

High Country News

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A Paper for People who Care about the West

Three dollars

Northwest salmon at the crossroads



Chris Pietsch



HIGH COUNTRY NEWS

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Dear friends,

New intern

On April Fool's Day a large brown "Oldsmobile-Buick" with Jersey plates turned down Grand Avenue. The driver was Jeff Hanissian, this spring's latest incarnation of an HCN intern. Jeff joins Jacob and Emily in the interns' daily vigils: clipping articles, writing Hotlines and ministering to the love-starved dog they have to pass walking to and from work every day. He is also enjoying other facets of small-town life in Paonia, such as making music, broadcasting at KVNf and "accessing the inner self" at yoga class. Jeff graduated from Dartmouth College last spring. As a student of physics, he missed out on courses in journalism — but, as he says, it's never too late! After a brief stint in Washington this summer with the House Energy and Commerce Committee, he will join the ranks of an offshore oilfield services company in Louisiana.

First salmon

While putting together this special issue, the non-Northwesterners among us were a bit confused by the terms "First Salmon Ceremony" and "Last Salmon Ceremony" in the titles of the issue's opening stories. Northwesterners will know that the First Salmon Ceremony is the annual Indian event in which the first salmon caught each spring is ceremonially thanked as a symbol of all the salmon to follow. It is not, as some of us took it to mean, the first such ceremony ever performed. Then, once we got that straight, we read "Last Salmon Ceremony" to mean a similar annual event for the last salmon caught. Northwesterners will



Jacob Forman

Jeff admires Paonia's Father Escalante mural, painted by Ginny Allen

know that it refers, instead, to the crisis of extinction that faces these fish today. We thought we'd note our own initial confusion in case any of our non-Northwestern readers might have the same problem.

Pat Ford

This special issue on salmon marks the end of Pat Ford's year-plus term as our Northwest regional bureau chief. During this period Pat edited, in addition to this issue, the special issue on North-

west old-growth timber that HCN published last Nov. 19. He also has built a strong network of stringers in the region. Pat will continue to write for HCN from Boise, Idaho, and plans to continue working to restore the Northwest's salmon and steelhead. We thank Pat for sharing his considerable editorial talents with us and look forward to more of his insightful and caring reporting.

—Larry Mosher and Mary Jarrett
for the staff

HOTLINE

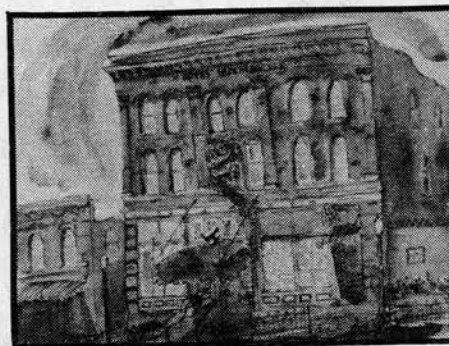
Bureau of Mines director attacks environmentalists

T.S. Ary, the director of the U.S. Bureau of Mines, calls environmentalists "a bunch of nuts" and accuses them of creating obstacles for the mining industry. In a speech to the National Wilderness Conference in Denver, Ary told an audience of federal-lands miners, loggers and ranchers, "If they find a way to roll us and repeal that mining law, you people are duck soup," *The Denver Post* reported. Ary, appointed by former President Reagan and reappointed by President Bush, claims environmentalists are attempting to rewrite the 1872 Mining Law in order to raise the cost of mining operations. He also accuses them of using the Endangered Species Act to prevent logging and other resource development ventures. The spotted owl in the Northwest and the snail darter in Tennessee are examples of species being used to prevent resource development, Ary says. Part of the mandate of the Bureau of Mines is to conduct research on conservation methods for all aspects of mining.

Squirrels delay construction of Mt. Graham observatory

A federal appeals court has temporarily halted construction of the \$200 million international observatory on Mount Graham (HCN, 9/24/90). Environmental groups contend that the project's impact on an endangered subspecies, the Mount Graham red squirrel, has not been adequately studied in a U.S. Forest Service and University of Arizona squirrel-monitoring program. Having the University of Arizona, a major proponent of the project, responsible for the monitoring program is a bit like "putting the fox in charge of the

chicken coop," said Sierra Club Legal Defense Fund attorney Mark Hughes. "We've alleged that the monitoring program is designed to find no impacts on the squirrel." The Associated Press reports that construction will not continue until U.S. District Judge Alfredo C. Marquez decides to grant or deny an injunction.



Small Colorado towns face gambling development

Voter approval last November of \$5-limit blackjack, poker and slot machines is bringing big changes to Central City, Black Hawk and Cripple Creek, Colo. Real estate values in these towns, all within two hours of Denver, are soaring as speculators prepare to greet the new industry and its patrons. The towns previously relied on a small-scale tourist industry based on their historic mines and buildings. "The growth will improve the towns, providing residents with the financial ability to properly upgrade the historic buildings," said Robert Olensky, a bartender at Central City's Teller House. This museum, bar and restaurant, built in 1872, will soon be leased to a tenant who is willing to invest "several million dollars" to restore it, *The Denver Post* reported. Most residents welcome the prospect of a revived, year-round economy, but some fear that the influx of developers and gamblers will change the character of the quaint, historic towns. In Black Hawk,

residents of a trailer court became the first substantial group of people to lose their homes to the "gambling boom." Their landlords plan to sell the court for more than \$1 million. Gambling is slated to begin Oct. 1.

Deficit drilling predicted for Brooks Lake

Shoshone National Forest figures indicate that tourism revenues in the Brooks Lake, Wyo., region are likely to fall by nearly 25 percent because of planned oil and gas drilling near the lake. Despite these figures — which translate into more than \$260,000 per year — the Forest Service approved oil and gas leasing on the lake (HCN, 4/8/91). According to the *Jackson Hole Guide*, the leasing deal is expected to yield only \$21,000 annually for the government; the Environmental Assessment on the drilling, in fact, states there is only a 10 percent chance of a successful oil and gas strike. The losses for local businesses "will be staggering," says Brooks Lake Lodge owner Dick Carlsberg, who is preparing an administrative appeal against the decision. "The economic factor is certainly upside-down."

BARBS

Eating our words.

This newspaper could end up as cattle feed, according to an experiment being conducted at the University of Illinois. Early findings show that cows are capable of eating 10 pounds of newspapers daily, which would replace 20 to 40 percent of their normal hay intake. Newspapers are first processed to make them more digestible. Having cows eat papers might alleviate some of the pressure on grazing lands as well as landfills.

WESTERN ROUNDUP

Yellowstone cancels bison kill because of lawsuit

Researchers in Yellowstone called off their plan to shoot 25 park bison after the New York-based Fund For Animals won a temporary restraining order to have the action halted.

National Park Service officials made the announcement April 11, just three days after U.S. District Court Judge George Revercomb issued an order in Washington, D.C., preventing rangers from shooting the popular park animals.

On the first day of the research project, only hours before Revercomb's order, three pregnant bison cows were shot and tissue samples were removed from their bodies. The judge's order staved off the shooting of 22 additional animals.

Cleveland Amory, the Fund For Animals' outspoken founder, called the park's withdrawal from the controversial killing "a major victory" for animal-rights activists. "These magnificent animals, which for 30 years have undergone terror and torture, mismanagement and even massacre, will now be spared the final indignity — being studied to death," he said.

Wildlife officials, however, were stunned. They said the lack of research would delay the drafting of a long-term bison management plan that would benefit the park's free-roaming herds and possibly prevent future killing of the animals next winter in Montana.

"We're very disappointed this research effort was shut down because we view the data as essential for future bison management." This is a major setback, said Yellowstone spokeswoman Joan Anzelmo. "We initiated withdrawing the proposal because we lost a critical window of opportunity to get it done." Anzelmo said the opening of Yellowstone to summer tourism precipitated the park's decision to back off.

Late in March, Yellowstone accepted a request from veterinary pathologist Don Davis to shoot 25 pregnant bison cows inside the park and then conduct a series of tests on tissue and blood specimens collected from the carcasses. An Environmental Assessment prepared on the research proposal concluded that it would have no impact on the overall health of the park's three bison herds.

Researchers may try to resurrect the proposal this autumn, according to Anzelmo. The park plans to allow for adequate public review to forestall any legal challenges in the future.

Davis, an expert on the bovine disease brucellosis, says the research is necessary to help scientists assess whether disease-carrying bison represent an actual risk to cattle and to other wildlife. Fears that bison could transmit brucellosis to Montana cattle have served as justification for killing some 700 animals outside the park since 1985.

"Yellowstone had the right idea in



Library of Congress

wanting to do more research, but the park didn't have to go to this extreme," said Wayne Pacelle, the Fund For Animals' national director. He added that the fund would not under any circumstances support the killing of park wildlife for research purposes, even if the need for bison carcasses was clear. Pacelle says blood and tissue samples can be extracted from live animals — a point disputed by researchers.

Davis, who has close ties with the livestock industry, believes that brucellosis can be eradicated from wildlife populations. But Yellowstone biologist Mary Meagher, whose bison research is known worldwide, believes that eliminating the disease in Yellowstone's bison would require the wholesale killing of all three herds — a total of 3,000 animals.

In Canada's Wood Buffalo National

Park, livestock officials have supported a proposal to eliminate the threat of bovine brucellosis and tuberculosis by destroying all 2,000 bison in that park. Similar action, if ever proposed in Yellowstone, would meet fierce political and scientific opposition, Meagher said. The only alternatives to annihilation are keeping bison confined to the park or allowing them to roam on adjacent national forest lands.

National Park Service Director James Ridenour believes that a national treasure like free-roaming bison should have access to other federal lands where their presence would not pose a threat to livestock. The Greater Yellowstone Coalition has tried to lobby ranchers with federal grazing permits near the park's boundary who may be interested in letting bison occupy areas that are not used by cows. So far, however, neither the state of Montana nor the Forest Service has openly discussed any option that would allow bison to use rangeland outside the park.

Davis said specimens from the three bison shot by rangers will be tested during the coming months. But the results will be essentially meaningless, he said, since at least 25 animals are needed to obtain a statistically viable sample.

— Todd Wilkinson

Todd Wilkinson is a free-lance writer based in Bozeman, Montana.

Navajos pull the plug on Animas-La Plata water project

Already mired in controversy and stalled by threats to the endangered Colorado River Squawfish, the embattled Animas-La Plata water project hit a new obstacle this month: the objections of the Navajo Nation.

Claiming that the federal government is "attempting to pit project against project and tribe against tribe," Navajo President Peterson Zah slammed a federal proposal to mitigate Animas-La Plata's impact on the squawfish by using water claimed by the Navajos.

The Animas-La Plata project would divert the two rivers it is named after to deliver water to towns, farms and Indian reservations in southwestern Colorado and northwestern New Mexico. It would settle long-standing water claims of Colorado's two Ute tribes, which are slated to receive about one-third of the project's water.

The \$589 million water development was put on hold the day before its scheduled groundbreaking last May when the U.S. Fish and Wildlife Service said it would threaten the endangered Colorado squawfish. After nearly a year of negotiations with the Bureau of Reclamation, Fish and Wildlife announced a "reasonable and prudent alternative" last month that would allow at least part of the project to go forward. The solution includes mitigating Animas-La Plata's impact on the squawfish with water from Navajo Dam.

Zah says the plan would use water that belongs to the Navajos and bar completion of his tribe's long-overdue irrigation project. Navajo objections mean at least more delay for Animas-La Plata because the tribe's signature is needed in order for the plan to proceed. The tribe met with Fish and Wildlife and Bureau of Indian Affairs officials last week. "Unless someone finds an innovative way around it, I don't really know what will happen," said Galen Buterbaugh,

the Denver-based Fish and Wildlife Service regional director.

Despite his opposition to the plan, Zah doesn't oppose the Utes' attempts to develop their water. Rather, he considers the tribes united in the face of a federal government that persistently overlooks the needs of Native Americans.

"In spite of our senior water rights to water, land and resources, American Indians have the highest unemployment, face widespread poverty and lack basic services. We must fight every year to force the U.S. government to live up to its golden promises.... The past teaches us that our concerns are not the priority," Zah told the Southwestern Water Conservation District in a speech in Durango, Colo. "We are prepared to work with our brother tribes and our non-Indian neighbors ... but we cannot allow additional Navajo water to be taken from us when so much has already been taken."

The "reasonable and prudent alternative" proposed by the Fish and Wildlife Service would permit an annual depletion of 57,100 acre-feet of water from the San Juan Basin — about one-third of the volume of the total project. Completion of the project would depend on the outcome of seven years of studies on the fish. The research would utilize releases of up to 300,000 acre-feet of water per year from the Navajo Dam upstream on the San Juan River, which receives both the Animas and La Plata river flows. When the tests are finished, dam releases would be regulated to benefit the fish.

The Navajo tribe takes a dim view of delaying their project's already-overdue completion to mitigate Animas-La Plata. The Navajo Indian Irrigation Project was authorized in 1962, but stands only a little more than half built and 15 years behind schedule. Meanwhile, the San Juan-Chama Diversion Project, which was authorized by the same act of

Congress, has been diverting water rights from the San Juan River to non-Indian customers for 20 years.

While the Navajos' water rights haven't been quantified in court, the tribe, under the Winters Doctrine, claims water on the San Juan River that could virtually dry up the river.

"I consider all of the water in the Navajo Reservoir to be Navajo water," says Stanley Pollack, the water rights attorney for the Navajo Nation. "The federal government is reprioritizing the water on the river."

Rick Gold, the assistant regional director of the Bureau of Reclamation, disagrees.

"We're looking for opportunities to use water that's not allocated," he said, pointing out that Navajo Reservoir was built to hold water for recreation and flood control as well as to irrigate Navajo land. He added the test flows would not cause any shortages to the Navajo irrigation project, and said he doubted that permanently-altered flows to accommodate the fish would limit full development of the project, because of the Navajos' "very good, very senior" water rights on the river.

Whether Animas-La Plata is built or not, the regulation of the San Juan River has changed forever. "If the Navajos pull the rug out from Animas-La Plata, the squawfish issue isn't going to disappear," said one observer. "Animas-La Plata is nothing more than the vehicle driving the need to recover the fish."

The squawfish was once so plentiful in the Colorado River and its tributaries that it was used as fertilizer; in the 1960s it was poisoned to make room for trout. But its numbers have been slashed by the construction of dams and diversions in the Colorado River Basin. It was put on the federal endangered species list in 1973.

The project's critics say that the current objection is just more proof of the

project's fatal unwieldiness. Some members of the Southern Ute Tribe oppose the project, saying they won't be able to afford the municipal and industrial water it will supply them. The Environmental Policy Institute called the project "one of the most ill-conceived reclamation projects in the nation's history" (HCN, 12/17/90).

The project's main reservoir would be located some 500 feet above the Animas River. Water would have to be pumped uphill to fill it at the expenditure of 165 million kilowatts of energy per year — the same amount used by a city of about 26,000 people. It would also flood prime game habitat and increase the salt load of the Colorado River Basin.

— Lisa Jones, HCN staff writer

HOTLINE

Low silver prices plague Idaho mines

Sunshine Mine, the largest silver mine in Idaho, will lay off 279 workers, paring its staff from 436 to 155. "If we continued at full production, we would lose twice as much as if we simply shut down," Don Hullinger, a spokesman for Sunshine Precious Metal Inc., told The Associated Press. In 1990, when the price of silver averaged \$4.82 per troy ounce, the mine lost \$6 million. The 1991 price has been about \$3.90 per troy ounce. Hullinger estimates the mine will not break even until the price reaches \$5 per troy ounce. "Without some recovery in silver prices, we can pretty much count on the mining industry disappearing piece by piece," said Steve Brown, a union spokesman. Several other northern Idaho mines have recently cut back or closed.

HOTLINE

Utah's Dugway contains 127 toxic sites

The Dugway Proving Ground in Utah encompasses 127 toxic sites marked for cleanup by the Defense Department, reports the *Albuquerque Journal*. The department's list, which draws from 1,855 current and former military installations, now contains 17,482 sites. They hold weapons-manufacturing and -testing wastes that were dumped in many cases without any attempt at containment. Although preliminary assessments of 16,000 sites have been made, work has begun at only 1,400 locations. "The problem is worse than we had imagined. The military's cleanup record continues to proceed at a snail's pace while more and more contaminated sites are discovered," notes Gary Cohen, executive director of the National Toxic Campaign Fund.

Forest Service proposes campground fee hike

The U.S. Forest Service has proposed a 70-percent user fee hike to increase revenues to \$24 million a year from their current level of \$14 million. The proposal, which will go before Congress in a month or two, recommends that the public pay to use picnic areas, boat ramps and rustic campsites. Fees would be \$3 to \$8 a day for campsites and \$1 to \$3 for boat ramps. Unlike national parks, national forests do not charge except for the use of full-service campgrounds offering drinking water, toilets, grills, tables and garbage service. Jay Watson of The Wilderness Society said the fee increases are inevitable. Forest Service Chief Dale Robertson assured The Associated Press that the "funds would be used to maintain and upgrade those very facilities that the recreationists use." Two months ago, however, the General Accounting Office determined that the Forest Service spends \$2 on central office overhead for every dollar spent on wilderness preservation and campground maintenance.

Concessionaire pollutes Lake Powell

A report by the Interior Department's Inspector General recommends closing certain polluted areas of Lake Powell until tests prove there are no health hazards to either people or wildlife. Last fall's severe drought lowered lake levels nearly 70 feet, exposing 200 to 300 lead-cell boat batteries near Wahweap Marina, managed by ARA Leisure Service. According to the report, the National Park Service knew that the concessionaire "was discarding batteries and chemicals into Lake Powell but has not taken sufficient action to correct this practice." In fact, the National Park Service gave ARA a satisfactory rating in its evaluation for the year ending September 30. The Park Service has agreed to add an admonishment to its report on ARA, and the Arizona attorney general is conducting a criminal investigation into the dumping, reports The Associated Press. Rep. Mike Synar, D-Okla., chairman of the House Government Operations Environment Subcommittee, asked National Park Service Director Jack Ridenour, "How can the National Park Service be so blind?" "I have no answer," said Ridenour, adding, "It's difficult to have someone looking around every corner every minute."



Deer at the Rocky Mountain Arsenal near Denver, Colorado

Rocky Mountain Arsenal's costly cleanup

Cleaning up Colorado's Rocky Mountain Arsenal, perhaps the most polluted piece of real estate in the country, will cost \$1 billion to \$2 billion — or considerably more, if new toxic hazards are found. Official estimates quote prices of \$1.5 billion to \$1.8 billion for the entire cleanup. But preliminary studies themselves have already cost more than what was originally expected, and environmental experts say it's still impossible to know the extent of the arsenal's contaminants.

The 27-square-mile area, formerly used by the U.S. Army to make nerve gas and by Shell Oil Co. to make pesticides, is saturated with chemicals ranging from arsenic to mercury. State officials hope part of the area can be used for wildlife habitat once the cleanup is complete.

But years of burying hazardous wastes by the army and Shell Oil is presenting lots of costly surprises for today's cleanup experts. "Basin F," for instance, a 93-acre pond once used to hold millions of gallons of toxic liquids, was discovered to have a false bottom, beneath which several million more gallons of toxic swill had settled. That discovery boosted the cleanup price by millions of dollars.

The status of the arsenal cleanup underscores a problem that many Superfund sites encounter: predicting what sort of toxins will ultimately surface and how much it will cost to remove them.

"When you design a dam, you know what you're dealing with," says Eric Yould, an engineer with Ebasco, one of the companies contracted by the army to study the arsenal cleanup. "With hazardous waste sites, you never know what you'll run into. We see cost growth with every Superfund site we investigate."

Yould says part of the problem in estimating cleanup costs for Superfund sites lies with previous owners, often cryptic about their uses of the site. "In trying to get a historical perspective, you need to talk to previous operators," says Yould, "and previous operators don't always have a friendly attitude towards that."

Superfund sites go through four stages of cleanup: remedial investigation (determining the extent of the contamination), feasibility study (choosing alternative methods for cleanup and estimating the cost), design (actual planning of the cleanup), and remediation (the cleanup itself). The Rocky Mountain

Arsenal is still in the first and second stages; the actual cleanup work won't start until 1994.

New legislation may expedite the cleanup of the arsenal and other Superfund sites as well. Earlier this year, Sen. George Mitchell, D-Maine, introduced the Federal Facilities Compliance Act of 1991. The legislation would clarify states' and EPA's authority to enforce hazardous waste laws, vis-à-vis federal agencies' authority.

Mitchell cites a 1986 General Accounting Office report to justify the legislation. According to that report, nearly half of the federal hazardous waste handlers monitored by the EPA were found to be in violation. Four years later, the GAO discovered that 600 of the most contaminated sites were still not being cleaned up.

Mitchell's bill, a similar version of which has already passed the House, would give the EPA authority to fine federal agencies that violate hazardous waste laws. When the EPA has tried to fine federal violators in the past, it has been vigorously challenged. Mitchell's legislation is opposed by both the Department of Defense and the Department of Energy.

Once the arsenal is cleaned up, many people would like to see it converted to a wildlife refuge for the eagles, waterfowl, deer, coyotes and badgers that already visit the site. The EPA's Connelly Mears calls the area a "tremendous wildlife resource," and the Colorado Fish and Wildlife Department says its weekend tours are generally packed.

But while the wildlife may appear to be thriving, certain species have suffered from the arsenal's pollutants. For instance, prairie dogs that have proved to be highly contaminated will have to be exterminated or "managed" out of the area to prevent eagles from ingesting them. Several bird species have been shown to be poisoned as well, especially near "Basin F."

The ultimate costs of dumping hazardous wastes at the arsenal will go beyond the actual removal and treatment of toxins there. Shell Oil recently paid a total of \$1.4 million in four separate land purchases to settle lawsuits filed by property owners neighboring the arsenal. The owners of the parcels bought by Shell claimed pollution and publicity about the arsenal's problems shattered property values. The purchases may be a

small part of Shell's ultimate legal challenges: Adams County residents have filed at least 70 other lawsuits against the company, most related to lowered property values and health problems allegedly resulting from arsenal waste.

Should cleaning up Rocky Mountain Arsenal and other sites become increasingly more expensive as new hazards are discovered, the Superfund program may be re-evaluated. As Ebasco's Yould puts it, "There's no doubt that congressmen get frustrated when they appropriate funds and then have to appropriate more funds. They don't like going back to the till."

— Mark Harvey

Mark Harvey, a former HCN intern, lives in Aspen.

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TROUT BIOLOGY

"Because our frontier ethic involved the view that nature's bounty was virtually limitless, a lot of good trout water has been abused," writes Bill Willers in his revised and augmented edition of *Trout Biology*. Willers's book is designed principally for anglers wishing to understand "some of the fundamentals of biology as they apply to salmonids [trout and salmon] and the relationship of these fish to their environment." This book is also very useful in understanding the effects of hydropower facilities and dams on fish habitat.

Lyons and Burford, Publishers, 31 West 21st St., New York, NY 10010; 212/620-9580. Cloth: \$29.95. 240 pages, with black-and-white and color illustrations.

THE RIGHT LIGHTS

The simple act of turning a light on can have drastic effects on the global environment. *The Rising Sun Sampler*, a 54-page catalog of energy efficient lighting products, can help both individuals and corporations save money and decrease electricity consumption at the same time. One part of the catalog uses lay terms to answer commonly asked questions about lighting efficiency, while the rest displays efficient products, mostly fluorescent bulbs. For details on the \$5 catalog, write Rising Sun Enterprises, Box 586, Old Snowmass, CO 81654.

SOUTHWEST SILVICULTURE

"Silviculture for Southwestern Forests" is the title of a workshop aimed at helping grassroots groups effectively participate in Forest Service decisions. Participants will learn about silviculture, the theory and practice of managing trees for harvest. The workshop will be conducted by Lane Krah, a forester, and Jim Tolisano, an ecologist and watershed hydrologist. It will be held April 27-28 in Flagstaff, Ariz., and May 4-5 in Cedar City, Utah. The workshop is sponsored by the Forest Trust, a nonprofit environmental group. For more information write Lane Krah, Forest Trust, P.O. Box 519, Santa Fe, NM 87504 or call 505/983-8992.

ANASAZI ARCHITECTURE AND DESIGN

A symposium called "Anasazi Architecture and American Design" will be held May 17-19 at Mesa Verde National Park near Cortez, Colo. The purpose of the symposium is to analyze the development of Anasazi architecture, draw lessons from it for contemporary architecture, promote research into Anasazi design and relate ancient American architecture to American history. The symposium will focus on landscape architecture, site selection and planning. Issues concerning archaeology, engineering, agriculture, horticulture and sociology will also be discussed. For more information contact Baker H. Morrow, ASLA, 210 La Veta NE, Albuquerque, NM 87108; 505/268-2266.



GROW YOUR OWN

Spring gardening workshops in Basalt, Colo., will cover composting, soil preparation, fertilizer teas, gourmet crops and natural insect control, among other topics. Workshop dates are April 27-28, May 4-5 and May 11-12. The teacher, Jerome Osentowski, who has been a high-altitude market gardener for 10 years, will also hold a one-day greenhouse workshop June 9. For more information call Jerome Osentowski at 303/927-4158.

ENVIRONMENTALIST DIRECTOR WANTED

The Mineral Policy Center is seeking a new director to support its efforts to control the environmental damage caused by metals mining and onshore oil and gas development. Outstanding writing, communication and fundraising skills are required, along with a commitment to environmental protection. Send cover letter, résumé, salary history and salary requirement, and writing sample to: Mineral Policy Center, Suite 550, 1325 Massachusetts Ave. NW, Washington, D.C. 20005.

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THE WOLF IN YELLOWSTONE. Join our three-day llama trek to learn about the wolf's reintroduction and role in the Greater Yellowstone ecosystem, July 11-13. Led by a wolf specialist with the National Wildlife Federation plus our experienced mountain guides. Our eighth year of leading gourmet llama treks in the Northern Rockies. For color brochure and information packet write Yellowstone Llamas, Box 5042-H, Bozeman, MT 59717. Phone 406/586-6872. Fax 406/586-9612.

ORGANIZATIONAL CONSULTANT wants to match professional endeavors with personal values. Desire to use my talent in organization development consultation, conflict management and group facilitation to serve clients that have environmental awareness as an integral part of their mission. I have designed and conducted team development workshops, planning sessions, trainings and retreats for boards of directors, community groups, management teams and statewide organizations. I invite you to contact me. References available. Virginia Winter, Box 339, Grand Lake, CO 80447, 303/627-3503. (2x6p)

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FIELD REPRESENTATIVE

Mineral Policy Center, a national nonprofit environmental organization, seeks a Field Representative or "Circuit Rider" for its efforts to control environmental damage from mining and oil development. The Circuit Rider is a technical/environmental expert and community organizer who will work with towns in the Southwest concerned about mining's impacts. Training/experiences in mining or environmental fields and/or community organizing pluses. Location must be in a central city to serve Four Corners states. Frequent travel required. Salary depends on experience; limited benefits. Send cover letter and complete résumé with salary requirement to: Circuit Rider Applications, Mineral Policy Center, 1325 Massachusetts Ave. NW, Suite 550, Washington, DC 20005. Closing date: May 10, 1991. Mineral Policy Center is an Equal Opportunity Employer. Women and people of color are strongly encouraged to apply. (1x7b)

CONSERVATIONIST needed to negotiate protection of critical riverlands. Responsibilities include negotiating the purchase of private riverland and conveying the land to public agencies for protection. Should have a background in real estate. Salary: \$30,000 plus benefits. Send résumé and writing sample by May 20 to River Network, P.O. Box 8787, Portland, OR 97207. (1x7p)

OUTDOOR SINGLES NETWORK, bi-monthly newsletter, ages 19-90, no forwarding fees, \$18/1-year, \$4/trial issue information. OSN-HCN, 1611 Cooper #7, Glenwood Springs, CO 81601. (8x2p)

WYOMING WATER ATLAS

Less than 10 percent of Wyoming "receives more water as precipitation than is lost back to the atmosphere as evaporation and transpiration." This and much more information pertaining to this vital resource is contained in the *Wyoming Water Atlas*, an official centennial project developed by three University of Wyoming geographers. The text and 53 computer-generated maps illustrate such topics as where the state's water comes from, how it is used, and the location of water development projects and water quality problems. The atlas, designed to provide a single, concise volume of information on Wyoming water resources and trouble spots, should be of interest to agencies, schools, environmental organizations, and individuals concerned with water management.

Wyoming Water Research Center, University of Wyoming, P.O. Box 3067, Laramie, WY 82071; 307/766-2143. Cloth: \$35.00. 124 large-format pages.

DeBONIS SPEAKS AT U. OF COLORADO

Former U.S. Forest Service employee Jeff DeBonis will address the issues of old-growth forest protection, forest restoration, environmental ethics and free speech within government agencies on April 25 at the University of Colorado at Boulder. Early in 1989, after 10 years of working for the Forest Service, DeBonis charged the Forest Service with failing to fulfill its role as steward of the forests. DeBonis founded the Association of Forest Service Employees for Environmental Ethics, and its publication *Inner Voice*, to attempt to reform the Forest Service's bias favoring resource extraction, particularly timber harvest.

DeBonis will speak at 8 p.m. at Duane Physics E020 on the Boulder CU campus. For more information call the Wilderness Study Group, 303/492-6870, or the Environmental Center, 303/492-8303.

"OUTDOOR PEOPLE" lists 50-word descriptions of active, outdoor-oriented Singles and Trip companions nationwide. \$2/copy, \$10/ad. OUTDOOR PEOPLE-HCN, PO Box 600, Gaston, SC 29053. (12x15p)

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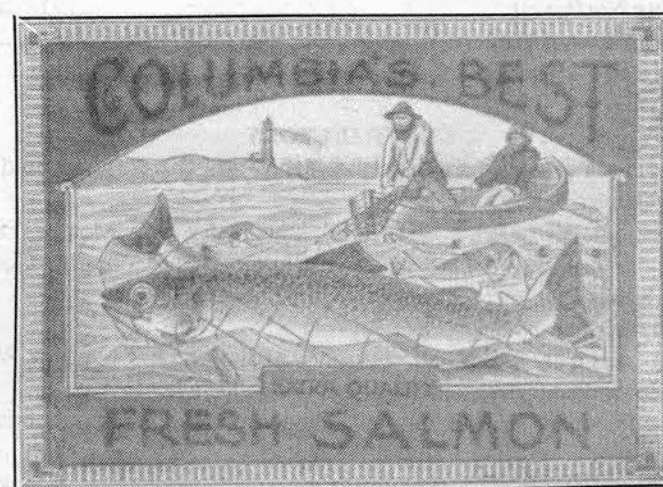
'Grizzly Park' is not dead

Despite the Gallatin County Commission's unanimous rejection of his proposed \$28 million theme park featuring captive bears (HCN, 3/25/91), Montana developer Lewis Robinson says the project is not dead. The original proposal called for hookups to the town of West Yellowstone's water and sewer services, reports The Associated Press. The town borders Yellowstone National Park. Robinson has now withdrawn his request to have the property annexed to the town. "I'm not going to be dependent on anybody for anything again for this development," he said. "We own the property free and clear and can do damn near anything we want with it." Robinson, who plans to build his own water and sewer systems, will need to submit a new proposal to the county.

Grasslands drilling doubles

The U.S. Forest Service is expecting to double oil and gas leasing on 2.1 million acres of North Dakota grasslands over the next 10 years. According to the latest draft Environmental Impact Statement, the agency plans to lease some 500 new wells on the northern grasslands. The 522 already existing wells on the grasslands produced two-thirds of the 20 million barrels of oil that flowed from Forest Service lands last year, agency spokeswoman Louise Odegaard told The Associated Press. The grasslands support bighorn sheep, buffalo and domestic cattle; prairie falcon, golden eagle and ferruginous hawk. Mike McKenna, head of the North Dakota Game and Fish Department natural resources division, wants to keep some of the area off-limits to leasing. "At least that way my kids will get a chance to see what undeveloped land looks like," he said. Comments on the EIS are welcome until June 1. Write Custer National Forest Supervisor, 2602 1st Ave. N., Box 2556, Billings, MT 59102.

For a taste of the West



From *Bridge of the Gods, Mountains of Fire*, by Chuck Williams

Salmon can label circa 1900 (Senfort Collection)

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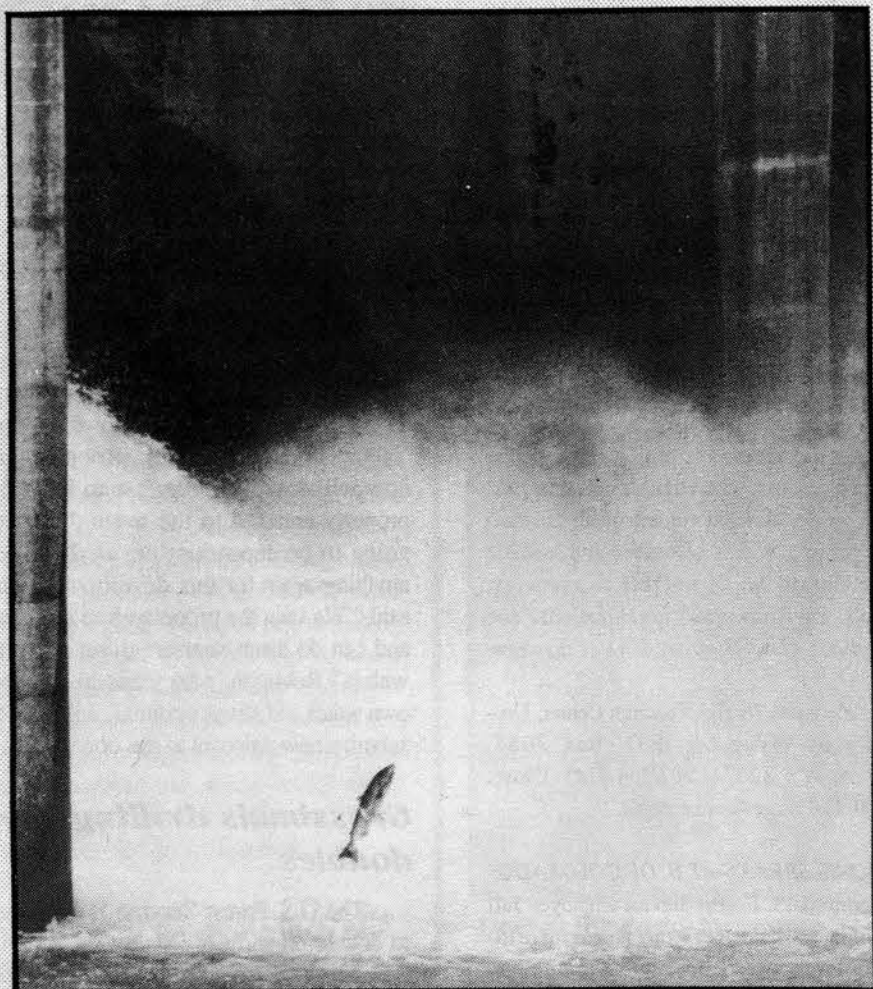
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Northwest salmon at the crossroads

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This special issue was made possible by support from the Northwest Area Foundation and contributors to the High Country News Research Fund.

The First Salmon

Huge salmon runs were once "the staff of life" for the author's forebears who lived in the Columbia Gorge. Here, he recounts the reverence they displayed for all their food. The tradition, still observed, begins with a prayer for spring chinook.



by Chuck Williams

I often sit atop Beacon Rock, a volcanic neck that towers a thousand feet above the Columbia River in the western end of the Columbia Gorge. Lewis and Clark gave the monolith its present name in 1805 to note that this was the place where they first noticed tidal action — and realized they were finally nearing the Pacific Ocean.

When their expedition entered the gorge — the Columbia's sea-level passage through the Cascade Range — they were in a sagebrush desert. When they reached Beacon Rock, less than a hundred miles later, they were in a lush rainforest where waterfalls dropped over cliff faces.

Downstream toward Portland, the Columbia flows freely another hundred or so miles to the sea. A few miles downriver is our family land, our allotment where my Indian father was born and where I lived for many years. Most of our land and the lake it feeds recently became a new national wildlife refuge, one of the few modern victories for nature in the gorge. The thousand tundra swans that are on the lake as I write finally have their winter home protected.

Just upstream from Beacon Rock, lighting up the horizon, is Bonneville Dam, the first of the massive barriers that have converted the famous "River of the West" into a staircase of reservoirs. The dam is built atop a large Cascade Indian village, the one I am descended from. My father's great-grandfather, Tumalth, the head chief who signed the 1855 Willamette Valley (Grand Ronde) Treaty with the United States, lived at this village — until hanged by Phil Sheridan and the U.S. Army. The Army Corps of Engineers visitor center at the dam is on the island that was my tribe's main cemetery.

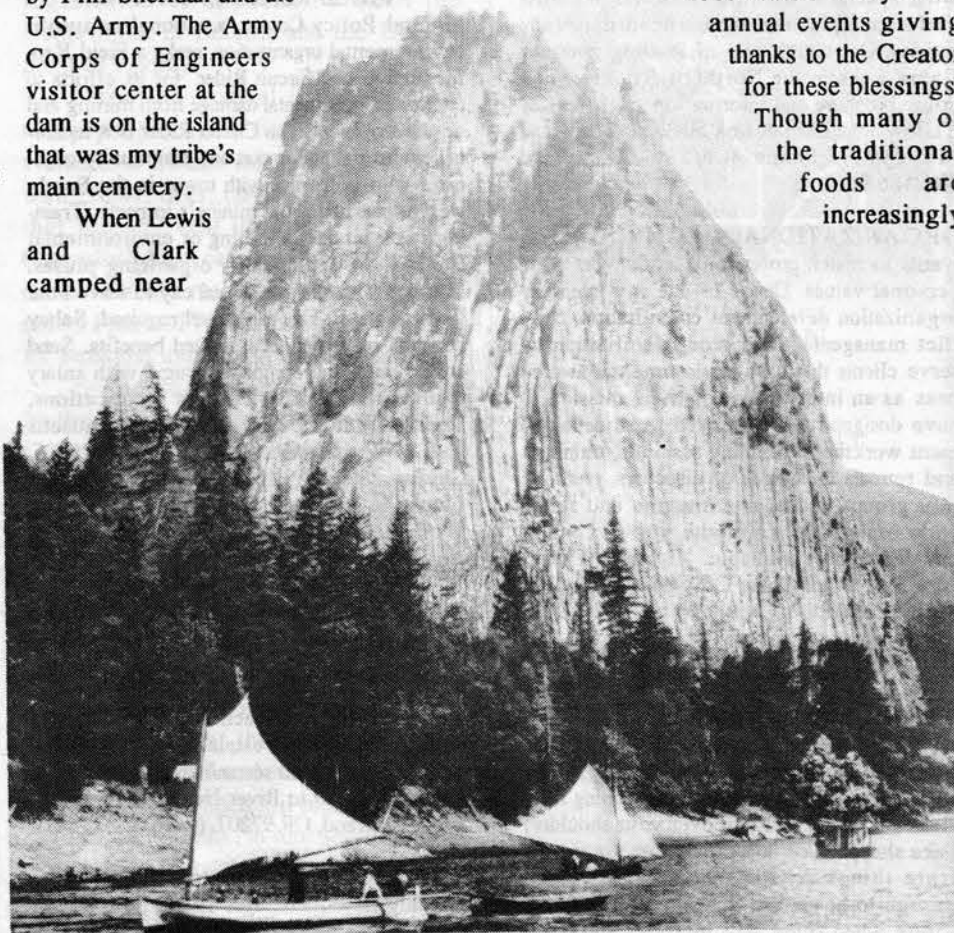
When Lewis and Clark camped near

Beacon Rock less than 200 years ago, about 15 million salmon swam upstream past here every year. Just upriver, now drowned by Bonneville Dam, was the Great Cascades of the Columbia, my people's primary fishing ground, where one person with a spear or dip net could catch a ton of salmon every day.

Most of the salmon were dried over fires in the gorge's western end or in the sun farther east, to store for winter or for trade to other tribes. Wrapped in fish skins, the dried salmon would keep unspoiled for several years. They were traded to Great Plains tribes in exchange for buffalo robes and to coastal tribes for dried clams and dentallia, the tubular shells that served as money in the Northwest. The main trade center was at Long Narrows and Celilo Falls in the eastern end of the Columbia Gorge, a transition point between ocean cultures and plateau people. Native Americans from throughout the Northwest gathered there every summer to fish, trade and socialize.

The huge salmon runs, which peaked in summer, were the staff of life for my ancestors and other Northwest Indian people. Every year, from time immemorial, these special fish returned, a miraculous gift to the people. In modern terms, it was an unparalleled renewable resource, so abundant that humans could harvest millions each year without decreasing the runs. They sustained other salmon connoisseurs, too, like bears, bald eagles and even California condors, which lived in the gorge until the arrival of Euro-Americans.

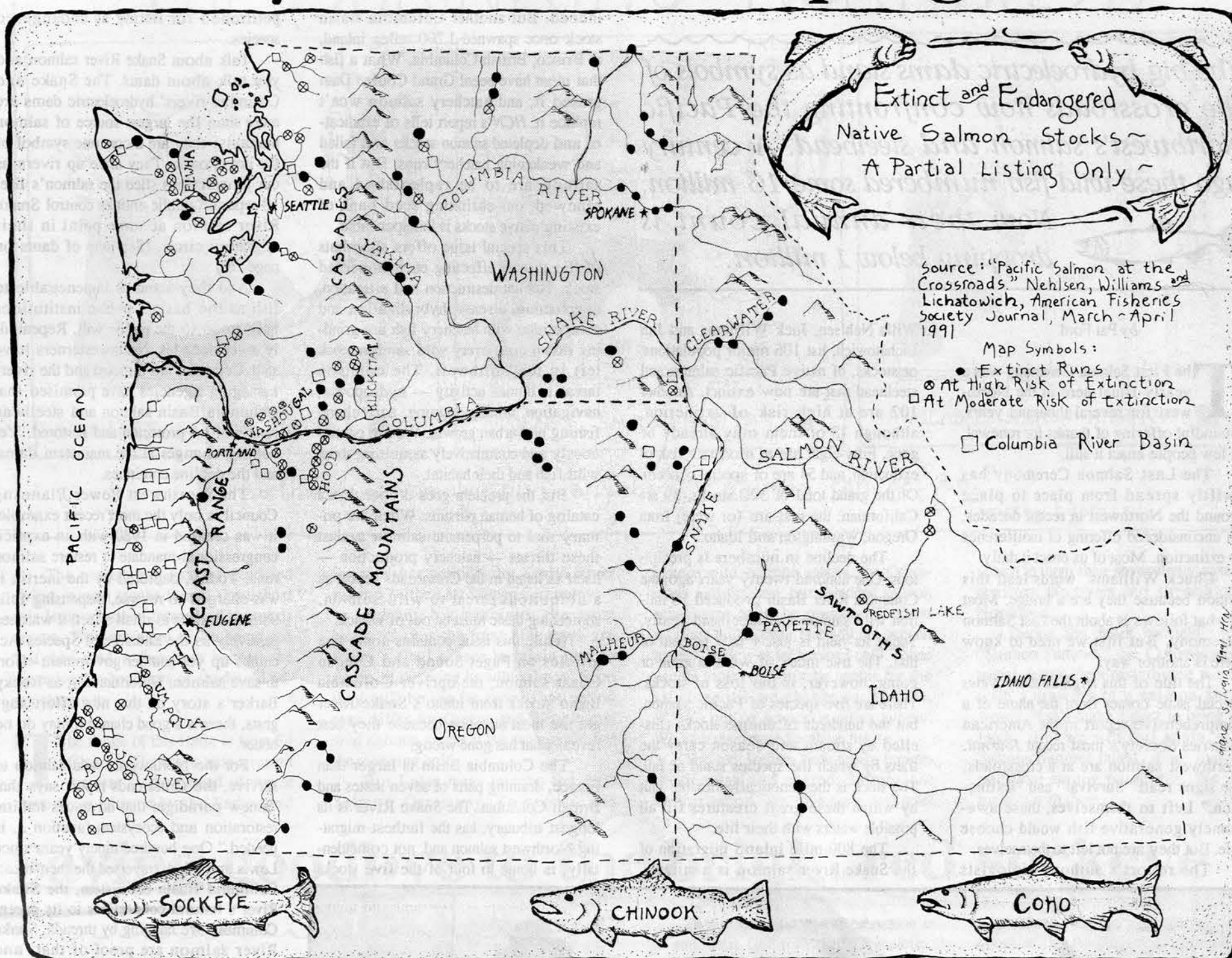
Native peoples here always honored salmon and their other main foods, in part through religious ceremonies anthropologists call "first food feasts." They were annual events giving thanks to the Creator for these blessings. Though many of the traditional foods are increasingly



George Weister/Oregon Historical Society #4232

Turn-of-the-century photo of recreational boaters at Beacon Rock

Ceremony still honors the spring chinook



scarce, these ceremonies are still held, primarily in longhouses on the reservations.

Root feasts are usually held in spring, when the natural root gardens are ready for harvest. Berry feasts are held in the mountains in early autumn, when the delicious huckleberries begin to ripen. The foods being honored have always varied, depending on the plants and animals available locally. Here along the lower Columbia, wappato, a small tuber growing in wetlands along the river, was our main source of starch — our potato.

While steelhead, sturgeon and other fish were available during the winter, the return of the first chinook salmon each spring was an especially good omen that required special reverence. It still does among traditional Indians. The treaty tribes, who have foregone a commercial season since the mid-1970s, use their spring chinook harvest exclusively for ceremonial and subsistence purposes.

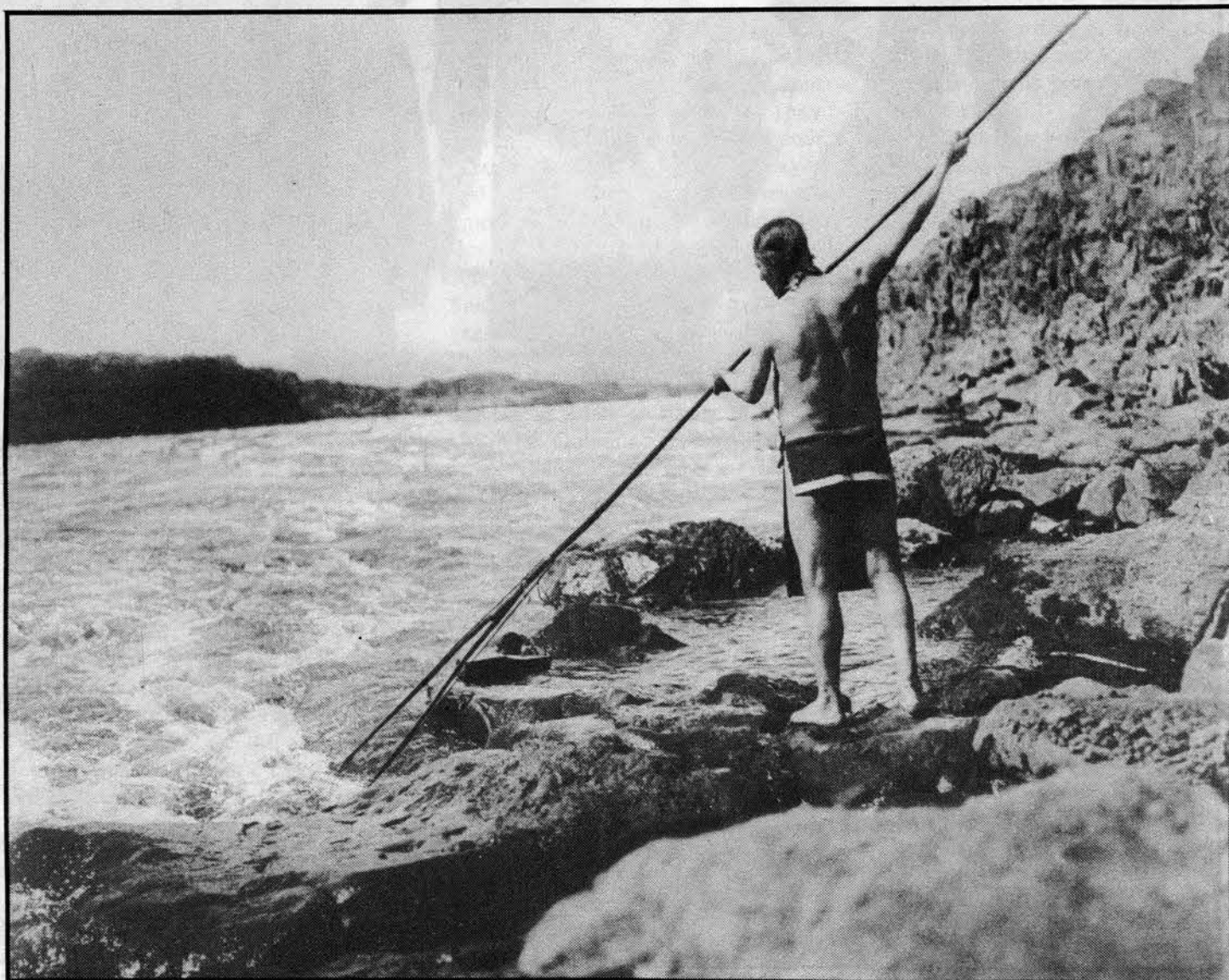
The first spring chinook caught are prepared for the ceremony in the traditional way: split lengthwise, then spread open and mounted on sticks that are placed upright near the fire. When the food is ready, people taking part enter the longhouses and sit in long rows. A few platters and bowls of food are served by young people, and participants put small amounts of each food on their plates. In addition to salmon, there are usually venison, elk, huckleberries and half a dozen different roots, including bitterroot and camas, plus some local favorites like black lichen. Drums, and sometimes bells and singing, accompany the ceremony.

A religious leader first says a prayer for spring chinook, thanking the salmon and the Creator. Everyone then takes a bit of salmon, followed by a drink of water. Then a prayer is said for the huck-

leberries, again giving thanks. Thanks is given for each food — a long process — and after each bite the participants take a drink of water to acknowledge that water is the source of life. After this ritual,

more platters of food are brought out and the feast begins. After the feast, dancing goes on, sometimes for days.

Then, gratitude shown, it's time to go fishing. ■



Wisham Indian fishing for salmon at the Long Narrows, just east of The Dalles (circa 1909)

Edward Curtis/Oregon Historical Society #70784

And now — the Last Salmon Ceremony?

The big hydroelectric dams stand as symbols of the crossroads now confronting the Pacific Northwest's salmon and steelhead. A century ago these wild fish numbered some 16 million.



Now their annual count is dropping below 1 million.

by Pat Ford

The First Salmon Ceremony was a yearly ritual here in the Northwest for several thousand years, a mindful offering of thanks for renewal. A few people enact it still.

The Last Salmon Ceremony has swiftly spread from place to place around the Northwest in recent decades, an unconsidered offering of indifference to extinction. Most of us enact it daily.

Chuck Williams' words lead this edition because they are a bridge. Most of what follows is about the Last Salmon Ceremony. But first we need to know there is another way.

The title of this *High Country News* special issue comes from the name of a comprehensive report in the American Fisheries Society's most recent *Journal*. Northwest salmon are at a crossroads; the signs read "Survival" and "Extinction." Left to themselves, these awesomely generative fish would choose life. But they are not left to themselves.

The report's authors, biologists

Willi Nehlsen, Jack Williams and Jim Lichatowich, list 106 major populations, or stocks, of native Pacific salmon and steelhead that are now extinct. Another 102 are at high risk of extinction, although 18 of them may already be gone. Fifty-eight are at moderate risk of extinction, and 54 are of special concern. Of the grand total of 320 stocks, 59 are Californian; the rest are (or were) from Oregon, Washington and Idaho.

The decline in numbers is precipitous. One hundred twenty years ago, the Columbia River Basin produced 16 million wild salmon and steelhead yearly. Today its yield is just 4 to 7 percent of that. The true index of what is gone or going, however, is the loss of stocks. There are five species of Pacific salmon, but the hundreds of unique stocks chiselled by stream and season carry the traits by which the species stand or fall. The stock is the genetically flexible unit by which these great creatures fill all possible waters with their life.

The 800-mile inland migration of the Snake River salmon is a miracle,

indeed. But another Columbia Basin stock once spawned 1,200 miles inland, at Brisco, British Columbia. What a fish that must have been! Grand Coulee Dam erased it, and hatchery salmon won't replace it. *HCN's* report tells of eradicated and depleted salmon stocks and failed and weakening hatchery runs. But if the salmon are to be replenished and renewed, our shrinking seed bank of existing native stocks is indispensable.

This special issue offers snapshots of the threats affecting each imperiled stock. Habitat destruction and alteration, overfishing, disease, hybridization and competition with hatchery fish are grinding down most every wild salmon stock left in the Northwest. The common threat is human activity — hydropower, navigation, mining, logging, agriculture, fishing and urban growth. We are continuously and cumulatively assaulting these wild fish and their habitat.

But the problem goes deeper than a catalog of human pursuits. When our primary tool to perpetuate salmon against these threats — hatchery production — itself is listed in the Crossroads report as a ubiquitous threat to wild salmon, something basic must be out of whack.

While this issue contains some fine articles on Puget Sound and Oregon Coast salmon, the upriver Columbia Basin stocks from Idaho's Snake River get the most attention because they best reveal what has gone wrong.

The Columbia Basin is larger than France, draining parts of seven states and British Columbia. The Snake River is its longest tributary, has the farthest-migrating Northwest salmon and, not coincidentally, is home to four of the five stocks

petitioned for listing as endangered species.

Talk about Snake River salmon and you talk about dams. The Snake and Columbia rivers' hydroelectric dams are more than the largest source of salmon mortality; they are a concrete symbol of the crossroads. They slice up rivers as our jurisdictions slice the salmon's life; 16 separate public entities control Snake River salmon at some point in their migratory circle. (See map of dams on page 26.)

And they stand as impenetrable to fish as the basin's public institutions have stood to the public will. Repeatedly, over decades, Northwesterners have said, Congress has directed and the river-managing agencies have promised that Columbia Basin salmon and steelhead runs will be protected and restored. Yet nothing changes at the mainstem dams, and the decline continues.

The Northwest Power Planning Council is only the most recent example; it was created in 1980 with an explicit congressional mandate to restore salmon runs. Today, captured by the inertia it was charged to reverse, dispensing millions of dollars to small effect, it watches passively as the Endangered Species Act cranks up yet another government effort to save salmon. Unfortunately, as Rocky Barker's story on that new effort suggests, there's a good chance it may do no better.

For the Northwest's wild salmon to survive, the Crossroads report says that "a new paradigm that advances habitat restoration and ecosystem function ... is needed." One hundred ninety years since Lewis and Clark traversed the then-intact Columbia Basin ecosystem, the Snake River's natural connections to its parent Columbia are hanging by threads. Snake River salmon are proof of that, and which path we let them take from their crossroads will be a test for the chances of all 200 imperiled stocks. And it could also be a test for the durability of our own somewhat imperiled stock.

This special *HCN* issue on Northwest salmon follows by five months another on Northwest ancient forests. I am struck how the same insistent theme keeps emerging in both: sustainability.

In 150 years, we've run through 90 percent of our ancient forest — and more than 90 percent of our wild salmon. We are only now recognizing the incredible biological complexity — in the forest soils and within hundreds of uniquely adapted stocks in the streams — that generated those natural riches we have mined. We have pegged our forest future to intensively managed short-rotation tree farms and our salmon future to fish farms, while shredding the genetic inheritance without which neither engineered trees nor engineered fish can long produce.

I repeat the key question from the forest issue's introduction: How do we stretch the short, fast, single-minded straight lines of our Northwest economy out toward the long, slow, many-minded cycles of nature's Northwest economy? Is there a better example of the former than a dam? Is there a better embodiment of the latter than a salmon?

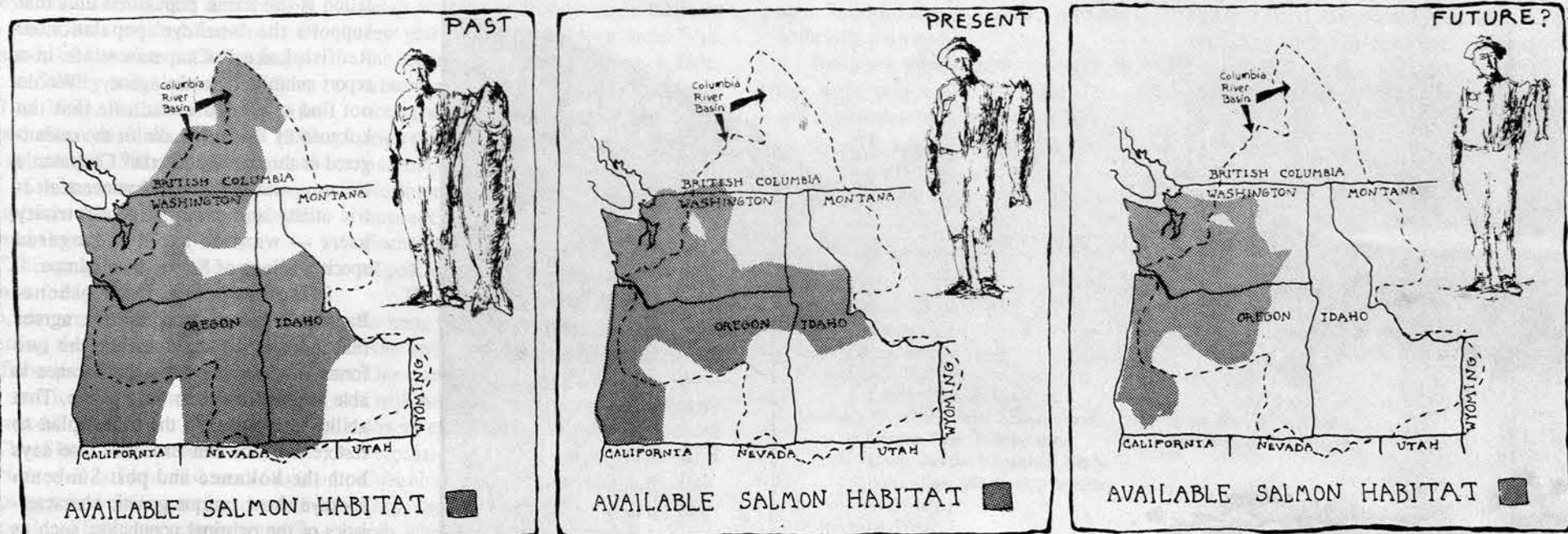
The Northwest, says Tim Egan, is anywhere a salmon can get to. As each salmon stock vanishes, the Northwest shrinks. The shrinkage is already well along, and the Crossroads report shows how swiftly and broadly it continues. On the Oregon Coast, Columbia Basin, Washington Coast and Puget Sound, salmon stocks are disappearing, and as they do this region contracts in body and soul.



Cold-storage men with the day's catch in Astoria, Oregon

Columbia River Maritime Museum

THE SHRINKING NORTHWEST



"The Northwest is simply this: anywhere a salmon can get to."

— Timothy Egan

The overlapping lists of dead and dying salmon stocks found throughout this issue are taken from the Crossroads report. They are more to be heard and felt than read, a drumbeat beneath the narrative, the hoofbeats of shadowed riders closing in.

The theme of this issue is from Ed Chaney. He calls this present moment — the period of two or three years initiated by the Endangered

Species Act petitions for Snake River salmon — the Last Salmon Ceremony.

Among his meanings, the most basic is that the next 700 days are Idaho's final chance to rejoin past to future in restoring its wild salmon. Soon they will be too far gone. That period may differ for Oregon and Washington wild salmon stocks at the crossroads, but the meaning holds.

But I also mean to echo the First Salmon Ceremony. To rescue and

restore wild salmon stocks, the Crossroads authors say, our shredded salmon ecosystems must be rewoven. The past 40 years make clear that will not happen by law, policy or technology only. Those useful tools will not be useful for the salmon until we change our attitude. What's out of whack is pretty simple. We lack reverence for these fish.

The old Indian view nicely bridges the secular and sacred: Salmon are another nation. We owe them, and must

return to them their sovereignty over this territory, the rivers and streams of the Northwest.

During Sen. Mark Hatfield's recent "Salmon Summit," the Columbia River tribal seaholders distributed a button with a drawing of a salmon and the words, "Let's make a pact to bring them back." But we will fail again, as the Salmon Summit failed, if we make the pact just among ourselves. We must make it with them.

Saying goodbye to the bright red sockeye

After years of scientific debate over genetic definitions and bureaucratic bungling by Idaho and the federal government, the Snake River sockeye has finally been proposed for listing as an endangered species.



by Rocky Barker

Not one sockeye salmon made it home to Redfish Lake in 1990.

A salmon run that numbered in the thousands as late as 1955 dropped to only one fish last year. But that one adult sockeye, returning from the ocean, only made it to Ice Harbor Dam, the first of four hydroelectric dams on the lower Snake River. The fish wasn't seen at the last dam, Lower Granite, and it didn't make it back to the luminous central Idaho lake named after it.

None of these bright red and silver fish returned to Redfish Lake.

"As near as we know, that's it," said Steve Morris, a National Marine Fisheries Service biologist, when the lone fish reached Ice Harbor. "Two made it in 1989, so the run has been cut in half."

That single fish captured the attention of the entire Northwest when the Shoshone-Bannock Tribes petitioned the National Marine Fisheries Service (NMFS) "to list the Snake River race of sockeye salmon as an endangered species." And its death somewhere in the reservoirs that were once the lower Snake River marks the latest chapter in the destruction of the Northwest's natural ecosystems.

In 1976, the year after Lower Granite Dam was completed, 771 sockeye made the journey from the ocean back to Idaho. Three years later only 30 fish returned. The run jumped to 216 in 1983. In 1985 it dropped to 24. Twenty-two were counted in 1988; two the next year; none the next. With the 1991 count this summer, Northwesterners may know whether they have witnessed an extinction.

This month NMFS proposed listing Snake River sockeye as an endangered species. In June the agency will make the decision for three Snake River chinook salmon stocks. Both species swim the same ocean, pass the same fishermen and run the same gauntlet of dams in the Columbia and lower Snake rivers, so parts of both decisions will be based on similar issues.

But the sockeye's very different spawning habits, genetics and habitat will focus the scientific debate on its unique problems. History and genetics will play a special role.

To the Shoshone and Bannocks the sockeye is more than a food source. "The salmon to me is the spiritual connection," says Keith Tinno, a Shoshone who serves on the tribes' business council. "The salmon is a part of the Indian people's life."

The tribes' Fort Hall Reservation is in southeast Idaho, north of Pocatello. But the Salmon River headwaters in central Idaho are part of a wider area where the tribes reserved their fishing rights in their treaties. These headwaters include the large lakes that the sockeye once inhabited — Alturas, Pettit, Yellowbelly, Redfish and Stanley lakes.

By the time adult sockeye reached the lakes each summer, they had swum 900 miles inland and 6,500 feet up from sea level in about 60 days. They spawned beneath the majestic Sawtooth Mountains, along windswept lakeshores and in feeder streams nearby. Juveniles emerged the following spring and spent one to two years in their home lake before migrating oceanward. Nearly all Snake River sockeye then spent two years in the ocean before their return trip.

No one knows how large the runs were before white settlement. In 1894 a U.S. Fish Commission scientist witnessed Sawtooth Basin lakes and streams "teeming with redfish." In 1881, 2,600 pounds of sockeye were harvested from Alturas Lake alone for mining camps.

In 1910 Sunbeam Dam was built downstream on the Salmon River to provide energy for nearby mines. The headwaters lakes were cut off. A primitive fish ladder worked badly or not at all. The sockeye, lacking spawning habitat below the dam, largely vanished.

Sunbeam was breached in 1931 when unknown parties ran a dynamite-laden raft into it. Sockeye rebounded, peaking in 1955, when 4,361 adults were counted entering Redfish Lake. Then, as the four lower Snake dams were built from 1960 to 1975, populations dropped steadily to today's single-digit counts.

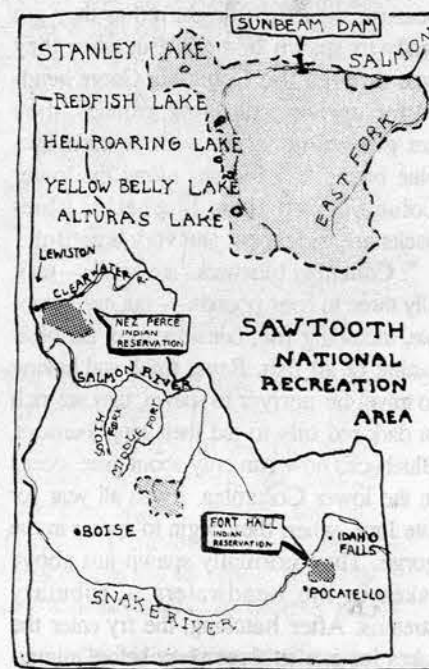
What exactly happened to the sockeye while Sunbeam Dam was closed and

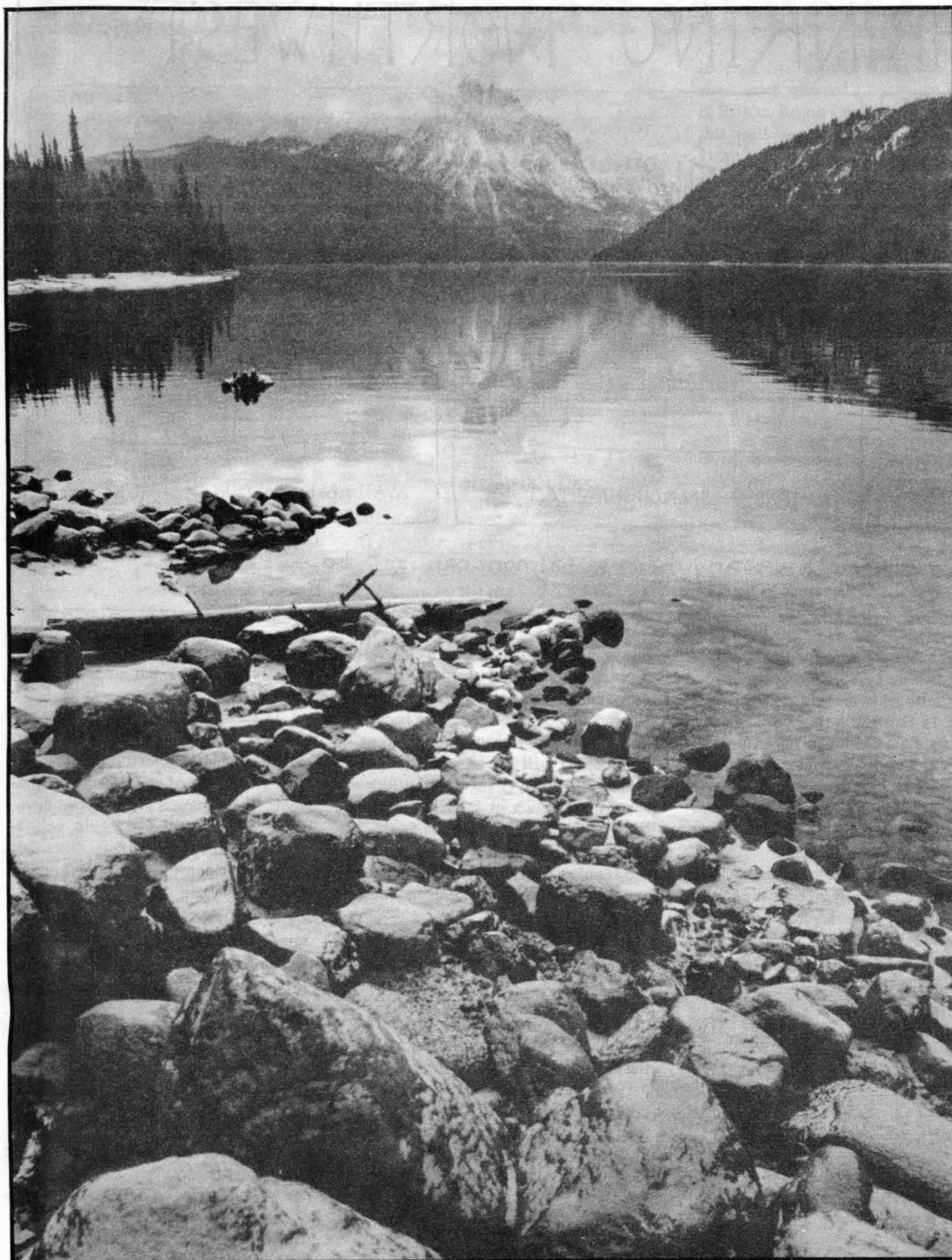
after it was breached is a crucial, thorny issue in the Endangered Species Act review. Scientists are divided over how the run was restored after 1931. Was it by descendants of a few remnant native sockeye that managed to scale the inadequate fish ladder while the dam stood? Or by some resident Redfish Lake kokanee — the landlocked, freshwater form of sockeye — drifting seaward after the dam was breached and somehow realizing their genetic potential to become sockeye salmon?

Experts have been waging the argument within the technical committees of NMFS's endangered species review. Don Chapman, a fisheries biologist under contract to the Pacific Northwest Utilities Conference Committee, says the original ocean-run sockeye was eliminated by Sunbeam Dam and that restoration came solely from Redfish Lake kokanee.

"The Redfish [Lake] kokanee popu-

Continued on next page





Not one sockeye made it home to Redfish Lake in 1990

Glenn Oakley

Goodbye sockeye...

Continued from previous page

lation is the same population unit that supports the 'sockeye' population of Redfish Lake," Chapman wrote in a report submitted to the agency. "We do not find evidence to indicate that the kokanee of Redfish Lake fit the endangered or threatened criteria." Chapman's clients — nearly every Northwest electric utility and many large electricity users — want to avoid endangered species listings of Snake River salmon.

Susan Broderick, the Shoshone-Bannock's fisheries coordinator, agrees that there is strong evidence the two forms interbreed and that the kokanee is able to transform into the sockeye. That ability is integral to the tribes' plan to restore the run. But Broderick also says both the kokanee and post-Sunbeam sockeye show unique genetic characteristics of the original population, such as lake shoal spawning. (Bill Sullivan, a veteran local fishing guide, says sockeye must have made it past Sunbeam Dam in the 1920s because he saw some of them above it.)

Broderick says there can be no Snake River sockeye unless the fish make the trip to the ocean. "I want our sockeye run back even if it's kokanee," she argues. "You've got a gene pool able to migrate 900 miles if we give it a chance."

Steve Huffaker, Idaho Fish and Game Department fisheries chief, says the genetic debate obscures the real issue: the 95-plus percent mortality at the downstream dams and reservoirs. "We still get down to the point that regardless of whether kokanee and sockeye are the same or different, an anadromous form of *Oncorhynchus nerka* [the species name for both forms] is what's being petitioned for listing," he says. "And the limiting factor on survival for those is obviously survival between the production area and the ocean."

But Idaho's Fish and Game Department has sockeye blood on its hands, too. In the 1950s and 1960s, Fish and Game poisoned sockeye nursery areas in Stanley, Hellroaring, Yellowbelly and Pettit lakes, then installed barriers to keep sockeye from again using them. The lakes remained toxic as long as two years after treatment. Then they were stocked with rainbow and cutthroat trout,

The iridescent 'blueback': my personal fish

by Chuck Williams

While the spring run of chinook has special spiritual significance to me, the blueback, or sockeye salmon, is my fish, my personal totem. Sockeye are often called "scarlet" salmon because they turn bright red as they get ready to spawn and die. But when they pass through the Columbia Gorge headed for upriver spawning grounds, they are glistening silver with aquamarine-blue backs. So Indians along the lower Columbia call them bluebacks. Bluebacks are iridescent and very beautiful.

Columbia bluebacks are small — usually three to four pounds — but many people, including me, consider them the best-tasting of all fish. Being small and having to travel far upriver to spawn, they are rich in dark-red oils to aid their long journeys. Bluebacks now run only about three weeks in the lower Columbia. I wait all year for late June, when they begin to appear in the gorge. They normally spawn just above lakes in the headwaters of tributary streams. After hatching, the fry enter the lakes for one to three years before migrat-

ing down to the sea. Bluebacks generally return upriver to spawn as four-year-olds.

About 4 million adult bluebacks once returned to the Columbia annually, and non-Indian commercial catches once neared 2 million fish a year. The Yakima River was a major producer; local Indians used elaborate stick weirs and traps at the headwaters lakes. But just after 1900 the federal government built storage dams on the lake outlets and killed the runs. In 1924 Idaho's Black Canyon Dam killed the Payette River sockeye run, which was a major non-Indian commercial fishery in the late 1800s. The biggest blueback runs spawned in Canada's Arrow Lakes region; they were destroyed in 1939 when Grand Coulee Dam blocked their upriver migration.

The Northwest Power Planning Council estimates that only 11,619 acres of lakes remain as blueback nurseries, while 211,231 acres of lakes the fish once used are now blocked off. Many of these lakes now have populations of kokanee, the land-locked version of sockeye.

Only two Columbia blueback runs remain in any numbers — those in the Wenatchee and Okanogan basins of

northern Washington. The runs fluctuate wildly year to year for reasons not understood. The current escapement goal (enough adults to spawn before fishing starts) is 75,000 bluebacks at Bonneville Dam. A remnant population in Idaho's Salmon Basin has now almost disappeared, in no small part because of neglect by Idaho officials. They have traditionally been much more concerned about steelhead, which bring in tourist dollars.

General lack of interest may be the biggest obstacle facing the blueback, although much is still to be learned about the species. Early efforts to raise bluebacks in hatcheries were not successful, but modern supplementation techniques have not yet been tried. The Columbia River Inter-Tribal Fish Commission's scale-sampling program at Bonneville Dam is filling some of the knowledge gaps. Biologists trap bluebacks at the fish ladders and extract a few scales from each fish before letting it go. Much like trees, the scales have rings that can be read to tell where each fish is going, how long it had been in fresh water and how long in the ocean, and other information to help guide management.

But research can only do so much. Like other salmon, bluebacks are devastated by the huge mortality to smolts trying to get downriver past all the dams. What the bluebacks need most right now is passage — past the mainstem dams and back to the lakes where they rear their young. They also need lots of people demanding much more emphasis on their survival.

I feel about bluebacks the way environmentalists feel when their personal special places are threatened. As we learned so tragically from the loss of Glen Canyon — lost in large part because so few people had ever seen it — we have to share our natural treasures with others to build political constituencies. I would rather keep the blueback's exquisite taste a secret. But unless these beautiful fish have more advocates, they will not survive. Steelhead, as a fighting "game" fish, have a large sport fishing constituency. Coho and chinook have sport and commercial constituencies. But, for the most part, only Native Americans are going to bat for the bluebacks. ■

which the department felt were of more interest to fishermen.

In 1975 Idaho's Fish and Game Commission voted to try restoring the sockeye run. Working with the NMFS, Fish and Game planted hundreds of thousands of Canadian sockeye fingerlings in Stanley and Alturas lakes from 1980 to 1983. But the program was stopped when no adults from the 1980 plant returned in 1983. NMFS's regional chief of enhancement operations wrote his superiors that the problem was Idaho Fish and Game:

"This program has obviously been given a fairly high public profile in Idaho," he wrote, "but does not seem to be getting the kind of support from the state fisheries agency that is necessary to make sure it has some reasonable chance to succeed."

The Shoshone-Bannocks blame NMFS as well as Idaho Fish and Game for not aggressively supporting the fading species. "Both agencies essentially stood by as this species crashed," says Sue Broderick. "The endangered species petition was the only option left."

NMFS had to choose among three options in its decision on the petition — that the Snake River sockeye is already

extinct, that it is endangered or threatened, or that it is in no danger at all because it is a kokanee.

The first option assumes that no adult sockeye will show up in the next few years at the lower Snake dams. With the second, which NMFS chose, it faces a heavy political fight to make the region accept significant changes in hydroelectric operations and mixed-stock salmon harvests. The third option is the one Northwest utilities, entrenched energy bureaucracies, downriver fishermen (including other Indian tribes), and a raft of politicians want.

The Shoshone-Bannocks only seek to bring the sockeye back — to restore "the spiritual connection," as Keith Tinno says. So they are backing Gov. Cecil Andrus' call for reservoir draw-downs each spring to restore pre-dam velocities in the lower Snake and Columbia rivers for the migrating fish. They want Columbia River harvest controls when the adult sockeye are running up in June and July. And they have a package of habitat and production projects for the nursery lakes.

It's possible some adult sockeye may show up at Ice Harbor Dam this summer, since good numbers of smolts

probably went out in 1989 — Idaho's only average water year in the last five. The Sho-Bans propose that any that appear be trapped, transported 400 miles up to Redfish Lake, held in net pens and artificially spawned.

But such emergency measures, if they work, only buy a little time. There are many unknowns, such as what hap-

pened with Sunbeam Dam, whether any sockeye are left and if kokanee can restore the run.

But two facts are beyond doubt. Today's Snake River sockeye run has no margin of safety left. Sockeye will again flourish in the heart of Idaho only when and if their rivers and lakes are restored to the conditions of 40 years ago. ■

EXTINCT AND IMPERILED SOCKEYE SALMON

EXTINCT — Partial list

Payette River (Id.)
Metolius River (Ore.)
Wallowa River (Wash.)
Yakima River (Wash.)
Okanogan Basin (Wash.)
Alturas, Pettit, Stanley, and Yellowbelly
Lakes (Salmon Basin, Id.)
Columbia River tributaries above Grand
Coulee Dam (Upper Arrow,
Lower Arrow, Whatshan, Slo-
can Lakes, Wash. and Canada)
Elwha River (Wash.)
Mason Lake (Wash.)

IMPERILED

At High Risk

Deschutes River (Ore.)
Redfish Lake (Id.) *
Baker River (Wash.)

At Moderate Risk

Lake Ozette (Wash.)

Of Special Concern

Okanogan River (Wash.)
Wenatchee River (Wash.)

* Indicates the stock may already be extinct.

Source: "Pacific Salmon at the Crossroads," Nehlsen, Williams and Lichtowich, American Fisheries Society Journal, March-April 1991.

Idaho's Middle Fork of the Salmon River

It is the most pristine large river left in the West. But its runs of wild chinook are nearing extinction. One reason is the degraded spawning habitat, which can be improved. The other is the eight hydroelectric dams downstream, a more formidable problem.



by Rocky Barker

The three-foot female salmon shot through the shallow rapids of Marsh Creek, sending wings of water in her wake. Terry Holubetz had frightened her off her redd, or nest, where

she had been laying eggs. He and his students — young biologists learning how to count salmon spawning redds — were slogging downstream at the peak of spawning last July. Once they moved on, the spring chinook quickly returned to finish a task begun three months earlier when

she entered the Columbia River 750 miles downstream at 7,000 feet less altitude.

The blunt-nosed fish had beaten her tail down to the flesh to plow the stream-bottom gravel into a proper redd to protect her eggs during incubation. A hook-jawed male hovered in the shadows, ready to deposit milt over the eggs to fertilize them. In a few days, their mission complete, both fish would die.

These salmon and each member of their increasingly rare stock are special animals, physically and genetically. They are the wild salmon of the Middle Fork of the Salmon River.

The Middle Fork and its tributaries, like Marsh Creek, are the only salmon waters in Idaho that have remained off-limits to weaker hatchery stocks. No hatchery salmon have been mixed in; the evolution that has prepared the wild fish

to make the long journey from the Pacific Ocean has ruled unchanged for centuries.

But eight hydroelectric dams on the Columbia and Snake rivers, with some help from gill nets, trolling hooks and sediment, threaten to end this remarkable natural saga. The wild spring and summer chinook salmon of the Snake River are in serious trouble. Perhaps only 5,000 wild springs, and even fewer wild summers, are returning to Idaho each year. Last year petitions were filed seeking the designation of both stocks as threatened or endangered species.

The Middle Fork of the Salmon is among the wildest rivers in America. Over 90 percent of its almost 2-million-acre watershed is within the Frank Church-River of No Return Wilderness. Its 100 miles of pools, riffles and white-water rapids are boated by nearly 10,000 recreational rafters and fishermen each year. Half of Idaho's outfitting and guiding economy derives from this one river. No one who floats the Middle Fork ever forgets it.

It is the most pristine large river left in the West. Its clarity and purity support not only its economic value, but also its habitat value to salmon. The watershed within the wilderness provides spawning and rearing habitat unmatched in the Columbia River Basin.

The river also has spiritual importance. The Middle Fork was home to ancestors of today's Shoshone-Bannock Tribes and is part of their reserved fishing territories. But a connection exists for white Idahoans as well. Outfitter Dave Mills spends three months each year on the river. "Every trip is different," he says. "The weather, the water, flora and fauna, the fish — every part of it changes every time. You pay attention every moment. And you connect back — we sleep where those old Indians slept."

The spring chinook that Terry Holubetz spooked in Marsh Creek had swum about as far as it could. Marsh Creek is where the Middle Fork watershed begins. Indeed, the fish had completely traversed the largest wilderness area in the 48 states; the Middle Fork's headwaters, in Marsh and



Scott Caraway

Terry Holubetz teaching a redds seminar on Marsh Creek

Continued on next page

Middle Fork ...

Continued from previous page

Bear Valley creeks, are one of the few parts of its watershed where roads were built before the wilderness area was created in 1980.

When Holubetz, fresh out of college, first saw Marsh Creek in 1964, the stream was teeming with spawning chinook. Today he is 51, with more than a few scars from a career devoted to salmon. Marsh Creek also bears scars of change. Silt, sloughed into the stream by countless hooves of grazing cattle, covers gravel beds that once were prime spawning beds for the red and black chinook. Algae is thick in some areas, a visible sign of poor water quality. On the day of Holubetz's redd-counting class, a dead salmon floated by, showing the spear marks of a poacher.

But the big change is the disappearance of most of the large spawners that

filled the creek in 1964. That first year Holubetz counted 709 redds. In 1990 he and his students could only find 57 — barely better than 1989, when 44 redds were counted. Also gone are the huge schools of juvenile salmon that once filled the pools and riffles of the mountain meadow stream.

"This used to be one of the most heavily used salmon areas in the Snake River drainage," Holubetz says. "It's depressing to see the low numbers of fish and the poor condition of the habitat. I have seen a serious degradation in 26 years."

Holubetz has tried to do something about it, first within the Idaho Fish and Game Department, then as executive secretary of the Columbia River Fisheries Council. He fought for greater flows on the Columbia and Snake rivers. He lobbied for salmon-protection amendments to the Northwest Power Act of 1980. He fought to raise the concern

for salmon within the fishery agencies charged to protect them.

But despite the power act's promise of "equitable treatment" for salmon, and the expenditure of more than \$500 million on anadromous fish in the last decade, the Middle Fork's wild fish and other Snake River salmon stocks are on the brink of extinction.

Holubetz has suffered, too. Although he has more experience with anadromous fish management and politics than anyone else in Idaho's Fish and Game Department, today he plays only a minor role in the state's salmon program.

Idaho tribes, outfitters and conservationists, however, are mobilizing to restore Marsh Creek's degraded habitat. After years of Forest Service delay, livestock grazing in upper Marsh Creek may end next year. Conservationists want the Frank Church Wilderness made the first all-wilderness national forest ever, so that its habitat can be managed on a

watershed basis. Although Idaho's Legislature just denied Marsh Creek and the Middle Fork the state's highest level of water quality protection, a campaign to designate it critical habitat under the Endangered Species Act will begin soon.

But many prime spawning areas in Marsh Creek lie unused, and even maximum success in improving and protecting every square foot of Middle Fork habitat won't restore Middle Fork salmon. "Wild fish production here, and hatchery production in other streams, won't work unless we improve downstream survival," Holubetz says. No matter how many wild juvenile salmon leave Idaho habitat for the ocean, every year more than 95 percent of them are killed by the hydroelectric system downstream.

"A lot of people in Idaho want to give up on these fish," Holubetz says. "But if we solve that one problem" — passage at the downstream dams — "we're back in business." ■

Counting the declining 'redds' of Frenchman Creek

by Stephen Stuebner

In the sun-drenched glare of the Sawtooth Mountains, Kate Forster crawls on her belly to the edge of Frenchman Creek, a ribbonlike tributary of the mighty Salmon River. Like a snake slithering through the grass, she makes no sound. She parts the brush and peeks into the small pool below.

"There they are!" The magnificent king salmon, a male and female, beat up and discolored from their 2,500-mile journey to the Gulf of Alaska and back, lie side by side nearly motionless in the pool, pointing upstream, protecting the nest.

Their life cycle complete, the huge fish — longer than the creek is wide — will plow their noses into the loamy streambank and die, ending a miraculous life. Come spring, 4,000 to 5,000 eggs will hatch in the carefully constructed redd. Depending on the sediments, egg-to-fry survival will be between 15 and 85 percent.

Kate Forster likes this work. It's a thrill to see the salmon. "It's really great seeing the fish, knowing all the obstacles they've got to overcome to make it here," she says. "To sit there and watch them spawning in these tiny little creeks — it's just really something."

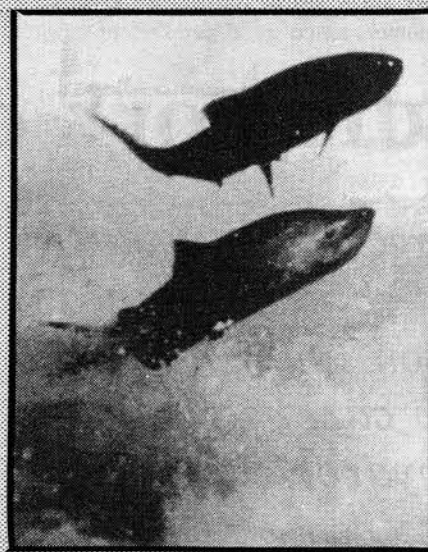
It's also an increasingly rare experience. As Snake River chinook and Red-

fish Lake sockeye slide toward extinction, the Idaho Fish and Game Department documents the decline with its redd counts. By helicopter and foot, Fish and Game staff tally the number of wild or hatchery-raised "natural" salmon that survive the dams to carve a nest in the gravel and spawn the next generation.

Redd counts provide the only true picture of the wild population of salmon. The Army Corps of Engineers counts millions of smolts carried by barge around the dams, or thousands (fading to hundreds) of adults coming back past the dams. But an adult salmon at Lower Granite Dam doesn't guarantee that a mate will be found and eggs laid.

On Frenchman Creek, chinook or king salmon used to vault by the dozens over the four-foot beaver dams. In the 1950s and 1960s, upper Salmon River redd counts varied between 350 and 1,100 nests. In 1982, that dropped to 42, the benchmark low for the upper Salmon. Increased funding for hatcheries boosted natural spawning levels for a time; redd counts hit 162 in 1987. Now they're on a steady slide downhill to 97 last year.

Overall, salmon redds have declined 40 percent in the last three years in the Salmon and Clearwater rivers, Idaho's only drainages still avail-



Stacy Gebhardt/Idaho Department of Fish & Game
Two adult chinook leap up falls

able for Snake River spring and summer chinook. 1990's total count of 1,052 redds is just 8 percent of the 12,206 redds recorded in 1957, the first year Fish and Game conducted field surveys.

Idaho's strongest remaining wild salmon run is the spring chinook. Their sanctuary is the emerald-green Middle Fork of the Salmon River, encircled by wilderness. In the late 1950s, the five-year average redd count in the Middle Fork was about 2,080. The 1985-1990 average is 452 redds.

Adult populations also are in pre-

cipitous decline. Adult salmon are counted at Lower Granite Dam, the last of eight dams they must pass on their ocean-to-Idaho journey. In 1989, 12,955 springs, 3,169 summer and 706 fall chinook were tallied at the dam — respectively the seventh, third and eleventh lowest counts ever. Last year, 17,315 springs, 5,080 summers and 386 falls were tallied. And this includes hatchery fish — which account for perhaps 50 to 60 percent of the spring chinook counts, for instance.

Dexter Pitman, an Idaho Fish and Game biologist, says it appears that 1991 will also have some of the lowest adult returns ever. 1991's adult spring chinook count is projected to be only 11,000 fish.

"The wild fish numbers we're expecting this year are no better than the lowest numbers we saw in the 1980s," Pitman says. "The outlook for chinook is the numbers are down, and down substantially." Redd counts this summer will be very low. "We'll go to areas where we used to find redds, and we'll find zero fish," he says. "There will be a lot of zeroes."

As to the \$64 million question — when do the numbers get so low as to warrant endangered species listing — Pitman says only, "That's up to the National Marine Fisheries Service." ■



A spawned-out female chinook lies dying in the gravel riverbed of Hurricane Creek

Chris Pietsch

'Build dams and the hell with the fish'

Ed Chaney is to the salmon of the Pacific Northwest what John Muir was to the Sierra Nevada and the conservation movement in California.



by Paul Shaffer

The phone rings, and Ed Chaney slides his six-foot-six-inch frame slightly lower in his swivel chair before reaching a long arm to lift the receiver.

"Chaney here." The voice is soft and quiet, unexpected in such a large man. His face opens in a tired but genuine smile as salutations are passed. His other hand rests on and occasionally strokes the head of his eager English setter pup, Smith.

They share a well-equipped office in the basement of his home, situated on the Boise River 10 miles west of Idaho's capital city. A fax hums almost continuously in one corner. The several desks hold state-of-the-art desktop publishing equipment. Books cover two walls floor to ceiling; the other walls display awards and plaques honoring Chaney's conservation work over several decades.

Chaney is a leading consultant on Western natural resources — land, streams, cows, upland birds, fish — and the law and policy governing them. Particularly fish. He has logged more time, personal and professional, on Columbia River salmon and steelhead than perhaps anyone.

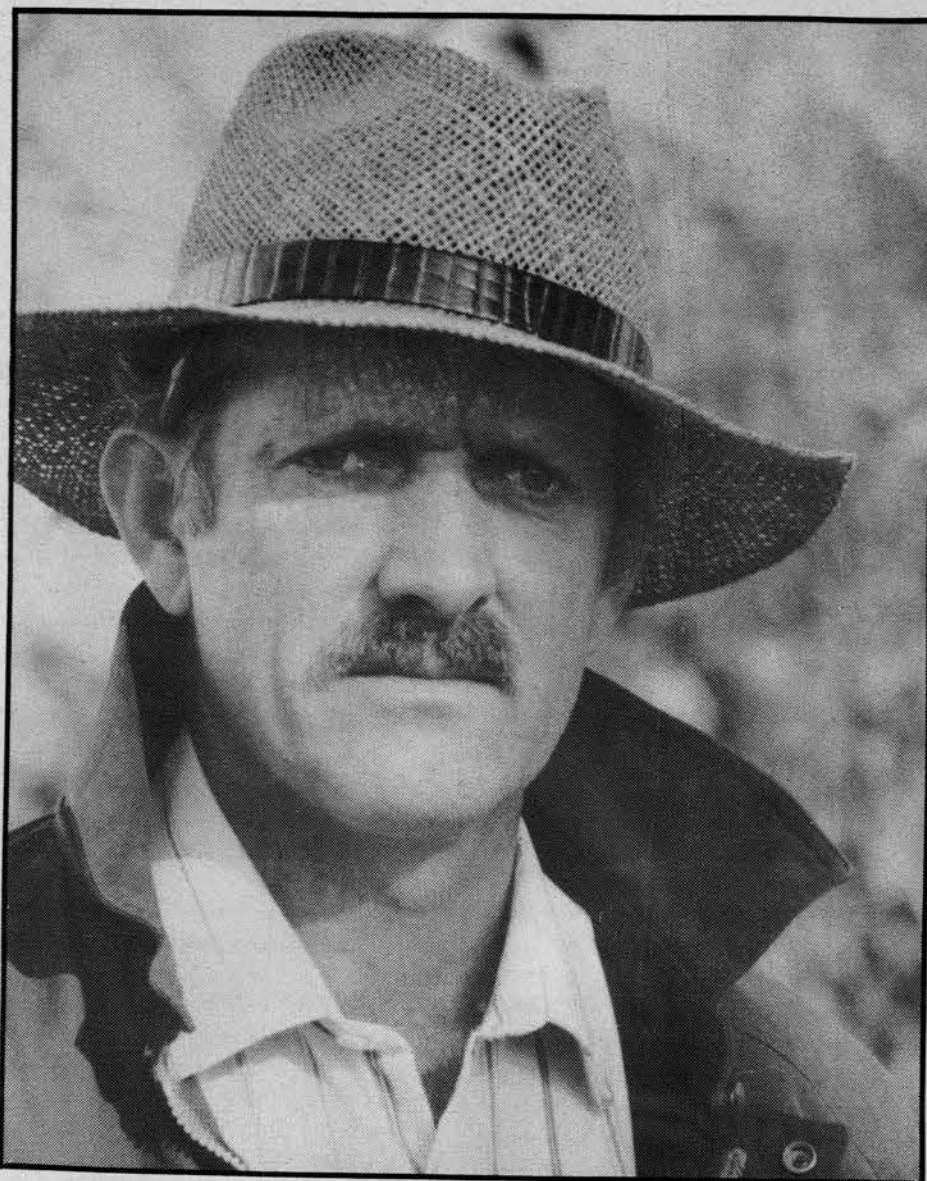
"My baptism by fire began, I believe, in October 1966," he says, "working for what was then called the Oregon Fish Commission. They managed the commercial salmon fisheries."

A year later that ended in a full-page photographic spread published by the *Portland Oregonian*. The photos showed the massive fish kills after the Army Corps of Engineers closed the just-completed John Day Dam before its adult fish ladders were operational. They did this over the objections of fisheries agencies and fishermen in order to be ready for the planned dedication address of Vice President Hubert Humphrey, whose schedule could not be changed. Several hundred thousand adult salmon and steelhead were killed as a result. Fish washed up in piles on the banks, and Corps workers buried them in the sand.

Chaney did take the photos and he did pass them to the newspaper — along with a request for anonymity, which the paper ignored. What piqued Chaney's bosses was that he did it while under a gag order. Discretion suggested a move, and two weeks later he was settling into a position with the National Wildlife Federation in Washington, D.C.

He laughs and drops his forehead into the cup of his large palm. "I knew I made a wrong turn someplace in my career. I could've been a normal person with a regular job." Looking up, he adds, "It was when they closed John Day Dam without any fish ladders. That's what's responsible for me being what I am today."

Chaney's story is a grim reminder that the Columbia Basin fish wars have gone on for a very long time, "fought step by



Charlotte Chaney

Ed Chaney

bloody step from the very beginning. This has been a bloody, ugly political battle."

From 1933, with construction of Rock Island Dam on the Columbia River, until 1975, when Lower Granite Dam was completed on the Snake, 15 dams were built between the basin's upriver spawning grounds and the sea. The original vision saw all the Columbia's waters run through the turbines of successive dams in what would be — and now is — the world's largest coordinated hydroelectric system. That vision also provided for protecting the world's largest anadromous fish runs and their dependent economies.

"Instead," Chaney says, "we got a fundamental failure in public policy. The visionaries went home, the engineers and bean counters took over, and they set out to just build dams and the hell with the fish. If you were setting out to design dams to wipe the fish out, this is the way you would have designed them. Except you just wouldn't put adult fish ladders in."

In fact, the Corps of Engineers began building the first federal dam in the series, Bonneville Dam, without adult ladders. When fishermen raised a stink, the Corps installed them, and the ladders became a standard design feature. But no provision was made to pass juvenile fish through the dams on their downstream migration to the sea, although the eventual plan was to run the entire flow through the turbines.

"It is hard to escape the conclusion — because these were not stupid people — that there was never any intent that these fish would survive," Chaney suggests. "But politically that was not acceptable, so we had this charade of pretending they were going to be there, while making the smallest investments in it possible."

Chaney calls this the shadow policy that has directed hydro development in the Columbia Basin. "I don't think they decided, 'We're going to kill all these fish,'" he explains. "I think what they decided was, 'Well, it's inevitable. In time the fish will be gone, so it's just not prudent to make certain investments.'"

Chaney came back West in the early 1970s and set up shop as a consultant. This has allowed him to work at all levels of the salmon issue: for ranchers, state agencies, Indian tribes, and regional and federal agencies, doing everything from writing federal law to putting up fence along salmon streams in cow country.

A contract with the now-defunct Pacific Northwest Regional Commission was his first chance to work on salmon at the level that matters most — basinwide. One outcome was the creation of the Columbia Basin Fish and Wildlife Authority, to coordinate state and federal fish agency programs regionally. "The pivotal basinwide issue is the mainstem dams. We hammered on it again and again," says Chaney. "We didn't make any progress."

But the work taught him the regional nature of the issue: "Fish are to the Northwest what wheat is to Kansas. By using fish as a common denominator you can influence regional policy-making in a lot of arenas."

The regional emphasis led, finally, to the fish provisions in the Northwest Power Act of 1980. Chaney helped Idaho Sen. Frank Church draft the key provision, requiring "equitable treatment" for anadromous fish and energy in operation of the federal hydrosystem. Fish advocates thought it was an unambiguous congressional mandate to finally fix the problems at the dams and restore the salmon.

But that hasn't happened. Columbia and Snake river dam operations are little different today than in 1980. This testifies to the power of institutions — Bonneville Power Administration and the Army Corps of Engineers — to sandbag popular mandate and the power of law. "The [Power Act] only gave us the opportunity to fix things," Chaney sees now. "We didn't seize it."

Such stories of failure are endemic to the Northwest fish business. It explains why so few veterans like Chaney are still at it; losing wears people out. But there have been wins, and what Chaney has learned from them has helped keep him going.

"Despite the dire scenarios, fish and water development are compatible," he says. "The Umatilla shows you can get there from here if you're creative."

The Umatilla River is a Columbia River tributary draining farmlands and parts of the Umatilla Indian Reservation in northeast Oregon. Diversions had dried up the lower river for 20 years; its salmon runs were history. In the late 1970s, while working for the Umatilla Tribe, Chaney helped design, fund and build broad political support for a comprehensive restoration project.

"I looked at it as a test case of whether people could work together in enlightened self-interest," he recalls. Part of the strategy was a dexterous use of tribal treaty rights, not just to allocate harvest on declining numbers of fish, but to help lever and cajole necessary support from irrigators and politicians.

"Twelve years later now," he says, "the Umatilla Tribe, Oregon Fish and Wildlife, the irrigators and Senator Hatfield have restored three salmon runs, and have a \$70 million project under way that will restore flows to the lower river and keep the farm economy whole." The irrigation water now taken from the Umatilla will be replaced by water pumped from the Columbia. And, thanks to the fish benefits, all with a positive cost-benefit ratio.

In other words, it's good business. That is the heart of Chaney's message today. "The shadow policy has been very bad business," he insists. "We don't have to trade fish for energy. Fish and hydropower are compatible. The whirlwind of agony and economic cost we have reaped from wiping out these fish hasn't been necessary. It isn't necessary today, if we apply a little entrepreneurial creativity."

The tiredness in Chaney's face lifts; he sits straighter and an eagerness enters his voice. "Physically, we just have to figure out how to get fish up and down the river. In the Snake River there is only one way to do that without taking out the dams: Increase the velocity of water through the reservoirs. And there's only one way to do that: In the short term draw them down; in the long term modify the dams."

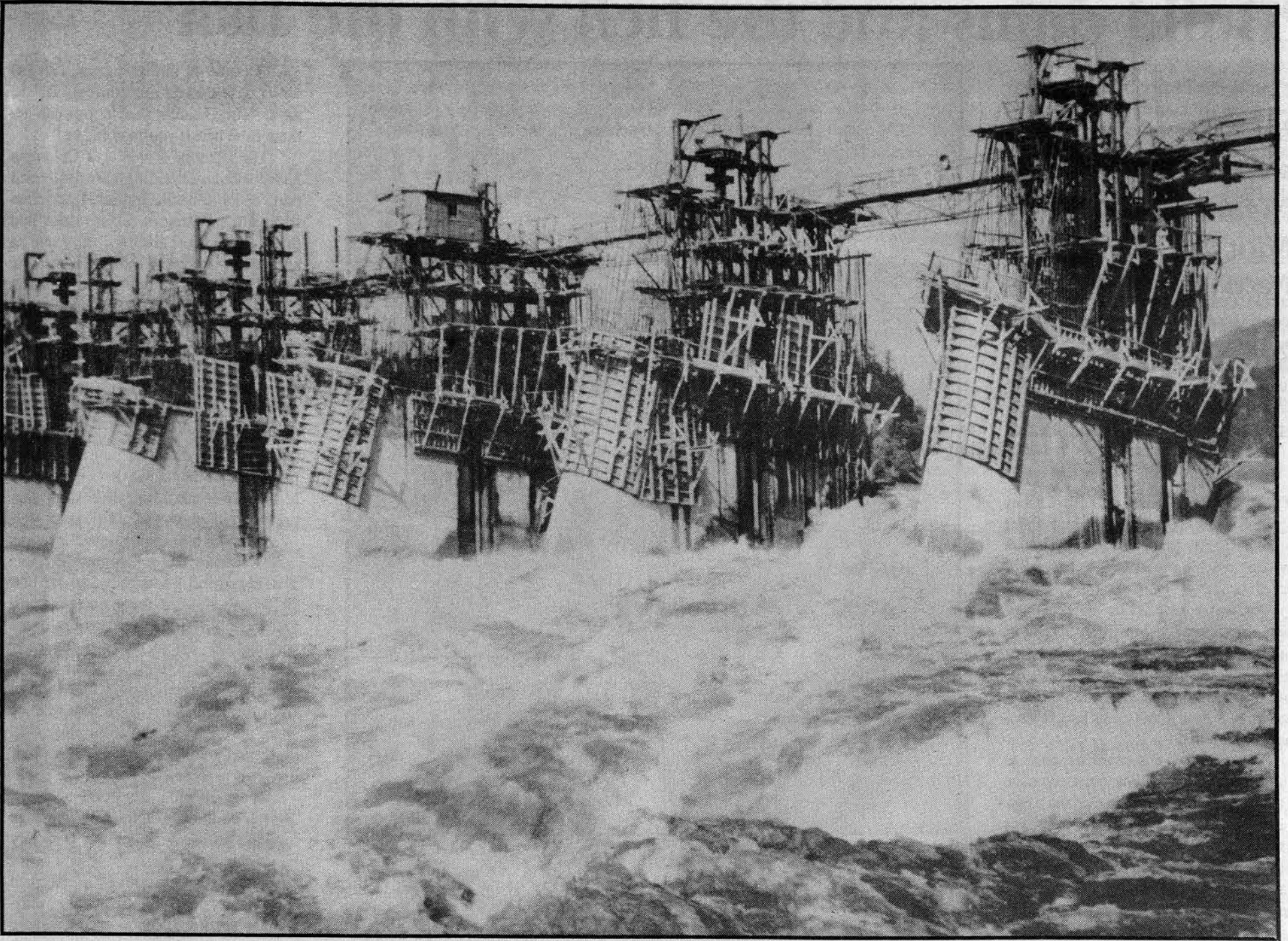
"Then the question becomes, 'How do you configure the energy system to capitalize on this change?' I predict we will find we can make more money from energy than we do now, plus restore all the money we once made from fish — if we persevere long enough to overcome the inertia and the doomsday thinking of Bonneville, the Corps and the region's utilities."

Chaney is persevering. He has sued Bonneville Power Administration, challenging its interpretation of the Northwest Power Act's "equitable treatment" clause. He has organized the Columbia-Snake Rivers Main-Stem Flow Coalition, with 20 groups representing 40,000 Northwesterners, to make the public and political case for changing course at the dams. He serves on the National Marine Fisheries Service's technical panel for its endangered species review. He is in ceaseless contact with other fish advocates, public officials, tribes and media.

And in his free time he tries to make a living.

Chaney takes his dog outside and watches him dash across an overgrown field that drains to the Boise River, which empties into the Snake, which, in turn, flows into the Columbia and on to the sea.

"Fish are this great integrator," Chaney says. "They spawn 900 miles inland and they travel to the ocean and all along the coast. They bind this region together. They make us think about being our neighbor's keeper."



I. Bunpee/Oregon Historical Society #049602

Construction of the Bonneville Dam, 1936, on the lower Columbia River

How the basin's salmon-killing system works

The Columbia Basin's eight mainstem dams account for nearly all — 95.3 to 98 percent — of the Northwest's annual salmon slaughter. These dams could be modified.



by Pat Ford

Salmon do not swim to the ocean. Consider a chinook salmon fry as it drifts in three-foot-wide lower Herd Creek. The weather warms, the snowpack starts to melt. The rivulets feeding Herd Creek rise. The spring freshet begins moving downstream, picking up speed as it picks up water.

The tiny salmon drifts near the grav-

el where it emerged the year before. The freshet reaches it and takes it. The fish washes down backwards, snout pointing back upstream, moving within a pocket of its home stream's water.

The surge shoots from Herd Creek into the East Fork Salmon River, and a few miles later into the main Salmon River. The fish joins others washing down backward from the Salmon's headwaters 60 miles above.

Now the water really moves. The fish are 850 miles from the Pacific Ocean. They will reach it at the four-mile-wide mouth of the Columbia River, in a week or so, depending on the winter's snows and spring temperatures in the Columbia Basin. When they enter the ocean, an internal transformation from fresh- to salt-water fish will be complete.

Two or three years later, those still alive will enter the Columbia, swimming this time, and fight up to the Snake, the Salmon, the East Fork Salmon and Lower Herd Creek — 850 miles — to begin the cycle again, in the same place. Somehow they do this.

Or did this. In 1938, the Bonneville Dam closed on the lower Columbia River. Since then, seven more dams have blocked the migratory path Snake River salmon must travel down as juveniles and up as adults.

These dams are why Snake River

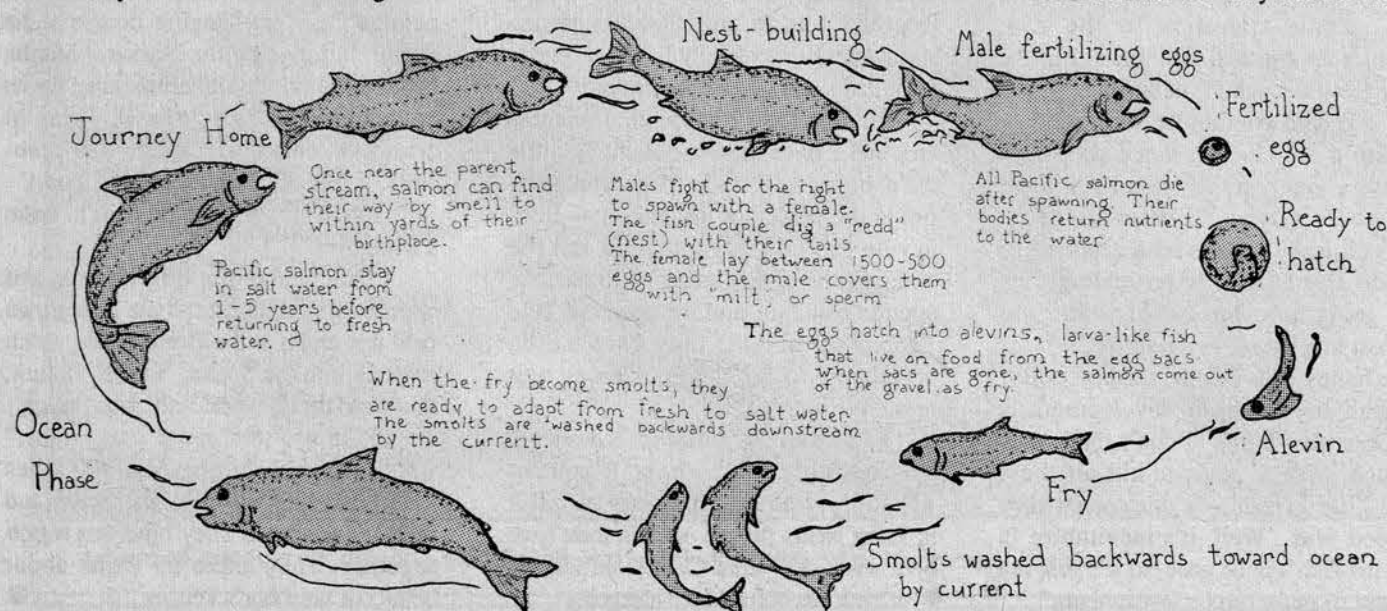
coho salmon are extinct, why four other wild salmon are petitioned for listing as endangered species, and why wild steelhead may soon join them. "Many factors have contributed to the general decline of Snake River salmon and steelhead runs," says their champion, Ed Chaney. "But only one threatens their survival — the eight Army Corps of Engineers dams on the lower Snake and Columbia rivers."

Juvenile salmon are killed at the dams: shredded, shocked and lost. They also die between the dams, where slack-water reservoirs have replaced the river and the week's trip now takes 30 days. As the fish drift in the currentless pools, they succumb to reservoir-bred predators, to high temperatures, disease and premature saltwater transformation.

Millions are taken out of the river at two of the dams, put in barges, then dumped back in the Columbia below the last dam. But salmon take handling poorly; delayed mortality is extremely high.

Returning adult fish are also killed at and between the dams. They fail to find the fish ladders, fall back from above the dams or lose their way in the reservoirs. Oregon's Department of Fish and Wildlife estimates that each dam claims from 5 to 14 percent of the adults that reach it. Cumulative estimates of juvenile losses are 90 percent or more.

For the four Snake River salmon petitioned for endangered species listing, fishery agencies estimate that food harvests — commercial, sport, tribal, both ocean and in-river — account for between 2 percent (for spring chinook) and 4.7 percent (for fall chinook) of total human-caused mortality. From 95.3 to



98 percent of the deaths result from the dam harvest.

This massive annual slaughter occurs for a simple reason. The Army Corps of Engineers designed adult fish ladders for all eight mainstem dams, but none were designed so juvenile fish could migrate safely downstream.

This fundamental engineering error was made not once but eight times over 40 years. It was not made in ignorance — fish advocates pointed it out from the beginning. It was made despite laws, policies and repeated assurances that anadromous fish runs would be preserved.

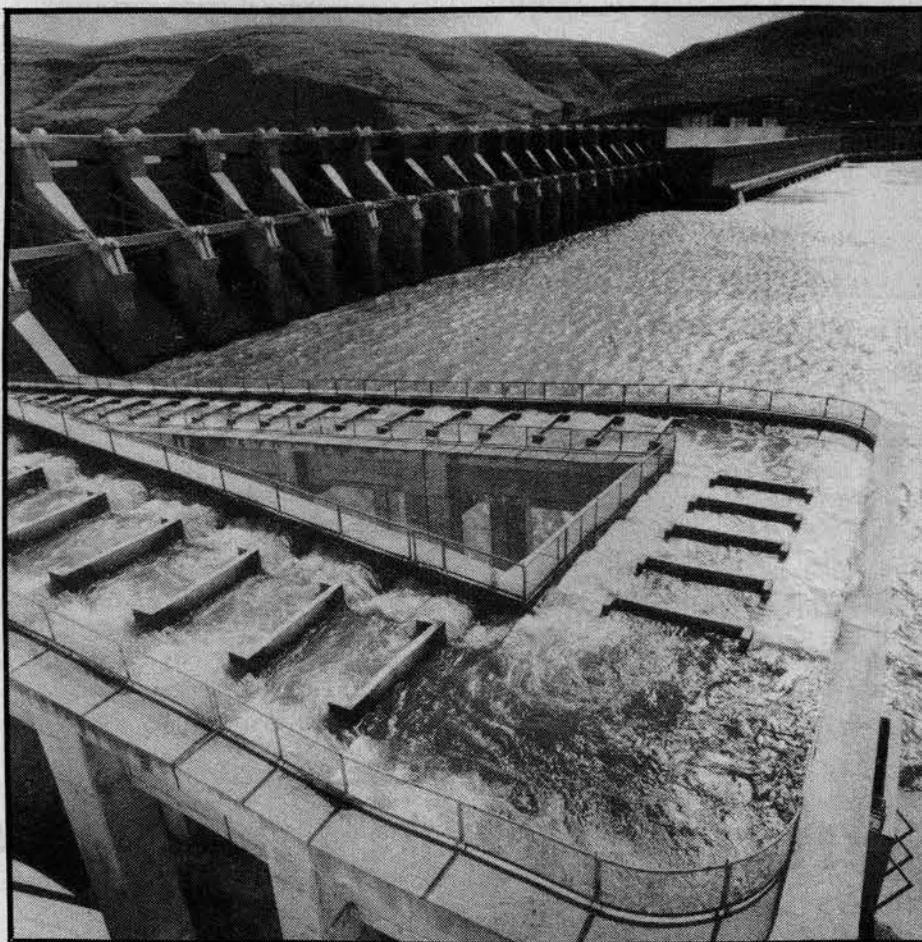
Because the salmon stubbornly refused to die out quickly, more than a billion public dollars has since been spent to patch around that design flaw. Turbine screens and juvenile fish bypasses were tacked on at half the dams, with varying degrees of ineffectiveness. Hatcheries were built to throw ever more millions of fish into the killing system. Water was thrown at it to achieve slight flow increases. Predator control was launched against the squawfish hordes created by the dams and fed by the hatcheries. A transport program now collects over 90 percent of the juvenile salmon from the river, barges them down, dumps them below the last dam — and virtually none ever return.

Ed Chaney sums it up: "Over 50 years we've built a Rube Goldberg artificial life-support system that simply doesn't work. The risk of total collapse has increased with each new whistle and bell added to 'help the fish.' That money could have fixed the real problem: design and operation of the mainstem dams."

The real problem hasn't been fixed for another simple reason. Changing the dams would require altering the uses they are built and operated to serve: hydroelectric generation, navigation and irrigation.

The eight dams between Idaho salmon and the ocean — Lower Granite, Little Goose, Lower Monumental and Ice Harbor on the lower Snake, and McNary, John Day, The Dalles and Bonneville on the lower Columbia — are part of the world's largest coordinated hydroelectric system. More dams, higher in both basins, fill out the system, which produces an average 19,000 megawatts and gives the Northwest the lowest electric rates in the nation.

Fifteen Northwest utilities, the Corps of Engineers and the Bureau of Reclama-



A fish ladder, designed to help adult salmon pass through areas where dams block their migration routes
Portland District, U.S. Army Corps of Engineers

tion (which operate the dams), and the Bonneville Power Administration (which markets their power) generate money as well as power. Fifty years of construction, and the WPPSS nuclear plant fiasco, have left the Bonneville Power Administration \$15 billion in debt. To avoid raising power rates, the system maximizes hydrogeneration — and thus revenues from its sale — even when the region doesn't need power. During the spring salmon migration, Bonneville sells as much electricity to California as the four lower Snake dams generate.

The reservoirs also created a navigation industry. Farm and forest products from inland ports are barged down to Portland, many destined for Pacific Rim markets. Finished goods are barged up through locks and waterways built and maintained free of charge by the Army Corps of Engineers. Lewiston, Idaho, is now a seaport from which Montana wheat and Idaho paper products head overseas.

Irrigated agriculture is the third beneficiary. Huge pumps suck water from some of the reservoirs onto thousands of acres of croplands in Oregon and Wash-

ington. Recreation development — marinas, warm-water fisheries, shoreside parks — has grown up on the reservoirs as well.

It is a tight-fitting system. At the lower Snake projects, maximum generation from the turbines, necessary barge clearances, intakes for the irrigation pumps and watering of adult fish ladders all occur within a five-to-seven foot range of reservoir elevations. Drop below that range — for instance, to create current for juvenile passage — and each use either ceases or is substantially affected.

A system so big generates another kind of power. Its users and customers — utilities, bargers, irrigators, ports, aluminum companies — create a familiar politics of inertia. This is distinctively magnified by a mega-bureaucracy unique to the Northwest: Bonneville Power Administration and the Army Corps of Engineers, publicly financed, wielding public powers, yet publicly unaccountable. Bonneville and the Corps have built a Columbia Basin kingdom.

These agencies were instruments of a great New Deal dream — public development of the Columbia Basin. While giving much, it has left two terrible wounds. The region's greatest natural gift has been ravaged, and the autocratic, self-perpetuating bureaucracies that did it grind on, largely immune to market discipline or democratic control, shackling today's dreams in yesterday's chains.

How can Snake River salmon get safely down to the sea so they will return in productive numbers? Two basic approaches are contending for favor in the Endangered Species Act process and for the newly attentive hearts and minds of Northwesterners.

The first avoids killing fish at the dams by removing the fish from the river. Juveniles would be collected and barged down past the last dam. Because 97 percent of all fish reaching the dams over the last six years were transported, this plan can fairly be called business-as-usual. (There is one new element: At least double the current flush of stored water from Idaho would be used to augment natural spring flows, to move more fish faster through the first two reservoirs to collectors at Lower Granite and Little Goose dams.)

The second approach would return the river to the fish, emulating pre-dam conditions as much as possible during the peak migration from mid-April through June. In the long term, the lower Snake dams, then the Columbia's, would be rebuilt to allow simultaneous juvenile and adult fish passage. In the short term, the four Snake reservoirs would be dramatically drawn down to create much faster flow velocities for juveniles, with adult ladders modified to keep operating.

The plans betray their chief sponsors. The first — replacing natural with engineered migration — is radical for salmon but conservative in its effects on the federal hydrosystem. Bonneville and the Corps are its major champions. The second is conservative for the fish but radical in its effects on Bonneville and the Corps. Idaho Gov. Cecil Andrus is its architect.

During the six months of Sen. Mark Hatfield's Salmon Summit, the Idaho plan gained steady if often grudging ground by the force of its logic. North-

Continued on next page

'We've got an economic opportunity here'

What will it cost to restore the salmon of the Snake River? Since the filing of endangered species petitions last year, the conventional wisdom prophesies dire consequences for the region's economy that "make the spotted owl's impact look tame."

The Bonneville Power Administration said Northwest power rates could rise by 30 percent or more; bargers predicted the end of their industry; irrigators said farming in southern Idaho and Washington could be devastated. Sen. Mark Hatfield talked of 50,000 jobs at risk.

As analysis slowly replaces conditioned reflexes and sound bites, the conventional wisdom is retreating. Early studies of the most dramatic recovery proposal — the Idaho Plan — suggest its energy impacts may be a wash. Hydrogeneration at the four lower Snake River dams would cease for the spring salmon migration, but the energy (that is, the water) wouldn't be lost, only shifted to other parts of the year. The Columbia River dams — the backbone of the hydrosystem — would not be shut down by the Idaho Plan.

During spring, the hydrosystem produces a surplus of energy, which is sold to California. So managing a lower Snake spring shutdown is a problem of marketing, energy exchanges and perhaps short-term replacement generation (for instance, a gas-fired combustion turbine that could operate two months a year). Bonneville's threats to the contrary, expensive new coal, nuclear or hydro plants — plants that operate year-round — will not be needed.

Impacts on agriculture also seem manageable. If anything, Idaho farmers will make money on endangered-species listings, since they will create a steady market for water lease sales by upriver farmers to federal agencies trying to augment flows downriver. Farmers' water rights are not threatened. Washington farmers' irrigation pumps in the lower Snake reservoirs would need extending or boosting if reservoir drawdowns occurred each spring.

The Idaho Plan's major negative effect would be on lower Snake navigation; with reservoir drawdowns, barges would not be moving in the spring

months. Mitigation seems possible. Montana wheat that now is trucked to Lewiston, for example, could be trucked 100 miles farther for a few months to Washington's Tri-Cities, whose port will remain open. But no overall mitigation plan has been developed by Idaho or the industry, so unavoidable impacts and mitigation costs are still unknown.

The economic benefits if Snake River salmon are restored to harvestable levels also are unknown — but undeniable. The Snake River once supported roughly half the spring and summer chinook salmon of the Columbia Basin. These millions of fish supported fisheries in Idaho and helped support fisheries in Oregon, Washington, British Columbia and Alaska. "Restoring these fish is going to create jobs, not cost them," says Ed Chaney.

The largest economic impact will probably be the overall cost of any salmon recovery plan. Bonneville estimates its proposals would cost \$150 million annually. The Idaho Plan would have very high (but as yet unknown) capital costs — to modify the mainstem dams for

free juvenile fish passage — but few continuing costs. Both plans would create some jobs; the Idaho Plan in particular is a large public works project.

A financing mechanism already exists for any recovery plan. The 1980 Northwest Power Act directed that salmon restoration costs be paid, via Bonneville's wholesale rates, by electric ratepayers of the Northwest. Since 1980, perhaps \$400 million has been spent (albeit without much payoff) for that purpose. Spread across several million ratepayers, the annual cost to each has been modest. Some federal appropriations, notably for the Corps of Engineers, may also be part of the mix.

"I keep thinking that a light bulb's going to suddenly go on in this region, and we will realize that a businesslike investment made now to restore these fish will create more jobs, more dollars, more stable communities for the region," says Ed Chaney. "We've got an economic opportunity here, not a threat."

—P.F.

Dams ...

Continued from previous page

west fish agencies and tribes have recommended flow levels young salmon need to pass the dams in-river with reasonable survival rates. But creating those levels in the lower Snake reservoir pools would take half the river's total annual flow, delivered over three months. Even if one-third of Idaho's farmers agreed to quit farming, the river could not deliver that water unless a string of dams disappeared.

The Idaho plan sponsored by Gov. Andrus, however, would instead draw down the reservoirs 30 to 40 feet to create the velocities needed to move the juvenile fish through the reservoirs and down the river. The drawdowns would reduce power generation at the four dams over the two-to-three month migration period, probably ending it entirely for two months. But the advantage is that the juvenile salmon



Bonneville Power Administration

A fish transport truck

would not have to be barged at all.

In a January speech to the Salmon Summit, Andrus told about how he once blew up a dam. In 1964, he pushed the plunger to dynamite Idaho's Grangeville Dam, and a salmon run into the river was restored. Today the run is again threatened by dams, those down on the lower Snake.

Andrus smiled as he told the story, but no one missed the edge. He is serious, and so are the Indian tribes, fisher-

men, conservationists, fish agencies and even some utilities who agree with him.

In May, the Boise engineering firm of Morrison-Knudsen will unveil the first-ever technical analysis of how (and for how much) the lower Snake dams could be modified to allow safe in-river passage of juvenile salmon. (Punching big holes in the dams, then gating them, is one option.) The work is being funded by the state of Idaho and Idaho Power Company.

No institutions with any direct or

indirect authority over the projects — the Corps, Bonneville, the Northwest Power Planning Council, Congress — are involved. This says much about Northwest salmon politics, about where leadership does and doesn't exist, and about the obstacles ahead. More than concrete will have to be breached. Whether the Endangered Species Act will finally provide the detonator remains to be seen.

Will salmon ever again have free migratory passage in the Columbia Basin? Ed Chaney gets the last word:

"The Northwest once had vision. It built the first high-voltage transmission line, the largest hydroelectric project in the U.S., the largest single utility transmission system in the world, the world's largest coordinated hydroelectric system and a seaport 500 miles inland. We need to recapture that can-do attitude. We can figure out how to let water run downhill without killing most of the fish." ■

Salmon and the Endangered Species Act

Despite Sen. Mark Hatfield's efforts to avoid another spotted owl brouhaha, the act and the salmon's future are now entwined in a growing political controversy. Up to 150 petitions could be filed.



by Rocky Barker

Like the body counts that convinced generals they were winning the Vietnam War, rising numbers of hatchery salmon in the Columbia River Basin blinded the Northwest's politicians and most of its people to a decades-long decline in wild salmon stocks. Now that decline has turned into a crisis.

The wake-up call from the Shoshone-Bannock Tribes came April 2, 1990, when they petitioned the National Marine Fisheries Service to list the Snake River's sockeye salmon as endangered under the Endangered Species Act. Two months later, Oregon Trout and three other groups petitioned to list four other salmon stocks under the act — Snake River spring, summer and fall chinook, and lower Columbia River coho. The process came full circle this April 2 when the fisheries service proposed listing sockeye as an endangered species.

Suddenly Northwest politicians, industries and the media were paying attention to salmon, and to the presumed economic disaster their listing could bring down on the region. Two years after the spotted owl became a household word, the Endangered Species Act is again at center stage in the Northwest.

The act could put protecting salmon above all other uses of the Columbia and Snake rivers. Flows through the eight federal hydroelectric dams between Idaho and the ocean would have to change. The Bonneville Power Administration, Army Corps of Engineers, Bureau of Reclamation and Northwest utilities would have to revamp the largest coordinated hydroelectric system in the world, and bring the complicated treaties and contracts that govern it into compliance with the act.

But while the act and its possible effects have gotten public attention, the real issue is the long-term failure of federal agencies, states and Indian tribes to protect wild salmon stocks. "It should

not take a listing under the Endangered Species Act to prove the obvious," said Oregon Sen. Mark Hatfield at a mid-1990 congressional hearing on the petitions. "Our management strategies are not working."

Hatfield's own strategy to avoid a listing — the "Salmon Summit" — ended last month by making listing even more likely. But it also made clear that endangered species law and science will only influence the fate of the region's salmon. It is the politics of endangered species — governors, congressmen, conservationists, industries, the Northwest's unique federal-private energy establishment, all locked in various arenas of cooperation and combat — that truly will decide their fate.

The U.S. Fish and Wildlife Service is in charge of most endangered species reviews. But for salmon it is the National Marine Fisheries Service, an arm of the U.S. Department of Commerce responsible for ocean mammal and fishery regulation.

The agency's biological review of the petitioned salmon stocks began last September. In early April it proposed listing sockeye and it will make a decision in early June for chinook and coho. After 60 days of public comment, the agency must make a final decision by April and June 1992. If listings occur, development of recovery plans will follow.

Merritt Tuttle of NMFS's Portland office coordinated the review, which included key technical puzzles — defining distinct populations that qualify as separate species, setting numerical thresholds for endangered or threatened status — as well as analysis of each stock's health. Tuttle's office will make recommendations to NMFS headquarters in Washington, D.C., where the final decisions rest.

This review is not the first to be done for Columbia River salmon. In 1978, prodded by several salmon advocates, NMFS began an in-house endangered species review of Columbia Basin salmon and steelhead. In 1980, with the

review still under way, Congress passed the Northwest Power Act directing that, in the operation of the basin's federal dams, fish and hydropower receive "equitable treatment."

NMFS suspended the review soon thereafter with no official conclusion. That decision was made, according to the unpublished *Federal Register* announcement, because of the Northwest Power Act's fish-protection mandate and also because NMFS believed new conservation efforts by the states and tribes could help.

In short, NMFS stopped the review on the basis of remedies it hoped would take place. "We were betting on the Northwest Power Act," says Merritt Tuttle. Since that bet, Snake River coho salmon have been declared extinct and Snake River sockeye may have become extinct. This time, salmon advocate Ed Chaney says, "NMFS would be well advised to base its decision on facts, not hopes."

Hatfield, anxious to avoid a repeat of his spotted owl experience, decided not to leave salmon to the Endangered Species Act alone. In October 1990, the Northwest's senior politician proposed regional negotiations on a plan to save the salmon and thus avert a listing. The talks, organized with help from Northwest governors, were dubbed the "Salmon Summit."

A 30-seat panel representing diverse interests — conservationists, Indian tribes, electric utilities, water-dependent industries, fishermen, federal dam operators, land managers and governors — met over five months in an effort to reach consensus. The group produced no comprehensive plan to restore the salmon, focusing instead on assisting the fish this year. But even its limited agreement for 1991 began falling apart days after the final summit meeting March 4.

Salmon migration, and thus the dams that lie between Idaho and the ocean, got the most attention. To get juvenile fish to the sea this year faster and with less mortality, Idaho Gov. Cecil Andrus and fish advocates proposed drawing down four lower Snake River reservoirs below the level at which hydroelectric plants and navigation locks can be operated.

A 1991 drawdown experiment was approved by most at the summit, including utilities. "We just can't find enough water," said Al Wright of the Pacific Northwest Utilities Conference Committee. "So let's look at reservoir manipula-

tion." But the Army Corps of Engineers, which operates the dams, and Bonneville Power, which sells their power, resisted it. After the summit ended, the Army Corps refused to try the experiment.

Summit attendees agreed to augment natural flows with water from Idaho's Dworshak and Brownlee reservoirs for this spring's salmon migration. But Idaho's fifth straight drought year means much less will be available than projected, leaving total flows far below what the young fish need. Andrus did make progress with downstream summit people, who at first insisted that more Idaho water could solve the salmon's problems. Most finally agreed that the huge amounts needed, especially in dry years, just aren't there.

No harvest agreement was reached. Downstream fishermen held any reductions hostage to agreement on flows and other issues, and insisted that harvest decisions be made only in the proper legal forums, not at the summit. Talks about habitat and hatchery practices made progress, but also didn't reach agreement.

Hatfield acknowledges the summit probably didn't get far enough to prevent some listings, as the NMFS sockeye action shows. But he said it gave the region a head start. "The problem we had with the spotted owl is we didn't have the science until we were two years into the debate," he said. But now with salmon "by the time we get to great public debate, we'll have the science in hand." Hatfield also has the option of reconvening the summit after NMFS has made its decisions.

Post-summit action will proceed on several public and private tracks. Northwest governors, whose representatives had extensive private talks during the summit, will continue them. "Private sector" talks between fish advocates and regional utilities will continue. A public relations battle for the hearts and minds of Northwesterners is already under way, from the Bonneville Power Administration to the Shoshone-Bannock Tribes.

The Northwest Power Planning Council will be on the salmon hot seat. This regional energy policy body, with two members each from Washington, Oregon, Idaho and Montana, is charged with implementing the Northwest Power Act's mandates to restore salmon runs and give fish equitable treatment with energy at the federal hydrodams.

"The petitions show that the council has failed that charge so far," says Ed Chaney. "But it is an established,

publicly accountable body with a legal mandate to restore salmon. It is a logical place to lobby for the leadership to get it done."

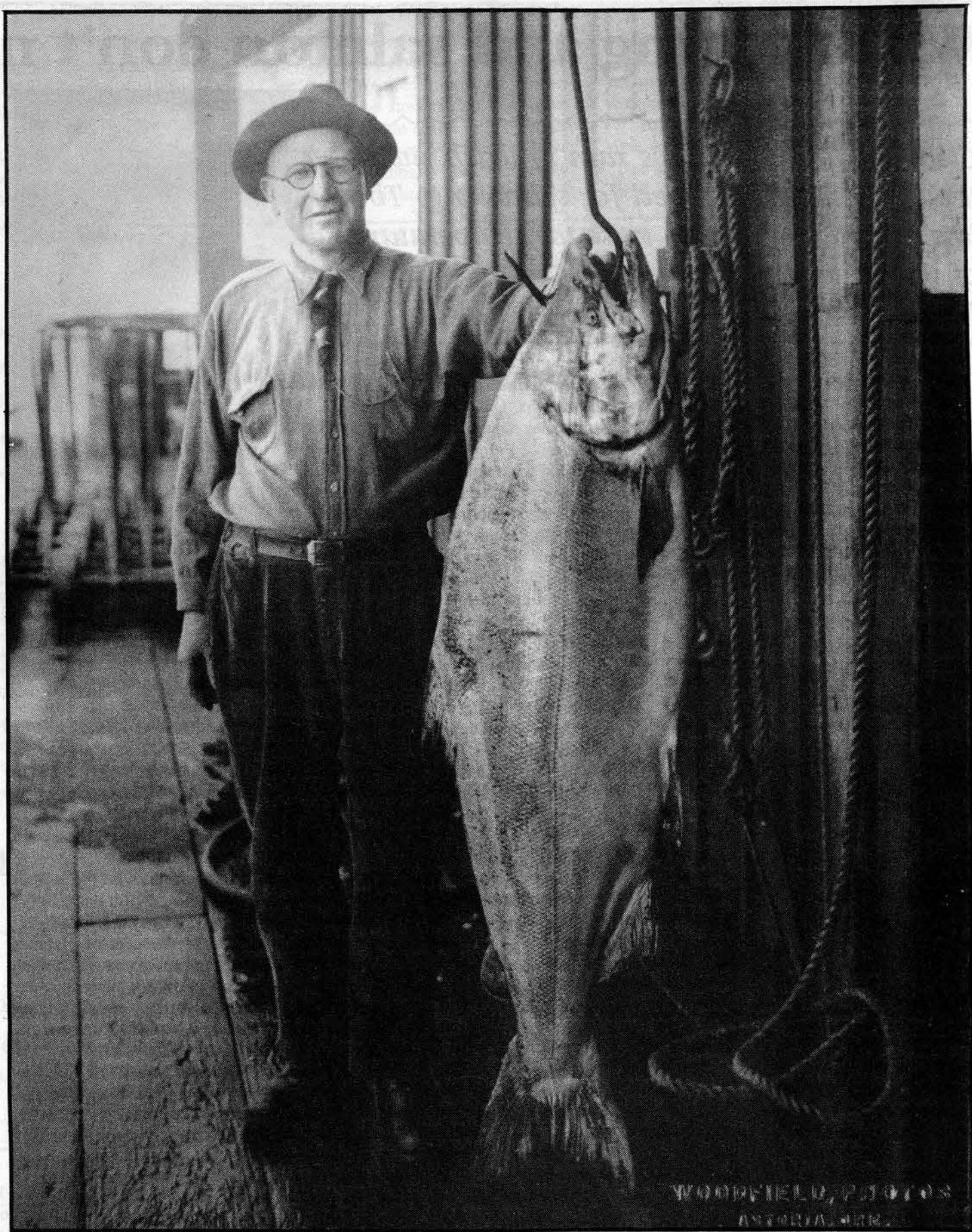
Oregon Trout, which filed four of the original petitions, has said it will speed up the endangered species review by requesting a mid-April emergency listing of Snake River fall chinook, the chinook stock in deepest trouble. If NMFS accepts the emergency request, controversial actions to protect fall chinook — such as harvest reduction — could begin almost immediately.

The Oregon Natural Resources Council, a leading actor in the spotted owl-ancient forest fight, says it may file up to 150 Endangered Species Act petitions this summer for all at-risk salmon stocks in the Northwest. This would attract a lot of political and public attention, but the practical effects are unclear. NMFS doesn't have the staff to handle such a mass filing.

Established forums where decisions affecting salmon are made — the Columbia River Compact for harvest limits, the Pacific Northwest Coordination Agreement for hydrosystem operation — will face pressure to open up. The region can expect an extended tug-of-war between the "ins" — Oregon, Washington, and downriver Indian tribes for harvest, federal energy agencies and utilities for the hydrosystem — and the "outs" — Idaho, the Shoshone-Bannock Tribes, conservationists and (if listings occur) NMFS.

And at some point Congress will surely join the fray. Hatfield has made it plain he wants no non-Northwest congressmen meddling with salmon, as he says they have with spotted owls. But unless the power planning council or governors succeed soon where the summit failed — in creating regional political consensus — neither Congress nor the White House will be able to leave so compelling and volatile an issue alone.

The people of the Northwest have yet to definitively register their voices. Fishermen and conservationists are betting their fellow Northwesterners will agree in the end with Oregon Trout's Dale Pearson: "If the lands and waters of the Northwest, their ancestral home, are no longer fit to sustain the salmon, how bright and interesting can our own future be?" ■



Tony Canessa with an 85-pound "June hog" chinook, caught in 1926 before Grand Coulee Dam extinguished the run

Woodfield/Columbia River Maritime Museum

Tracing the salmon's many genetic blueprints

The endangered species review of Northwest salmon will have national impact. If the National Marine Fisheries Service rules that Snake River chinook are distinct from their Columbia River cousins, a biological and bureaucratic Pandora's box may open from Alaska to Massachusetts, making thousands of inland and marine strains of fish eligible for listing as well.

The Endangered Species Act provides protection to endangered species, subspecies and "any distinct population segment of any species that interbreeds when mature." Biologists recognize, among salmon and other fish, distinct "stocks" with unique characteristics, like the powerful homing instincts that lure salmon back to the very streams where they were spawned.

More than 400 stocks of salmon and steelhead once migrated up and down thousands of miles of tributaries in the Columbia Basin. Each had its own genetic blueprint, evolved over thousands of years, uniquely suiting it to the tributary where it spawned, the rivers it migrated through and the section of ocean where it lived. Scientists

estimate that some 200 stocks now remain in the basin. The American Fisheries Society has identified 76 at some risk of extinction, and 36 at high risk.

If even a third are eligible for listing, the Endangered Species Act could override other land and water laws wherever there are salmon. And it could set precedent for listing distinct strains of other fish, like the rare Bonneville cutthroat trout in Idaho or the redband cutthroats of Nevada and Oregon. "The implications of listing separate strains are staggering," says William Horn, the assistant Interior secretary of Fish, Wildlife and Parks in the Reagan administration.

But many biologists say losing any genetic diversity held in the variety of salmon stocks could seriously weaken the overall population and possibly lead to future collapse of the entire species. "An irreplaceable reservoir of genetic variation ... is lost each time a distinct population segment ... vanishes," says Fred Utter, a retired geneticist with the Northwest Fisheries Center in Seattle. "Such segments contain critical raw materials for the future of both cultured and wild populations."

NMFS is using its current review of five petitioned salmon stocks to craft general policy on whether individual fish stocks are separate species under the Endangered Species Act. In early March it published a draft policy, written by fisheries biologist Patricia Montanio.

The paper says that to be a distinct population, a stock must represent "an evolutionarily significant unit" of the salmon population. To meet this test, each stock must be "substantially reproductively isolated" from other stocks and represent "an important component in the evolutionary legacy of the species."

That means stocks from larger Columbia River tributaries, like the Snake River, will qualify more easily than a stock from a smaller tributary. A tributary population with distinct characteristics, like size or spawning timing, could still be considered a separate species, but Montanio says, "It's a harder test to meet in a smaller tributary."

"Not all traditional salmon stocks will qualify" under the definition, says Montanio. Its message for the four Snake River stocks now being reviewed

is ambiguous. It might be used to lump Snake River spring and summer chinook into one distinct stock, but probably not fall chinook, which spawn in the main Snake River rather than in tributaries. The "reproductive isolation" test could be used to disqualify Snake River sockeye, since they apparently can interbreed with their resident form, kokanee.

"It's round 15 in the 'lumpers vs. splitters' debate," says salmon advocate Ed Chaney. "It's an important debate, but the real point is that none of these stocks, lumped or split, will make it unless we change how we manage the dams that stand between them and the ocean."

NMFS will release a second policy paper soon on another key question: At what numerical thresholds are salmon populations endangered or threatened? In the only real-world case to date, NMFS listed California's Sacramento River winter chinook as endangered when the wild population declined to 500 fish.

—R.B.

Why logging and salmon don't mix

Clearcut logging allows rain to wash away the gravel salmon need for spawning. The loss of shade also can raise the temperature of the water to lethal levels.



by Jim Stiak

There was a time, Susan Applegate remembers her dad saying, when he couldn't cross Elk Creek without being knocked down by leaping salmon. Even in springtimes in her childhood, she remembers keeping the family dogs away from the creek so they wouldn't get infected with salmon flukes.

But in the late 1950s, loggers cut the thick forests on Ben More Mountain, north of Roseburg, Ore., where Elk Creek begins its journey to the Umpqua River and the Pacific Ocean. After three years of logging, Applegate says, the salmon disappeared.

In winter, without forest to soak up the water, rains gushed off the slopes, swelling Elk Creek, washing away the gravel the salmon spawned in. In summer, without the spongy forest loam releasing its water, Elk Creek dwindled. With no trees for shade, the sun hammered through the shallow water, driving water temperatures up to 80 degrees Fahrenheit — lethal to salmon.

Similar stories are told on the Siuslaw River, 50 miles to the northwest. In 1975, a merciless rain dropped eight inches in 36 hours on the Oregon Coast Range. After the deluge, Siuslaw National Forest rangers counted 218 landslides caused by logging. Logging roads washed away, taking hillsides with

them, pushing torrents of mud and debris into the streams. One slide choked a canyon, covering almost an acre with 20 feet of muck.

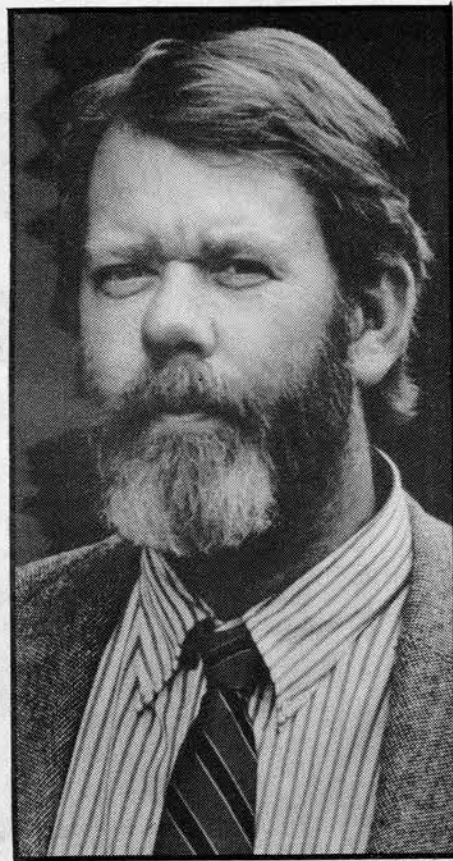
The flood prompted a study of the Siuslaw, which contains 10 percent of the fish habitat on national forests outside Alaska. The results were an angler's nightmare. Half the forest's fish habitat, it was estimated, had been destroyed by soil erosion since intensive logging began in the 1940s.

All along Oregon's coastal rivers, from the Necanicum in the north to the Winchuk in the south, native salmon runs are in trouble. "The overall picture is pretty bleak," says Oregon State University researcher Chris Frissell. "There are two or three runs at risk in most watersheds, and four or five in some."

On many rivers, sea-run cutthroat trout are most at risk, followed by chum and coho salmon. Along the southern coast, native coho runs have dropped from levels of more than 2,000 to less than 100. Several spring and fall chinook runs have decreased sharply.

"Ocean conditions could have something to do with all that," says Frissell. "But the major cause is habitat loss."

In the conifer-carpeted hills of western Oregon, habitat loss comes from logging. There are dams on some rivers, stream flows are lowered by farms, and overfishing has depleted runs. But Frissell says the data shows a "strong signa-



Chris Pietsch

Bill Bakke of Oregon Trout

ture" that logging is the chief culprit. "There's a clear relation," he says, "between the amount of logging in a watershed and the size of fish runs."

Logging damage is not confined to rivers west of the Cascades. Throughout the Northwest, spawning habitat is being smothered or scoured away — "a little here, a little there," says Bill Bakke.

"Logging changes the hydrology," explains Bakke, director of Oregon Trout, a 2,300-member group that calls itself a voice for the fish rather than the fishermen. "In the rainy season, higher peak flows increase sedimentation, covering up and killing eggs, filling in pools, destroying habitat for juvenile salmon. In summer, the stream goes dry or gets real low and warm."

"The decline is likely to be gradual,"

he says, "but many fish stocks are doomed if we don't change what we're doing."

From the Siuslaw Forest north, the rivers flow from the relatively low elevations of the Coast Range, a mix of private, state and federal lands where almost all virgin forests are gone. Oregon's major rivers in the south, the Umpqua and Rogue, flow from higher elevations in the Cascade and Siskiyou mountains, which hold much of Oregon's remaining old growth. Future logging is focused in those remnant forests.

"There's no doubt we're going into steeper, less stable areas," says Jeff Dose, fisheries biologist on the Umpqua National Forest. "But our first priority is not timber harvest; it's protecting all high-quality fish habitat. We're trying to avoid roads in riparian zones by encouraging fewer roads everywhere. We maintain all shading along streams and leave any logs that fall in. Our objective is no increase in water temperatures."

Farther south on the Siskiyou Forest, fish biologist Don King says salmon habitat is actually being restored. "We're building in-stream structures to create habitat," he says, "and are doing more monitoring. We have better road construction, more helicopter logging, and have reduced the timber base to protect rivers."

The Siuslaw Forest has also changed its practices since the mid-1970s. Road builders must haul away dirt rather than dump it off the roadside, says John Ouimet, resource assistant on the forest's Mapleton Ranger District. In response to a lawsuit, the forest now leaves several acres of trees at the heads of streams in unstable areas. The new forest plan calls for hundred-foot buffer zones along many fish-bearing streams. But, Ouimet concedes, these strategies are yet to be tested by a 1975-size deluge.

The Bureau of Land Management also is changing. Standard practices now include no-cut buffer strips along fish-bearing streams and cable logging on steep ground, says Bob Bessey, fisheries biologist on the BLM's Medford District, which includes parts of the Rogue and Umpqua watersheds. But Bessey admits the buffer strips are "minimal" along smaller streams and that their widths vary considerably.

"The Forest Service and BLM guidelines are great on paper," says Oregon Trout's Bakke, "but are unevenly implemented on the ground." Riparian guidelines, he points out, don't protect the slopes above streams from being logged and eroded. And the worst erosion occurs on steep hills with unstable soil — the kind common in southern Oregon.

"The new forest plans don't do the same kinds of analyses for salmon as they do for spotted owls," Frissell says, and the Forest Service Habitat Conservation Areas established for spotted owls won't do much good. But, he adds, "with some fairly minor boundary changes, the fish and watersheds could be helped a lot."

Regulations on private and state forests are even less helpful. These lands, along the lower parts of most Oregon coastal rivers, were clearcut decades ago, leaving neither shade trees nor woody debris for fish habitat. Oregon's 1971 Forest Practices Act, which requires buffer strips along major streams, slowed the rate of habitat loss but didn't stop it.

The Oregon Legislature may tighten the act this year. But what's needed, say many observers, are "cumulative impact



Forest activist Jeff DeBonis by Oregon's Deer Creek, a tributary of the McKenzie River

AFSEEE

analyses" of entire watersheds. "Fish runs can be protected," says Frissell. "We can predict where landslides are likely. But coordinated, basinwide planning across ownerships is the way to go."

Various state programs are aimed at saving salmon. Two dollars from the sale of each Oregon fishing license goes to research and habitat work. A statewide Salmon Trout Enhancement Program encourages volunteers to rear fish and restore riparian areas. "We give them eggs; they hatch 'em," says Dave Loomis, with Oregon's Department of Fish and Wildlife. Loomis points to some 50 projects under way.

A nine-year-old hatchery program on the south Umpqua, Loomis says, has increased spring chinook numbers from less than 30 to more than 300. "We hope to increase that to 1,000," he says.

But while spring chinook on the south Umpqua may be increasing, coho and cutthroat trout runs are threatened, and summer steelhead are already extinct. (Steelhead, generally the most resilient of salmonids, have declined dramatically along Oregon's coast because of ocean conditions, according to researchers.)

A changing timber market also is threatening habitat. "Some towns are no longer milling old growth," says Frissell, "so chips for pulp have to come from second growth. Some lands on the

Rogue are moving to 30-year rotations. Since there can be increased erosion for 20 years after a clearcut, the land is in an almost perpetual state of erosion."

"Even if we stop cutting now," Frissell says, "streams take decades to clean and restore themselves. We're talking about a human lifetime or two before new

populations will re-establish themselves."

Bill Bakke says the changes needed are clear. "We need to preserve riparian zones even on streams that don't have fish and maintain shade to keep water temperatures down. We need to leave large woody debris, which is extremely important to the health of a stream. We

need to maintain the aquatic ecosystem. These are very resilient animals, and if we give them half a chance, they respond very favorably."

But will the changes be made in time for many of the threatened runs? "I'm a hopeful person," Bakke says, "working a hopeless job."

EXTINCT AND IMPERILED NATIVE SALMON AND STEELHEAD STOCKS OREGON COASTAL RIVERS AND STREAMS

EXTINCT — Partial list

Sprague River spring, summer and fall chinook
Williamson River spring, summer and fall chinook
Wood River spring, summer and fall chinook
Klamath River spring, summer and fall chinook
Euchre Creek coho

IMPERILED

At High Risk

Coquille River spring chinook
South Umpqua River spring chinook
Hunter Creek fall chinook
Rogue River fall chinook
Euchre Creek fall chinook
Winchuk River coho
Chetco River coho
Pistol River coho
Rogue River coho
Elk River coho
Sixes River coho

Floras Creek coho
Elk River chum
Sixes River chum
Coos River chum
Umpqua River chum
Alsea River chum
Yaquina River chum
Siletz River chum

At Moderate Risk

Winchuk River fall chinook
Pistol River fall chinook
Yachats River fall chinook
Coquille River coho
Coos River coho
Umpqua River coho
Siuslaw River coho
Yachats River coho
Alsea River coho
Beaver Creek coho
Siletz River coho
Salmon River coho
Nestucca River coho
Tillamook Bay coho
Nehalem River coho
Elk Creek coho

Necanicum River coho
Netarts River chum
Nestucca River chum
Tillamook Bay chum
Illinois River winter steelhead
Rogue River summer steelhead
Siletz River summer steelhead
Oregon coastal sea-run cutthroat trout

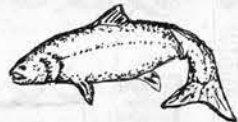
Of Special Concern

Alsea River spring chinook
Siletz River spring and summer chinook
Nehalem River summer chinook
Coos River fall chinook
Yaquina River fall chinook
Siuslaw River winter steelhead
Big Creek winter steelhead
Tenmile Creek winter steelhead
Yachats River winter steelhead
Alsea River winter steelhead
Yaquina River winter steelhead
Siletz River winter steelhead
Salmon River winter steelhead
Nestucca River winter steelhead
Tillamook Bay winter steelhead

Source: "Pacific Salmon at the Crossroads," Nehlsen, Williams and Lichtowich, American Fisheries Society Journal, March-April 1991.

Ending Washington state's long 'fish war'

Tribal courage, the federal courts and hard mediation have increased the portion of tribal salmon catches from 5 percent in 1970 to 50 percent in 1986. Most of that catch is used for subsistence.



by Sarah McCoy

On a Sunday morning in January 1973, Sid Mills and a few dozen other Indians demonstrated outside the Department of Game in Olympia, Wash. The steelhead were running, but the state had long ago declared them a game fish to be caught with hook and line, not traditional Indian nets.

"We'd been taken to the limit," Mills says now. "They'd stolen all of our equipment, our boats and motors and nets."

"We just went on in the building. At that point I was in the director's office, and I looked his phone number up and called him. I said I needed to talk to him about the stealing of my equipment and he said, 'Well, you come down to my office on Monday and we can talk about it.' I told him 'I'm in your office, sitting at your desk. You can come down here now and we can talk about it.'"

The director didn't come, but Mills was used to being put off. Washington's "fish war" had been at high pitch for nearly a decade. In court, tribes and the state government battled over fishing rights as often as 70 times a year. On the ground, Indian fishermen and demonstrators squared off with fish and game officers and local and state police in angry, sometimes violent confrontations.

Sixteen years later, in Washington's 100th year of statehood, Gov. Booth Gardner and the state's 26 federally recognized Indian tribes publicly signed a Centennial Accord. The ceremony legally extended and symbolically ratified

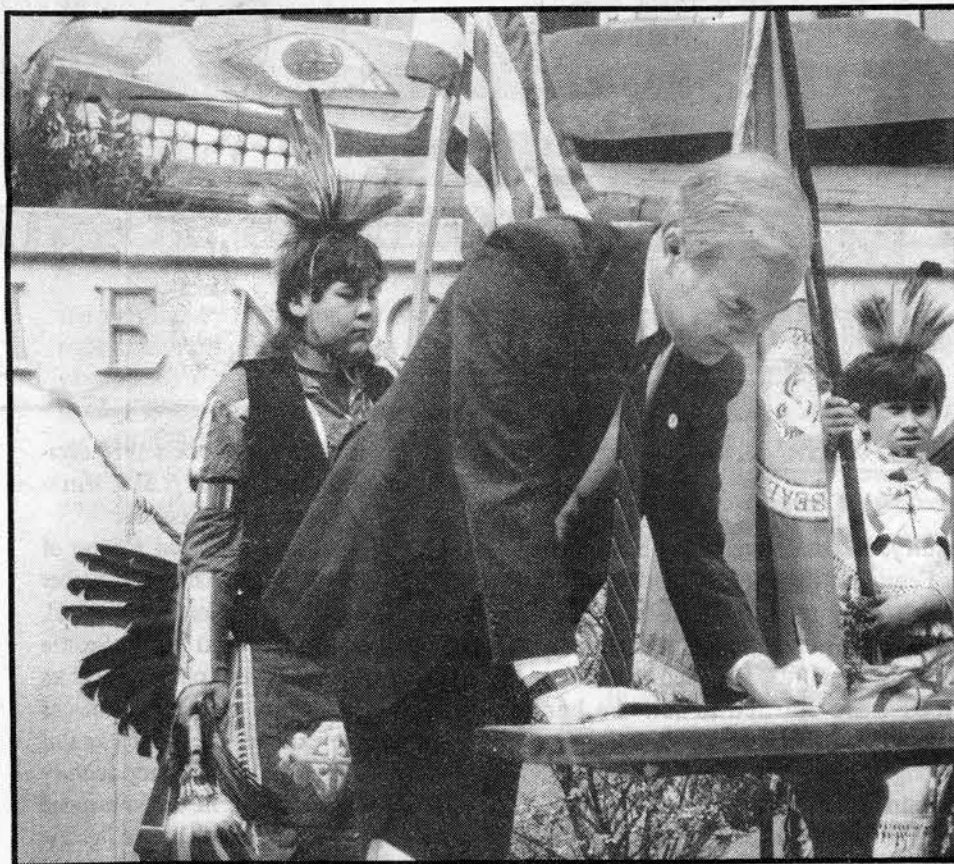
one of the most cooperative working relationships in the United States between a state and its Indian tribes.

The path from wars to accord has gone by way of salmon.

Pressured by white settlement and a fast-moving federal negotiator, Indian tribes in the territory that would become Washington signed treaties in 1854 and 1855 that ceded huge tracts of land to the newcomers. But they reserved the right to fish for salmon at "all usual and accustomed grounds and stations ... in common with all citizens of the Territory." Twenty tribes in the Puget Sound and Olympic Coast area, which number about 20,000 people today, have been officially recognized as signers of the treaties.

Their fishing rights meant everything. "Salmon have always been the primary food for the Indian people in western Washington," says Jim Anderson, executive director of the Northwest Indian Fisheries Commission (NWIFC). "They were always there, always in plentiful supply. Salmon shaped the culture."

But for 75 years after statehood, the Washington Department of Fisheries, which regulates salmon, and the Department of Game, which regulates steelhead trout, told the Indians they had to fish by the same rules non-Indians did. The agencies' decisions on fishing seasons, locations and methods consistently chopped away at tribal harvests. By 1970, non-Indian commercial and sport fishermen together accounted for 95 per-



Northwest Indian Fisheries Commission

Washington Gov. Booth Gardner signs the Centennial Accord

cent of catches, and non-Indians owned over 99 percent of the commercial fishing licenses.

Loss of fish, Anderson says, "had a profound effect on the tribes' stability, their health, their economic vitality. It knocked the underpinnings out of the Indian community."

Beginning in the 1930s, the tribes filed lawsuit after lawsuit to reclaim their lost rights. Frustration and militancy mounted as legal efforts won little. By the 1960s, many Indians were sneaking out at night to catch a few fish, and a growing number were going out in daylight for everyone to see. More often than not, state game wardens were waiting with handcuffs.

The most intense period of the fish war took place from 1965 to 1973. Sid Mills, just back from Vietnam, recalls that "we weren't talking about nonviolence." He and others were harassed, arrested, maced and clubbed for fishing.

Bill Frank Jr., a Nisqually tribal leader who is Mills's uncle, was arrested more than 80 times. Nets and boats were seized and sabotaged.

The most publicized incident came in 1970, when a group of armed Indians and non-Indian supporters camped on a small piece of riverbank land in downtown Tacoma claimed by the Puyallup Tribe. They were arrested by a force of 30 fisheries officers, 27 game officers and 50 Tacoma police.

That same year the federal government filed a lawsuit on behalf of 20 Washington tribes before Federal District Judge George Boldt, a Nixon appointee with a reputation for imposing stiff sentences. *U.S. v. Washington*, later called the Boldt decision, changed everything.

After an exhaustive three-year

Continued on next page



'Fish Wars' ...

Continued from previous page

inquiry, Boldt delivered his bombshell on February 12, 1974. He ruled that the tribes' treaty right to take fish "in common with" non-Indian citizens meant "sharing equally." He ruled that treaty tribes were entitled to half the harvestable return of salmon, and he gave this right a priority second only to conservation of the salmon themselves.

The state reeled. Sabotage and fist-fights increased as tribal and white fishermen faced off on the fishing grounds. Washington Attorney General Slade Gorton (now a U.S. senator) fought back on all fronts. The decision reached the U.S. Supreme Court eight times, the last time in 1979. With minor modifications, Boldt was upheld.

The Fisheries and Game departments, however, joined by non-Indian fishermen, refused to comply. Judge Boldt responded by taking control of the fisheries, appointing a Special Master to decide harvest seasons, numbers and shares, as well as other management questions. A long guerrilla war ensued. Tribal and state biologists battled each year before the Special Master, and the departments did what they could to delay and resist the rulings.

While that struggle continued, a new judge, William Orrick, took up two questions set aside by Boldt. Did the tribes have rights to catch hatchery-bred fish? And did the treaties include an implicit right to have fish habitat protect-

ed from destruction? Orrick's 1980 decision, known as Phase II of *U.S. v. Washington*, said yes to both questions.

Orrick's ruling triggered a wave of rethinking. In 1981, Washington timber companies, Burlington Northern Railroad, Puget Sound Power and Light, Seattle First National Bank and other companies formed the Northwest Water Resources Committee to explore the implications of Phase II. When they asked Seattle attorney Jim Waldo for advice, he recommended sitting down with the tribes before fighting them in court or in Congress. When the tribes asked the corporations to show their good faith by not appealing Phase II, the companies agreed, and discussions began.

About the same time, Trout Unlimited activist Frank Gaffney began talking with the Muckleshoot Tribe about salmon habitat in the Green River watershed — the first conversations ever between Washington sports fishermen and a tribe. Gaffney, who grew up in eastern Washington trout fishing with his father, describes himself as "part of the problem for a long time." When other Trout Unlimited chapters heard he was talking to the Muckleshoots, Gaffney says, his phone "lit up like a Christmas tree."

Bill Wilkerson, the Department of Fisheries' new director, heard about the talks in 1982. That year, he recalls, "I was either preparing for or in a courtroom or in a court-ordered discussion almost the entire spring and summer and fall."

Every year, "it was our biologists ver-

sus their biologists," Wilkerson says. "It was very contentious. You couldn't even get people on my staff to talk to them, or vice versa. There was no holistic thinking. It was all 'our way versus your way.'"

And while the fighting went on, salmon harvests went down. Timber practices, runoff, development, pollution and dams were taking a toll. In 1983, on top of those continuing problems, the warm ocean current known as El Niño killed salmon in the ocean. Fishermen harvested a tenth of their usual catch. The irony was that the state and tribes could still be in court to divide the last fish.

Wilkerson decided to seek peace, and Gov. John Spellman agreed to back him. At the Seattle Rotary Club in the spring of 1983, Wilkerson declared an end to the fish war. The state hired Jim Waldo to mediate a first meeting of the former contenders, at Port Ludlow.

When Waldo looked out at that first meeting, he saw groups with more in common than they realized. The Fisheries Department and the state faced continuing litigation and losses ahead. And even though the tribes had won in court, Waldo says, "On a management level, they had achieved minimal acceptance and minimal gains."

The groups decided to try to get through one fishing season going to court as little as possible. A makeshift one-year agreement for Puget Sound fisheries was worked out to settle dis-

putes between North and South Sound tribes, and between sports fishermen and tribes.

The Port Ludlow meeting was the start. Building on that first year, the state and tribes took over the Puget Sound Management Plan from the court and renegotiated it themselves. They worked together in the massive U.S.-Canada fishing treaty negotiation that helped settle 20 years of argument over Pacific coastal salmon fisheries.

But the conflicts didn't stop on a dime. After his Rotary Club speech, Wilkerson (like Boldt before him) was hanged in effigy. White fishermen marched on the capitol to denounce him, and the state Senate refused to confirm his appointment for three years.

In 1984 Boldt opponents mounted a statewide ballot initiative to invalidate treaty rights and won 53 percent of the vote. Although the initiative never took effect — federally recognized Indian treaties override state law — it clearly indicated the mood of non-Indian Washingtonians. Some still feel that way.

But in that same 1984 election Democrat Booth Gardner became governor, and he aggressively expanded cooperative management. In 1986, tribes and the Fisheries Department began crafting watershed management plans throughout Puget Sound. A coastal fisheries plan was negotiated with Olympic Peninsula tribes. Today's complex multi-level system of agreements, meetings and collaborations steadily built up.

The tribes became active supporters and participants in a wide range of other mediated agreements affecting Washington's natural resources and land management. With Jim Waldo again as lead mediator, a statewide Timber/Fish/Wildlife (TFW) agreement was negotiated to improve forest practices. Puyallup tribal leader Bill Frank Jr. — the same man whom Washington authorities had arrested 80 times during the fish war — was one of the architects of the TFW process and agreement.

A state-tribal hunting agreement, based on Boldt principles, was negotiated. In northern Puget Sound, counties and tribes are creating government-to-government structures for making future land-use decisions. The tribes are key participants in the Sustainable Forestry Roundtable, a statewide effort to negotiate private timberland harvests and conversion to urban uses. And the tribes are one of seven major caucuses in the most ambitious mediation effort yet, to overhaul Washington's entire water policy framework.

The 1989 Centennial Accord capped all these agreements. The accord commits both parties to a government-to-government relationship and to institutionalizing it throughout state and tribal agencies. State and tribes also promise to pursue new avenues of cooperation in social services and other areas.

The tribes say Washington's fisheries co-management is the most advanced such system in the world. It has not made the tribes affected by the Boldt decision rich or solved all their problems, but the welfare of individual Indians and the tribes has clearly improved. The tribal portion of the salmon catch steadily increased from 5 percent in 1970 to 27 percent in 1978, 43 percent in 1983 and 50 percent in 1986. Most of that catch is used for subsistence, but a small Indian commercial fishery also has grown up in northern Puget Sound.

The tribes have built a world-class fishery management system. The Northwest Indian Fisheries Commission

(NWIFC) began in 1974, when Judge Boldt ordered the tribes to form an organization to help carry out the new role his rulings gave them. NWIFC provides the tribes technical information and monitoring services. Each tribe also has its own fishery staff. NWIFC's Jim Anderson estimates that the tribes' fisheries budgets totalled less than \$100,000 in 1970. Today it's a \$15 million enterprise.

Nancy Butterfield, a Chippewa Indian and journalist who lives in Tacoma, compares the Washington experience with the black Americans' long struggle to win civil rights in the South. "At first integration had to be enforced by U.S. marshals," she says, "but once people realized it was going to be enforced, they had to accept it, and today many accept it more fully than in

the North. The same thing has gone on here. There was enormous resistance, not only by non-Indians but by the state itself. But finally people just had to come to terms with the law, and gradually they accepted and even embraced it.

"It's been a long process that's involved a lot of hard work," she concludes. "But as far as I know, Washington is the only state where there is effective

cooperative management of resources with the tribes and states as equal partners."

Bill Frank Jr. is now chairman of the Northwest Indian Fisheries Commission. "Let's leave the courtroom behind and focus our energies on stewardship of the resource," he said recently. "If the salmon could speak, he would ask us to help him survive. This is something we must tackle together." ■



Celilo Falls on the Columbia River (1899), about 16 miles east of where The Dalles Dam is located today

Oregon Historical Society #554

The tribes become a major salmon manager

The Columbia River Inter-Tribal Fish Commission has helped the four basin tribes develop their own strategy for restoring salmon runs. Key parts are controversial.



by Paul Koberstein

Some Indians say they can still hear the echo of water crashing over Celilo Falls. The falls, one of the Columbia River's greatest tribal fishing sites, was flooded by The Dalles Dam in 1957. State and federal agencies cheered the event, which ended tribal fishing at the site. Many thought fading upriver salmon populations would rebound with the disappearance of the tribal dip nets.

They were wrong.

Instead, the event inspired tribal officials to seek court affirmation of their treaty rights. And history has shown that dams, not tribal fishing, are the main cause for the decimation of salmon and steelhead runs.

The Indians' rights are older than the Civil War. In 1855, the federal government signed a treaty with the Nez Perce, Yakima, Umatilla and Warm Springs tribes guaranteeing them the right to fish at all their usual and accustomed fishing places.

Over the last 30 years, the tribes have secured those rights in a series of court cases and rulings. Many of their gains since 1977 have come with critical help from the Columbia River Inter-

Tribal Fish Commission, a public agency in Portland that provides legal, scientific and policy support for the four tribes.

"It is to their credit," says the commission's executive director, Ted Strong, "that these tribes have been able to overcome many differences to act as one body and arrive at a consensus for fishery management."

The tribes have much at stake. Although the court rulings said Indians could fish at all usual and accustomed places, they did not guarantee the existence of fish to catch. Construction of dams in the Columbia Basin has caused many runs to become extinct and many others to dwindle dangerously. Decreasing returns from the ocean, in turn, have forced the tribes to reduce their catch.

In 1968, members of the Yakima Indian Nation filed suit in federal district court against the state of Oregon, seeking definition of their treaty rights and state regulation of tribal fishermen. Later that year, the federal government joined the Indians' side in the case, *United States v. Oregon*.

Judge Robert Belloni ruled in 1969 that the state had only limited regulatory powers over the Indians. In 1974, Judge Robert Boldt in Seattle ruled that Indian

and non-Indian fishermen each had the right to take up to 50 percent of the harvestable fish. Although Boldt's ruling applied to another area, it set precedent for a 1975 Belloni ruling that divided the Columbia River spring chinook catch in a similar manner.

More litigation followed. When Washington state officials in 1983 decided to end the fish wars, negotiations began on a Columbia fisheries management plan. In 1988, that plan became final under the continuing *United States v. Oregon* proceeding.

The Columbia River Inter-Tribal Fish Commission was formed in 1977 when the four tribes decided to coordinate their work on fishery issues. Although the court decisions affirmed treaty rights to fish, the tribes felt they needed a unified voice and a reliable source of technical data in negotiations with state and federal fishery agencies over harvest allocation, water flow and quality, habitat protection, and enforcement. The organization began with three staff members; today it has over 50.

The tribes' reservations are spread over a wide area — the Nez Perce in northern Idaho, the Yakima in central Washington, and the Warm Springs and Umatilla in Oregon. But they all share fishing rights and traditions in both the Columbia River itself and major tributaries. They participate in both ceremonial and subsistence fisheries and a commercial fall chinook fishery.

The *United States v. Oregon* management plan is one of several harvest forums involving the tribes. They helped negotiate the landmark 1985 U.S.-Canada Pacific Salmon Treaty, and now participate in the commission established by

the treaty to set the rules for fishing and conserving the complex, intermingled salmon runs of both countries.

The tribes are participating in the Endangered Species Act review for five Columbia Basin salmon stocks and were active in Sen. Mark Hatfield's Salmon Summit. In both forums they have supported restoring the stocks in question, but have resisted harvest restrictions that might curtail or set precedent for curtailing treaty fishing rights.

In the past few years, the tribes and the commission developed their own strategy for rebuilding Columbia Basin salmon. They proposed a "gravel-to-gravel" strategy that protects the habitat salmon need at each stage in their life cycle — from spawning and rearing areas in tributaries to the migratory habitat now interrupted by dams.

The most controversial part of their strategy is its broad program of supplementation — outplanting hatchery fish into unused or underused natural habitat to establish naturally spawning populations. The tribes believe careful supplementation can help rebuild natural runs without major genetic risk for existing wild stocks.

In the complex and combative arena of Columbia River Basin management, the four treaty tribes, individually and through the commission, have become a powerful force in a relatively short time.

"We draw upon our present-day education and experiences to carry forward and refine traditions that began in the dawn of time," Ted Strong says. "We must acknowledge the values and traditions that brought us here, and yet be flexible and responsive to a fast-changing and demanding modern world." ■

Why Hood Canal is a 'biological desert'

An angler argues the case for returning this arm of Puget Sound to the good old days of sport fishing. He says the problem is made worse by Washington's fisheries management, which favors commercial fishermen.



by John De Yonge

Joe Blum, the plain-spoken director of Washington's Department of Fisheries, made an astounding statement about salmon this January. "Hood Canal probably is close to a biological desert from the standpoint of sports fishing," Blum said. "Our objective is to turn that around."

Hood Canal is a long arm of what people around Seattle call Puget Sound. In local parlance (although not on the maps), Puget Sound is all of that glacially carved inland sea that washes Seattle, Tacoma and Olympia to the south, and Everett, Bellingham and up to the Canadian border on the north. Its western terminus is Port Angeles on the Strait of Juan de Fuca.

The Puget Sound area is booming. It now holds about 3 million people, more than half of Washington's population. It is undergoing a rapid "Californization" that battens off the economies of Boeing airplanes, Microsoft software, other high technology and the feverish logging of evergreen timber to feed the lumber and pulp mills of Japan, Korea, Taiwan and China.

Puget Sound also is reckoned — or used to be reckoned — as one of the finest places in the world to angle for the five North American species of Pacific salmon: chinook (or king), coho (or silver), chum (or dog), sockeye (or red) and pink (or humpbacked).

One constant theme of popular regional art — call it a cliché — is of an angler in a kicker boat alone on the Puget Sound swell at dawn's light. He is

just lifting a bowed rod. In his wake, where gulls dive on a herring ball, leaps a silver torpedo, a coho salmon.

Once it was so. But your chances of catching a salmon in Puget Sound aren't so good anymore. A recent set of sports fishing statistics shows that in the area roughly corresponding to Puget Sound the average angler had to spend three full days on the salt water to hook and land one salmon — of any kind.

That average held for the anglers working right off Seattle's and Bremerton's docks. Near Olympia, where the Department of Fisheries and Indian tribes have concentrated significant plants of hatchery-reared salmon smolts, thus creating significant concentrations of returning adult fish, the average angler was more lucky. He or she caught one fish every two days.

But in the nearby Hood Canal, once known as a salmon angler's paradise, the average person trolling or working herring, lures or flies had to fish for seven days to catch just one fish. It's not much to base a tourist industry on: "Come to Hood Canal and maybe you'll get one salmon in a week."

Averages, of course, blend the efforts of expert fishers, mediocre fishers and those benighted souls who never catch anything. A closer look shows that just a handful of anglers consistently catch most of the fish.

In 1988, 475,562 people bought licenses to fish for salmon in Washington's fresh and salt water. Of these, a mere 2.4 percent — 11,603 anglers —

caught 21 percent of the state's total sports catch of 701,755 salmon. Of the remaining anglers, 266,379, or 56 percent, reported that they caught no fish.

Most of Washington's other marine waters are now richer in salmon than is Puget Sound. What has happened to change this fishery from its glory days, when it was shameful to say you hadn't caught a fish?

- First, bad land management, especially of forest lands and urban areas, has destroyed much of the capacity of the Sound's many rivers and streams to provide healthy spawning areas for salmon — and, of course, for steelhead and other trout. The problems are many: watersheds devastated by extensive clearcut logging; waters polluted by sewage and pesticides from agriculture, industry and cities leapfrogging ahead of any sensible zoning; and extensive flooding and dewatering, depending on the season, created by logging and the paving of streams and wetlands.

- Second, and partly in response to the habitat degradation, Washington state relies on the technological fix of hatcheries to replace or "augment" naturally occurring runs of salmon. Hatcheries over time actually decrease the number of wild fish.

- Third, hatchery owners — the Fisheries and Wildlife departments, and Indian tribes — fail to coordinate their separate releases of millions of salmon and steelhead smolts into streams. No one knows what the effects are; no studies are even under way. But it's easy to guess that millions of smolts arriving all at once overgraze the food insects of the streams and the plankton and bait fish of Puget Sound. That necessarily stresses individual fish and jeopardizes their survival on their ocean journeys.

- Fourth, the United States has equivocated in trying to end the North Pacific drift netting that Japanese, Taiwanese, Koreans and others operate. Their 40-mile-long nets entrap salmon as well as porpoises, sea birds and tuna.

- Last, the Washington Department of Fisheries manages its salmon fisheries mainly to benefit 6,000 commercial fishermen.

Let's go back over that list again. It would not be easy or cheap, but science knows how to return Puget Sound salmon streams like the Nooksack, Skagit and Puyallup to conditions under which they could again produce great numbers of naturally spawning fish. But this would require the political will to tame the timber companies, bridle the developers, civilize the farmers and force all the industries to honor the nation's environmental laws. Must we have an ecological catastrophe to endow that will with the strength to overcome the legislative lobbies of economic interests ready to spoil great rivers for profit?

It will be equally difficult to convince fisheries managers and most anglers that hatcheries cause more harm than good. Washington has had hatcheries for more than a century. They maintain the state's annual salmon return at an average of about 7 million fish.

More than a decade of study, however, shows that hatcheries endanger precious, declining runs of wild, naturally reproducing salmon adapted by natural selection for optimum survival in their river systems. Hatcheries bring diseases that attack wild fish. They pour millions of smolts into streams, compete with wild smolts and often overload carrying capacity.

The artificial, often large runs of returning hatchery fish create dependent commercial fisheries that decimate runs of wild fish returning in the same waters at the same time. Hatchery runs can be maintained by artificially spawning a hundred fish or even fewer. But wild runs, already under heavy stress, need many adults to perpetuate themselves. This "masking" of wild runs is probably the most pernicious effect of hatcheries.

Hatchery fish also compete with wild fish for an already limited supply of spawning spaces in streams. Beyond that, most hatchery stocks are mongrelized, with genetics selected by hatchery managers to provide fry and smolts that thrive in concrete tanks on handouts of fish pellets dosed with antibiotics. Hatchery fish inevitably breed with wild fish, diluting what is most precious about wild fish — their gene set. Read Bruce Brown's *Mountain in the Clouds* on how hatcheries damage wild stocks.

But as long as hatcheries exist, their operators could help by studying the carrying capacities of individual streams and the Puget Sound. And the Fisheries and Wildlife departments (Wildlife manages trout) could coordinate their hatchery releases with each other and with the Indian tribes who co-manage many fisheries.

We all know that the high-seas netteries must be stopped. A gunboat would do it. Unfortunately, the Reagan and now the Bush administrations have lacked the vision to risk upsetting our Asian trading partners.

Finally, it's a peculiarity of how things work in Washington that the non-tribal salmon fisheries are managed to benefit a tiny slice of the state's population: nontribal commercial fishermen. Every year fisheries are rigged so that about 6,000 commercial fishermen can take 85 percent of the harvestable fish. (About 600 of these 6,000 commercial fishermen catch some 90 percent of the commercial take.) Some 475,000 resident and nonresident sports anglers compete for the remaining 15 percent.

A 1984 study commissioned under Gov. Booth Gardner showed that the commercial fishery — when hatchery, management, fuel and other costs are counted — deduces a net loss to Washington's economy. The sports fishery, by contrast, generates millions of dollars.



Seattle urban area and Puget Sound

T. Steen

What the study didn't reveal is that the commercial fishermen's lobby is well organized, extremely vocal, and never hesitates to say that offering one more salmon to sports anglers will cause some poor woman and her children to starve in a freezing hut. Because many commercial fisheries focus on hatchery runs, a built-in lobby for more hatcheries also is guaranteed.

Sports anglers, on the other hand, are not well organized, and their existing groups show that most of them would rather buy a good lunch than take political action. Consequently, despite all the lip service, the Gardner administration shies away from letting sports anglers catch more fish.

This is why Hood Canal is a biological desert for sports anglers, and why Joe Blum, when he promises to try to put some fish out there for us, must talk about using hatcheries while "maintaining a responsible commercial fishery" in the canal, too.

Both ideas were losers from the start. ■

EXTINCT AND IMPERILED NATIVE SALMON AND STEELHEAD STOCKS PUGET SOUND AND OLYMPIC PENINSULA REGION

EXTINCT — Partial list

Snohomish River spring chinook
Duwamish-Green River spring chinook
Puyallup River spring chinook
Nisqually River spring and summer chinook
Elwha River sockeye
Mason Lake sockeye
Nisqually River chum

IMPERILED

At High Risk

Wynoochee River spring chinook
Skokomish River spring and summer chinook *
Dosewallips River spring chinook *
Dungeness River spring chinook
Elwha River spring chinook *
North Fork Nooksak River spring and summer chinook
Stillaguamish River spring chinook *
Duckabush River fall chinook

South Fork Nooksak River spring and summer chinook
Dosewallips River fall chinook
Dungeness River fall chinook
Ozette River fall chinook *
Chambers Creek coho
Lyre River coho
Elwha River coho
Nooksak River coho *
Baker River sockeye
Duwamish-Green River chum
Ozette River chum *
Elwha River chum *
Skokomish River pink
Elwha River pink
Dewatto River winter steelhead
Stillaguamish River summer steelhead

At Moderate Risk

White River spring chinook
Lake Ozette sockeye

Hood Canal chum (early-timed)
Chambers Creek chum (early-timed)
Dungeness River pink
Lake Washington winter steelhead
Tahuya River winter steelhead
Nooksak River summer steelhead

Of Special Concern

Puyallup River fall chinook
Lake Ozette coho
Nooksak River winter steelhead
Samish River winter steelhead
Skokomish River winter steelhead
Puget Sound tributaries sea-run cutthroat trout
Hood Canal tributaries sea-run cutthroat trout

* Indicates the stock may already be extinct

Source: "Pacific Salmon at the Crossroads," Nehlsen, Williams and Lichatowich, American Fisheries Society Journal, March-April 1991.

Getting beyond the fish hatchery fix

Washington's Yakima-Klickitat Production Project is seeking to enhance natural salmon runs rather than just create separate fish populations. It's called supplementation.



by Chuck Williams

Can hatchery production be used to protect and supplement natural salmon runs rather than replace them? The Northwest's major attempt to answer that question — the Yakima-Klickitat Production Project — is an innovative effort to restore salmon runs in these two Washington rivers.

The Yakima and Klickitat rivers begin on the east side of the Cascade Mountains and flow southeastward into the Columbia River. They were once productive contributors to the Columbia's great salmon and steelhead runs, but dams and other developments have sharply reduced the number of fish returning to spawn each year in these adjoining basins.

There are significant differences between the two basins. The Klickitat Basin is much more natural, and habitat protection and enhancement are its primary needs. The Klickitat River still flows free, and its lower 10 miles have been designated Wild and Scenic, with another stretch being studied. But the Yakima River is so developed and the fisheries so devastated that "high-tech" solutions will be required to rebuild its salmon runs.

Although the basins are adjacent, the two rivers enter the Columbia River far apart. Young fish originating in the Yakima Basin must pass four mainstem hydroelectric dams on their migration to the sea. Each dam kills about 15 percent of the fish. Klickitat fish have only to contend with Bonneville Dam.

The Yakima-Klickitat project is a precedent-setting partnership between the co-managers of the rivers' fisheries: the Yakima Indian Nation and the Washington departments of Fisheries and Wildlife. The Yakima forms the eastern border of the Yakima Reservation, through which the upper Klickitat runs. Both basins are within the Yakima's traditional lands, which they no longer own but use for fishing, hunting and gathering under reserved rights.

The Yakima is the project's first focus. The river begins at Lake Keechelus near Snoqualmie Pass, north of Mount Rainier, and flows 200 miles over many

diversion dams to the Columbia. The watershed's upper elevations are heavily forested and still semi-natural, while the lower river winds through a sagebrush desert, watering some of the West's most productive agricultural lands.

Over the past century, the Yakima Basin has been much altered. Cities and industries have grown up along the river. The Hanford Reservation, whose stored nuclear wastes pollute the water, is at the river's mouth. Logging and grazing have degraded spawning grounds.

Local farmers began to irrigate in the 1870s. In 1902 the Bureau of Reclamation started to build a large network of storage reservoirs, diversion dams and canals that now supply water to a half-million acres. Major crops include apples, cherries, pears, grapes, vegetables, hops, wheat and mint.

Development in the Yakima Basin has produced many benefits, including an abundance of food crops. But another annual "crop," anadromous fish, has suffered greatly. A century ago, upwards of 900,000 salmon and steelhead returned to the Yakima every year. Now, only about 10,000 fish return. In addition to damage within the watershed, Yakima runs have been hurt by the Columbia dams and freshwater and ocean fishing.

The project's goal is to increase annual returns to between 76,000 and 175,000 adult fish. Making the basin's irrigation systems as compatible as possible with fish production is one key element. The project is complemented by ongoing construction of fish ladders, screens and bypass systems for both adult and juvenile fish. Newly built ladders around dams, plus revolving-drum screens to keep smolts from entering irrigation canals, are already proving successful, and more are planned. Net pens set in irrigation canals will be used experimentally to raise fall chinook.

The most-watched element of the project is supplementation — both by the experimental use of hatchery facilities to increase naturally spawning runs and by the outplanting of salmon smolts into depleted spawning and rearing habitat.

The goal is to enhance natural runs,

not to create separate natural and hatchery populations. So broodstock for supplementing spring and fall chinook and steelhead will be taken from runs now returning to the basin. Eggs from trapped adults will be hatched in central facilities, then transferred to "acclimation ponds" along the streams to be supplemented. The intent is that returning adult fish will establish natural spawning in the streams where they were released.

Summer chinook, coho and sockeye (blueback) runs no longer exist. If these species are reintroduced, stocks as similar as possible, perhaps from the neighboring Wenatchee River, will be used. Certain Yakima tributaries that have surviving wild runs, such as Satus Creek on the reservation, will not be supplemented.

Monitoring and research are important parts of the project, for supplementation is a controversial issue throughout the Columbia Basin. Both the co-managers and the Northwest Power Planning Council, whose fish and wildlife program is funding the project, want answers to many questions about supplementation, including its genetic effects and technical feasibility.

Where there are salmon projects, there is controversy. Some sportfishing groups, including Oregon Trout, oppose parts of the project out of concern that the genetics of native stocks might be altered by supplementation. The project's managers and some other sportfishers share the concern, but contend that many specific claims of genetic risk have no scientific basis.

Local treaty Indians say the runs can't be rebuilt without supplementation, and they note their own leadership in reforming hatchery practices that harm native stocks. Many Indians believe the "wild" fish issue is often used to justify anti-Indian actions such as stopping the Indian steelhead harvest, a treaty right upheld in court. The specific debate about what unique wild substocks exist in these rivers may be clarified by ongoing research.

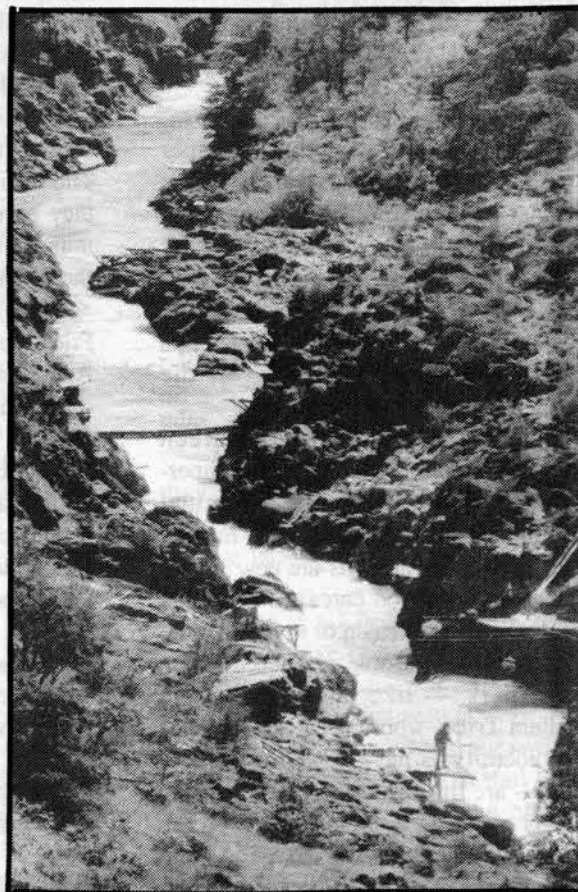
A second dispute concerns a trophy rainbow trout catch-and-release fishery on the Yakima above Rosa Dam. Some flyfishers fear that salmon reintroduction to the upper Yakima will harm it.

Debates between sport and treaty fishers go back and forth.

Some flyfishers say Indians hurt wild runs by not throwing back non-hatchery fish. Some Indians say sportfishing is not comparable to ceremonial, subsistence and commercial fishing. (One elder joked, when given a pitch for catch-and-release, "I was raised that it's wrong to play with my food.") Flyfishers respond that the tribes are more interested in the number of fish caught than in protecting native stocks. And so on.

The project's co-managers represent all these interests and are committed to modifying plans if necessary. Some disputes may be resolved by better science as the project moves ahead. The co-managers also are committed to keeping good working relations through the many rough spots that will surely occur.

Let's hope so. The present endangered species battle makes clear that past fisheries management has not worked. The Yakima-Klickitat Production Project is the best hope for a new cooperative era of fisheries management, one that protects native runs and begins to reverse this century's extreme declines. If the Yakima Basin's fisheries can be restored to anything approaching past runs and the Klickitat's habitat can be enhanced and protected, there is hope for other areas in the Columbia Basin as well. ■



Yakima-Klickitat Production Project
Yakima Indian dip-net fishing from a platform on the lower Klickitat River

A ray of hope shines on the Elwha River

The Olympic Peninsula's Elwha River once jumped with all five Pacific salmon species. Then came two dams and several extinctions. Now there is a push to remove the dams.



by Brian Collins

Ask Dick Goin of Port Angeles about the Elwha River he has known for 50 years, and he says: "People have never forgotten that this was a crime." The crime is the damage two dams have done to this Washington river and its legendary salmon runs. But restitution may be in the offing. The Elwha dams, like the salmon runs in the river they block, could be facing extinction.

The Elwha River [see map on page 20] descends from the heart of Olympic National Park through rain forest and rock canyons to the Strait of Juan de Fuca at the entrance to Puget Sound. From its headwaters to the town of Port Angeles on the strait, the Elwha is only 45 miles long.

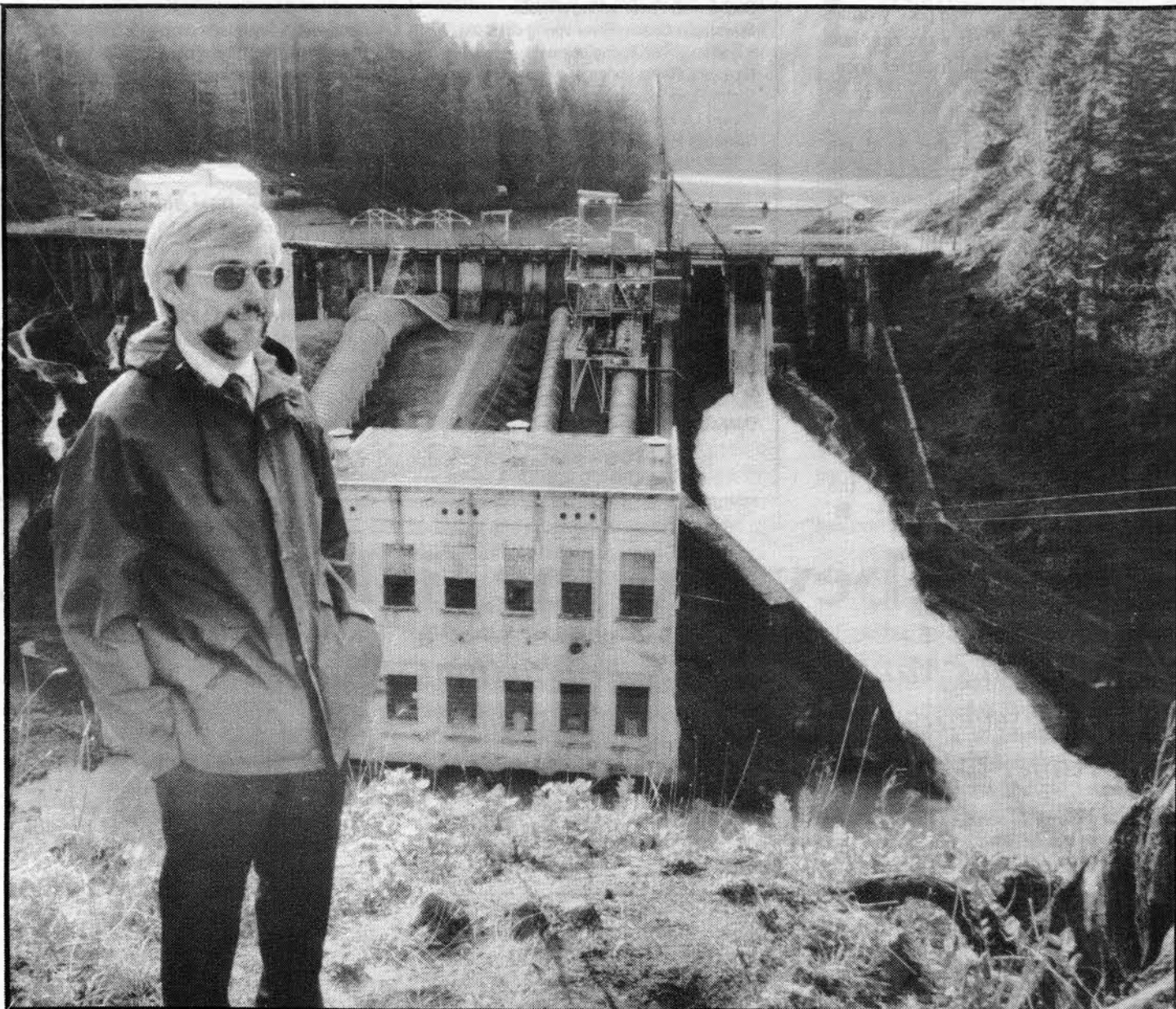
But a century ago it may have been the most productive single watershed for ocean-going fish in the 48 states. Hundreds of thousands of pink salmon spawned in the lower river. Giant chinook salmon weighing up to 100 pounds fought up to the headwaters to spawn. The river was home to all five species of Pacific salmon — chinook, sockeye, coho, pink and chum — as well as seagoing steelhead, cutthroat and Dolly Varden trout.

Biologists have no firm explanations for the watershed's remarkable abundance. But they do know why all these wild Elwha stocks are now extinct or critically endangered. For 80 years, two dams have blocked 70 miles of habitat in the Olympic Park's largest watershed and stopped replenishment of spawning gravels in the remaining five free-flowing miles below.

Today, according to Goin, the Elwha sockeye is extinct, the summer coho has been gone 20 years, and the summer steelhead may disappear soon. The American Fisheries Society says the wild chum and spring chinook runs may be extinct. And last year only three pink salmon spawned in the Elwha, says Rachel Kowalski, a member of the Lower Elwha Klallam Tribe.

The loss goes further. Maureen Finnerty, Olympic National Park superintendent, says the entire ecological community has been disrupted. Eagles, bears and other animals are now scarce because the salmon carcasses and eggs aren't there to be eaten or to fertilize the watershed. And people who depended on the fishery — like the Lower Elwha Klallam Tribe, whose economic and cultural identity is merged with the watershed — are hurting too.

The Elwha's modern story — the severing of ties between the salmon and the ecological and human communities it supported — has been repeated all over the Northwest. But here there is a chance to reverse history. Goin, Kowalski and



Brian Collins

Jim Baker of Friends of the Earth in front of Elwha Dam

Finnerty are part of a coalition seeking to remove the dams and restore the fish (HCN, 8/27/90).

Elwha Dam, built illegally in 1914 only five miles from the river's mouth, blocked migratory fish from 317 of the watershed's 321 square miles. Fourteen years later and seven miles upstream, the 210-foot-high Glines Canyon Dam was built. The Glines dam and reservoir were then included in the newly created Olympic National Park in 1938.

Elwha Dam has never been federally licensed; Glines was, in 1926. When the license expired in 1976, Crown-Zellerbach, which owned both dams and the paper mill that used their 19 megawatts, applied to license both with the Federal Energy Regulatory Commission. Fish advocates opposed the application, demanding that the fishery be restored. The commission responded with delay; they have issued 15 annual interim permits for the dams, without yet ruling on the license application.

Four environmental groups — Friends of the Earth, Sierra Club, Seattle Audubon and Olympic Park Associates — first advocated restoring the watershed by removing the dams in 1984. With Friends of the Earth's Seattle office in the lead, they have steadily built public support for removal, and developed a plan to do it without harming Port Angeles' economy.

The Lower Elwha Klallam Tribe joined them in 1986. The Elwha Klallam are descended from the Klallam peoples who signed the Treaty of Point No Point in 1855. They now live at the river's mouth on a tiny reservation, promised by the treaty but not created until 1968.

The dams violate the treaty, says Carson Boysen of the Point No Point Treaty Council. The Indians' right to fish at all "usual and accustomed grounds" implies the right to an environment that

sustains the fishery, he says, and the dams are destroying it. The tribe also worries about the dams' safety. Elwha Dam blew out in 1912 before it was completed, unleashing a catastrophic flood on the Klallam. Though FERC ordered strengthening repairs a decade ago, the tribe questions if the work was adequate.

In 1988 Crown Zellerbach sold the dams and the mill to James River Corp., which kept the dams and sold the mill to Daishowa Corp. James River then proposed its own fish restoration plan, which was to truck fish around Glines Dam and build a fish ladder at Elwha Dam. After a thorough review, the National Marine Fisheries Service, Fish and Wildlife Service, Park Service, Lower Elwha Klallam Tribe and Washington's Department of Wildlife concluded James River's plan could not fully restore the fishery.

In June 1990, the National Park Service, with a post-Reagan boldness that surprised nearly everyone, publicly recommended that the dams be removed and the watershed be restored. In July, the Fish and Wildlife Service followed suit.

In 1989, FERC finally initiated an Environmental Impact Statement on the application. While the environmental statement has crept through FERC's

notoriously slow and dam-loving halls, the anti-dam coalition opened a political front. In 1989 the conservation groups offered Rep. Al Swift, D-Wash., whose district includes both the dams and Port Angeles, a framework for a negotiated settlement. Jim Baker, of Friends of the Earth, says their plan "preserves jobs, supplies the company with cheap power and restores the watershed."

The dams' 19 megawatts supply one-third of the Daishowa mill's energy. The groups estimate that renovating the mill could save 3 to 6 megawatts; a recycling facility planned by Daishowa could save another 12 to 15, and a full energy audit could identify further savings. And it all could be funded through the Northwest Power Planning Council's fish and wildlife program, which uses Northwest ratepayer dollars to mitigate damage from the region's huge hydroelectric system.

Swift, who first opposed dam removal because of job-loss fears, has gradually moved to the middle. Swift aide Midori Okazaki says her boss now sees dam removal as a possible outcome and wants a settlement. But Daishowa and James River declined to sit down and talk, saying instead they would wait for the draft environmental statement. "Nothing can be done to force people to the table," Okazaki says.

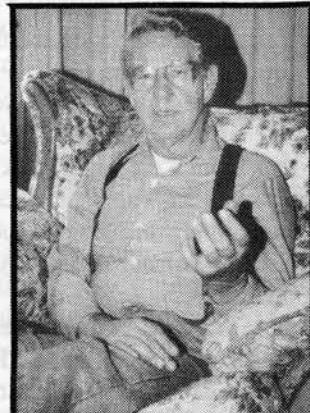
Brian Collins photos



Rachel Kowalski



Maureen Finnerty



Dick Goin

While toppling the Elwha dams has wide popular support in nearby Seattle and Tacoma, the people of Port Angeles are wary and divided. The town's economy is plain to any visitor. Mills run by Daishowa and ITT-Rayonier dominate views west and east. The port is filled with logs awaiting export. Log trucks roll by on Highway 101, the main street. Half of Clallam County's 17,000 jobs are related to forest products.

"We've taken a lot of hits lately," says Margaret Crawford, of the Clallam County Economic Development Council. Spotted owl-based logging restrictions and reduced log exports have cost about 1,000 jobs, she said, and memories of 25 percent unemployment in the early 1980s are fresh. Daishowa's 350 workers are the town's second largest payroll.

Dam-busting proponents say their plan preserves the mill's jobs, and that a restored Elwha would lure sportfishermen and boost commercial fishing, too. More of National Olympic Park's thousands of visitors would visit the Elwha, and Port Angeles, says Baker.

Some Port Angeles residents are actively working for restoration. Jim Curnew, a businessman who heads the 100-member Friends of the Elwha, says the group shows there are local people "who can see that dam removal isn't going to damage the town or the mill, and who want to see the river put back the way it should be." Dick Goin is another example; he has been a machinist at the ITT mill for 41 years.

Washingtonians and FERC's analysts are asking the same questions. Can the dams and a healthy fishery coexist? Is dam removal feasible? How much will it cost?

James River claims the Elwha salmon can be restored with the dams in place. The company would build a ladder to pass adult fish over Elwha Dam. Those fish would then be trapped at the base of Glines Canyon Dam and trucked upstream. On their trip to the sea, the next generation would be spilled over Glines and protected by screens from Elwha Dam's turbines.

The fish agencies, however, say it won't work. In the five miles downstream of the dams, fish will keep vanishing as the dams keep blocking replenishment of spawning gravels from the watershed above. They say the adults going upstream will be injured by the trap-and-haul handling the company proposes. Even if adults made it upstream, downstream passage for their progeny would require almost five times the spill proposed by James River at Glines, and would require spill, not screens, at Elwha Dam. Providing that spill would sharply reduce the dam's energy generation.

With James River's plan, the agencies conclude, chances are poor for restoring chinook, fair for coho and sea-going trout, and nonexistent for pink, chum and sockeye. Without dams, the agencies rate restoration prospects as fair for sockeye and spring chinook, and good for all other runs.

James River estimates that dam-removal costs could approach \$700 million. The Lower Elwha Klallam Tribal Council commissioned their own engineering study, which estimated \$20 to \$80 million. The cost of dredging, trucking and dumping the silt and gravel impounded behind the dams accounts for most of the difference. The tribe's experts suggest stabilizing sediment in place, or releasing it downstream.

An even cheaper alternative is to blow up the dams, pick up their pieces, and let the river do the rest. This isn't inspired by Earth First! It's been done

Resetting the genetic clock on the Elwha

Say the Elwha dams are removed. Then what? As badly depleted as the river's wild salmon stocks are, what is possible?

By definition, there may not be a wild salmon stock anywhere on the West Coast. No stocks restored to the Elwha will be genetically pure descendants of their wild forebears, and some won't even trace any of their lineage to the Elwha. "We can never turn the clock all the way back," says Dick Goin.

But the evolutionary clock may be restarted. Jim Lichatowich, co-author of the American Fisheries Society report quoted throughout this issue, offers a more pragmatic definition: A stock is wild if it has enough genetic diversity to sustain itself and adapt as its environment changes through time. Evolution is not static; the potential for evolution to operate, and take a fish stock where it will, may be restored. That would be the goal of an Elwha restoration project.

The Elwha has a hatchery program now. The state Department of Fisheries built a summer-fall chinook rearing facility two miles downstream of Elwha Dam in 1976. The Lower Elwha Klallam Tribe built a hatchery near the river's mouth in 1978; it produces coho, summer-fall chinook and winter-run steelhead.

Tribal biologist Pat Crane says the hatchery and river stocks are now genetically identical and reflect genetic influence from fish introduced to the Elwha. The hatchery stocks have half the ocean survival rate and spend half the time in the ocean that the wild fish did. But their genetics and fitness can move back toward wild conditions if natural spawning in the watershed is re-established.

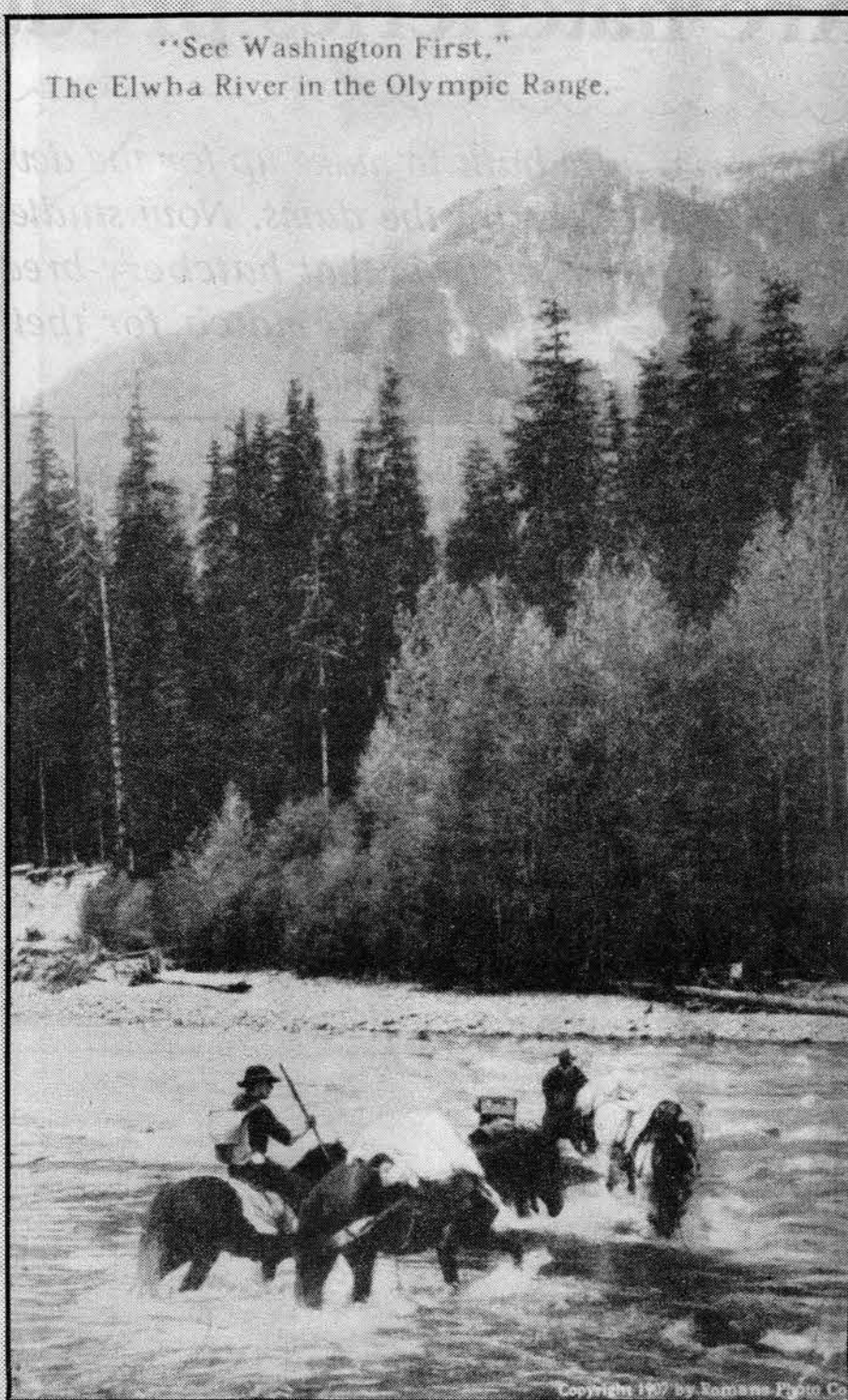
For extinct and badly depleted stocks, broodstock will have to be introduced to the Elwha from other streams. In principle, a stock can be found that has adapted to a stream with similar flows and temperatures. In practice, such transplantations are a game of chance. Some have worked; many haven't.

"If I could pick just one fish to restore," says Goin, "it would be the pink." The pink salmon, as huge in number as the chinook were in size, fueled the tremendous productivity of the wild Elwha ecosystem. The water-

with several dams, not as big as Glines but impounding comparable sediments, and the rivers seemed to recover quickly.

FERC finally released its draft Environmental Impact Statement this March. "Its conclusions," Jim Baker says, "are devastating to the company's position." Its analysis confirms the fishery agencies' judgment that James River's plan won't restore the fishery. It predicts dam removal will restore the watershed's original habitat conditions within 25 years. It projects dam removal will cost \$64 million, not \$700 million, and says Daishowa's power costs will be about the same whether the dams are removed or not.

Daishowa spokesman Bob Hartley says the company disagrees that its power costs will be unaffected. He says its position still is that "there's nothing to negotiate," although he left the door ajar for considering a specific offer. Rep.



A 1907 postcard of the Elwha River

shed that built that system may be restored, but no one can know if it will reproduce the abundance or diversity of the past.

An agreement or congressional directive to restore the Elwha's wild fish also will have to contend with the inertia of an entrenched fishery management system. For more than a century, emphasis on artificial production has helped degrade the genetic viability of the wild Pacific salmon. Washington's Department of Fisheries and the Lower Elwha Klallam Tribe co-manage the Elwha. Both, but especially the department, are heavily invested in hatcheries. Many question whether the state agency can take the needed new direction.

But Lichatowich says past hatchery failures are leading managers to reconsider their goals. Maintaining genetic diversity necessarily emphasizes habitat protection, since distinct stocks evolve as salmon adapt to specific streams. And that turns up the political heat on the fish agencies. But, he says, genetic diversity is essential for the long-run survival of both wild salmon and hatchery programs.

Hatcheries must play a key role in restoring the Elwha's wild salmon. The trick — biologically, financially and politically — will be figuring out how to use and keep hatcheries as the means and wild fish as the end.

—B.C.

Swift, while wondering about the power cost analysis and how to pay for removal, says he will continue to urge the companies to negotiate.

"What other conclusion can be reached than removal?" says Jim Baker. "It's a bargain. Let's get on with it."

FERC is taking public comment until April 30, and soon after will have to choose sides when it prepares the final EIS. It will make that choice with at least one eye on Congress.

Last year Congress's General Accounting Office said that because Glines Canyon Dam is inside a national park, FERC doesn't have authority to license it. The commission later ruled that FERC does have authority. But Rep. Bruce Vento, D-Minn., who chairs the House Interior and Internal Affairs Subcommittee on National Parks, has warned FERC that Congress "will not tolerate" any move to relicense Glines Canyon.

James River also has something else

to worry about — its possible financial exposure without a settlement. If no license is granted, says National Marine Fisheries Service attorney Lori Bodi, the company has an unlicensed obstruction on a navigable river — and is legally liable for removal costs.

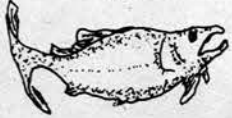
As the jockeying continues, time may be running out for the wild fish. Wild stocks keep dwindling as the dams operate under their 15th annual interim permit.

"They're all fiddling while Rome burns," Dick Goin says in frustration. He includes the fish agencies and environmentalists in his indictment.

To keep some stocks going until the dams are gone, Goin wants to start trucking adults above the dams and planting fry in the headwater habitat. Citizens would do the work, he says, if fishery agencies would support them. "People don't realize we're losing something that took 15,000 years to evolve."

Are hatcheries producing salmon 'wimps'?

Hatcheries were built to make up for the devastation wrought by the dams. Now studies are beginning to show that hatchery-bred fish are no match for their wild forebears.



by Paul Koberstein

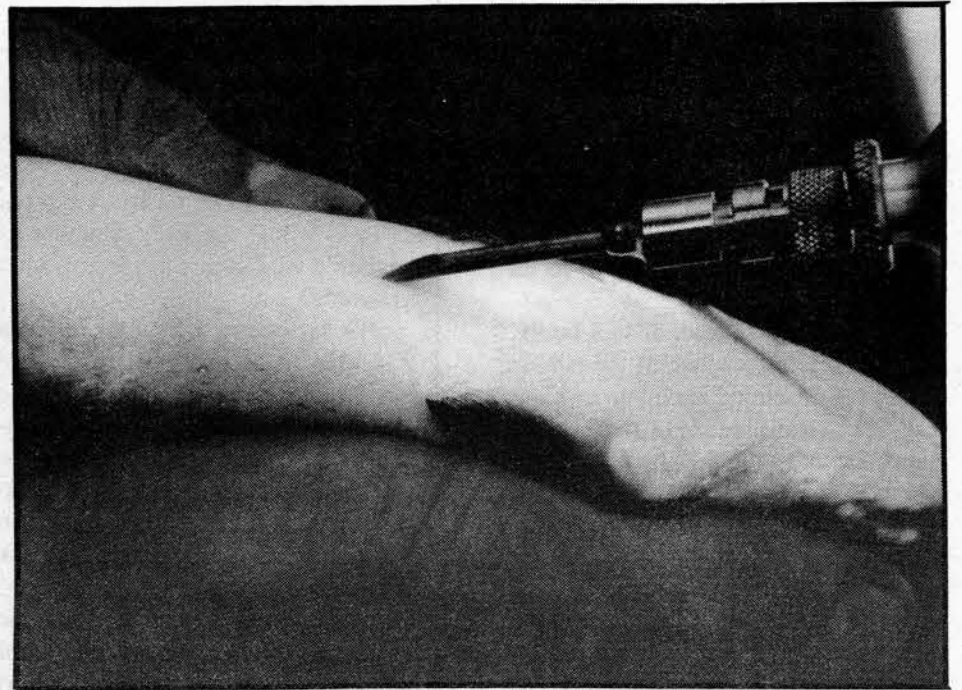
A King Kong of a dam plugs the North Fork Clearwater River canyon behind the old Nez Perce fishing village of Ahsahka, east of Lewiston, Idaho. Dworshak Dam, one of the tallest in North America, wiped out a wild steelhead run in the Clearwater when it was erected two decades ago. The Army Corps of Engineers replaced the fish with an artificial run, bred in concrete ponds at the dam's base.

Dworshak National Fish Hatchery is the largest steelhead factory in the world. Each year it turns out 2.5 million steelhead and 1 million chinook salmon smolts. The Army built the hatchery to compensate for the dam's damage. But

the intent never was to provide full compensation. The Army settled for a lesser goal: "mitigation," a lessening of pain. Throughout the Northwest, mitigation for dams has meant hatcheries.

Fishery managers have long thought hatcheries could rebuild salmon runs ravaged by dams, overfishing and habitat destruction. As a result, managers often downplayed natural runs. Some wild runs were eradicated and others allowed to vanish. Idaho poisoned the sockeye salmon, now an endangered species candidate, out of its ancestral lakes. Idaho and Oregon officials let Snake River coho salmon become extinct.

Today, dozens of wild runs are on the brink of extinction. "Unless we preserve these fish, important gene pools



Earl Prentice/USNMFS

A salmon is tagged by injection

will be lost forever, and instead of the mighty, wily salmon, we will be left with fish wimps," says Norma Paulus, a former Oregon member of the Northwest Power Planning Council.

Countless steelhead and chinook smolts from the Dworshak hatchery die before they ever reach the sea. Hatchery manager Wayne Olsen says the govern-

ment spends millions to spawn and rear these fish. "Then to send them to their deaths makes no sense," he says. "We need to improve survival at the dams downstream."

But other biologists say the hatcheries must share the blame for the heavy mortality of juvenile fish. They point out that half the hatchery-bred smolts don't even survive to the first dam.

One hundred years ago, 15 million or more adult salmon and steelhead entered the Columbia River each year. They headed straight to their native stream, spawning in or close to the very gravel where they were born. Today, 2.5 million adult salmon and steelhead enter the Columbia. But eight of every 10 of them were born in hatcheries. Only about 500,000 fish spawn in streams.

"With these wild stocks now at 2 percent of their former abundance in the Columbia, the ecosystem itself is in jeopardy," says Robert Francis, director of the University of Washington's Fisheries Research Institute.

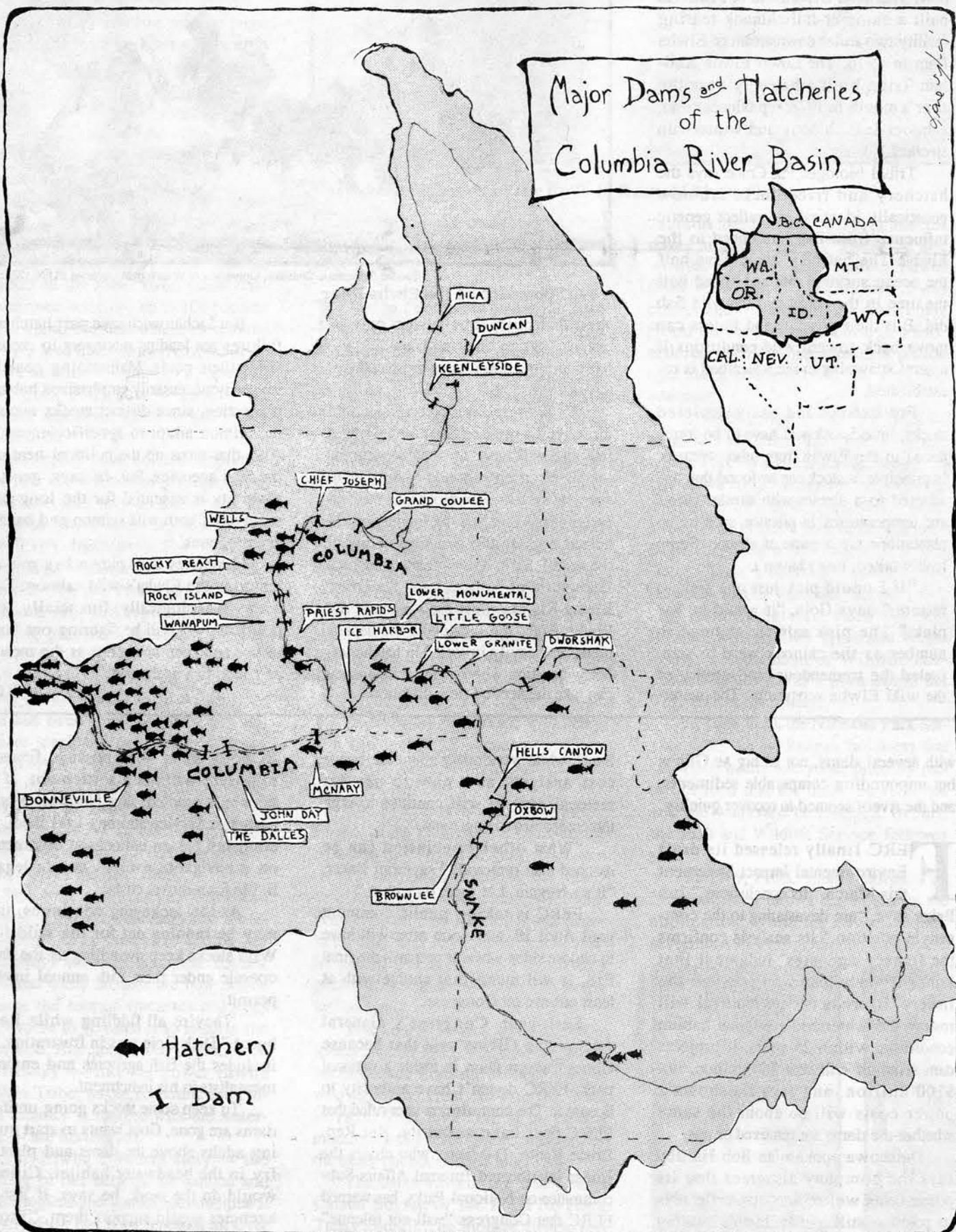
In the 1930s, the federal government initiated a massive program of damming the Columbia and other river basins. In 1938, Congress passed the Mitchell Act to fund hatcheries in order to mitigate the damage caused by the Columbia's dams. Although Congress saw the Mitchell Act as an emergency measure — responding to reports that salmon were having trouble climbing fish ladders around Bonneville Dam — it has since authorized more than 30 hatcheries in the Columbia Basin. Oregon, Washington and Idaho have built many more, and more are under construction or being planned.

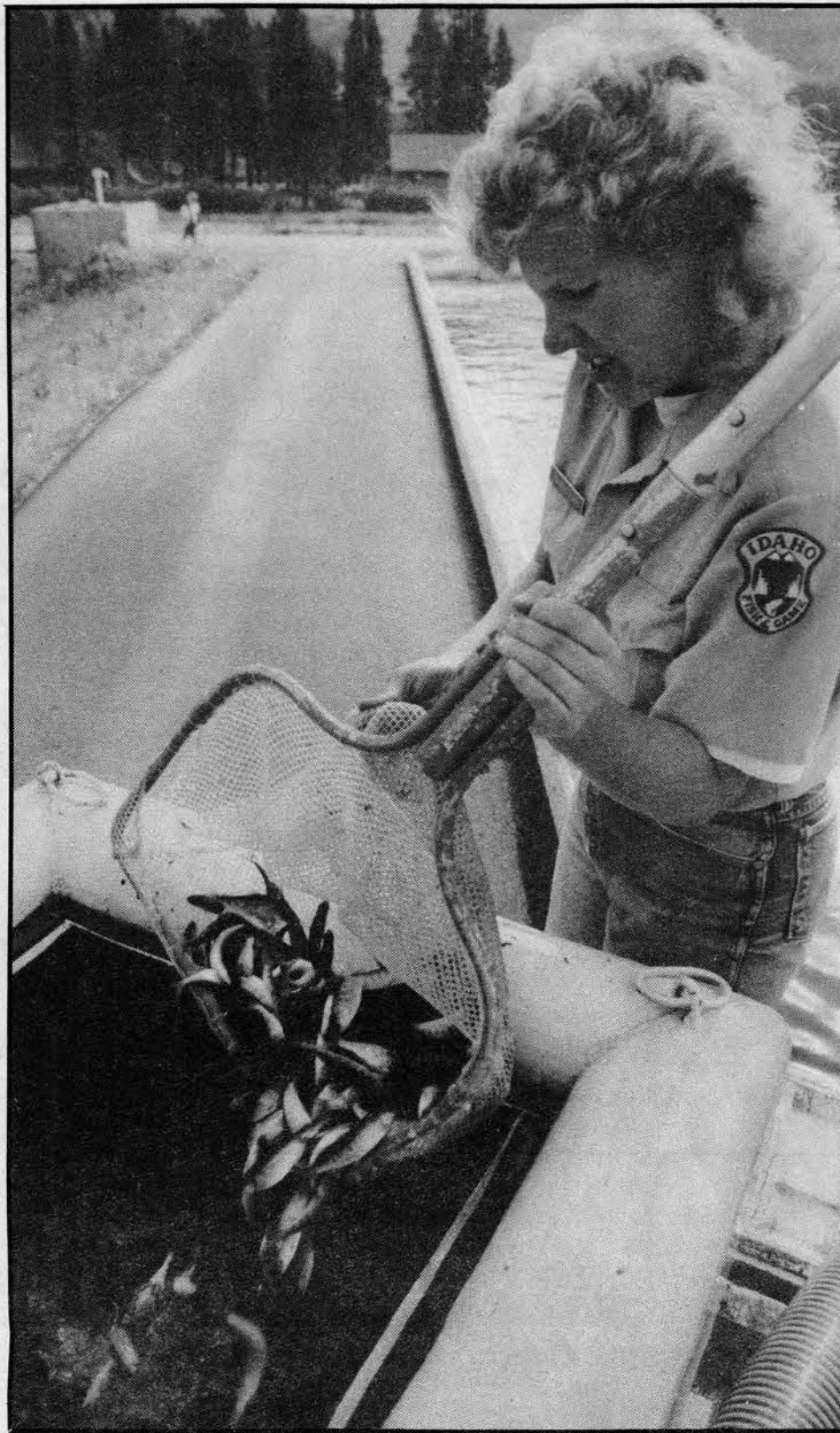
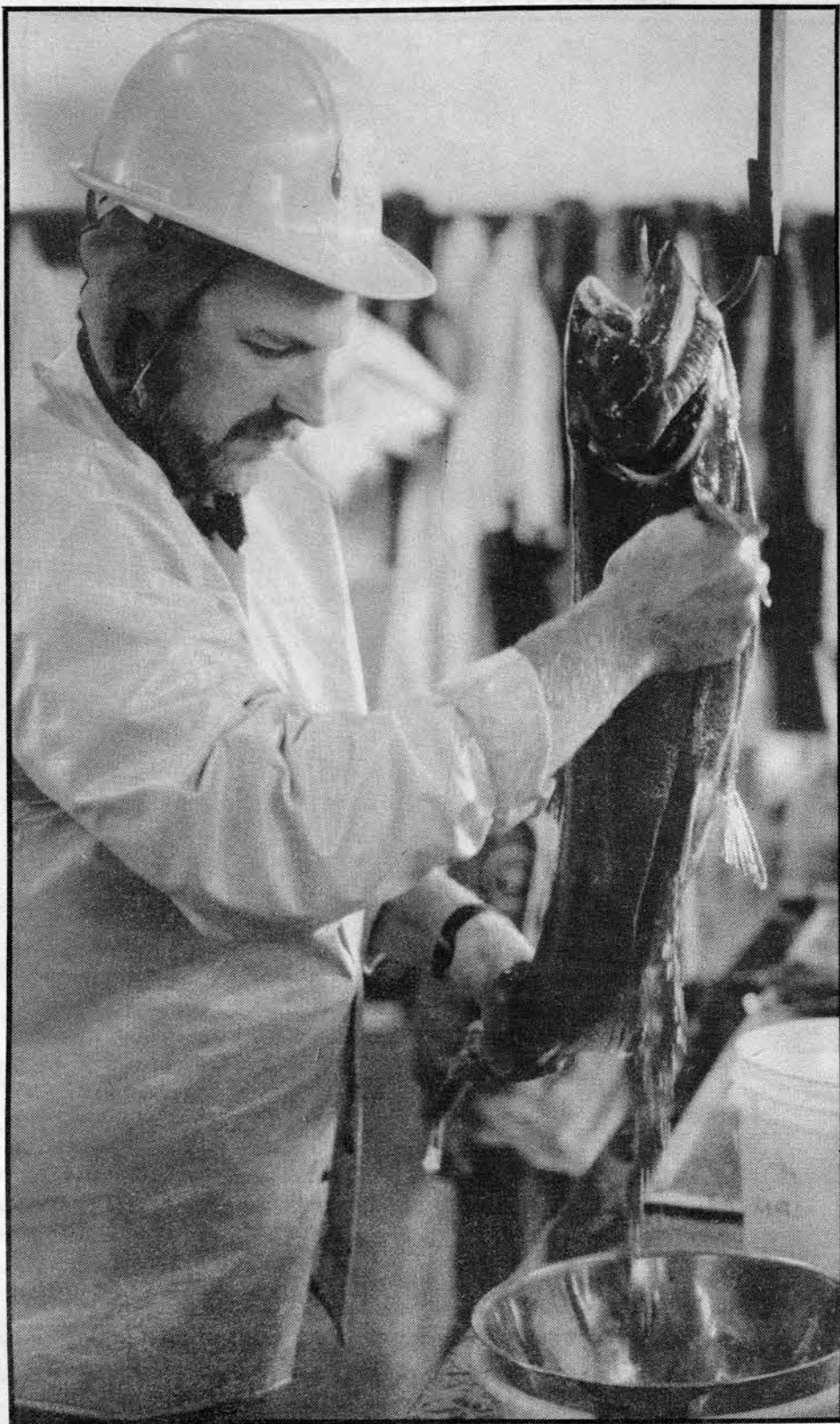
The hatcheries have provided sport, commercial and tribal fishers with fish to catch when otherwise they might have had none. They are defended by many fishermen and the agencies that serve them.

"I don't buy this intellectual extremism that our hatchery fish are artificial and inferior," says Jim Martin, fisheries director for Oregon's Department of Fish and Wildlife. "They're wonderful creatures, they perform well, and they should be taken home to enjoy."

During these years of rapid hatchery growth, however, wild populations have fallen drastically. Biologists fear that if the wild fish disappear, the species themselves could fade into oblivion. Some claim that the Northwest has become addicted to hatcheries but, like an addict, refuses to admit it.

The few studies on hatchery and wild run correlations provide reason to worry. An Oregon study of coastal coho





Scott Caraway

Sawtooth Hatchery's Rick Alsager harvests eggs from a chinook. Right, Nannette Neider loads fingerlings into a tank truck for stocking the Salmon River

salmon concluded that hatcheries led to gradual deterioration in the survival of both hatchery and stream-bred fish. A National Marine Fisheries Service study on Washington's Kalama River showed wild steelhead to be nine times more effective at producing the next generation than hatchery fish.

Hatchery-raised fish cause various problems for wild fish. They compete for limited food and habitat. Since hatchery smolts are often reared a year or more, they typically are larger than wild fish when released. And they are released in huge numbers. "If you plant hatchery fish on top of natural populations, you diminish the natural productivity," says Jim Lichatowich, a fisheries consultant to tribes on Washington's Olympic Peninsula.

Hatchery fish can transmit diseases to wild populations. Recent studies show that 100 percent of hatchery salmon in the Columbia Basin above Bonneville Dam are infected with bacterial kidney disease. Their feedlot conditions encourage the spread of this and other diseases. Epidemics have wiped out entire year classes in some hatcheries, including Dworshak and the Spring Creek National Fish Hatchery near Bonneville Dam.

Some hatcheries have been stocked with the wrong fish. In most Northwest hatcheries, the brood stock used to start up production came from a different river system, not the native stock. This affects hatchery productivity and weakens indigenous wild stocks when the foreign genes mix with theirs.

Hatchery fish are often planted in natural streams in order to rebuild fading

wild runs or replace extinct ones. But a recent analysis by the U.S. Fish and Wildlife Service concluded that such outplanting, or supplementation, is risky business.

The report found few successful examples of rebuilding self-sustaining salmon runs with hatchery fish. Of 316 projects reviewed, only 25 were successful in supplementing natural runs. Adverse effects on wild stocks were shown or postulated for almost every type of outplanting aimed at rebuilding natural runs. The most success occurred where wild populations had vanished entirely.

"If you don't like supplementation," says Chip McConnaha, a fisheries biologist with the Northwest Power Planning Council, "the report proves it. A lot of people are real unhappy and dissatisfied with it." The council has decided to continue various supplementation projects, with close monitoring of their results and effects.

But McConnaha says hatcheries will always play a role, particularly on the Columbia River where the natural flows have been changed forever. "It's hard to believe that wild runs will provide fishable runs," he says. "There is no reason why hatcheries cannot be successful if managed correctly."

Fishery agencies and Indian tribes are promising to improve performance and methods in hatchery programs. Doug Dompier, a biologist with the Columbia River Inter-Tribal Fish Commission, says rebuilding depleted runs depends upon hatcheries. "Can it be done? Absolutely," he says.

But Bill Bakke, director of Oregon Trout and an outspoken critic of hatcheries, foresees a day when hatchery runs will sputter and die. "If the hatchery runs die," he says, "we might not have anything to replace them with." Oregon Trout has filed endangered species petitions in a last-ditch effort to preserve imperiled wild stocks.

Bakke and others say the Northwest's dependence on hatcheries is leading to serious trouble as the genetic diversity of wild stocks continues to disappear. Fish researcher Robert Francis says hatcheries "have become a narcotic to pacify society, to block society's awareness of what is really going on."

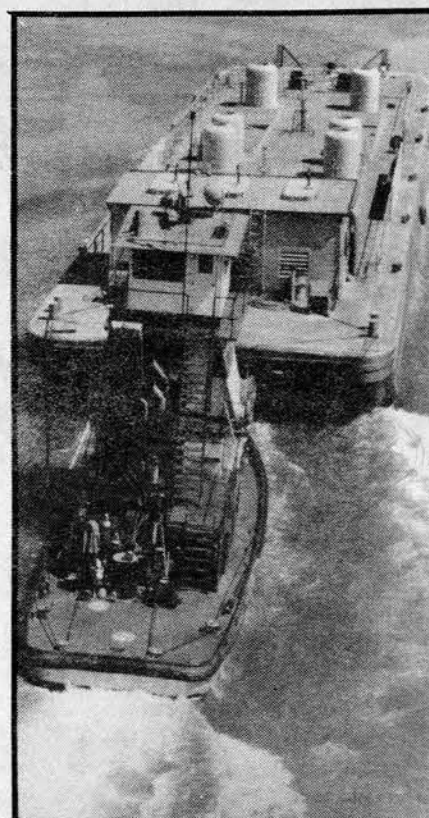
The Clearwater's big steelhead start pooling up outside the hatchery in October. Early comers hibernate like bears in chilly deep holes. Then in January they queue up when the hatchery fish ladder opens. The scene is a maze of water and concrete that requires only one extra-aquatic leap.

The death of the wild run did not mean the death of the Clearwater's steelhead. Biologists caught a few hundred for broodstock and spilled their eggs and sperm in buckets. The buckets were dumped into holding ponds. In 18 months, the young fish were taken to the river. Three years later, in 1973, the first adult crop came back.

In the wild, females lay their eggs in the gravel, and males squirt their sperm on top of it. Here at the hatchery, fish are killed with a blow to the head. A knife splits their guts, and eggs or sperm spill into buckets.

Hatchery manager Wayne Olsen is a sport fisherman. He knows what could have happened if hatcheries hadn't interceded when the dams were built. "If we didn't have hatchery programs," he says, "I don't know what we'd have for fishing out there."

"We can replace the wild salmon with hatchery salmon," counters Bill Bakke, "but having made that decision, we cannot protect the salmon ecosystem. And then where will we find genetic fitness? Where will the salmon find it?" ■



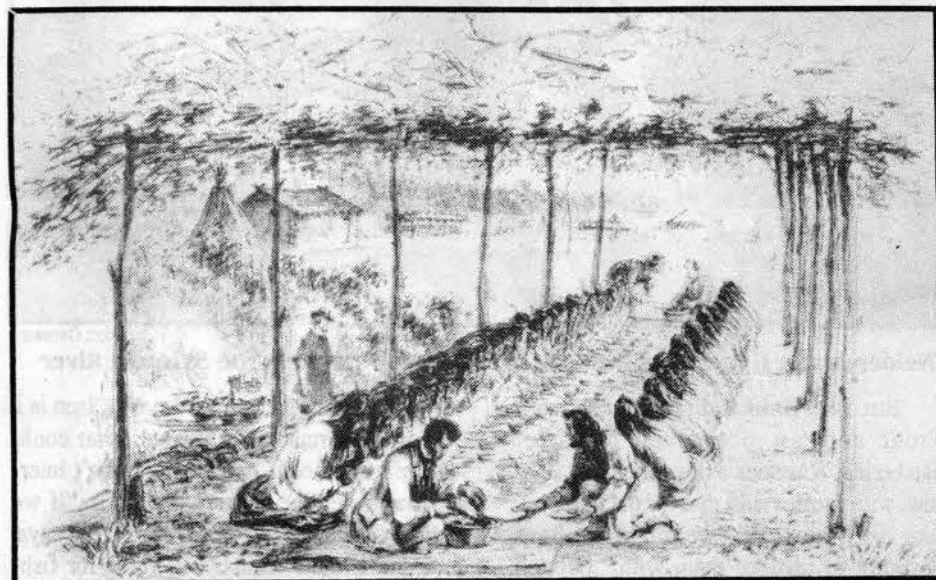
Walla Walla District, U.S. Army Corps

A fish barge



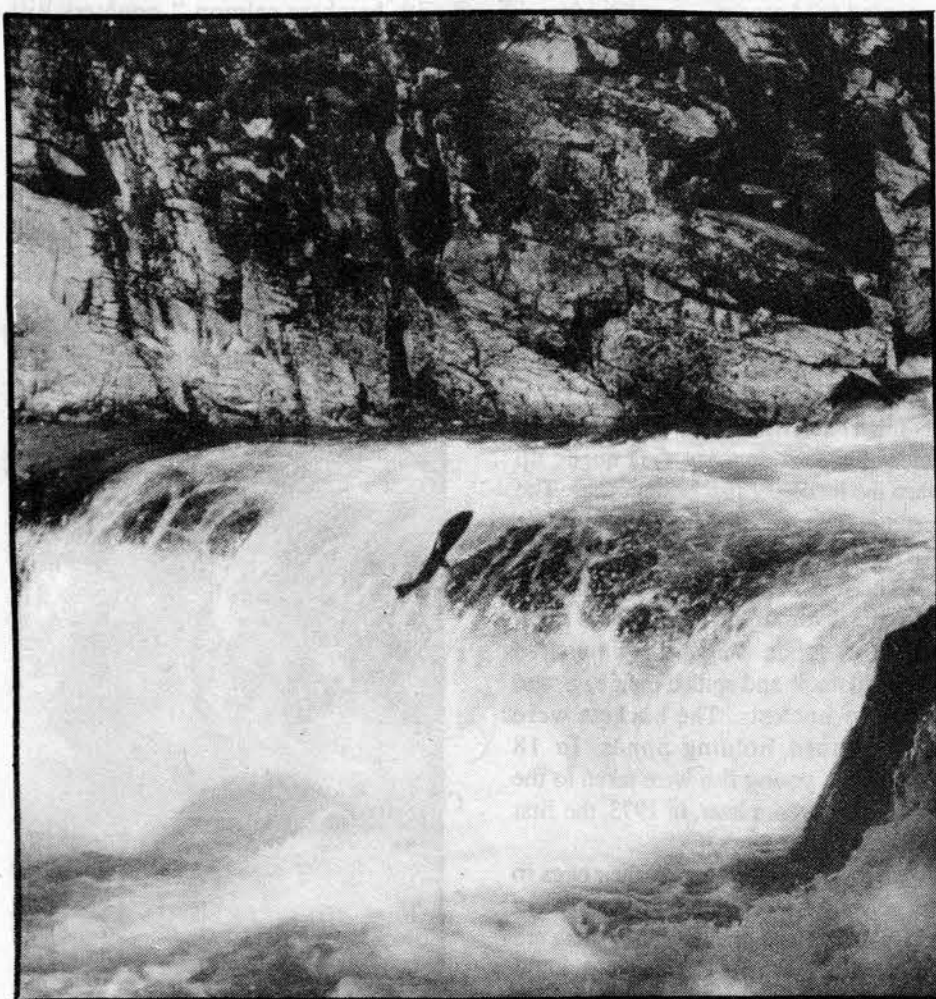
Nathan Dick and Troy Rodriguez fish for fall chinook at Cascade Locks, Oregon

Rocky Barker



Indian chiefs at dinner

Oregon Historical Society #4470



Marshal Edson/Idaho Department of Fish and Game

An adult chinook samon leaps up Dagger Falls, Middle Fork Salmon River

Behold the salmon and show respect

Today, most Northwest residents get their salmon from runs to the supermarket. The salmon may have been caught in gillnets set by non-Indian fishermen below Bonneville Dam or by Indians upriver from the dam or by trollers in the Gulf of Alaska. They may even have been raised in net pens halfway around the world in Scandinavia. We usually don't know.

If salmon are to return again to the Northwest in great numbers, we need to change our attitudes about them. We need to know and care more about them. We need to know where they return and when, and we need to appreciate the overwhelming obstacles they face on the way. Most importantly, we need to have religious reverence for the salmon. They are not toys to provide us fun; rather, they are part of each of us, part of what makes us Northwest residents.

Instead of just buying salmon "steaks" wrapped in Styrofoam at the supermarket, we need to find out where the fish we consume come from. We need to hold the fish before we clean them, to wonder at their amazing journeys and admire their great beauty as we gently rub our hands over them while washing them. We need to respectfully thank these wonderful fish for returning to feed us, for making our lives possible. And we need to promise the salmon that, for our part, we will not be wasteful or disrespectful and will do what we can to keep them returning year after year, as planned by the Creator or whatever God you worship.

— Chuck Williams

***This is not forever. Dams break.
Rivers never do. Two salmon
can spawn a thousand. The salmon
are an old and patient people.***

— Thomas Bigeater,
Warm Springs Indian