

The Tributary

A Newsletter of the Western Division, American Fisheries Society

Volume 17, No. 2/March 1992

PRESIDENT'S CORNER

The year has come and gone quickly and a lot has happened. Columbia River salmon were listed as threatened and endangered, myself and several other WDAFS officers ate at least 11 different varieties of chicken by visiting chapters and members, budget cuts crippled some state agencies' ability to operate, and I witnessed the birth of my second son. Too much, too little time. As I reflect, there is so much more that I should have done. A Western Division president is given three chances to reach all of the members of the Western Division. Like the genie in the lamp, I've used two already, I need to make the third one count.

I am not a sooth sayer, oracle, or mystic; rather I am a hippie. Actually a clean shaven, short haired (actually bald) variety of hippie that enjoys espresso, bottled water, a VCR, and owns two cars. Doesn't sound like a hippie? Ah, but I am a hippie, because I reject some, but not all of society's mores. I do by profession reject that Wall Street societal more of "Greed is good." Chances are you too are a hippie, whether you know it or not, because you are a biologist. And as a biologist, you're not into this for the money or you'd be a marketing analyst in Chicago.

But as a biologist, I and you possess a foresight of potential foreboding. We have a crystal ball which exists as a collection of science, history, statistics, chance and luck (if your crystal ball is tainted with politics, you are not a biologist, but an administrator). I do not like to look into the crystal ball, but as I do, I shudder at what I see. I see the continued loss of species, the degradation of habitat, the loss of resources and increased toxic pollution. Our environment, as Cal-Neva Chapter president Larry Week says, is reaching "critical mass." For example, several California fisheries are in horrible shape, coastal salmon stocks are almost nonexistent, bull trout are gone from much of their range, and so on. Fisheries and the environment are losing.

The battle is an emotional one and casualties are heavy on both sides. It will be a long hard fight and while each can claim victories, the war can never be won as long as we point fingers at the culprits. Why? Because we too are part of the problem. Because as we live, we are our own opponents. We use paper, drive autos, use electricity, eat, etc. And as long as we are consumers, we fight ourselves.

A solution? Conservation and activism start with ourselves and spread to our community. Take a moment and examine your activities, do you use styrofoam cups, use lots of paper and use too much water? Become a part of something, and AFS activism is the perfect something. No longer can we as a group of professionals just sit idly by and present papers and discuss them. We must act and speak up for the fish. When we present a paper we speak for the fish, but to ourselves. We know the problems, let's act and speak to others. Remember Timothy Leary, (a hippie who now works for IBM writing software); he said "Question authority." Well, most if not all, WDAFS chapters and some members are questioning their own agencies and speaking up for the fish. I'm not saying that we become "Fish First", but use our credibility as fisheries professionals to educate and inform others.

AFS is doing something to this end with the Fisheries Action Network (FAN). I had the honor to co-host with John Fritts and Paul Brouha the first meeting of the FAN. We had invited corporations, sportsmen groups, foundations, individuals, and other associations to propose a sharing of aquatic and fisheries information. Together we could represent and do something for "the fish" as a powerful and cohesive group, instead of a collection of fisheries factions. It was a fine hour of AFS and fisheries activism. I urge all of you to see how you, your sports group, or Western Division chapter can share and become part of the FAN. It is a solution. Paul, John or myself will be more than happy to tell you about the FAN and what you can do.

Finally, all of you as Western Division AFS members should use your chapter, or WDAFS elected officers to share your thoughts and ideas. Remember we work for you—you are our constituents. The Division is your voice on the Executive Committee of AFS that governs the way we operate. If we don't listen, feed us more chicken when we come to your chapter to visit. If you don't share with us, we'll feed you chicken. And I want to thank all of you for letting me be a part of an AFS experience that I will never forget.

—Donald L. Chase

SOCIETY NEWS

STREAM HABITAT PROCEDURES COMMITTEE NEEDS MEMBERS

The Western Division's Stream Habitat Procedures Committee is looking for new members. With all the activities that are taking place in the arenas of stream habitat inventory and restoration, it is timely to bring new life to this committee. The committee began in the mid-1980s with the mission of producing a glossary of stream habitat terms and a manual of standard inventory procedures. The glossary was completed under the chairmanship of Bill Helm of Utah State University, and the effort to put together a procedures manual has become national in scope thanks to Neil Armantrout.

But there is still much to be done. Continued inputs to the procedures manual are needed. Several chapters in the Western Division have sponsored or are planning to sponsor continuing education workshops dealing with stream habitat management. Restoration plans for threatened and endangered salmon are being assembled, and will surely include strong habitat restoration components. With so many of us involved in the habitat business in one way or another, it is important to keep abreast of the latest developments in habitat measurement and analysis.

If you're interested in becoming involved, the Stream Habitat Procedures Committee needs your help. Some of the activities planned for the near future include providing input to the national Habitat Committee stream and lake procedures manuals, participating in workshops and symposia on state-of-the-art habitat techniques (one is currently being planned for Portland, Oregon, in 1993), and helping local chapters put on their own habitat shortcourses. In return, you'll get to rub shoulders with the experts in the field (such as they are) and find out about all kinds of habitat measurement techniques that will make you look good to your boss.

An informal gathering of the reconstituted committee will be held at the Western Division meeting in Ft. Collins in July. The goal of the meeting will be to define a realistic action plan

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The Tributary is distributed to 3,000 WDAFS members and exists as a forum to present fisheries-related information. As the editor, I cannot accomplish this goal unless YOU participate! The WDAFS publishes three editions of *The Tributary* yearly.

Deadlines for submission of articles are February 15 (for the Winter issue), May 20 (for the Spring issue) and October 15 (for the fall issue).

If you have information you would like included in *The Tributary*, send it to:

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40 Hawk Springs WY 82217

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JOBS

for the coming year. Details of the meeting will be posted near the registration desk. If you'd like to become a member, please come to the meeting. Better yet, contact the committee chair Pete Bisson for more details (c/o Weyerhaeuser Company, WTC-1A5 Tacoma, WA 98477 206/924-6329). Hope to see you in Ft. Collins.

WDAFS FUN RUN UPDATE AND OTHER GOOD STUFF

Plans for the 1K and 5K fun runs are pretty well finalized now. The events will take place on Tuesday evening, July 14th at 5:30 pm. By paying the \$10 entry fee, you not only receive a great commemorative t-shirt, a challenging workout at 5,000 feet, potential recognition as the very best runner in the whole world; but also maybe, perhaps, just possible, you might win a great prize (don't hold your breath over the prizes; we'll see). A course description will be available at the registration desk in Fort Collins.

There will be a couple of options for people interested in playing volleyball during the WDAFS meeting. A net will be available for pick-up games during the evening social on Monday the 13th, and there will be two sand pits with nets at Corbett Hall that will be set up throughout the meeting. Depending on how much interest there is, one or both of the nets at Corbett Hall will be scheduled for some team challenge games. A team with the capability to seriously kick vent has already been organized in Wyoming and they welcome any and all challenges, especially from Colorado (yawn) or other wimpy places like Oregon and Montana. If you muster a team together it would help if you contact Bill Bradshaw by June 30th so that scheduling can be finalized. Teams hastily scraped together at the last minute can sign up at the registration desk.

Fort Collins is pretty much a bicycle friendly town, with a number of places to go and routes to take. If there is enough interest, arrangements will be made for some organized bike tours. Options discussed to date include bike path rides along the Poudre River, hatchery tours, and mountain trail rides. For those who would rather go-it-alone, there will be general information at the registration desk regarding routes around town and nearby mountain bike trails. If you don't have your own bike, there are a couple of bicycle shops in town that have offered rate-breaks on mountain bike rentals, but we need to reserve them in advance of the meeting. If you plan on renting a mountain bike, or are interested in an organized ride, contact Bill Bradshaw 307/777-4559 or Dirk Miller 307/745-4046 by the end of June. Bill Bradshaw

—Society News, continued on page 4

Vessel and gear technology academic staff required who will enthusiastically provide practical experience to Fisheries Science degree candidates. Traditional skiff and dhow fisheries, an industrial fleet and University-operated vessels are available for study of diverse commercial fisheries. Candidates should have *hands-on experience in vessel and/or gear technology* (i.e. maintenance, refitting, operating, gear fabrication and fish handling). Coastal resources exceptional, living standards high and cost of living modest.

Please supply resume with detailed teaching and practical experience, photocopy of passport information (date and place of issue, birth, countries visited in past year), fax or telephone numbers.

Contact HOD, Fisheries Science and Technology, Sultan Qaboos University, Box 32484 Al-Khod, Muscat Sultanate of Oman Fax, 011-968-513254; telephone, 011-968-515248.

—Society News, continued from page 3

fishing. Ten percent of all applicants usually fail. A successful examinee receives a 5-year license bearing the angler's photograph and stamped by government authorities. Officials say the rules are needed because highly industrialized Germany has too few fishing waters and too many anglers. Violating the angling laws brings tough penalties; in Germany's most populous state, an angler fishing without a license can be fined up to \$6,250. Anglers take their sport seriously because it is under attack from environmentalists and animal rights groups who propose that fishing be outlawed. Luckily (for us), tourists and diplomats are exempt. *Jan Eggers, from In-Fisherman, Winter 1990*

WHIRLING DISEASE DISCOVERED IN UTAH

J.C. Wilson Fisheries Experiment Station Utah Division of Wildlife Resources 1465 W. 200 N Logan, UT 84321-6262

In June 1991, the spores of *Myxobolus cerebralis* were discovered in rainbow trout (*Oncorhynchus mykiss*) during a routine fish health inspection of a private aquaculture facility in

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A BUCKET OF FISH

Picture a pristine lake in the heart of Montana bristling with thousands of arctic grayling. Fish so plentiful that with only a few scoops of the net through the spring spawning run, Montana hatchery workers could catch enough fish to supply eggs for the entire state's stocking program. Returning two years later, you would expect to see the same spectacular site, but instead you are greeted with a stream completely devoid of grayling. (Some material provided by Montana Department of Fish, Wildlife, and Parks: "Fish Line" October 1991.)

Sound impossible? Well, not to anglers in Montana's Rogers Lake. Because of a few people's desire to "have it all" and three successive illegal stockings of rainbow, cutthroat hybrids, brook trout and yellow perch, grayling runs, one of only four populations of that species in northwestern Montana, are now almost nonexistent. And what has happened to the stocked fish? After one good year of trout fishing and one year of jumbo yellow perch, only a devastated fishery producing four-inch perch remains. What is the solution to the havoc wreaked by illegal fish plants? Likely, the lake will be treated with rotenone (a fish toxicant) to remove all undesirable species and then restocked, at a cost to Montana anglers of more than \$25,000!

Every year, illegal fish stocking throughout the U.S. costs anglers millions of dollars in lost fishing opportunities and added fishery management expenditures. Unethical fishing enthusiasts who want to take fishery management into their own hands by stocking lakes and streams often upset the delicate balance of the receiving waters. Add to this the unintentional introductions of exotic species from around the world into the Great Lakes and other North American waters and the nationwide impact of unwanted introductions becomes enormous. Even legal introductions by state and federal agencies can develop unforeseen problems.

Unfortunately, all too often managers politicians and private citizens have relied on stocking as the end-all solution to our fishery problems while ignoring plausible (but possibly more complicated) alternative management actions. Conducted properly, stocking programs (through artificial propagation or transplanting naturally produced fish) provide tremendous benefits not only to recreational anglers but also to the ecosystem in general. Fisheries managers are taught that artificial propagation and stocking of fish has many uses, including re-establishing native populations which have been eliminated by human activities or natural catastrophes, bolstering depleted fish stocks, providing new fishing opportunities where previously none existed, and restoring balanced aquatic communities. Introductions of grass carp (an exotic from China), although controversial in some cases, have helped to bring under control nuisance aquatic vegetation. In other systems suffering from human-induced nutrient imbalance or other factors, introductions of predator or forage species have helped to bring the system closer to a balanced community, while supplying countless recreational fishing opportunities.

Increasingly, though, some biologists are beginning to question the value and motivation of stocking. Certainly, unintentional or illegal stockings such as that in Montana's Rogers Lake are a black mark against all introductions. But even legitimate and purposeful stockings are now beginning to come under fire. In the Pacific Northwest, hatchery stocks of Pacific salmon are being blamed for diluting the gene pool of native stocks and contributing to their decline. Although mistakes may have been made by stocking non-native strains to re-establish a native population, the fact remains that many strains would not be in existence today had it not been for hatchery production. Certain interpretations of the recently popular concept of biodiversity are challenging the traditional practice of stocking game species, even though such stockings may be beneficial to the aquatic ecosystem.

The knee jerk reaction to any fisheries problem caused by stocking is often to propose a ban on all stocking. However, the real challenge in such situations is to determine the rightful role of stocking in today's world based upon the wealth of accumulated knowledge on stocking that has been gained through past experiences and research. Today's ecosystems are not identical to those of a century ago, and we cannot expect that even the most extensive restoration efforts will ever return them to their "pristine" conditions. Healthy ecosystems are dynamic, constantly altered by biological, physical and chemical processes. In today's high tech society, influences originating thousands of miles outside of watershed boundaries are drastically altering water quality and aquatic life. Witness the drastic impacts of acid rain on poorly buffered systems and exotic introductions, such as the zebra mussel and spiny water flea, into the Great Lakes. The world population has increased dramatically

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AFS EQUAL OPPORTUNITIES

The newest AFS section—Equal Opportunities—has been formed and officers have been elected. If you are interested in this section, please contact the following folks:

President	Cay Goude	916/978-4613
Vice-President	Ira Palmer	202/404-1151
Secretary-Treasurer	Dr. Mary Fabrizio	313/994-3331
Membership	Christine Moffitt	208/885-7047
Newsletter Editor	Stephen Smith	503/230-3111

If you wish to join the EOS, fill out the form below and send it in today!

Equal Opportunities Section Membership Application
(must be a member of the AFS Parent Society)

Please fill out and return to American Fisheries Society, 5410 Grosvenor Lane, Suite 110, Bethesda, Md 20814-2199

Name _____ Date _____

Address _____

City _____ State/Province _____ Zip _____ Country _____

I am a member of AFS and have paid my 1992 dues. Therefore, I will pay the \$5.00 membership dues for the Equal Opportunities Section. Mail to Dr. Mary Fabrizio, U.S. FWS/NFRC, Great Lakes, 1451 Green Road, Ann Arbor, MI 48105.

Interested in Serving on a Committee?
Please fill out the following information

Name _____ Position _____

Agency/business/university _____

Address _____

City _____ State/Province _____ Zip _____

Country _____

Business phone _____ FAX _____ EMail _____

Areas of Interest: _____

THIS AND THAT AROUND THE WEST

WE'RE THE WORST!

American Rivers' annual listing of 10 North American waterways with "endangered status" lists the Columbia and Snake Rivers at the top. The report, published annually since 1984, is compiled to encourage the protection of undeveloped stretches of rivers. Studies referenced by American Rivers suggest that 200 salmon stocks and at least 214 other native fish species are imperiled along the heavily dammed Columbia system. American Rivers also lists 15 rivers as "threatened." Three Northwest rivers — the Illinois and Klamath Rivers in Oregon and the Elwha River in Washington — made that list. [Source: USA Today, April 9, 1992.]

COASTAL WATERS: NUTRIENT RICH OR NUTRIENT LADEN?

Coastal waters are among the most intensively fertilized environments on earth, says Scott Nixon, Rhode Island Sea Grant Director and University of Rhode Island oceanography professor. "On average, an acre of Narragansett Bay or Delaware Bay receives more nitrogen and phosphorous each year than the average acre of cotton, soybeans, or wheat grown in the U.S."

This over fertilization of coastal waters is due to three sources: human sewage, fertilizer run-off, and atmospheric deposition. Sewage treatment plants have long been known as sources of nitrogen, but land and atmospheric sources are growing. These new sources include run-off from commercial and home lawn fertilizers and atmospheric pollution from fossil fuel combustion and acid rain.

"Why are simple, naturally occurring chemicals that are so beneficial in Kansas, Iowa, or the home lawn, viewed with such alarm when they flow into Narragansett Bay or Chesapeake Bay?" Nixon asks. Because, he points out, these nutrients stimulate the production of large amounts of algae that clog coastal waters—shutting out sunlight, reducing water clarity, and choking and killing beneficial sea grasses. Moreover, when this runaway proliferation of algae dies, it sinks to the bottom and decays—causing further damage. In the process, it robs that water of oxygen, killing fish and making large areas of the

bottom uninhabitable for fish and other marine animals. What's more, the problem is compounded by the relatively recent loss of large areas of wetlands. Wetlands once helped to retain nutrients in the watershed and return nitrogen to the atmosphere. With the loss of wetlands, nutrients now flow largely unimpeded to coastal waters.

Surprisingly, scientists are just now beginning to understand the mechanisms of nutrient dynamics in coastal waters. Much of what is known about nutrients in the aquatic environment is based on studies of lakes. Saltwater systems may or may not behave in ways similar to freshwater systems, Nixon says, for coastal waters have added complexities; saline waters and tidal mixing. Lakes may not be good models for how saltwater systems respond to fertilization. For more information, contact: Carole Jaworski at 401) 792-6842.

CARRYING CAPACITY NETWORK IS INTRODUCED

Some observers are alarmed that the U.S. population is increasing by 3 million people per year, making it the world's fastest growing industrialized nation. Others are convinced that population growth is beneficial and should be encouraged. Thus, the Carrying Capacity Network (CCN) has been established to promote a broad exchange of environmental information among its participants. The organization's objective is to maintain an information network linking large and small environmental, population, resource conservation, and local growth control organizations, activists, universities, the press, and others.

Carrying capacity refers to the number of individuals who can be supported in a given land area over the long term without degrading the physical, ecological, cultural, and social environment. Many factors influence carrying capacity, including land, water, energy, human choice, and material consumption.

For more information on the CCN contact Dale Didion, CCN, 1325 G Street, NW, Suite 1003, Washington, DC 20005-3104, 800/466-4866.

SCIENTISTS DEVELOP DEGRADABLE NETS

Researchers at the University of Connecticut's Institute of Materials Science met recently with a delegation of 12 scientists and engineers from Japan to initiate formal scientific exchanges in improving marine applications of polymers and composite materials.

Kenneth Gonsalves, assistant professor of chemistry at the Connecticut lab, says that he and the other scientists discussed efforts to develop degradable materials that could be made into fishing nets, lobster trap closures, and other marine apparatus. The materials could be designed that, if lost at sea, they would degrade in about a year. Lost nylon materials that now last 30 to 50 years continue to needlessly trap and starve marine life by the thousands, Gonsalves says.

For more information contact Karen Grava Williams, University of Connecticut, 1266 Storrs Road, Storrs, CT 06269-5144, 203-486-3530.

GRANT CORRECTION

It has been brought to my attention that there was an error in the last issue of the Tributary. The "We Care for America" grants program funded by S.C. Johnson last year is unfortunately no longer available to World Wildlife Fund.

If anyone wants information about the program, they could write to Cynthia Georgeson, Environmental Communications Manager, SC Johnson Wax, 1525 Howe Street, Racine, WI 53403-5011; telephone 414-631-4728.

A NEW WAY TO REGULATE HARVEST?

Germans spend 3 months at night school to prepare for a test to determine if they will receive a fishing license. To pass they must correctly answer 45 of 60 questions. A typical question: How much roe does a freshwater roach produce? (606,261 eggs per pound of mother fish). Applicants must also assemble a rod and reel for a particular purpose such as eel

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MEETINGS, SEMINARS AND SHORTCOURSES

July 5-12, 1992

The Western Association of Fish & Wildlife Agencies 72nd Annual Conference will meet at the Scottsdale Registry Resort 7171 N. Scottsdale Rd. Scottsdale, Arizona 85253 1-800-2477-981.

July 13-16, 1992

The Annual Meeting of the Western Division of AFS. Colorado State University, Fort Collins, Colorado. For information contact Glenn Phillips, Montana Department of Fish, Wildlife, and Parks, 1420 East Sixth Avenue, Helena, MT 59620, 406/444-2449.

September 14-17, 1992

The 122nd Annual Meeting of AFS. Rushmore Plaza Hotel and Conference Center, Rapid City, South Dakota. For information contact Paul Brouha, AFS, 5410 Grosvenor Lane, Suite 110, Bethesda, MD 20814-2199, 301/897-8616; Fax: 301-897-8096.

September 26, 1992

Oregon Lakes Association

The Third Annual Meeting of the Oregon Lakes Association, Diamond Lake Resort. For more information contact Ela Whelan, Clackamas County, Department of Utilities, 902 Abernathy Road, Oregon City, OR 97405-1100 503-650-3474.

September 27-30, 1992

Salmon Management in the 21st Century: Recovering Stocks in Decline This is the theme for the 1992 Northeast Pacific Chinook and Coho Salmon Workshop. This gathering is hosted biannually by a Western Division Chapters. The 1992 workshop will be held in Boise, Idaho, at the Owyhee Plaza by the Idaho Chapter of the AFS and the Idaho Water Resources Research Institute. September 27 will be a field trip to the Stanley Basin. The workshop will begin September 28 and will conclude at 1 PM., September 30. Topics will be relative to the status, research, and management of Northeast Pacific Chinook and coho. This will be a forum to discuss realistic approaches to recovering our salmon stocks. All disciplines of salmon management are welcome. A proceedings of the workshop will be published.

For registration information, please contact Sharon W. Kiefer, Idaho Department of Fish and Game, P.O. Box 25, Boise, Idaho, 83707, 208/334-3791; Fax: 208/334-2114. Registrations by mail must be received by September 1, 1992.

October 4-7, 1992

Nineteenth Annual Aquatic Toxicity Workshop

Edmonton Hilton, Edmonton, Alberta. Workshop topics include anthropogenic discharges into northern aquatic environments, new toxicity testing methods, and pathways and fate of contaminants in the aquatic environment. Contact Earle G. Baddaloo, Standards Research and Development Branch, Alberta Environment, 9820-106 Street, Sixth Floor, Edmonton, AB T5K 2J6, 403/427-6102; Fax: 403/422-9714.

August/September 1993

The 1993 American Fisheries Society national meeting will be held in Portland, Oregon in late August or early September. We are interested in organizing a program session on threatened, endangered and "sensitive" fishes for the meeting. We expect a session would focus on the biology and ecology of threatened, endangered and sensitive species, management issues, and recovery approaches.

In order to organize such a session, we need to provide the meeting program chair with a preliminary estimate of the number of participants and potential topics. This necessarily precedes the formal call for papers published in Fisheries by a substantial time. This letter is a preliminary effort to solicit potential participants and to identify topics for such a session.

If you are interested in presenting a paper of this general topic, we ask you to let us know. We would also encourage you to help us inform other colleagues of this proposed session, as we realize we know only a fraction of the workers in this area. Posting this letter, passing it along to others, or sending us the names and addresses of potentially interested individuals would all be greatly appreciated. Please send the following information if you are interested in attending or participating in the meeting. Name, address, city, state, zip, phone, fax, topic or title.

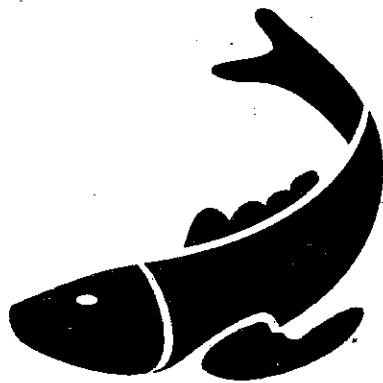
Please feel free to call either of us if you have any questions or wish to discuss ideas. Thank you for your help. Hal Weeks Threatened & Endangered Fish Program Leader Oregon Department of Fish & Wildlife P.O. Box 59 Portland, OR 97207 503/229-5410 X368. Rollie White Fish Biologist U.S. Fish & Wildlife Service 2600 SE 98th Avenue, Suite 100 Portland, OR 97266 503/231-6179.

BRINGING BACK THE NATIVES

BLM is "bringing back the natives" with the help of AFS. Bureau of Land Management (BLM) Director Cy Jamison recently signed a cooperative agreement with the American Fisheries Society (AFS) to enhance the conservation and management of fisheries, riparian habitats, and wildlife resources on the nearly one-third of a billion acres of public lands administered by the BLM.

Under a Memorandum of Understanding, the BLM and AFS will work together to implement BLM's "Bring Back the Natives" projects, which seek to restore entire public land watersheds and re-establish native fish into these streams. AFS recently documented the need for such projects in an article citing a 45 percent increase in the number of native fish requiring special management because of their increasing rarity over the past decade.

Stream systems and native fish communities have declined substantially on our more than 461 million acres of public lands in the United States. For more information, contact Jack Williams, Division of Wildlife and Fisheries, Bureau of Land Management, 1849 C Street, N.W., Washington, D.C. 20240; 202/653-9202.

**Bull Trout Workshop Proceedings**

Oregon Chapter has published the proceedings of a 1989 workshop on the life history, distribution, and status of bull trout *Salvelinus confluentus* populations. The workshop, sponsored by the Natural Production Committee, was attended by 45 fisheries professionals from 4 states and 11 agencies and companies. Co-editors Philip Howell and David Buchanan write, "While many of Oregon's bull trout populations are at risk, we are optimistic, albeit somewhat naive, that we can maintain the healthy populations, recover some of the depressed populations, and perhaps even reintroduce bull trout in a few of the suitable areas where they are not extinct." They caution, however, that this is not possible "unless the management of bull trout and their habitats are substantially changed."

The Proceedings of the Gearhart Mountain Bull Trout Workshop is a call for management change. Cost of the volume is \$5 plus \$1 postage and may be ordered by mail through Oregon Chapter AFS (P.O. Box 722, Corvallis, OR 97339) or by contacting David Buchanan, 503/737-7634.

NMFS has released its first comprehensive report on marine resources.

Our Living Oceans is largely an up-to-date national compilation of advice given by NMFS to the regional fishery management councils. NMFS plans to update the report annually and to broaden its coverage. Eventually, NMFS plans to extend this effort to cover the environment and the economic and social aspects of the nation's commercial and recreational fisheries. This first report provides the available scientific information on the health and abundance of important marine populations based on assessments available in mid-1991. It addresses most marine and anadromous species having commercial, recreational, and ecological significance. Besides finfish and shellfish, it includes marine mammals, sea turtles, and corals under the purview of NMFS. For a copy of the 123-page report, contact National Marine Fisheries Service, 1335 East-West Highway, Silver Spring, MD 20910.

Biology of Freshwater Pollution

Second Edition. By C.F. Mason. John Wiley and Sons, New York. 1991. 351 pp. \$44.95 (paper). Revised overview of the impacts of pollutants to include current concerns in environmental contamination. Topics in 12 chapters include toxicology, organic pollution, eutrophication, acidification, heavy metals and organochlorines, thermal pollution, radioactivity, oil, and chapters on biological assessments. Useful text for undergraduate courses or interested lay persons.

Eutrophication of Fresh Waters: Principles, Problems, and Restoration

By D. Harper. Routledge, Chapman, and Hall, New York. 1992. 327 pp. \$79.95. Available from AFS at 5% discount. Causes and effects of nutrient loading and management options for lakes and waterways. Coverage in eight chapters includes processes, responsible nutrients, biochemical effects, biological effects, engineering and economic aspects, modelling, reduction and management, and a case study. Chapter 4 highlights effects on fishes.

The Expendable Future: U.S. Politics and the Protection of Biological Diversity

By R.J. Tobin. Duke University Press, Durham, North Carolina. 1991. 325 pp. \$18.75 (paper). Critical evaluation of biodiversity politics and federal policies on endangered species in the last 30 years. Eleven chapters cover topics such as resources and priorities, administration, listings, preservation, costs, cooperation among agencies, assessing performance, and others. Weaknesses, successes, and failures of protection and recovery programs.

Reconciling Conflicts under the Endangered Species Act: The Habitat Conservation Planning Experience

By M.J. Bean, S.G. Fitzgerald, and M.A. O'Connell. World Wildlife Fund, Washington, D.C. 1991. 109 pp. \$17.50 (paper). Critique of habitat conservation plans over the last decade. Recommendations to improve such plans, with four detailed case studies and seven case briefs. Lessons for conservation biologists to improve rare species protection.

—A Bucket of Fish

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along with human demands on our natural systems, and it is unrealistic to expect that fish communities will remain identical to those known to older generations of biologists and anglers.

However, we can and must take into account society's desires concerning the use of fish stocks when formulating stocking programs. As pressure continues to build on fisheries resources, both through direct targeting of the resource for recreational uses and through increased mortality attributable to outside influences such as degrading habitat conditions, managers must be ready to evaluate the utility of stocking. If society demands more fish than a system can reasonably produce under altered conditions, then managers must be ready to evaluate the merits of such programs as put-and-take stockings (including put-grow-and-take), introduction of additional species (including exotics), bolstering native spawning populations, and increased public education, along with alternative management techniques such as harvest and gear restrictions.

This is not to say that managers should completely abandon the idea of maintaining what the public perceives as "natural ecosystems" devoid of hatchery fish. Indeed, there is a certain demand among the recreational fishing community (who pay most of the fisheries management costs) and other societal groups such as preservationists to maintain systems in North America that are as similar as possible to systems first encountered by our ancestors centuries ago. However, biologists would be hard pressed to find a system anywhere in the world that is untouched by human influences (consider the effects thought to be caused by acidic atmospheric deposition and global warming).

A balance must be struck which takes into account changes in habitat quantity and quality, changes in demands on the resource, and adaptability of species to these perturbations. The fundamental question for any manager contemplating stocking is: what is the long-term management goal? If the goal is to preserve the integrity of genetic lines, then managers must be careful to choose only those strains which will achieve this

goal. For example, in their on-going efforts to preserve populations of Atlantic striped bass, the U.S. Fish and Wildlife Service, in conjunction with several states, capture mature striped bass on their spawning grounds and transport them to the hatchery. Eggs are fertilized with milt from fish taken from the same system and offspring from these fish, which are raised in hatcheries for several months, are stocked back into the systems from which their parents were captured, thus, maintaining the genetic distinction between spawning stocks.

If, however, the goal is to provide a purely put-and-take fishery with no natural reproduction, then selection of species for stocking into a system may be based on totally different criteria, such as superior fighting ability or cost effectiveness in the hatchery. Put-and-take fisheries are extremely successful in providing anglers with opportunities to enjoy the sport of fishing and harvest fish without managers worrying about the impact that angler harvest may have on the reproductive success of the population. Put-and-take fisheries serve an important role in supplying angling opportunities in fisheries subject to heavy fishing pressure, such as in urban regions, and may serve to transfer pressure away from more sensitive naturally self-sustaining fisheries.

Regardless of the rationale for stocking, history has taught us that there is no substitute for careful study and research on the long-term impacts of introductions. Biologists must consider the ecological changes that will be brought on by the stocking, recognizing that change in itself is not always bad. Maintaining biodiversity, although a noble concept, must be considered in the context of modern day ecosystems, often previously altered irrevocably by a multitude of human-induced perturbations. Stocking and biodiversity are not mutually exclusive, indeed stocking can enhance the goal of biodiversity if conducted properly.

Carefully planned and researched stocking programs play an integral role in the way fisheries resources are managed. Illegal introductions such as the case cited at the beginning of this article, unintentional introductions, and some intentional introductions gone awry can create undesired effects on native

ecosystems and fisheries management plans. However, as with any research program, the practice of stocking, as a component of fisheries science, will only progress if managers can build upon past experiences to ensure future successes. Hatchery production is simply one tool in the fisheries manager's arsenal for developing and maintaining healthy and balanced ecosystems and fisheries in an increasingly complex world.

Editor's Note: Excerpted from the SFI (Sport Fishing Institute) Bulletin, No. 432, March 1992. They can be contacted at 1010 Massachusetts Ave., NW, Suite 320, Washington, D.C. 20001.

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the Colorado River drainage in southern Utah. The spores were first detected by the plankton centrifuge technique and found to be morphometrically consistent with *M. cerebralis*. Definitive diagnosis was made by identification of spores in cerebral cartilage by histopathologic examination. This represents the first known presence of this parasite in Utah.

Subsequent testing of the watershed has shown the parasite to be more widespread than earlier thought. Salmonids located in 2 upstream reservoirs and several miles of river downstream from the affected hatchery have also tested positive. In one section of river below an affected reservoir, rotenone sampling showed approximately 8% of the wild rainbow trout with gross deformities of the head or spine. In addition, spores of *M. cerebralis* have been detected at 3 other aquaculture facilities in the drainage and 2 other sites in the Great Basin drainage. The finding of spores at these locations suggest transfer of infected live fish from affected facilities may have occurred. The origin of the parasite into the state remains a mystery.

Parasite eradication plans are continuing to develop as the scope of fish infection is determined. Efforts so far have involved chemical eradication and removal of all wild/feral fish from the watershed to eliminate the fish host. Fish at the affected facilities will be grown to marketable size prior to removal. Efforts are being made to protect unaffected state and private facilities located downstream from contamination.