisheries and Wildlife Sciences at Virginia Polytechnic Institute & State University.

Kenneth Sherman (AIFRB Fellow 1984) of the Northeast Fisheries Science Center has been decorated with the Commander Class of the Order of Merit of the Republic of Poland. The award, presented by Poland President Lech Wolesa in Gdynia, Poland, was for Kenneth's achievements in studying the mechanisms governing marine ecosystems, definition and description of large marine ecosystems, and contributions to Polish-U.S. cooperation in the field of marine biology.

Michael F. Tillman (AIFRB Fellow 1984) has assumed the position of Director of the Southwest Fisheries Science Center of the National Marine Fisheries Service. He is located in La Jolla, California.

At the 1993 American Fisheries Society meeting in Portland, Oregon, **Paul J. Wingate** (AIFRB Member 1980) was installed as First Vice-president of AFS, and **Charles C. Coutant** (AIFRB Fellow 1978) became Second Vice-president.

Donald E. (Curly) Wohlschlag (AIFRB Emeritus 1992) was presented the Oscar Elton Sette Outstanding Marine Fishery Biologist award (a plaque mounted on a miniature trawl board) at the American Fisheries Society meeting in Portland, Oregon. This award, given by the Marine Fisheries Section of the Society, was made for sustained excellence in marine fishery biology through Curly's history of accomplishments in marine fishery research in the Arctic, the Antarctic, and in Texas estuaries, as well as for his teaching, administration, and journal editing.

What's a Member and a Fellow?

Vaughn C. Anthony, AIFRB President

Many Associates and Members of AIFRB remain as Associates and Members far too long when they should be promoted. The mechanism for this is to be nominated by the District Director, by another member, or by yourself. In scanning the Directory recently, I noted 68 people who should be upgraded to Member or Fellow. I have passed their names along to Sammy Ray for action, so some of you will be receiving requests shortly for an updated Curriculum Vitae to substantiate advancement. These were only the people I happen to know or realized from time lags that reevaluation was appropriate.

Several people have asked me to define what a "Member" or "Fellow" really is so they would know when to apply for promotion. The Board of Control recently clarified and ex-

What's a Member and a Fellow? cont.

panded the criteria for both categories, so it's timely to explain those criteria now.

The Membership Committee may elect as a Member any person meeting all of the following qualifications:

- (a) actively engaged in research concerned with the fishery sciences;
- (b) a baccalaureate degree from a recognized university or college;
- (c) experience in the field of fishery biology of at least 5 years with a baccalaureate degree, 4 years with a masters degree, or 2 years with a doctoral degree; time alone, however, is insufficient for promotion;
- (d) competence in the field of fishery biology as demonstrated by publications, growth of the individual, or by other professional achievements which are significant to the advancement of fishery biology.

Membership in the American Institute of Fishery Research Biologists shall be available to scientists of competence and of proven achievement in the field of fishery biology, subject to their participation in the profession, and years of experience as defined in the Bylaws of the Institute.

In nominating new members the following criteria of competence and achievement will be given primary consideration:

(a) The quality and quantity of publication. Papers which are published in recognized journals or agency publications shall be given greater weight than routine annual reports and reviews of activities. The quality of the science and usefulness of the research to conserve and utilize our resources will be properly evaluated, however, regardless of where the information is published.

(b) The growth of the individual in responsibility and professional development. Responsibility will not be measured in terms of size of staff or number of students, but will be judged by the caliber, enlightenment and conduct of the fishery program or programs under the nominee's supervision.

(c) Contribution outside the published record to the profession and to the conservation and proper utilization of fishery resources. This contribution may be in the form of providing expert scientific advice to management councils, international commissions, state management agencies, etc., teaching, developing effective programs of instruction, editing, or promotion of legislation and such other activities concerned with proper management and conservation of fishery resources.

Affiliation with and participation in the activities of fishery societies shall serve as a measure of an individual's awareness of fisheries as a profession. Service to the profession through leadership roles within a professional society will serve as a measure of the nominee's desire and ability to advance the goals of the profession. Strong support of the profession and professional integrity are requisites.

The Membership Committee may elect as a Fellow any person meeting all of the following qualifications:

- (a) actively engaged in research concerned with the fishery sciences;

- (b) a baccalaureate degree from a recognized university or college;
- (c) experience in the field of fishery biology of at least 15 years with a baccalaureate degree, 14 years with a masters degree, or 12 years with a doctoral degree; time alone, however, is insufficient for promotion;
- (d) distinguished achievement in the fields of fishery sciences.

Distinguished achievement is measured by:

- 1) a record of continuous publications in recognized peer-reviewed scientific journals;
- 2) growth in responsibility and/or advancement on the job;
- 3) duties and responsibilities of present positions -as evidenced by publications; such as those in agency journals and technical memoranda -as evidenced by instruction and training of students and acquisition of research grants or contracts -sought after for advice from peers -chairman of various committees -invited to present papers -major editing responsibilities -participation in fisheries organizations;
- 4) significant contributions to resource conservation such as: -an expert advisor in international commissions -participation by consultation, if asked, in local fisheries management activities;
- 5) evidence of strong support of the profession and professional integrity.

Election of a Fellow by the Membership Committee shall be considered after application by a Member eligible for advancement, or by the candidate to substantiate his/her qualifications. An affirmative vote by four members of the Membership Committee shall be required for election.

Please review your personal status and if you feel that you may deserve promotion, alert Sammy Ray to this with an updated C . V .

Restoration Planning Following the Exxon Valdez Oil Spill

The Exxon Valdez Oil Spill Trustees have recently published a *Summary of Alternatives for Public Comment* that describes different ways to restore resources and human uses (services) injured by the Exxon Valdez oil spill. It is the intent of the Trustees to use public comment in preparing a Draft Restoration Plan for publication in Autumn 1993. The Draft Restoration Plan will provide long-term programmatic guidance that the Trustees can follow in restoring injured natural resources and reduced or lost services. The Draft Restoration Plan will be accompanied by a Draft Environmental Impact Statement that will analyze the impacts of the alternatives on physical, biological, social, and economic aspects of the environment. It will help the Trustees and the public understand the consequences of alternative ways of

Restoration Planning cont.

restoring injuries caused by the oil spill. It is anticipated that a (Final) Restoration Plan and (Final) Environmental Impact Statement will be completed in early 1994.

The T/V *Exxon Valdez* struck Bligh Reef in Prince William Sound in March 1989, just before the most biologically active season of the year. The resulting spill of approximately 11 million gallons of North Slope crude oil occurred during the seaward migration of salmon fry, major migrations of birds, and the primary breeding season of most species of birds, mammals, fish, and marine invertebrates in the spill's path. Portions of 1200 miles of southcentral Alaska's coastline were oiled (about 350 miles were heavily oiled), frequently with devastating impact to the upper intertidal zone. Direct oiling killed many organisms, but beach cleaning, particularly high-pressure, hot-water washing, also had an equally devastating impact on intertidal communities. The spill also affected human services, including subsistence, commercial tourism, recreation, commercial fishing, and intrinsic (aesthetics) uses. Some resources remain vulnerable to persistent oil in intertidal areas.

In 1991, Exxon Corporation, Exxon Shipping Company, and Exxon Pipeline Company agreed to pay up to \$900 million over a period of ten years to settle the civil claims asserted by the United States and the State of Alaska. The spending guidelines are set forth in the Memorandum and Consent decree which was filed in the District Court for the District of Alaska in Civil Action A91-081 (*United States v. State of Alaska*). The Memorandum of Agreement provides that the Governments shall jointly use the monies for purposes of "restoring, replacing, enhancing, rehabilitating, or acquiring the equivalent of natural resources injured as the result of the oil spill and the reduced or lost services provided by such resources."

The Summary of Alternatives for Public Comment uses five broad policy questions to combine four categories of restoration activities in different ways to achieve restoration of injured resources and reduced or lost services.

Policy Questions

- 1) Injuries Addressed by Restoration Actions: Should restoration address all injured resources or only those whose populations measurably declined because of the spill?
- 2) Restoration Actions for Restoration Resources: Should restoration cease when an injured resource or service has recovered, or should restoration continue in order to enhance the resource or service?
- 3) Effectiveness of Restoration Activities: Should the plan only include those restoration approaches that produce substantial improvement over natural recovery, or should the plan also include those restoration approaches that produce at least some improvement?
- 4) Location of Restoration Actions: Should restoration actions take place in the spill area or anywhere there is a link to injured resources or services?
- 5) Opportunities for Human Use: To what extent should

restoration actions create opportunities for human use of the oil spill area?

Categories of Restoration

- 1) Habitat Acquisition and Protection: This category includes protection of habitat on acquired lands as well as protection of habitat on public lands.
- 2) General Restoration: This category includes restoration actions that modify existing State of Alaska and Federal management authorities or directly manipulate resources (usually on site) to restore injured resources or habitats and reduced or lost services. Examples including target resources and services (shown in parentheses) are:

Management of Human Uses

- a) reduce disturbance at marine bird colonies (common murre) and marine mammal haul-out sites (harbor seal) and rubbing beaches (killer whale);
- b) seek voluntary restrictions in subsistence harvests of marine (harbor seal, sea otter) and terrestrial mammals (river otter) and sea ducks (harlequin duck);
- c) minimize by-catch of marine birds (marbled murrelet) in fishing nets;
- d) reduce harvest of injured fish species (pink, chum, and sockeye salmon) by re-directing commercial and sport fishing; and
- e) protect archaeological resources.

Manipulation of Resources

- a) improve freshwater salmon (pink, chum, and sockeye) spawning and rearing habitat;
 - b) eliminate residual oil from intertidal mussel beds;
 - c) eliminate introduced foxes and other predators from islands important to nesting marine birds (common murre, pigeon guillemot);
 - d) create new recreation facilities; and
 - e) preserve and replace (return) archaeological resources.
- 3) Monitoring and Research: This category includes following the progress of natural recovery and evaluating the effectiveness of restoration actions. It could also include monitoring long-term cycles and trends in distribution and abundance of affected resources, and quality and quantities of lost or reduced services. Scientific research would clarify the causes of poor or slowed recovery, and design, develop, and implement new technologies and approaches to restore resources and services not recovering adequately.
 - 4) Administration and Public Information: This category includes support for such activities as Trustee Council Meetings, staff, independent peer reviews, the Public (Citizen) Advisory Group, public involvement, and public information.

Description of Alternatives

Five possible restoration alternatives are identified in the *Summary of Alternatives for Public Comment*. They are presented here for discussion only and do not at this time indicate any preference of the Trustees. They are:

- 1) No Action: This alternative is to take no active restoration but to rely on natural (unaided) recovery to restore the injured ecosystem and its associated services. Expected times for

Restoration Plan cont.

natural recovery range from a few years (e.g., bald eagle, most subtidal habitats) to decades (e.g., common murre, harlequin duck, sea otter). This alternative is also the no-action alternative in the Draft Environmental Impact Statement. Consequently, none of the civil settlement funds would be spent.

2) Habitat Protection: The goal of this alternative is to protect strategic lands and habitats important to recovery of resources and services injured by the spill. It includes changes in management practices on private and public lands. Beyond land management practices, damaged habitats or property rights could be acquired short of fee simple title, e.g., purchase of timber rights. Restoration activities would be limited to the spill area.

In this alternative, 91% of the remaining settlement funds would be available for habitat protection. Monitoring and research would evaluate the effectiveness of habitat protection measures to accelerate recovery and would cost 5% of the remaining funds over the lifetime of the settlement. Administrative and public information costs are estimated to be 4%.

3) Limited Restoration: This alternative is limited in that it addresses only the most severe of injuries (resources whose populations measurably declined) until the resource or service recovers, includes actions most likely to produce substantial improvement over natural recovery, is limited to the spill area, and is not intended to increase human use of the spill area. The monitoring and research program would evaluate the effectiveness of restoration actions and follow the progress of natural recovery.

In this alternative, 75% of the remaining funds would be available for habitat protection; 12% would be available for general restoration; and 7% would be available for monitoring and research. Because the overall program is larger, 6% would be spent on administration and public information.

4) Moderate Restoration: This alternative also limits restoration to resources and services not yet recovered and adopts the same high standard of effectiveness. It differs from Alternative 3 by addressing all injured resources, even those injured at a sublethal level. It allows for restoration outside the spill area but inside Alaska, and increases opportunities for human use of the area to a limited extent. The monitoring and research program in this alternative is expanded to include a component to reveal long-term trends in the health of the affected ecosystem.

In this alternative, habitat protection is reduced to 50% while general restoration costs are increased to 35%. Monitoring and research and administration and public information are increased to 8% and 7%, respectively.

5) Comprehensive Restoration: The goal of this alternative is to help all resources and services recover to or exceed pre-spill levels. It is more comprehensive by including restoration for resources whether or not they have recovered, including any action likely to produce at least some improvement over unaided recovery, and encourages new human uses. It allows restoration anywhere there is a link to injured resources and services. The monitoring and research program includes monitoring and research to understand long-term trends in the

health of the ecosystem in addition to monitoring natural recovery and effectiveness of aided restoration.

In this alternative, 35% of the remaining funds would be available for habitat protection. With little or no limitation on general restoration activities, this category increases to 48%. While monitoring and research increases to 10%, administrative and public information costs remain at 7%.

Implementation of Restoration Plan

Restoration at the project level will be consistent with restoration actions described within the selected alternative(s) and will begin with implementation of annual work plans beginning in 1994. Each year there will be call for ideas (project descriptions) for the next year's annual work plan. Based on this input, a draft annual work plan will be assembled by the Trustees and circulated for public review. After consideration of public comments and any necessary revision, the annual work plan will be adopted and implemented.

Funding

Funding for restoration will come from the \$900 million that the EXXON Companies agreed to pay the United States and the State of Alaska over a period of 10 years. About \$630 million remains after reimbursing the Trustee Agencies for the costs of damage assessment. The *Exxon Valdez* oil spill, however, resulted in injury to resources that may not recover for generations. The extent of injury and the rate of recovery for some resources and services will not be completely known for decades, well beyond the life of the existing settlement. For these and other reasons, restoration needs will continue well beyond the last scheduled payment in 2001. To address this need, The Trustees are considering a proposal to establish an endowment. An endowment could serve to extend the life of the restoration program providing longer-term (perpetual) support for certain restoration activities, e.g. monitoring and research. An endowment also offers opportunity to undertake restoration at a slower pace than would be the case if all the funds had to be expended within the 10-year life of the settlement. We may not know if initial restoration is successful for many years, which suggests a more cautious approach.

John A. Strand, III
AIFRB Member 1976

C. Lavett Smith Retires

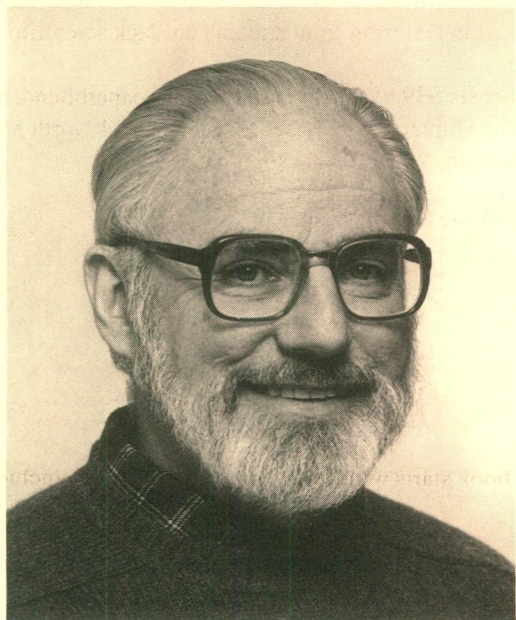
Dr. C. Lavett Smith, "Smitty" to the ichthyological community and AIFRB Fellow since 1972, retired this August from his position as Curator in the Department of Herpetology and Ichthyology of the American Museum of Natural History, New York City.

Smitty received his Doctorate in Ichthyology from the University of Michigan in 1959, and over the years has taught this subject to students at Michigan, the College of Guam, the University of Hawaii, Ohio State University, Oklahoma State University, C.W. Post College, Rutgers University, and the City University of New York.

He began his curatorial career at the American Museum of Natural History in 1962, and served as Chairman of the

C. Lavett Smith Retires cont.

Ichthyology Department from 1975 to 1982. His research interests have involved studies on the evolution and classification of fishes, community ecology of Bahamin reef fishes, coral reef habitats, early life history and growth patterns of fishes, and inland fishes of New York State. These research interests have allowed Smitty to work in all aquatic habitats from the shoreline, and surface-to-extended underwater saturation dives involving the TEKTITE II, NULS I, FLARE, and HYDROLAB, undersea habitats. Among the many significant contributions made by Smitty was the unexpected discovery, in 1975, of the ovoviviparous nature of *Latimeria*, the living coelacanth.



Smitty, throughout his career, has been the recipient of numerous grants, awards, and honors and has authored over 100 scientific articles, reviews, and more popular publications; but on the east coast he is perhaps best known for his definitive book on the "Inland Fishes of New York State" which, since its publication in 1986, has become a prime reference work for fish biologists and fishery scientists concerned with New York waters.

Although officially retired, Smitty has been granted Emeritus status at The Museum and still maintains an active research program. Among his current projects is a study of the signaling behavior of the sailfin blenny, *Emblemaria pandionis*, at Carrie Bow Cay, Belize. It seems that these little fish use their fin flashings socially among males and between male-female pairs in courtship rituals. Much of this work involves a "peeping Tom approach" using undersea, *in situ*, video camera recording of these interesting little fish. Smitty is also overseeing the final phases in the production of his latest book whose intriguing working title is "The Shoreside Guide to Watching Freshwater Fishes." We in the New York/New Jersey District are proud of C.L. Smith and join all AIFRB members in wishing him well.

Meetings and New Publications

Cultured Fishes Symposium

The American Fisheries Society will sponsor a special symposium at the Doubletree Hotel and Convention Center in Albuquerque, New Mexico on March 12-17, 1994. The symposium, entitled *Uses and Effects of Cultured Fishes in Aquatic Ecosystems*, will examine the roles of fish hatcheries and genetics in fisheries management.

The symposium and workshop will be hosted by the Division of Fisheries, USFWS, Southwest Region, and sponsored by the Fish Culture, Fisheries Management, Genetics, Fisheries Administrators, Introduced Fish, Bioengineering, Physiology, Marine Fisheries, and Early Life History Sections of the American Fisheries Society.

The goal of the symposium is to define existing appropriate uses and to suggest future improvements in cultured animals, especially the genetic aspects, to make them better tools for specific management uses. The symposium will be interactive with contributing Sections adapting and modifying individual Section views on the uses and effects of hatchery products. Papers will be published, and a follow-up facilitated workshop will be held in Halifax at the 1994 annual meeting.

Solicited and contributed papers will be published in a special AFS publication. Papers will be solicited to fall in topic areas (panels), and contributed paper authors should identify for which panel their contribution is intended. Manuscripts should accompany authors to the symposium. Poster presentations are encouraged. Alternate papers will be published even if not orally presented.

For information, write Delano Graff, Symposium Chairman, Pennsylvania Fish & Boat Commission, Bureau of Fisheries, 450 Robinson Lane, Bellefonte, PA 16823.

N.A. Wildlife and Natural Resources Conference

The 59th North American Wildlife and Natural Resources Conference is scheduled for March 18-23, 1994, at the Egan Civic and Convention Center in Anchorage, Alaska. The international meeting's theme is *International Partnerships for Fish and Wildlife*.

Those wishing to participate in the Conference are invited to request abstract guidelines from, and propose papers to, the appropriate chairs listed below. This should be done immediately. Below are the listed session subjects and their appropriate chairs:

Conserving International Resources of the North Pacific Rim -- A. M. "Art" Martell, Canadian Wildlife Service, P.O. Box 340, 5421 Robertson Road, Delta, British Columbia, Canada V4K3Y3; (604) 946-8546.

Wildlife Population Estimation -- David L. Otis, Cooperative Fish and Wildlife Research Unit, G08 Lehotsky Hall, Clemson University, Clemson, South Carolina 29634; (803) 656-0320.

The Role of Hatcheries and Genetics in Fisheries Management -- Delano Graff, Pennsylvania Fish and Boat Commission, 450 Robinson Lane, Bellefonte, Pennsylvania 16823; (814) 359-5154.

N.A. Wildlife and Natural Resources cont.

Integrating Game and Nongame Management -- William O. Vogel, Office of Migratory Bird Management, U.S. Fish and Wildlife Service, 634 Arlington Square, Washington, D.C. 20240; (703) 358-1714.

Biological Diversity and Sustainable Ecological Systems -- Tom Darden, Wildlife Program Manager, U.S. Forest Service, P.O. Box 96090, Washington, D.C. 20090-6090; (202) 205-1275.

North American Gamebirds: Developing a Management and Research Agenda for the 21st Century -- Leonard A. Brennan, Tall Timbers Research, Inc., Route 1 Box 678, Tallahassee, Florida 32312-9712; (904) 893-4153.

Aquatic Fauna in Peril: The Southeastern Perspective

The Tennessee Aquarium will present a symposium on *Aquatic Fauna in Peril: The Southeastern Perspective* at the Holiday Inn-Chattanooga Choo Choo, Chattanooga, Tennessee on March 31 and April 1, 1994.

The Southeastern United States is widely regarded as the center of biodiversity in North America. However, pollution and habitat loss are threatening the rich natural heritage of this region. Freshwater ecosystems in particular face unprecedented threats.

The two day conference will focus on the problems facing the imperiled aquatic fauna of the southeast. This conference is designed to provide a thorough historical review of the imperiled aquatic animals of the southeast as well as a review of the management efforts aimed at conserving and restoring these faunas. Presentations will also address the management of aquatic ecosystems in the southeast, the roles of government and the public in aquatic conservation, and the formulation of a unified practice of resource management.

Sessions will cover imperiled insects, crustaceans, mollusks, fishes, amphibians, reptiles, birds, and mammals, and management of aquatic resources.

Preregistration fee is \$80. Registration after March 1, 1994, is \$100. The conference fee includes a registration ice breaker, lunch at the Holiday Inn, and an evening buffet at the Tennessee Aquarium. Additional guests can attend the aquarium buffet at a cost of \$30.

For more information, write Tennessee Aquarium, Attn: Janet Allen, P.O. Box 11048, Chattanooga, TN 37401-2048.

Trout Stream Therapy

The University of Wisconsin Press has published *Trout Stream Therapy*, a book by Robert L. Hunt.

Trout Stream Therapy is a fully illustrated field guide to improving trout habitat in streams damaged by human activities associated with agriculture, forestry, and urbanization. Over the past four decades state and federal natural resource management agencies in the Midwestern region have devised, tested, and refined a variety of techniques intended to restore healthy living conditions for trout. Leading the way in this regional effort has been the innovative and aggressive program of the Wisconsin Department of Natural Resources.

Robert L. Hunt, during his thirty-three years as a research biologist with the Wisconsin DNR, has carried out many of the pioneering field evaluations of the techniques developed to reestablish healthy wild trout populations and improve the sport fisheries that depend on those populations.

Trout Stream Therapy provides twenty-one of the most up-to-date, successful, field-tested techniques applicable not only to Midwestern streams, but also to physically similar streams elsewhere in the United States and in other countries. Professional fisheries biologists and administrators responsible for rehabilitating trout habitats will find this manual an invaluable reference in the field and in the office.

The many sketches and color photographs illustrating these techniques will be particularly helpful to those who are interested in restoring trout streams but lack scientific training.

This costs \$39.95 in cloth and \$19.95 paperbound. Order from The University of Wisconsin Press, 114 North Murray St., Madison, WI 53715-1199.

Fishes of the Southern Ocean

O. Gon and P.P. Heemstra have edited *Fishes of the Southern Ocean*, a 462-page volume published by the J.L.B. Smith Institute of Ichthyology. This is a product of six years of intensive research by a team of 32 ichthyologists from 11 countries. It is the first comprehensive work on Antarctic fishes since J.R. Norman's (1938) review of notothenioid fishes.

The book starts with six introductory chapters, including a review of the history of Antarctic ichthyology, the physical oceanography of the Southern Ocean, the origin and evolution of the Antarctic ichthyofauna, special adaptations of Antarctic fish, their exploitation and conservation with emphasis on recent times, and the use of otoliths in their identification.

The introductory chapters are followed by an extensive taxonomic section with keys for the identification of all families, genera, and species. Families are presented in phylogenetic order. All but three of the 272 species treated in the book are illustrated. Species accounts provide a synonymy, diagnosis, distribution notes (with a map), and a review of the current knowledge of the biology of the species.

The book ends with 12 colour plates, glossary, a list of museum acronyms and addresses, and a bibliography of about 800 references.

This book costs \$105 from ICHTHOS, J.L.B. Smith Institute of Ichthyology, Private Bag 1015, Grahamstown, 6140, South Africa.

Quality Criteria for Water

This book provides environmental regulators and technical personnel with Environmental Protection Agency (EPA) guidance on instream concentrations for more than 85 toxicants. Summarizes tolerance levels for: aquatic life, human health, temperature, dissolved oxygen, color, pH, and hardness.

Summaries are arranged alphabetically by chemical and usually include the numerical limits both for exposed populations of aquatic life and for human health. EPA guidance on

Quality Criteria for Water cont.

limits cited in this book is frequently adopted as state water quality standards. Each listing also includes the Federal Register number so users can easily research additional information about a particular chemical. Subscription service includes the basic manual and one supplement. The material is punched for your 3-ring binder.

To order for \$23, ask for List ID QUCW from Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

The Physiology of Fishes

The Physiology of Fishes is a 608-page book edited by David H. Evans and containing contributions from 21 experts worldwide. It is a comprehensive, state-of-the-art volume covering most aspects of fish physiology. The book begins with an introduction to the systematics of fishes, followed by two chapters that discuss swimming and buoyancy mechanisms important in movement and maintaining position in the water column. Four chapters are devoted to the inner ear and lateral line, electrosensation, vision, and chemoreception.

International contributions from leading experts cover the anatomy and physiology of the cardiovascular system and the gill, the control of these systems by the autonomic nervous system, osmoregulation, acid-base regulation, ammonia and urea metabolism and excretion, thermoregulation, endocrine control, and reproduction. The final chapter of the book examines the morphology and physiology of coloration in fishes. This outstanding volume is an essential reference for all ichthyologists, fisheries biologists, comparative physiologists, systematists, behaviorists, anatomists, and others interested in fish physiology.

Order for \$95 from CRC Press, 2000 Corporate Blvd., N.W., Boca Raton, FL 33431.

Thesis and Dissertation Abstracts

Microhabitat Use and its Effect on Growth of Age-O Smallmouth Bass in the North Anna River, Virginia

Matthew J. Sabo, Ph.D. 1992
Virginia Polytechnic Institute

This study examined the relationship between microhabitat use and growth of age-O smallmouth bass in the North Anna River. The study objectives were to describe microhabitat use during summer, assess the profitability of microhabitats, and determine if and how microhabitat use could determine which individuals gained a growth advantage.

Age-O smallmouth bass changed their microhabitat use as they passed through stages of ontogenetic development and became familiar with their environment. More than 30% of the area available to brood larvae contained mean water column velocities greater than 4 cm/s and no cover. More than 80% of larvae observed after dispersing from the nest site occupied areas approximately 1 m deep with velocities near 0 cm/s, or large cover objects that created low-velocity shelters throughout the water column. By 6 weeks after dispersal

(when all juveniles were > 40 mm), more than 50% of juveniles occupied depths less than 60 cm and focal point velocities > 3 cm/s, and microhabitat use by large and small juveniles did not differ. In these shallow microhabitats with moderate-to-fast current velocities, juveniles foraged at a higher rate (5.1 bites/min on average) than in deeper and slower velocity areas (1.3 bites/min). When these foraging rates were translated into estimates of energetic profit, juveniles in the shallow-fast microhabitats gained approximately 5 J/min more than juveniles foraging in other microhabitats. Microhabitat use was the only aspect of behavior that affected the foraging rate or energetic profit gained by juvenile smallmouth bass.

I examined daily rings on otoliths to track the growth of individual smallmouth bass through time. Temperature affected growth rates below 22-23°C, so that individuals spawned later grew in warmer thermal regimes and grew relatively fast during early life stages. However, individuals that spawned early and grew slowly in cooler temperatures did not suffer higher mortality and compensated for their slow growth by accumulating growth over a longer period of time. Above 22-23°C, relative growth rates were not consistent through time; a fast-growing individual during one life stage could grow relatively slow during the next. If growth above the temperature threshold depended on foraging success and foraging success depended on microhabitat use, then few individuals were consistently occupying the most profitable microhabitats.

In experiments in an artificial stream, juvenile smallmouth bass assessed the potential profitability of an area by the foraging rate they achieved there. They usually did not remain in an area unless they foraged well at the time they searched it, and did not appear to associate habitat characteristics with profitability. In the river, most of the microhabitats available were relatively unprofitable, so an individual that abandoned a profitable area might (depending on its foraging behavior) spend significant time in unprofitable microhabitats and consequently reduce its growth rate. Increasing the availability or density of food resources may improve growth of juvenile smallmouth bass in the North Anna River by increasing the rate at which juveniles encounter profitable microhabitats and elevating their intake rates in profitable areas.

Factors Affecting Reproductive Success of Smallmouth Bass and Redbreast Sunfish in the North Anna River, Virginia

Joseph A. Lukas, Ph.D. 1992
Virginia Polytechnic Institute

This study examined the spawning habitat requirements, timing of spawning, and influences of habitat, temperature, and stream discharge on the reproductive success of smallmouth bass and redbreast sunfish in the North Anna River, 1992.

Habitat suitability criteria for spawning smallmouth bass were similar to previously published criteria. Male smallmouth bass selected nest sites in protected areas of pools

Factors Affecting Reproductive Success cont.

(mean velocity 0.05 m/s; range 0 to 0.20 m/s) with water depths ranging from 0.44 to 1.76 m. Chi-square tests showed that suitable PHABSIM cells (depth suitability index (SI) \times velocity SI > 0) were used for spawning in higher proportion than unsuitable cells (SI = 0). In addition, the number of suitable cells available exceeded the number of cells used for spawning until flows reached 10 m³/s, suggesting that spawning habitat for smallmouth should not be limiting at flows less than 10 m³/s.

Smallmouth bass began spawning when temperatures reached 15°C, and high flow disrupted spawning five times. Larger males spawned earlier than smaller males; a loglinear relation between male TL and degree-days accumulated was significant ($r = -0.63$, $P < 0.01$). Forty-five of 105 nests (43%), and 42 of 81 males (52%) produced free-swimming larvae. Production of free-swimming larvae was variable, ranging from 98 to 1802 with a mean of 608. Stepwise discriminant analysis distinguished successful nests from unsuccessful nests by: higher flow at nest construction (4.93 m³/s vs. 2.25 m³/s), higher mean temperatures (19.2°C vs. 17.6°C), lower mean stream discharge during nest incubation (5.03 m³/s vs. 7.67 m³/s), lower distance to shore (11.7 m vs. 13.2 m), and higher male aggression. Swim-up production for the 45 successful nests was positively correlated with male size and distance to cover. High flow (> 10 m³/s) was responsible for most nest failures (85%). Increased nest site velocities with increased stream discharge was most likely the mechanism causing nest failures. The increase of mean velocity with increased stream discharge was significantly lower for successful nests than for unsuccessful nests ($P = 0.02$). The temporal pattern of streamflow fluctuation was the most important abiotic factor determining reproductive success or failure for smallmouth bass.

Redbreast sunfish began spawning in late May when temperatures exceeded 20°C. Spawning habitat was similar to previously reported information. Redbreast sunfish nested in pools with low velocities (< 0.10 m/s) and water deeper than 0.5 m. Nest densities declined into the summer and variation in nest density was explained by a single predictor (log degree-days). All nests constructed in May in the 600-m study reach were destroyed by high flow, while 30 of 51 nests monitored over time were successful. The overall success rate for nests was 33%. Multivariate separation (MANOVA) from 21 variables was not significant, suggesting that reproductive success was not related to the variables measured and may be influenced by biotic factors (predation).

Evaluating the Effects of Angler Behavior on the Efficacy of Harvest Regulations in Recreational Fisheries

Allan E. Creamer, M.S. 1992

Virginia Polytechnic Institute

A computer-implemented simulation model was modified to compare various regulation schemes and determine how they are affected by angler non-compliance and voluntary catch-and-release fishing. Combinations of three creel limits

and five length limits were simulated. Scenarios for no regulations and catch-and-release were also simulated. Angler non-compliance varied from 0% to 50% and voluntary release included rates of 20%, 50%, and 80%. Based on catch, harvest, yield, and PSD, the ranking of specific regulations changed little among levels of angler non-compliance and voluntary release. All four decision variables were most influenced by regulations when angler compliance was high and voluntary release was low. Further, for a fishery with a high degree of voluntary release, and relatively high angler compliance, regulations did not produce any discernable benefits in the fishery.

The model was demonstrated with data on a smallmouth bass, *Micropterus dolomieu*, fishery for the upper and lower James River, Virginia. Simulated regulations were assessed based on adjustments to angler non-compliance, which averaged based on adjustments to angler non-compliance, 17%, and voluntary release, which averaged 90%. Model results indicate that more restrictive regulations improved PSD and catch, whereas numerical harvest and yield in weight benefitted from liberal regulations. Variability among the 81 regulations was low, suggesting that voluntary release (90% average) is a dominant control in the James River smallmouth bass fishery. From a management standpoint, these findings also suggest that, where appropriate, management strategies should focus on increasing voluntary release and rely on regulations only in certain fisheries.

In Memoriam

L. Dean Marriage

AIFRB Emeritus 1986

May 18, 1993

Lowell Dean Marriage, a retired fisheries and wildlife biologist, died of cancer on May 18 in a Milwaukie, Oregon care center. He was 69. Lowell worked as an aquatic biologist for 21 years and then held the post of Assistant Director of Fisheries for the Oregon Fish Commission for 2 years. He went on to serve as Regional Fisheries and Wildlife Biologist for 13 Western states for the U.S. Soil Conservation Service until his retirement in 1985.

He had written and co-written numerous publications related to fish-pond management and watershed issues. Mr. Marriage belonged to the American Fisheries Society, the Wildlife Society, and the Soil Conservation Society of America, and was an Emeritus member of the AIFRB. One of his most popular publications is *The Bay Clams of Oregon—Their Identification, Relative Abundance, and Distribution*.

Lowell was an active member of the First Presbyterian Church of Portland.

In Memoriam cont.

Gary Michael Russell
AIFRB Member 1979
September 17, 1993

Gary Michael "Mike" Russell died on September 17, 1993 after a four-month valiant struggle against cancer. Mike received a B.S. degree in Biology from the University of West Florida in 1969 after serving four years on submarines in the U. S. Navy.

Mike worked as a research fishery biologist with the Resource Surveys Division at the Pascagoula facility of the MFS Mississippi Laboratories. During his 23-year career in fisheries he served as the Regional NOAA diving officer and chief scientist on bottomfish and reef fish surveys. He recently developed a survey design to monitor and assess reef fish populations in the Gulf of Mexico, using an underwater video camera and fish traps. He published a variety of scientific reports including a field guide to the searobins (*Prionotus* and *Bellator*) in the Western North Atlantic, and an evaluation of mid-water structures designed to attract coastal pelagic fishes.

He had a keen interest in soccer and coached state and local teams which became league champions. He was an avid hiker, having covered over 500 miles of the Appalachian Trail. We knew he was preparing to do the Trail when he came to work in hiking boots. Growing cactuses was Mike's specialty; his

office and home were filled with a large variety of plants which bloomed throughout the year.

Mike will be remembered for his enthusiastic approach in all of his activities. He was an inspiration to new laboratory personnel as well as to young soccer players.

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.

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FIRST CLASS

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

Address Correction Requested

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

*American Institute of Fishery
Research Biologists*

