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NORTHWEST ENERGY NEWS

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Northwest Power Planning Council



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Editor's Notes

Over the next several months, the Council will be re-evaluating resources to fit into a new 20-year electric power plan for the region. Of special importance are those resources that do not depend on fossil fuels for power generation. In this issue, we present an overview of several of these renewable resources. We hope to present more detail on individual resources over the coming months.

This issue's cover illustration is by Joan Barbour.

The Northwest Power Planning Council is seeking public review of its proposal to amend the Columbia River Basin Fish and Wildlife Program to incorporate specific policies regarding wildlife species affected by hydroelectric development in the Columbia River Basin. Copies of the proposal are available from the Council (see the back cover of this publication). Comment will be taken at a series of public hearings (see below). Interested people may also submit comment in writing through September 30, 1989. Please label comments "Wildlife Comments," and send them to the Council's central office, 851 S.W. Sixth Avenue, Suite 1100, Portland, Oregon 97204.

The Northwest Power Act, which mandated recovery efforts for the region's salmon and steelhead runs affected by hydro-power development, also called for steps to rebuild wildlife populations in the Columbia Basin. Congress, in passing the Act, required that Northwest ratepayers finance these recovery efforts as a cost of power generation at the dams. The Bonneville Power Administration includes these costs in its wholesale power rates.

A key issue in the Council's proposal is what portion of the cost of wildlife measures should be borne by ratepayers, since most of the dams serve multiple purposes such as irrigation, navigation, flood control and recreation in addition to power generation. The Council is

requesting comment on three allocation formulas.

Construction and operation of dams has harmed many species of wildlife, primarily by flooding prime riverside habitat animals depended on. To address wildlife losses, the Council called for assessments of the numbers and species of animals that may have been lost at each Columbia Basin dam, and plans for their recovery. The current proposal addresses wildlife mitigation plans already being reviewed by the Council and also sets up a process for adopting future plans.

The mitigation plans being reviewed are those for wildlife affected by Grand Coulee Dam in

Washington; the Palisades, Anderson Ranch, Black Canyon and Albeni Falls dams in Idaho; and Cougar, Dexter, Lookout Point, Hills Creek, Foster, Green Peter, Big Cliff and Detroit dams in Oregon's Willamette Basin. The proposals affect waterfowl, peregrine falcons, deer, elk, bald eagles, bear, beavers, otters, mink, cougars and other species.

Public Hearings

Idaho

September 13, 7-9 p.m.
Holiday Inn
Bay 1 and 2
414 W. Apple Way
Coeur d'Alene, Idaho

September 20,
7-9 p.m.

Shilo Inn
Twin Falls Room
780 Lindsay Blvd.
Idaho Falls, Idaho

September 21, 7-9 p.m.

Owyhee Plaza Hotel
Regency Room
Eleventh and Main
Boise, Idaho

Montana

September 25, 1:30 p.m.
Outlaw Inn

Remington Room
1701 Highway 93 S.
Kalispell, Montana

Oregon

September 27, 9:30 a.m.
Northwest Power
Planning Council
851 S.W. Sixth
Suite 1100
Portland, Oregon

Washington

September 20, 2-5
and 6:30-8:30 p.m.
Seattle/Tacoma Airport
Large Auditorium

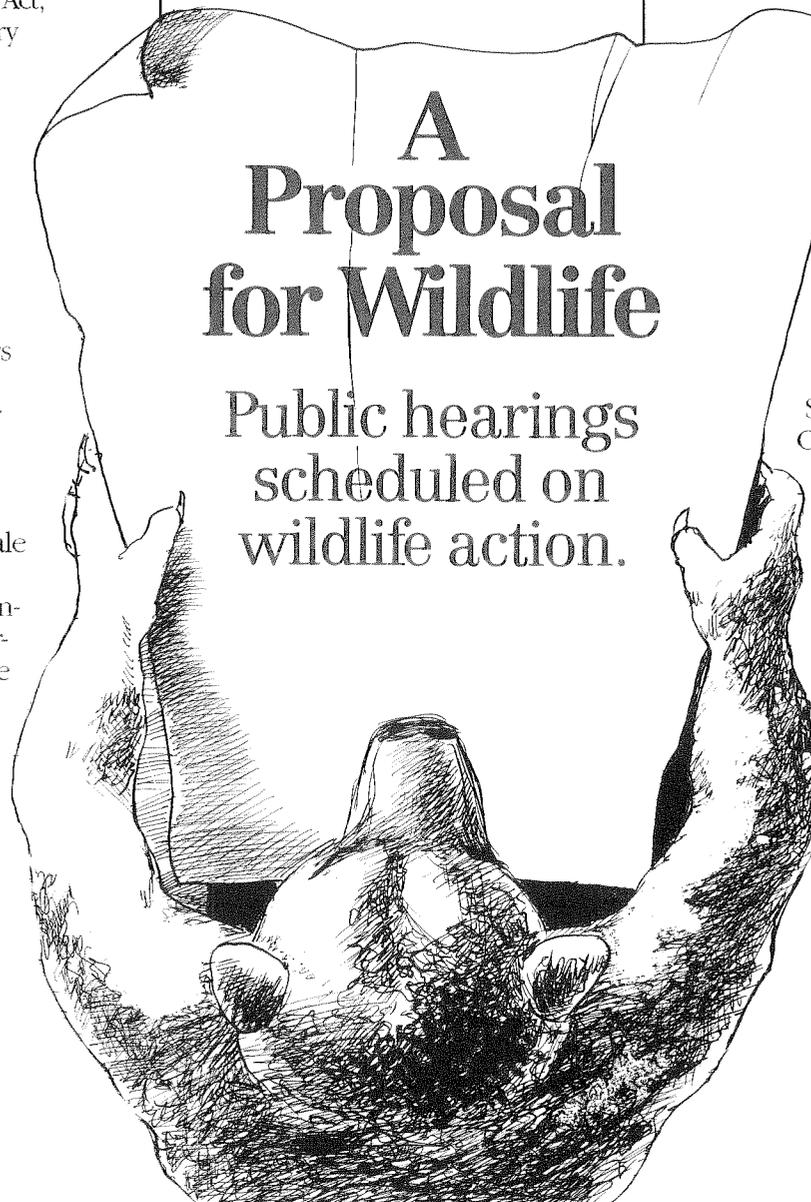


Illustration by Fredrika Spillman

New Spring for Renewables



The Council is revisiting
renewable resources

by Gordon Lee

This past May, two members of the Northwest Power Planning Council visited a sprawling energy site that taps into pockets of hot water under California's blistering Mojave Desert and a vast wind farm on a breezy, barren hillside not far from Livermore, California.

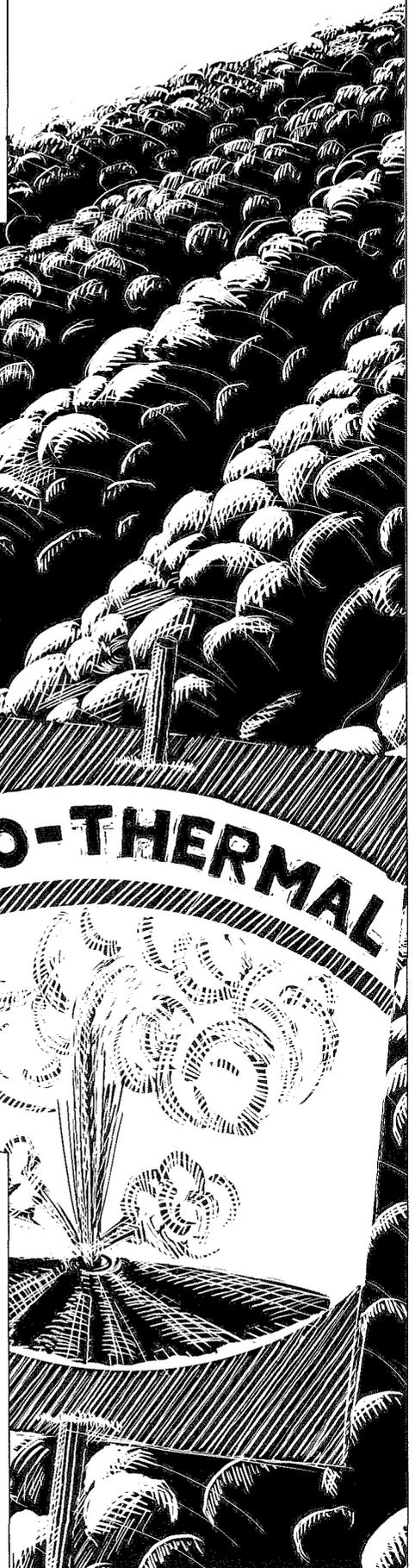


Illustration by Thomas Hardy

But what those locations may lack in aesthetics and creature comforts, they make up for in energy potential. California is the nation's most developed region for wind- and geothermally generated electricity, housing 98 percent of the United States' installed wind turbine capacity and the majority of its geothermal plants.

Wind farms in California produce some 194 megawatts of energy and supply 1 percent of the state's total electricity demand. Geothermal plants supply another 6 percent of California's total electrical demand. Plants at the Mojave geothermal site, when fully developed, could produce as much as 230 megawatts of electricity for California Energy Company, the San Francisco-based exploration concern.

The Pacific Northwest could be next. California Energy is willing to bet \$20 million to \$30 million in exploration costs that it will find similar resources in the region. That's how much money it intends to spend looking for promising geothermal sites in Oregon and Washington in the next decade.

In simple terms, the Council visit — by Idaho member James Goller, Oregon member Ted Hallock and Ed Sheets, executive director — was an attempt to gauge the odds of such a gamble and explore whether the Pacific Northwest might possess other untapped renewable energy potential.

The Council's increasing interest in renewables isn't haphazard. It coincides with plans by the Council to reassess how the Northwest will meet its energy needs after the turn of the century. In the 1990s and beyond, if both power demand and environmental sensitivities grow throughout the region, renewable sources of energy could play a larger role than ever before in the power picture.

That reassessment will be part of a new 20-year power plan the Council intends to draft next year. Renewable resources — from hydropower, geothermal, wind, biomass, solar and ocean

A Rundown of Renewables

Renewable sources of energy that the Northwest Power Planning Council is considering encompass a wide range of electricity production methods and fuels. Here's a rundown:



Wind Resources

Wind energy devices harness wind power to make electricity. Typically, wind machines employ propeller-like blades that catch the wind and turn a driveshaft. That driveshaft spins an electric generator.

Early wind machines had large capacities of one megawatt or more. In recent years, those large machines have been abandoned in favor of midsize designs with capacities of 100 kilowatts to 300 kilowatts.

sources — may be able to supply a significant portion of the Northwest's power needs. Preliminary calculations by Jeff King, senior resources analyst at the Council, suggest that renewables and conservation may satisfy as much as 40 percent of the region's new energy needs in the next 20 years, under certain economic and demand conditions.

That would be a big change from past power plans, in which renewable energy sources other than hydropower played only a small role in the Council's regional energy blueprint. In plans drafted in 1983 and 1986, the Council concluded that new renewable energy sources other than hydropower and biomass — while technologically feasible and available — were either too expensive or unreliable, compared with conservation and the region's traditional resource base.

But in the years since, environmental and social concerns have grown over the costs and impacts of traditional resources such as coal and natural gas. When used to generate electricity, those resources produce carbon dioxide, a prime suspect in worldwide increases of so-called greenhouse gases. If in the future, authorities limit the amount of carbon dioxide and other pollutants electric plants may release, those resources may become unattractive compared with more costly alternatives.

At the same time, technological refinements have shaved the cost of some renewable resources and improved the reliability of others. This means that the cost and reliability differences between traditional and renewable resources are narrowing. And as energy planners increasingly take into account a broader range of social and environmental costs related to power production, the scales may tip in favor of renewables in some cases.

In a sense, the Northwest for years has practiced renewable religion. It

depends on one non-polluting, replaceable resource for most of its electricity: water. About 75 percent of all electric generating capacity in the region comes from hydropower. In fact, falling water in the Northwest produces an average of 16,400 megawatts, and accounts for some 40 percent of the United States' total hydroelectric output.

Thermal generation from nuclear plants and from coal-, natural gas- and oil-fired units accounts for 19 percent of the Northwest's electric capacity.

Electricity purchased from outside the region and small power projects make up the remaining 6 percent of the Northwest's capacity.

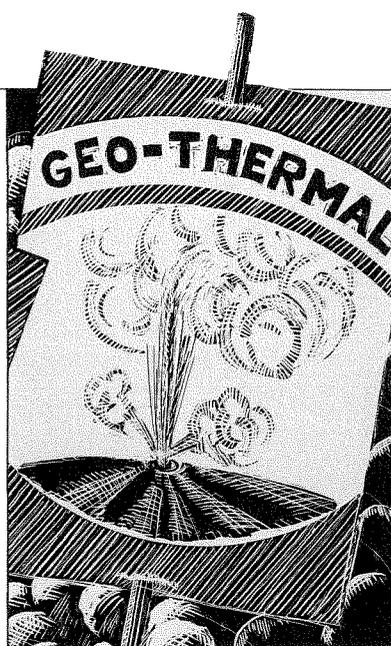
While biomass sources such as wood for years have played a small role in meeting the region's energy needs, other renewable sources of energy play almost no part in supplying power today. But as the Northwest's power surplus dwindles in the 1990s, the Bonneville Power Administration and the region's utilities may turn to those renewables as some of the first additions they'll make to their resource mixes.

Here's a rundown of why the Council is taking another look at renewables in 1989:

Wind

The Council in the past has recognized wind as a major untapped Northwest energy resource. In its 1986 Power Plan, the Council speculated that windy areas in the region — such as in the Columbia River Gorge between Oregon and Washington and the Blackfoot area of Montana — might be able to produce as much as 6,300 megawatts, enough electricity to supply more than a third of today's total regional demand.

That's the maximum amount of power that the region's winds theoretically could generate economically. In all likelihood, the intermittent character of the region's winds means that



Geothermal Resources

Geothermal energy units tap into underground pockets of hot water or steam to make electricity.

Most geothermal plants work this way: wells from the surface tap into hot underground water. Those wells act as a release valve, allowing water that has been kept at high pressure under the surface to turn to steam. Piping from the production wells route that steam into separators, which remove unwanted moisture from the steam and send it to a disposal point.

The separated steam proceeds to a turbine and generator, which produce electricity. Spent steam is condensed into water and injected back into the ground.

All geothermal plants require wells. Some geothermal resources, such as The Geysers geothermal field, which supports several power plants north of San Francisco, are so hot that the fluid comes to the surface as so-called "dry steam" that can be routed directly to turbines.

Other geothermal

not all of this potential could be exploited and folded into the Northwest's existing power system.

Even though the fuel is free, cost still was wind's biggest problem in the 1986 plan. The Council estimated that potential power could be obtained at an average of 6.5 cents a kilowatt-hour. That compared unfavorably with the 4.5 cents to 5 cents a kilowatt-hour the Council then figured energy would cost from new coal-fired electric plants.

But in the years since the Council drafted the 1986 plan, wind power's costs have shrunk. And if the trend continues, it may become fully competitive with traditional power sources within 10 to 20 years.

Utilities might be able to build the newest generation of wind machines — currently being developed independently in the United States, Europe and Japan — for \$1,000 per kilowatt of capacity, speculates the Council's King. Using similar 1989 dollars, that compares with \$3,000 per kilowatt for the first-generation wind machines of the late 1970s and early 1980s and \$1,400 for the second generation units that arrived in the mid-1980s, according to King.

By way of contrast, construction costs for new medium-sized coal plants today would approach \$1,200 per kilowatt of installed capacity. Fuel for those plants would be an extra expense.

"Wind's costs are following a classic cost curve," King says. "They were high early on, they dropped rapidly, and now they're beginning to flatten out."

The latest generation of wind machines now under development takes advantage of the best elements from the first two generations, he adds. The first generation — which relied on aeronautical engineering experience to help design the wind machines' blades and shafts — performed poorly. Blades sheared off or broke, especially after prolonged exposure to gusty or turbulent winds.

Power engineers compensated for those early failures in the machines' second generation, examples of which the contingent from the Council toured in May. Those units were larger and heavier than their predecessors and have proven to be a reliable source of power in California. However, the cost of the energy they produce, while relatively competitive in California, would have been comparatively high in the Northwest.

The Council is taking another look at wind now, because the latest generation machines look as if they'll have smaller capital costs and better reliability, King says. At the same time, the new machines are more efficient, meaning that they are better able to convert wind into electrical energy than older versions.

Moreover, having studied nearly a decade's worth of wind experience in California, the Council staff is more confident today than in past plans about the performance characteristics of wind machines. "The California experience has driven many of these improvements," King notes.

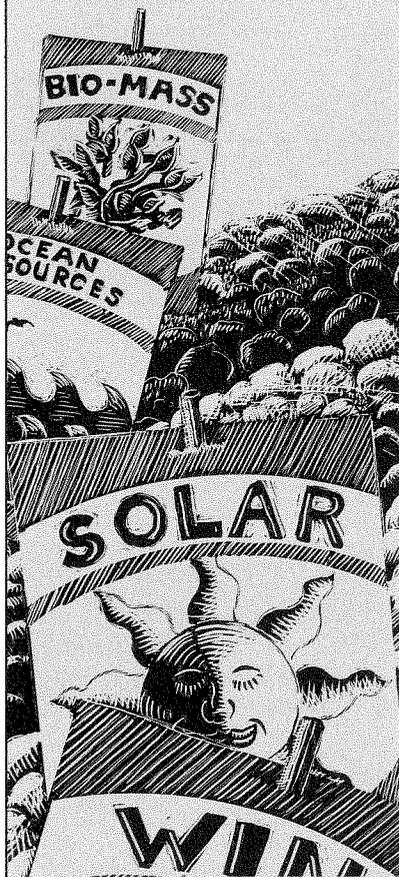
Geothermal

The Council in the past also has looked to producing electricity from naturally heated underground water as another unexploited source of power in the Pacific Northwest. No geothermal-electric power plants operate in the Northwest, but in its 1986 Power Plan, the Council — citing a four-state study by Bonneville — suggested that some 4,400 megawatts of geothermal-based electricity might be available in the region at lower prices than energy from new coal plants.

The issue then wasn't the cost of geothermal power. The Council concluded that the resource could be developed for 3.4 cents a kilowatt-hour or less, making it quite attractive to coal-fired alternatives.

Rather, the Council wasn't sure about the extent and character of this

plants tap directly into steam vents at the surface, which allows them to produce electricity through turbines and generators without having to drill wells underground.



Solar Resources

Solar resources employ the sun's rays to directly produce electricity or to heat water into steam that goes into conventional generators.

The direct transfer of solar radiation into electricity uses arrays of photovoltaic cells that turn sunlight into voltage through a photo-electric effect.

Solar-thermal technologies direct the sun's rays, usually through an array of mirrors, onto a boiler. Water, or some other working fluid, is vaporized in this boiler. The resulting vapor can drive turbine generators.

resource in the Northwest. Not enough was known about amounts of water underground, its temperature, chemical composition or hydrology.

In the years since 1986, several companies — including California Energy and Geothermal Resources International Inc. — have tested the temperature of underground water at two sites in Oregon: Newberry Crater and an area east of Crater Lake National Park.

The companies haven't publicized the results of most of those tests, but the signs are encouraging. California Energy seems confident enough of the potential to have announced plans to spend up to \$30 million in exploratory drilling in the region during the next decade.

California Energy has purchased 54 exploration leases on more than 82,000 acres of federal land in Oregon, most near Bend. In addition, it has applied for exploratory leases on 94,000 additional acres, including 36,300 acres west of Mount Adams, in Washington's Gifford Pinchot National Forest.

Solar

The Council's past power plans also did not include solar energy in the list of resources it recommended the region turn to for new electricity over the next 20 years. But new technologies and falling prices for established technologies will make the Council take a second look at this resource for its 1990 plan.

The Council intends to release a staff issue paper on solar energy technologies in fall 1989.

Solar wasn't included in the 1983 or 1986 lists of recommended resources primarily because the Council concluded that it was too costly, compared with alternative sources of power such as new coal plants. Not only were solar's costs estimated to be high, three to eight times greater than new coal-generated power, but the cloudy nature of the bulk of the Northwest's population centers made it uneconom-

ical, the Council concluded.

However, since 1986, the cost of photovoltaic cells — the units that collect and transform sunlight into electricity — have dropped dramatically. “The real potential appears to be in photovoltaics,” says King.

However, even with those cost reductions, solar may turn out to be unsuitable for the Northwest. It’s too cloudy where most of the population lives, and the Northwest’s sunny sections are too remote. The clearest parts of the region, southeastern Oregon and southwestern Idaho, receive only 83 percent of the solar radiation received by Phoenix, Arizona. Areas west of the Cascade Mountains receive less. Western Oregon, for example, receives about 52 percent of Phoenix’s sunlight.

Most of the Northwest’s sunshine falls in the summer and early fall, when the region’s energy needs are smallest. “Solar is best for summer-peaking systems, not winter-peaking systems like in the Northwest,” King notes. “But some east-of-the-Cascades utilities are summer peaking due to irrigation loads. Solar’s seasonality might be optimal for these systems.”

Biomass

The Council in 1986 examined two biomass sources of energy, municipal solid waste and wood waste, but included only one on its list of potential resources for the region. It calculated that if its economy experienced high growth during the next two decades, the Northwest might be able to obtain some 215 new megawatts using wood residue as a fuel. Most of that power would be a cogenerated by-product of lumber mill or pulp and paper operations rather than the output from stand-alone wood fired plants, which the Council concluded are a less efficient means to produce electricity.

The Council also estimated that the region, which today produces 10



Biomass Resources

Wood waste and municipal solid waste are used similarly to generate electricity. Both fuels are burned in furnaces, producing steam that drives turbine generators.

Wood waste plants use residue from logging operations and timber mills as their main fuel. Municipal solid waste plants use one of two methods to produce electricity. In mass-burn plants, all solid waste is fed into a furnace, where it is combusted, producing steam that drives turbine generators. Refuse-derived fuel plants, on the other hand, separate usable, combustible waste from unusable, toxic and uncombustible wastes. The combustible wastes then can be burned in furnaces.

Both types of municipal solid waste plants often must have complex pollution control devices, to keep toxics and heavy metals that get incinerated from entering the environment.

megawatts from municipal solid waste incineration, might be able to produce 380 megawatts from that source by the year 2000. However, the Council didn’t include municipal solid waste in its resource portfolio because of air quality, siting and general public acceptance issues.

However, as the Council prepares the 1990 Power Plan, the availability and cost of those fuels remain a concern. “What we don’t understand is the long-term cost and availability of biomass resources,” says King. “We have a better sense of the near-term costs.”

The supplies of wood waste are highly sensitive to the fortunes of the forest products industry, King notes. When that industry is healthy, relatively large quantities of residue may be available. But when the industry suffers a downturn, or environmental questions curtail timber harvests, much less wood waste may be available.

That sensitivity makes it difficult to gauge the reliability of wood waste as a fuel.

With municipal solid waste, on the other hand, reliability of fuel supplies isn’t in question. Nor is its price. Municipalities throughout the region have more waste than they can comfortably handle, and many are happy to pay parties to take it off their hands.

Rather, the issue centers on public acceptance of large, garbage-burning electric plants. The reviews are mixed throughout the region. Spokane, Washington, is building a municipal solid waste plant. Portland, Oregon, has rejected a similar one. Seattle is still debating the siting and safety of one.

Currently, the region has three municipal solid waste units in operation, in Salem and Coos County, Oregon, and in Whatcom County, Washington.

Ocean

The Council's 1983 and 1986 power plans did not include the ocean as a source to which the Northwest could turn for new energy in the next 20 years. Most methods to extract energy out of oceans — from tides, waves, currents, thermal circulation, salinity differences or marine vegetation — were too new, costly or unreliable, and they didn't stack up to the more traditional array of resources the Council suggested the region plug into when it needs new power.

But the Council last June reviewed ocean resources, releasing a staff issue paper that gauged the applicability of different technologies to the Northwest's ocean environment. The paper concluded that, while several technologies — especially wave energy — were promising, more study was needed before the Council could include them on its recommended resource list for the region.

Engineers have considered methods to extract electricity from ocean waves for nearly a century. Inventors have conceptualized hundreds of devices. But not until the 1970s and 1980s did technological advancements take place that made the resource commercially possible.

Two pilot plants, with respective capacities of 350 kilowatts and 500 kilowatts, operate in Norway. In Japan, a 30-kilowatt device at one time supplied electricity produced by air turbines driven by wave motion. The Japanese also market a small wave-energy device that powers offshore navigation bouys.

Energy experts consider the waves off the Pacific Coast the best in the United States for ocean energy. Some 3,400 megawatts to 5,100 megawatts of energy could be obtained from devices off the Oregon and Washington coasts. But that power would be relatively costly. A 198-megawatt array of wave devices in the North Pacific would supply power at 44 cents a kilowatt-hour,



Ocean Resources

Different ocean energy resources try to use the motion of waves, currents, or tides, the temperature differences between cold and warm layers of water, or the chemical differences between fresh-water and saltwater to produce electricity. Others suggest using marine vegetation as the source of natural gas to run electric generators.

Wave machines use hydraulic, pneumatic or hydropower technologies to convert wave energy to electricity. Hydraulic devices use wave motion to pressurize water or other liquids. The devices direct the pressurized fluid through hydraulic turbine generators to produce electricity.

Pneumatic wave energy devices use wave motion to pressurize air. They direct pressurized air through air turbine generators to generate electricity.

in 1988 dollars, according to a recent Massachusetts Institute of Technology study. That's more than seven times the Council's estimated costs for power from a new coal-fired electric plant.

Harnessing the power of tides to run hydroelectric plants has been successfully achieved in France and Canada. A 240-megawatt plant on the north coast of France has operated since 1967, while an 18-megawatt plant in Nova Scotia came into service in 1984.

But those facilities require inlets, bays or estuaries that have shallow, narrow entrances and high mean tides. Energy experts say that the method produces power most effectively in areas with 20-foot mean tidal ranges or more. In the Pacific Northwest, tides average 6 feet to 9 feet.

Extracting energy from ocean currents off the Northwest also would be difficult. While engineers have studied technologies to drive turbines with underwater currents, most studies have focused on swift currents off Florida, which average 8.2 feet a second. Currents off the Northwest are much slower, averaging 0.5 feet a second, making them a less efficient energy source.

Neither is the Northwest suited to generate electricity by exploiting temperature differences between warm surface waters and colder deep waters. While several prototypes have been tested around the world and a 50-kilowatt unit operates in Japan, most are located in the tropics, where surface temperatures are at least 36 degrees Fahrenheit warmer than deep water temperatures. Off the Northwest, the temperature differences average 11 degrees Fahrenheit.

Two other technologies for tapping into the ocean for energy are still in the conceptual stage. Analysts note that energy is released when freshwater and saltwater mix, and they theorize that some of that energy can be cap-

tured at the point of mixture. In theory, the site where the Columbia River flows into the Pacific Ocean could generate 7,500 megawatts of energy.

Scientists also theorize that utilities could obtain methane — the primary ingredient in natural gas — by cultivating kelp and other marine vegetation. Gas could be extracted as the vegetation decomposes, either naturally or in anaerobic digestors. That gas then would fuel conventional thermal elec-

Hydropower wave energy devices use waves to drive a low-head hydropower turbine generator.

Water current turbines extract energy from flowing water. Unlike conventional hydropower turbines, water current turbines operate on principals similar to wind turbines. They consist of one or more fan-like blade assemblies suspended across the prevailing current.

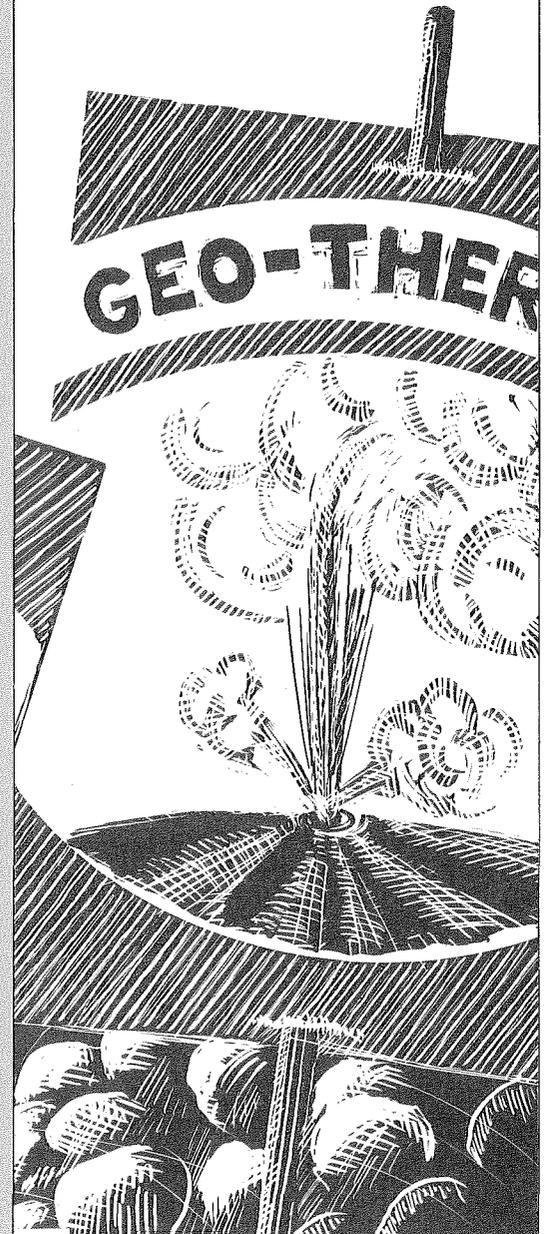
Tidal power plants are hydroelectric plants that use the energy of water drawn up by the tides to generate electricity. A typical plant has a dam, sluice gates and hydropower turbines.

Ocean thermal devices exploit the temperature differences between warm surface waters and deeper cold waters to drive engines, which produce electric power. The warm water vaporizes some fluid with an extremely low boiling point, such as ammonia or Freon, and the resulting vapor turns a turbine generator.

Salinity gradient devices theoretically could extract the energy released when saltwater and freshwater mix. One proposal would exploit the pressure that develops across a membrane when it is exposed to saltwater on one side and freshwater on the other. That pressure could drive a hydropower turbine.

Marine vegetation might also be cultivated and allowed to decompose so that it would produce methane, the prime component of natural gas. The methane could be used in conventional thermal electric plants. — GL

tric plants. No studies have been conducted about the Northwest's potential for growing commercial quantities of marine vegetation for gasification. But if the technology were found to be feasible for the region, one study suggests that methane could be obtained for \$4.10 to \$12.80 per million British thermal units (Btu), versus \$3.61 per million Btu for tapping into natural gas conventionally. ■



Dulcy Mahar Interview with Brigadier General PAT STEVENS

The Corps' Northwest leader adds his voice to the region's fisheries debate.

When members of the public think of the Northwest's fish and wildlife agencies or its energy entities, they probably think in terms of departments of fish and/or wildlife and utilities. If so, they're overlooking a presence that is one of the largest in the arena—the U.S. Army Corps of Engineers.

The Corps, the U.S. Army's engineering and construction wing, has 12 regional offices in the United States. The largest of these, the North Pacific Division, is based in Portland, Oregon. This division embraces 880,000 square miles—nearly a quarter of the U.S. land area—and covers the Pacific Northwest, Alaska and those parts of Wyoming, Utah and California that mark the outer reaches of the

Columbia River Basin.

The Corps was created in 1775 to provide engineering support for the Army during the Revolutionary War. Over the years, Congress added transportation and water resource activities to the Corps' responsibilities.

The Corps came to the Northwest to develop navigation routes, but its biggest role in the region began in the 1930s with the construction of Bonneville Dam. Today, in addition to navigation, flood control and other work, the North Pacific Division operates 21 multi-purpose hydroelectric projects in the Columbia Basin, which produce 13,000 megawatts of electricity.

Of those, nine are major dams on the Columbia and Snake rivers: Bonneville, The Dalles, John Day, McNary and Chief Joseph on the Columbia; and Ice Harbor, Lower Monumental, Little Goose and Lower Granite on the Snake.

In command of a primarily civilian work force that numbers nearly 4,000—not counting contractors—is Brigadier General Pat Stevens. Although his Northwest tenure began just

last November, he is already making his mark in the region's power, fish and wildlife communities.

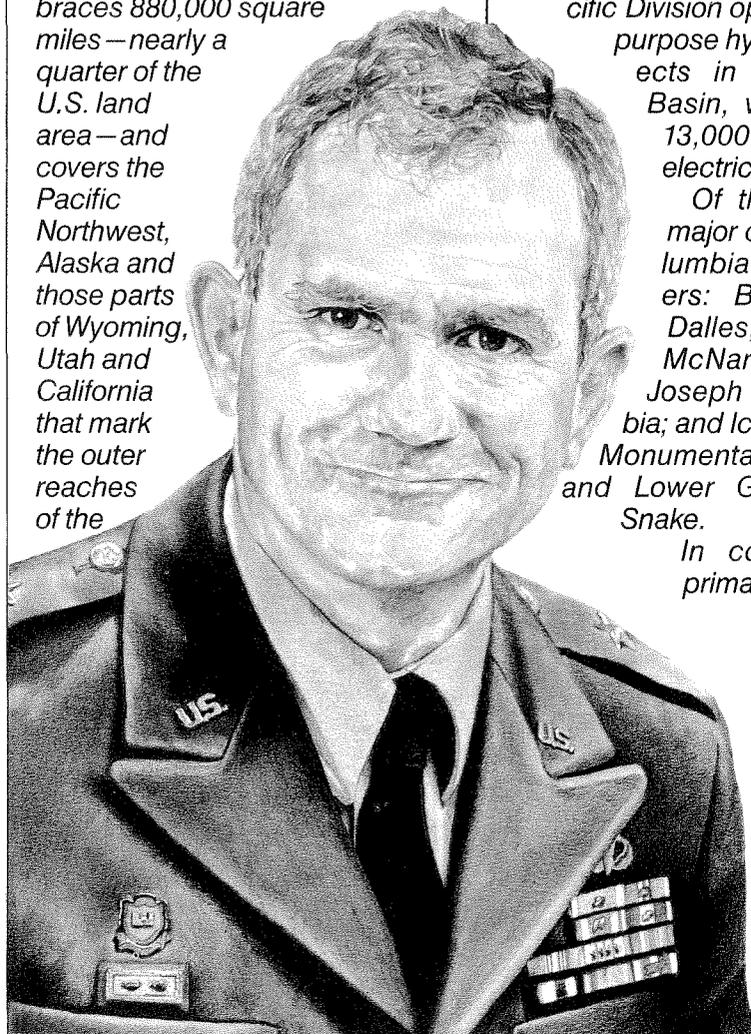
"Smooth" is a term one hears frequently in reference to the General. Although steeped in military tradition—both his father and grandfather were Army officers—he is what one considers "new army," with its emphasis on public relations.

After graduating from West Point in 1963, General Stevens joined the Corps and served tours of duty in Vietnam, Thailand, Australia and the Persian Gulf, including work building airfields in the Sultanate of Oman. Back in the United States, he served as district engineer in Vicksburg on the Mississippi River, which—as he puts it—"doesn't have anadromous fish, but has catfish, which are easier to get along with, but not as interesting."

From there, he went to Washington, D.C., as chief of staff to the chief of engineers, before his assignment to the Northwest last fall. It was his first visit to Oregon, and—if it means anything to the region's resource interests—he is clearly in love with the place. On living in the Northwest with his wife and two children, he volunteers, "We love it! It's a super part of the country."

Q. What do you see as the Corps' historical role in the Northwest? Has that role changed?

The U.S. Army's role in the Pacific Northwest goes back even to Lewis and Clark, who were Army officers. In their role as explorers for President Jefferson, they actually were performing a role common in that era to the



Corps of Engineers. Later, we built the roads; we did the mapping in the Pacific Northwest. Captain Bonneville¹ was a Corps of Engineers officer.

By about the turn of the century, we began to get involved in the more traditional things you see us doing today; for example, clearing the mouth of the Columbia for navigation. Then in the '30s, of course, we entered into the hydropower arena with our first big project at Bonneville Dam. This led to the work of the next 50 years; primarily the design and construction of the navigation, flood control and hydro-power facilities that the Corps has become so well known for.

How do we fit into the region today? Well, in much the same way as we always have. The newest ingredient in our region, as I understand it, is clearly the Council, created in 1980 to attempt to gain a consensus within the region on the trade-offs between the wildlife and fish issues and hydropower business. I think the Council was well conceived, and it has obviously done a remarkable job in trying to build a consensus within the region.

To a certain extent, some of the players who have to play in that consensus find difficulty in doing so, and I think the Corps has come to the forefront in that. During the time that I'm permitted to lead this great division, I clearly see it as one of the things on my plate to try to bring the Corps in line as much as we can with what the Council would have us do. In order to do that, I not only have to meet the rules and regulations and statutes that we, the Corps, live under, but I've also got to sell that up the pike to my folks back in Washington, in the same sense that Jim Jura² does to his folks back in Washington, and all of us who have these federal "stovepipes."

So if I had to give you a summary of where I would like to see us going in the future, it's to build a consensus that all the actors — the agencies and tribes, the Corps and everybody — can agree to and get on with. I refer most particularly to the installation of

The mechanical bypass facilities are clearly the best way to get the smolts away from turbine passage.

these contentious fish bypass facilities, which would thereby eliminate the requirement to spill.³

Q. Are there unique things about the Corps in the Northwest because of the prevalence of hydropower?

Clearly, in the Pacific Northwest hydropower has been one of the driving factors in the Corps' presence, because of the terrain, because of the way the country is out here. We've been called upon to install an array of hydropower facilities, and that does make the North Pacific Division unique in that respect, although we do have other hydropower assets around the country.

Q. Can you give me a ballpark feel for what percent of your Northwest charge is hydropower related?

Well, on my personal plate it looms very large, because I must deal with the issues of the day. It's difficult to say where most of my effort is spent from an organizational sense, because the North Pacific Division can't count navigation as less important than flood control or as more important than hydropower or any of the things that we get involved in. Recreation is also a big issue. All of those things compete for the same resource, which is the available water.

Q. How do you think the Northwest Power Act changed the Corps' role, if at all, in the Northwest?

Well, I think initially the Corps and all of the agencies, tribes and everybody involved in water as a resource here saw the Council

probably as a welcome thing. I would hope they did. I think it's proved to be just that. I don't doubt that there were then, and are still, issues that are so contentious that sometimes folks wished there was some other way of dealing with them. The issues aren't going to go away, and we're just going to have to keep hammering on them until we reach a solution.

Q. How do you see the relationship between the Council and the Corps evolving?

It probably started off as a relationship where each was kind of looking at the other one's roles and missions and trying to reach some sort of a working relationship. That continues today. Most particularly it continues in the area of legislation, which authorizes us each to do the things we see we should be doing. I am told by legal counsel that there are some clear areas of overlapping rights and responsibilities where it's not completely resolved — particularly the power to direct, which the Council feels that it has, and which the Corps has not always signed up for.

My position is that I will personally do, and ensure that the Corps does, everything that is humanly possible to come into line with what the Council needs. But where there's an issue that would require me to do something which I don't feel I legally can, then I feel obligated to desist in that.

¹Captain Benjamin Bonneville explored and mapped routes through much of the West during careers as an Army officer and fur trader in the first half of the 19th century. Although named for him, Bonneville Dam is not on a site he visited.

²Administrator, Bonneville Power Administration.

³Spill refers to the release of water carrying young fish through a dam's spillway to help the fish avoid potentially fatal turbines. Spill is not considered a permanent solution to aiding fish migration because of its cost in terms of lost power revenues.

Q. It sounds as though you agree that the Council is more than advisory, but that there may be other laws governing the Corps, which you feel override in some areas.

It's not a question of anybody's laws overriding the other person's law. In dealing with water resources, the Corps has flood control, navigation, irrigation, municipal and industrial water supply, recreation and the hydro-power purposes. All of those things are in legislation as purposes for one or more of our projects.

The Council is most concerned with hydropower generation, and fish and wildlife issues, and how they relate to each other. Beyond

that though, I have this other bunch of things, and I can't trade those off to satisfy a more narrow issue that the Council may wish that I could. And *that's* where we tend to get into some legal snarls from time to time. This has become very evident in the spill issue.

Q. Speaking of spill, the Corps has indicated that it will cooperate only in the first year of the 10-year spill agreement. You don't appear to have been as enthusiastic about spill as a fix for the problem as other fish and wildlife agencies.

Well, I don't think that you can characterize anybody as being enthusiastic for spill. I think every-

body agrees that spill is a way to accomplish a certain enhancement, a certain mitigation of the fish concerns, until we can get something better put in place.

The Corps has never supported spill per se. I don't think that anybody touts spill as being the fix for the problem. The agreement that the Corps has had some reservations about signing up for would have done more than just provide spill for 10 years. It would have caused us in signing it to sign up for the installation of mechanical fish bypass construction through that period.

One of the reasons we didn't sign the agreement was that we can't sign up for something that



would require the president and the Congress to support a 10-year program which so far the president has not agreed to.

Q. On that 10-year agreement, do you plan to revisit it each year and determine your position for that particular year?

Yes. I personally made the decision [on spill] this particular year, with a lot of concerns and advice expressed by my staff and everybody else, because I talked to everybody in the region about it. Before I can enter into it for another year, I want to go through the data that emerges from this year's efforts. And I might congratulate everybody who's had anything to do with this. In addition to my own Corps folks who have worked on the issue, I think the whole region has come together and done a super job on this year's spill.

But before we can go forward, I want to be confident that at least I know where we stand as a result of this year's effort. To go beyond spill on an annual basis, I absolutely am convinced I'll have to go back into the Chief of Engineers Office and the Army Secretariat in Washington to get an agreement to do that. To agree for more than a year probably exceeds my own authority here.

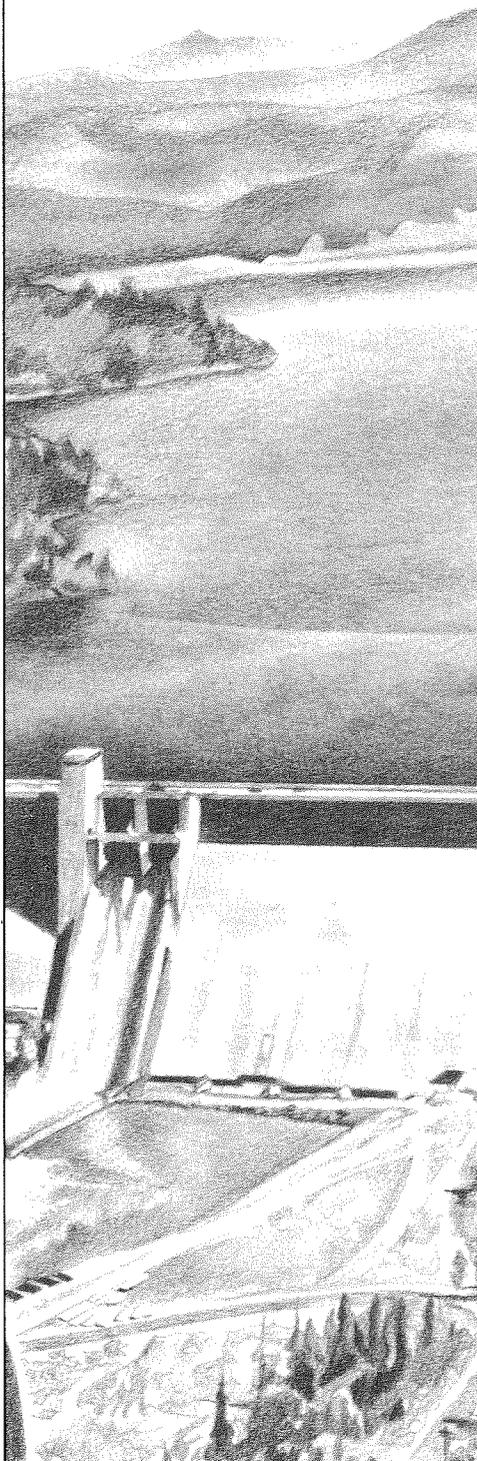
Q. So you simply want the freedom to revisit it on an annual basis, you aren't necessarily for or against the agreement.

That's right. I'm not for or against the agreement. I think there are better ways to accomplish what could be accomplished from spill. But that's something that's not universally agreed to.

Q. Such as?

Well, we found that fish transport accomplishes more, in what we've been able to measure, than spill, for example. And certainly the mechanical bypass facilities do. If we can get those completed and installed, they would be much more effective than spill. So there's two examples.

I will personally do, and ensure that the Corps does, everything that is humanly possible to come into line with what the Council needs.



Q. The objection that has been raised to transport without spill is that you can't collect all the fish and that there's no collection below McNary Dam. How do you deal with that?

Part of the installation of the fish bypass facilities would involve such collection facilities. That's part and parcel of the program.

Q. The bypass funding for 1990 has passed the House, and it still has to go through the Senate. Prior to 1988, it was sufficient for this money to be included in the committee report for the Corps to act. But in 1988, the Corps said it would not act on bypass installation without a congressional directive. Do you anticipate there will be a replay of that situation?

No, let me give you my own understanding of what happened there, because that was a most contentious issue as I walked in the door last November. The president has not supported fish bypass spending in 1988, 1989 or 1990. As a result, in 1988 Congress added some \$8 or \$9 million for the fish bypass installation. There was congressional direction in Senate report language about how that money would be spent.

Now at the Army level, even above the Corps, there was some disagreement about whether that report language was directive and law or not. That became a very enormous issue, because at the same time, the Corps and the Army were trying to put together a program that would meet our own requirements under the economic criteria to accomplish fish bypass.

Then along came 1989, the same thing, the president did not include it in the budget. It was added in the Senate. But in '89, it was actually in the [appropriations] act — the language on how to spend that money. And furthermore, it directed that the '88 report language be considered legal, binding and law. At that point the Army said, "Absolutely, we'll do it."

Now in 1990, the current allocation [pending congressional

approval] is \$9.9 million. We have a program, which the Council's been briefed on, for '88, '89 and now '90. If it [the allocation] goes through, it will give us the money to accomplish this program. Those three funding years are the beginning of a program which would allow us, given funding, to complete mechanical bypass installation by 1996.

Q. Will the congressional language specifying that the report language is directive apply to the 1990 year, or do you have to have a new congressional directive each year?

No, in my view, we already have a program. Should the \$9.9 million come through, we'll just follow through on what we're already doing. In fact, if we get the funding every year, however it comes to us, we will just continue to march.

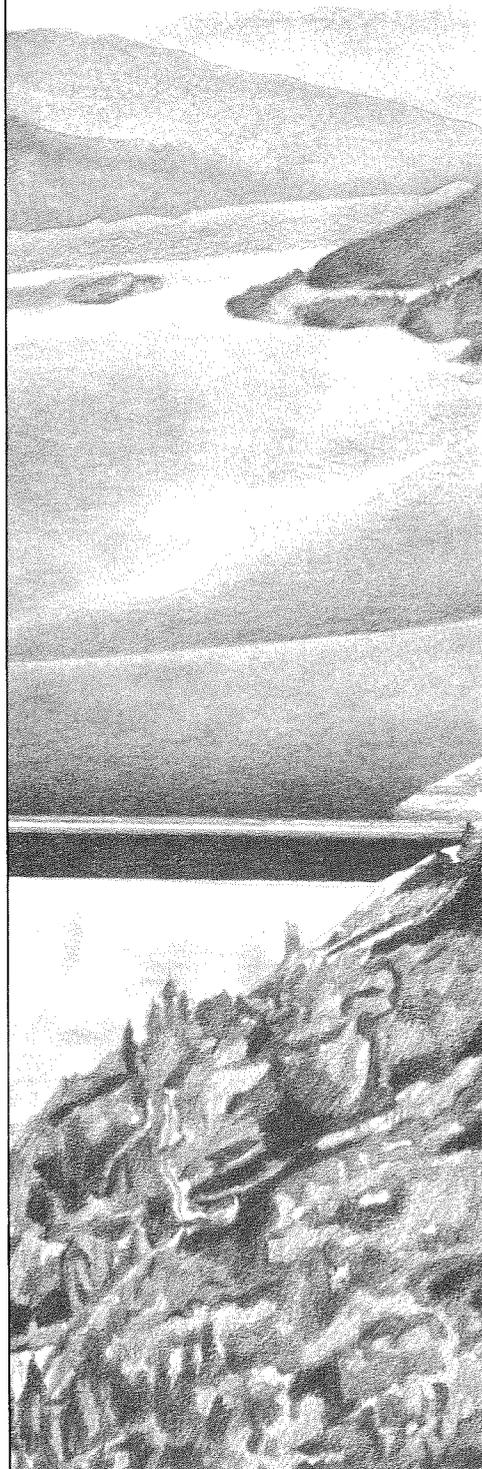
The issue that's still out there on fish bypass installation is what is the most effective design. We've been spending on the order of \$2 million a year trying to determine what I don't call "research," but what I call "testing and evaluation of modeling systems," to figure out the best set of screens, for example, and the best angles to have them set at. We don't have the answers to that yet. So that's still an issue that's imbedded within our ability to try and finish this thing by 1996.

Q. There are two dams — Ice Harbor and The Dalles — that the Corps previously didn't consider to be cost-effective for bypass systems. If the money comes through, will bypass systems be installed at these dams?

Yes. They're in the program, but currently not supported by the Army. So what does that mean? That means that the Army has said, "If the Congress adds the money to do those and so directs it, then we will do it." And they're in the program now.

However, absent congressional direction to do that, what the Army is trying to do is seek a consensus regionally for some regional funding made available to take care of

In the five-year period 1984 through 1988, more than 74 million fish were transported.



those dams, leaving the Army to do those that we feel are economically justified. That whole package then becomes the one that I'm talking about that started in 1988. The issue is, who is going to fund the bypasses and by what percentages.

Q. How would you propose the region fund bypass facilities?

Well, we have negotiations going on now with Bonneville [Power Administration], both regionally and at the Washington level, trying to sort that out. From the OMB [Office of Management and Budget] perspective, the president's perspective, it may be that it doesn't make much difference how that happens. Whether Bonneville funds it or the Army funds it, it's an outlay in that year, counting against the federal deficit. So I'm not sure how that's going to come out.

What the Army has said is that we would require up-front regional financing. There are two ways that can happen. The way it's currently happening is the Army puts it in our budget and then, for that portion of the project that relates to hydropower, it is billed back through the ratepayers of the region. The average for the whole system is about 85 percent. So that, for every dollar the Army spends on fish bypass, about 85 cents of that is paid for by the region through the Bonneville bill-back.

The other option is with regional funding, Bonneville would pay it up front, so that it would come out of their program line that year. And then the region would be paying 100 percent of it through rates rather than 85 percent.

Q. Is your issue who pays? You personally are not against bypass as a fix? This is the fix that you think makes the best sense?

Oh, yes, yes. Bypass will work. The mechanical bypass facilities, given the testing and evaluation to bring them on line properly, are clearly the best way at this point to get the smolts away from turbine passage.

But on individual structures,

you start getting into the economics and the benefit-to-cost ratio, where the planners and the economists and the Army look at some — Ice Harbor and The Dalles are examples — that have been determined to be not deserving of federal funding, but should be paid for by the region. It doesn't say it won't work, it's just a question of the marginal benefits against the cost. And those are the ones the agreement is trying to hammer out who is going to pay.

I'm not sure that people understand how much money has actually been spent trying to improve the fish migration since the installation of the hydropower facilities. Our numbers show that we [the Army] have spent about \$550 million on hatcheries, bypass, ladders, barges, that kind of thing. And of that, about 85 percent will, over the course of many years, be repaid to the U.S. Treasury by the folks in the region here, through Bonneville paybacks.

We're currently spending between \$2 million and \$5 million on research, testing and evaluation. Our operation and maintenance measures, which are directly attributable to the fish bypass business, run between \$10 million and \$15 million a year. And that new construction we've been talking about for the fish bypass facilities will probably run around \$250 million, if you total up all of the different funding packages involved in that.

So if you add all that together, it's a *tremendous* amount of money. This represents an awful lot of effort by not only the Corps, but by everybody in the region pulling together. We're really talking about \$1 billion.

Q. I know that the second powerhouse at Bonneville Dam has been a problem for the past several years, as far as fish passage is concerned. Are there any new developments?

We're hopeful. In fact, we've kept the construction funding line open on Bonneville II, as we call it, until we can close that problem out. I would hope that within the

The Corps fundamentally is not a regional organization. Everything I do has to be done with a national purpose in mind.

next couple of years, we'll be able to fix that problem, at least know what the solution is and put it in place. As this region begins to see the capability and requirement for power reaching a balance, Bonneville II is going to be more and more urgent. We're not running it at full capability today.

Q. Most reports indicate that this year's water budget was considered fairly successful. Do you share that feeling?

Yes, I do. Without reservation, I think the water budget this year and for that matter, the spill this year, have both done very, very well.

There were some rough spots on the water budget, primarily things that relate to what we thought was the agreement and what others have asked us to do in the execution of the water budget this year. At our recent meeting of what we call the Mainstem Executive Committee,⁴ I agreed to sit down with the other interests and try to come up, if we have to, with a revisitation of the water budget. I think the consensus was that we don't want to do that unless it's necessary. I gather it's been terribly difficult to get as far as we've gotten with it.

Q. Are you comfortable with the water budget as a measure? Is it something that you support?

Yes. The Corps signed up to do it, and we're not in any way trying to fight the water budget. I think if there's an issue of expanding it, there may be more than the Corps, there may be other factions that come into play. And it is being talked about. There is some discussion of increasing the amount of water allocated.

Q. Are you now transporting fish downriver primarily in barges? How many barges do you have?

Volume is primarily by barges. The Walla Walla District currently has four barges, and there are two more under construction, which will bring us up to just about the peak of what we think is the right amount of transported fish. Construction is running a little behind schedule. We'd hoped to use them this season, and I don't think we will.

Q. How many fish have been transported?

In the five-year period 1984 through 1988, more than 74 million fish were transported. To date this year, we've moved more than 13 million fish. That's an awful lot of fish. The other thing we do, of course, is truck some of them. But that's a much, much smaller volume than those moved in barges.

Q. Isn't there some problem with certain stocks — such as summer chinook — that don't survive transporting as well as other stocks?

Yes. A whole lot of research is going on. I don't think anybody has yet agreed on, one, what is the cause of it; and, two, after you get that, how do we go about fixing it. If we could decide what's causing it, then the fix might, hopefully, not be too difficult.

⁴The Mainstem Executive Committee is made up of policy-level leaders of Northwest fish and wildlife agencies and utility groups, chaired and convened by the Council.

Q. If the Council's fish and wildlife program were open today for recommendations, what kinds of changes would the Corps recommend?

Well, and I'm speaking personally, I would *absolutely* like to see the bypass systems put in place at every one of our facilities. When all of that is behind us, we can concentrate on other things to enhance the fishery assets of the region. That alone would be superb. While I'm not the biggest customer of the water budget, I think the water budget has been successful. I think it's done what it was put in place to do. I think our fish transport systems are working very, very well. The Corps has been pleased with those.

There are problems you have alluded to. As for spill as a measure, personally, I think it clearly has an effect. But it's so marginally effective that there is a lot of doubt about whether it's worthwhile continuing. And I think everybody would like to end it if we could get our bypass systems in place.

Q. How do you feel about the Corps' current relationship with the Council?

When I came on board here, the first thing I did was to try to meet with *everybody* who had *anything* to say to the Corps. And so I spent two or three months trying to get in touch with all those folks, and I found the Council very, very helpful. Some of the members were extremely helpful in educating me to what some of the regional concerns were.

How do the Corps and the Council get along? I think with great professionalism. There's certainly a wide range of issues that still exist, but I've not been displeased with the Corps' relationship with the Council at all. I think the Council's staff is highly professional. I found them to be a superb bunch of people, and certainly the Council members are.

Q. You mention there are a number of issues remaining. You've touched on most, but what do you see as the key issues to be dealt with between the Council and the Corps?

I think once we can get the fish and wildlife program issues — and we've talked about almost all of them — behind us, that *really* is going to reduce the tension that's existed for several years now. There's almost nothing that I can think of that's anywhere near as contentious as that has been.

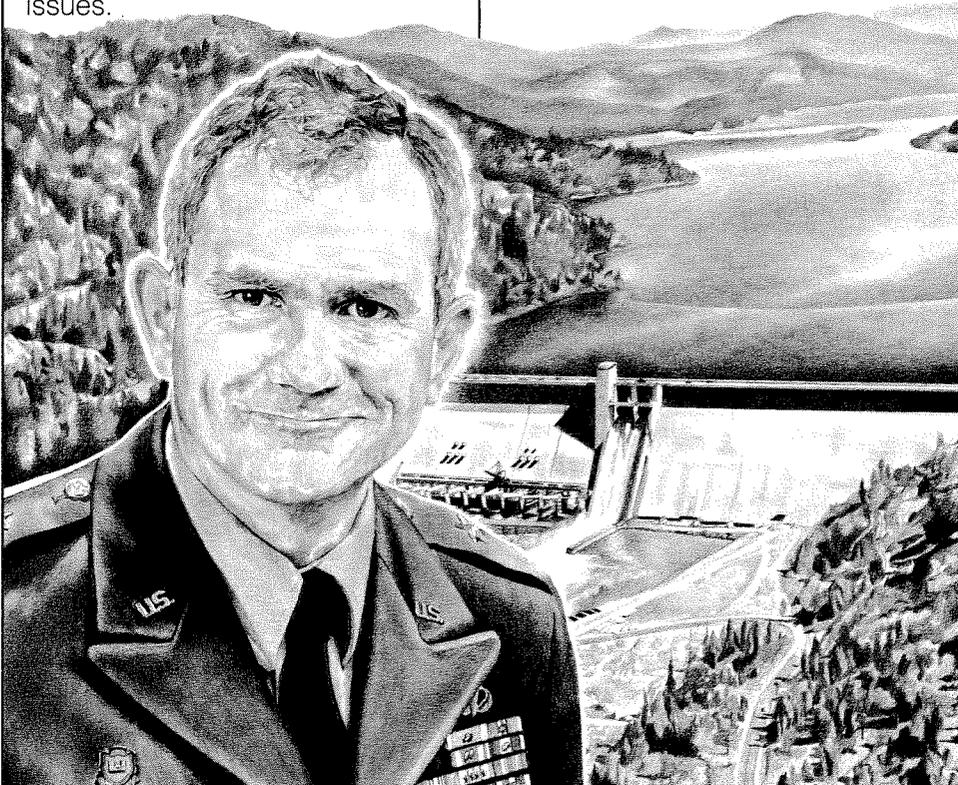
There are other things that are going to come along. And the Corps, as one of the principal operators of the system and as an organization which has dollars, is always going to be asked to contribute to helping solve whatever problems people identify. Our ability to do that will increasingly be challenged by the question of what is our statutory requirement, and how is the federal outlay of those dollars going to benefit the nation.

That's a key point we haven't touched on. The Corps fundamentally is not a regional organization. Everything I do has to be done with a national purpose in mind. It makes it difficult in dealing with what are defined as regional issues.

Q. It is sometimes difficult to discern whether a viewpoint or a reluctance to do something originates as a Corps position or as an OMB position. And I think that bypass funding was one of those fuzzy areas.

Oh, it very clearly is. We had a very nice visit from a deputy assistant secretary of the Army and our OMB examiner. They came out here for three days, and met with everybody that we could put in the room to talk about the fish bypass issues. We had the Columbia River Inter-Tribal Fish Commission, the Columbia Basin Fish and Wildlife Authority and the Pacific Northwest Utilities Conference Committee. We had the Council members, Bonneville, Bureau of Reclamation, the whole Northwest community was there.

It was a very, very good session. I'm hopeful that OMB has an understanding from that of what we're about out here, and that we can use that meeting as a basis to go forward on who's going to pay for what, so we can get these things [bypass] in place. ■



BACK EAST TO THE FUTURE



Northwesterners bring conservation concepts to New England.

by Carlotta Collette

Armond Cohen likes to describe the work he's doing to help New Englanders save electricity as the "fourth generation" of energy conservation programs. Cohen is a senior attorney with the Conservation Law Foundation in Boston, Massachusetts. His organization has systematically intervened in hearings before utility commissions in Connecticut, Maine, Massachusetts

and Vermont, each time bringing in expert witnesses from the Pacific Northwest bearing the news that energy conservation should be perceived and purchased as a resource, just like any other source of energy.

Cohen and his new version of the "civilian conservation corps," a cadre of staff and consultants borrowed from the Northwest Power Planning Council, the Bonneville Power

Administration, Pacific Power and Light Company, Portland Energy Conservation, Inc., and other agencies, have been successful in every case. Most of New England's major utilities are now a part of the "fourth generation" of conservation efforts.

"The first generation came in the 1970s," Cohen explains, "when conservation meant waiting in gas lines and wearing sweaters. The second

generation occurred a little later, when California utilities began giving rebates to customers who saved energy.

The Northwest Power Planning Council pioneered the third generation with big demonstration projects like Energy Edge¹ and the Hood River Conservation Project.² Utilities began to see that conservation is a resource that should be purchased like any other resource, not left to consumers to finance. Northwest utilities plowed significant ground by making the first direct investments in conservation resource acquisition programs.

"We're the fourth generation, because we're taking the ideas and demonstrations you've piloted in the Northwest," he says, "and we're running them full scale. We need resources now, and you don't."

Threats of power shortages and consequent blackouts have made headlines in New England since the first years of that region's economic recovery in the mid-1980s. Left with bleak prospects by the 1970s' corporate flight to the "Sunbelt," New England turned itself around and has instead been experiencing steady economic and electrical demand growth since 1983. Average electrical use in the region has been growing faster than 5 percent a year since 1986, despite industry forecasts that predicted something closer to 2 percent average growth rates.

Power constraints are already a reality in the Northeast. New England's Federal Reserve Bank has issued a study of the region's power supplies and with it a warning that current resources could be

¹Energy Edge is a design assistance program sponsored by the Bonneville Power Administration to help owners and builders of commercial structures attain high levels of energy efficiency.

²The Hood River Conservation Project was designed to test the participation rate for a conservation program where all the costs were paid for by the utility. More than 90 percent of the electrically heated homes in Hood River County, Oregon, were insulated through the program.

New England could cut its future energy requirement by 35 to 57 percent, while maintaining the same level of economic growth and personal comfort, just by making recommended efficiency improvements.

insufficient to meet needs early in the 1990s. The utility industry's power-needs forecasting entity has reported that "emergency procedures" may be necessary even this summer, if weather patterns mirror last year's heat wave.

Emergency procedures could include "brownouts," where the utility cuts power output by about 5 percent, and "rolling blackouts," where power is turned off in one place and then another so that no systemwide shutdown occurs.

Simply stated, New England's economic recovery proved to be a mixed blessing. The region's need for power, particularly at peak-use times, grew faster than its utilities could build new power plants and adequate transmission and distribution systems. Furthermore, two completed nuclear power plants (the region gets 28 percent of its power from nuclear) have had spotty records getting up to speed over public protests and technical problems.

At least one major utility, New England Electric System (NEES), which serves about 1.2 million customers in Massachusetts, Rhode Island and New Hampshire, announced in 1985 that it intended to pull its growth rate back to only about 1.2 percent a year.

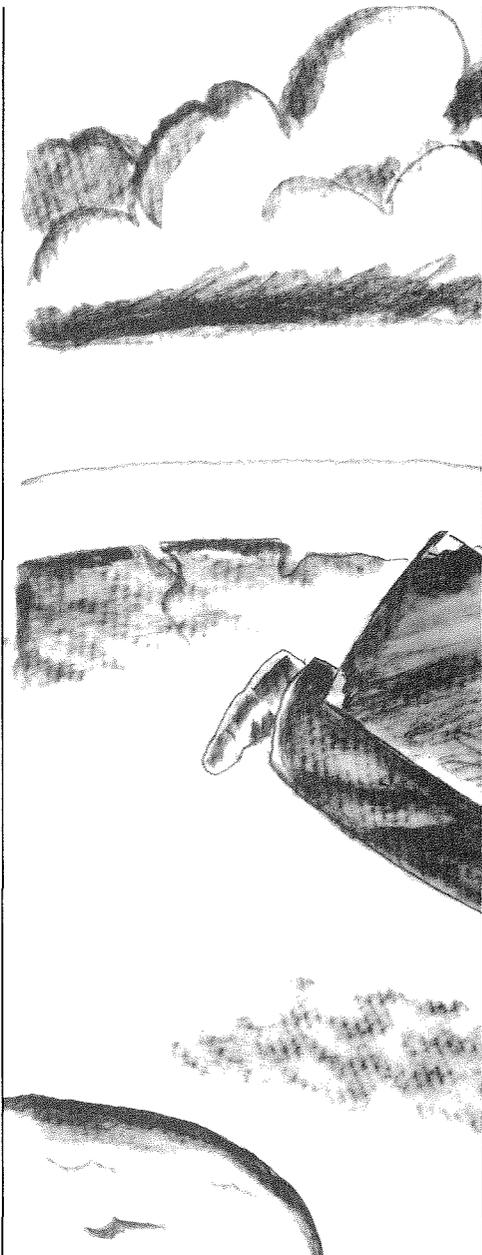
New England Electric had led the

region in 1979, by releasing its "NEESPLAN," which called for investments in conservation and measures to shift energy consumption from peak-use periods to other times of day. (Utilities must build enough power plants or other resources to cover the times when most customers are likely to be drawing on the system's supplies of power. By shifting some of this peak use, so called "load management" strategies reduce the total amount of electricity the utility must be prepared to deliver at any one time.)

But even with its energy plan, New England Electric and other Northeast utilities engaged in only small, pilot and demonstration conservation programs on the assumption that growth would slow and the power wouldn't be needed.

In 1987, the pace of change picked up. The Conservation Law Foundation and more than two dozen public interest and consumer groups formed the New England Energy Policy Council. Their first product was a plan for New England's energy future called *Power to Spare*.

Power to Spare pointed out that New England spends over \$7 billion each year for electricity, at rates that are 25 percent higher than the national average. Some of that big bill was payment for power plants constructed a decade earlier, contributing substantially to a doubling of regional electric rates between 1974 and 1985. The threat that the region might be about to go that same route and build additional electricity generating resources led the council to illustrate the cost advantages of efficiency over new generation.



By the New England council's calculations, that region could cut its future energy requirement by 35 to 57 percent, while maintaining the same level of economic growth and personal comfort, just by making recommended efficiency improvements. If only half the council's suggestions were taken, the region would require about 17 percent less electricity than utilities were predicting. Furthermore, the study found that it would cost New England's utilities between one-quarter and half as much to "buy" conservation outright as it would to get the same amount of power from new conventional power plants.

But *Power to Spare* also cited three major obstacles to full

implementation of conservation programs in New England: lack of information about new energy saving technologies; lack of resources or incentives to purchase conservation equipment or pay for efficiency improvements; and lack of utility action to acquire conserved electricity as a resource.

To tackle these, the Energy Policy Council proposed an action plan for New England. Actions focused on utility-sponsored programs to design and fund cost-effective efficiency improvements and load management measures in both residences and businesses. Despite the apparent logic and practicality of such an agenda, it took a rapid sequence of events to move the utilities.

In August 1987, the first voltage reduction brownouts in New England in more than a decade signaled problems meeting electricity demands with existing supplies. Then between September and December, armed with *Power to Spare* and backed by a team of energy experts from around the country (primarily the Pacific Northwest), the Conservation Law Foundation intervened in the first of what would become a string of rate and resource acquisition cases.

"*Power to Spare* was a conceptual 'shot across the bow,'" says Cohen. "But, unlike the Pacific Northwest, we had nothing like the [Northwest Power] Act to enforce conservation investments. We needed a legal forum to gain support."

The Eastern utilities are now launching some of the biggest direct investment energy-efficiency projects ever attempted.

Connecticut

The first forum came in October 1987 in Connecticut. Connecticut Light and Power Company, New England's largest retail utility, had requested a rate increase and a complementary *decrease* in its spending on conservation. The Connecticut Department of Public Utility Control, the state's regulatory commission, was hearing the rate case.

The Conservation Law Foundation brought in Dr. Arthur Rosenfeld, head of building energy-efficiency research at Lawrence Berkeley Laboratory in California; Tom Foley, manager of resource planning for the Northwest Power Planning Council; and Dr. H. Gil Peach, who was then a conservation manager with Pacific Power and Light Company in Portland, Oregon.

Connecticut Light and Power was basing its proposed conservation cutback on the fact that it already had surplus energy capacity, and that conservation could be a natural outcome of market pressures.

"What swung the commission was Tom Foley arguing that even in a surplus there's a lot you can do," Cohen relates. Foley explained that some conservation investments had to be made when buildings are under construction to gain the best value and the most savings. He also described the Northwest's experience with building the capability to gear up programs when the power is needed. The further asset of using low-cost conservation as a means of

stabilizing energy loads was also pointed out by Foley.

"Then Gil Peach told the commission about Pacific Power and Light's experience with the Hood River Conservation Project," Cohen continues, "How that utility was paying for a 'conservation power plant'." The commission was convinced. It ordered the Connecticut utility to nearly *double* its spending on conservation, and further ordered cooperation between the utility and its adversaries, the Conservation Law Foundation.

Northeast Utilities, the parent company of Connecticut Light and Power, put up an initial \$200,000 to cover expenses for the expert witnesses whose testimony had won the case for the Conservation Law Foundation and to keep the witnesses working with utility staff to design energy saving programs for the utility's customer groups. The Law Foundation was kept separate from the financial arrangement so that it could fairly evaluate the utility's compliance with the commission's ruling.

By early summer 1988, the Connecticut utility had in place the mechanisms to operate some of the most ambitious conservation programs in the nation.

Massachusetts

Massachusetts entered the picture in the spring of 1988. The Conservation Law Foundation brought its efficiency experts, including additional Northwesterners, to testify before the Massachusetts Department of Public Utilities. This time, the group spent two days detailing the potential energy savings from conservation programs, describing ways to manage direct investments in efficiency and protect utilities' profit margins, and critiquing existing Massachusetts conservation efforts.

While the department was still considering the arguments for con-

servation, all seven Massachusetts investor-owned utilities came forward on their own to negotiate cooperative agreements with the Law Foundation. The uncommon collaboration of conservation experts from the West and Eastern utilities was growing. Bringing Massachusetts in also carried bits of Rhode Island and New Hampshire's energy loads, because the New England Electric System, one of the Massachusetts signers, sells 30 percent of its electricity through subsidiary power companies in those states.

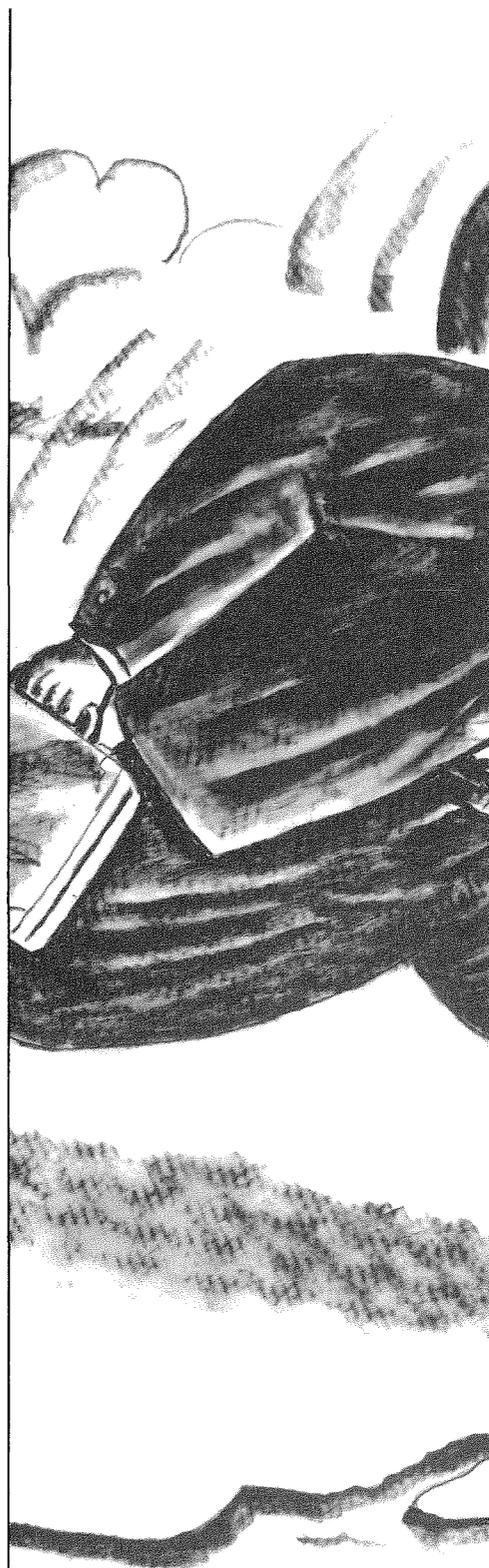
Vermont

By this time, July 1988, Cohen and the road show of energy experts were developing major conservation proposals in Connecticut, Massachusetts, Rhode Island and New Hampshire. Only Vermont and Maine still needed convincing.

Vermont had been on the original campaign trail when *Power to Spare* was first released. The New England Energy Policy Council had made a presentation of the study's findings to Vermont's legislative energy committee. The state's Public Service Board followed up by ordering an investigation into the benefits and costs of utility investments in conservation.

In July, the conservation team made an appearance before the board, and stood for cross examination by utility representatives. In this case, the Vermont board questioned its own authority to order the sort of cooperation that was taking place elsewhere in the region, but Vermont's largest utility, Central Vermont Public Service Company, decided to work with the conservationists.

On July 13, 1989, the Public Service Board announced that it was ordering all of the state's utilities to develop least-cost power plans and to invest in all cost-effective conservation available. The board



referred repeatedly to the Northwest's experience. It even carried over the 10-percent cost advantage conservation is given over generating resources when determining which resources utilities should invest in first. Another 5 percent was added to account for "otherwise unrecognized external costs" of generating resources.

Maine

The Conservation Law Foundation had been discussing the virtues of conservation with Central Maine Power, the state's largest utility, since September 1987. The Foundation had intervened in a proceeding before the Maine Public Utility Commission when the power company had proposed buying 900 megawatts of energy and capacity from Canada.

No settlement was reached in 1987, so the conservation group brought in its team of experts. It took some time, but in January 1989, the utility commission ruled in favor of the conservation option, turning down Maine's request for power imports until the utility had quantified the savings it could garner from efficiency and load management programs.

Today, nearly all of New England's utilities are bragging about their conservation programs. In full page advertisements, Massachusetts Electric, Central Vermont Public Service Corporation and others declare their "commitment to conservation" as a "win:win opportunity."

Bill Ellis, chief executive officer at Northeast Utilities, has described his company's experience in an article published in *Public Utilities Fortnightly*. "Key among the benefits of the collaborative process," he wrote, "was the potential to reduce dramatically the burdensome amount of conservation and load management litigation in future rate cases and to limit the focus to essential issues. This process alone," he added, "would save the utility significant sums in paperwork, cross-examination, and time ..."

Together, the Eastern utilities are now launching some of the biggest direct investment energy-efficiency projects ever attempted. Projected savings over the next decade amount to nearly 20 percent of the region's expected power needs during that period — and this would be before the programs are fully implemented.

Lydia Pastuzek, director of demand planning at New England Electric System, figures the new conservation programs and expansion of some existing ones at the utility could cut their need for new resources by one-third. "Our immediate goal is to reduce our peak load by 300 megawatts by 1991. We've already achieved 150 megawatts."

"Negative electricity demand growth is not an unreasonable target, even in an economically robust area such as New England," suggests a report prepared by the law group.

Cohen freely acknowledges the debt his group owes the North-westerners who paved the way for New England's turnaround. In fact, Cohen borrowed Tom Foley from the Northwest Power Planning Council for six months to help New England's utility managers determine ways to incorporate conservation along with more conventional resources in utility planning. Cohen's organization and the utilities he is now collaborating with are paying all of Foley's expenses as well as reimbursing the Council for the cost of hiring support in Foley's absence.

For the Council's part, Foley's half-year assignment in the Northeast will provide experience with fully implementing and evaluating conservation programs. "We want to monitor the heck out of these programs so there will be impeccable data," explains Cohen. "When you need the power in the Northwest,



we'll share with you our experience of what worked and what didn't."

Conservation's fourth generation is widening and deepening the trail to tomorrow's efficiency. It shouldn't be too long before that expanded path returns to the Northwest. ■

UNCLE SALMON WANTS YOU!



by Ruth L. Curtis

Northwest volunteers pitch in to protect fish runs.

There is a stream in Washington's Yakima Valley called Wide Hollow Creek. At one time, it was a breeding ground for salmon, but in 1869, a dam was built across the stream to power a grain mill. That was essentially the end of the fish run in Wide Hollow.

The local community still uses the stream's power to grind grain into flour, but now the community

also is involved in an effort to return salmon to the stream. The people at the mill, those who also use the stream's water for irrigation, the Yakima Indian Nation and the local school children are all helping in this effort. Through their efforts, guided and funded by the Washington Department of Fisheries, a fish ladder has been built around the mill, screens have been placed in

front of irrigation diversions on the stream, salmon eggs have been incubated and young salmon have been released into the stream. Soon Wide Hollow Creek again may have a healthy salmon run.

This is just one example of the volunteer work going on all over the Northwest, as folks seek to do what they can to protect the Northwest's prized fish and wildlife. Volun-

teer work to protect and enhance fish and game is a tradition with America's grass-root sports and environmental groups. But state agencies only recently began linking this work with their own goals.

The Northwest Power Planning Council has been looking at this work and the programs the states use to encourage it, because linking these voluntary activities with the Council's Columbia River Basin Fish and Wildlife Program efforts could help rebuild salmon and steelhead runs more quickly and at lower cost. This linkage also could serve as an educational tool. Involving Northwest residents directly in salmon and steelhead enhancement efforts encourages public awareness of and support for program efforts.

This kind of teamwork has worked in British Columbia, which has one of the oldest and most successful volunteer fish recovery programs. The British Columbia Department of Fisheries and Oceans relies strongly on public support to achieve the goals of its Salmonid Enhancement Program. Like the Council's fish and wildlife program, the Canadian program aims to double salmon and steelhead runs in British Columbia. It includes a vigorous effort to cultivate public awareness of the need to conserve salmon and steelhead and their habitat. It also draws largely on low-cost or volunteer labor to implement specific enhancement projects. In fact, community involvement gives projects higher priority in the Canadian program.

The Oregon Department of Fish and Wildlife's Salmon and Trout Enhancement Program (STEP) is patterned after British Columbia's. Started in 1981, STEP consists of eight biologists scattered throughout the state serving as community advisors to more than 6,000 volunteers. These volunteers dedicate more than 100,000 hours of their time to salmon and trout. According to Richard Berry, STEP's coordinator, the program's philosophy is "everyone working together to accomplish one common objective."

Thanks to STEP, fish are now spawning in areas where a few years ago there were no fish.

The state funds the biologists who plan and coordinate projects while the volunteers provide the muscle and materials. Much of the funding comes from the communities and industries in the project's area. Berry says they particularly "have a very excellent program working with most of the timber companies within the state. They provide materials if they happen to have timber sales in the area — \$25,000 or \$35,000 worth of equipment and supplies for some projects."

STEP projects come in all sizes and are located throughout the state. In one of the smaller efforts, a volunteer is incubating fish eggs in 10 to 15 bathtubs in his backyard. When mature enough, young fish from his homemade hatchery will be released into a local stream.

The Upper Clackamas River in the Willamette Valley was the scene of one of the larger projects. The upper Clackamas used to have a healthy population of Dolly Varden trout. In recent years, the Oregon Department of Fish and Wildlife questioned whether any Dolly Varden were still surviving in the river, but the department lacked the manpower to conduct a complete stream survey. Volunteers were the solution.

This summer, boy scouts and others, armed with thermometers and trained by STEP coordinators, surveyed the river for the most likely locations of any remaining trout. These specific locations will be checked out later by fish and wildlife staff.

STEP is also working with over 100 schools, where students incubate eggs in aquariums. "All the classes in the school tend to become involved with the project — writing,

social science and math, not just biology," says Berry. "The big day is the release day when everyone comes out. Each school hatches only a small number of eggs, but the children are learning the value of those fish and the value of clean, clear water."

Families, scout troops, schools, sports enthusiasts and other groups all have become involved with STEP projects. STEP biologists try to tailor the projects to the activity needs of the volunteers. The Oregon Department of Fish and Wildlife provides lists of needed projects, or volunteers can develop their own. The biologists work with the volunteers to ensure that the projects dovetail with the department's longer-term plans.

Thanks to STEP, fish are now spawning in areas where a few years ago there were no fish, reports Wayne Bowers, the STEP biologist in the Portland, Oregon, area. The educational aim of STEP has been particularly successful. People have a better understanding of why streams need to be protected.

Bowers says that when people see a bulldozer working by a stream, "they yell, and the phone starts ringing at the department. They want to be sure that the stream is not damaged. People also now appear at planning commission hearings, asking questions about how a proposed development will affect nearby streams."

Washington's Volunteer Fisheries Resource Program is similar to STEP, but there are a few differences. The Washington program is split between two departments. The Washington Department of Fisheries deals with salmon projects, and the Washington Department of Wildlife deals with steelhead and trout. These departments have smaller staffs than the Oregon program, and the money is funneled directly to the projects.

Rich Kolb, program manager for the Department of Fisheries, says their goal is to try to get as many

people working together as is possible within the community. "A lot of times we start out with one individual or small group," he says, "and we try to help and encourage them to work with others in their community, so that it becomes not just 'my project' but a communitywide project." This community involvement can be seen in the Wide Hollow Creek project.

"We don't care how big or how little a project is," Kolb reports. "If people want to get involved, we want to help them in whatever way we can — whether it's engineering, pathology or habitat work. We'll give them expertise and whatever money the budget allows."

Through the program, many schools are involved in incubating fish eggs and releasing the fish into streams. "These projects are generally fairly small," reports Kolb. "But this year, volunteers in Washington

released 95,000 pounds of fish. However, the long-term goal is getting the kids to know the value of water quality, so that when they get older they will make decisions that benefit the environment and the resource."

As in Oregon, the projects are closely watched to ensure that well-intentioned people don't damage the existing habitat and fish populations. To protect the genetic integrity of existing runs, everyone who wants to raise fish has to apply to the state and be approved. Each application is reviewed by the department's salmon specialists for disease and genetic considerations, by habitat experts to see if the proposed release river or stream is being managed for wild or hatchery stocks, and by fish harvest personnel

Oregon STEP volunteers clip fins of tiny coho salmon to mark them for research and counting purposes before releasing them.

to see how the adult fish will fit in with harvest patterns.

"We try very hard not to turn down anyone who wants to do something," says Kolb. "However, we may have to modify the project some. But if they want to do something, we want to help them."

The states of Idaho and Montana don't have such formal programs to use volunteers as Oregon and Washington, but the fish and game organizations in those states are eager to help volunteers. Montana's Department of Fish, Wildlife and Parks doesn't have the money to develop a large volunteer program, but the regional offices do rely on local sports groups for some small projects. For example, on a stream near Kalispell where livestock were damaging the habitat of migrating fish, the Flathead Wildlife Federation recently installed fencing to keep cattle away from the stream banks.

Idaho also is aware that there is a largely untapped resource available. As in other states, local sports groups and others are interested in doing all they can to protect and enhance Idaho's fish and wildlife. Some use has been made of the volunteers, but not in any formal fashion. This is changing, however. The Idaho Legislature recently approved money for a staff person to coordinate volunteer efforts, and that person began working on July 1.

According to Oregon's Richard Berry, the key to the success of these fish recovery programs is each volunteer's own project. "Each volunteer looks at it as a contribution to the state and the people of the state, and it's one that they are very proud of," he explains.

Tom Trulove, Council chairman, agrees that these programs are valuable to the Northwest. "As long as people have a high enough level of interest to donate their time to make these things happen, and as long as agencies are able to provide expert knowledge and resources, this work is going to have a major beneficial environmental impact on the future of our region." ■



Salvaging the Salmon River

Repairing habitat in Idaho's Salmon River Subbasin

by Karen Nelson

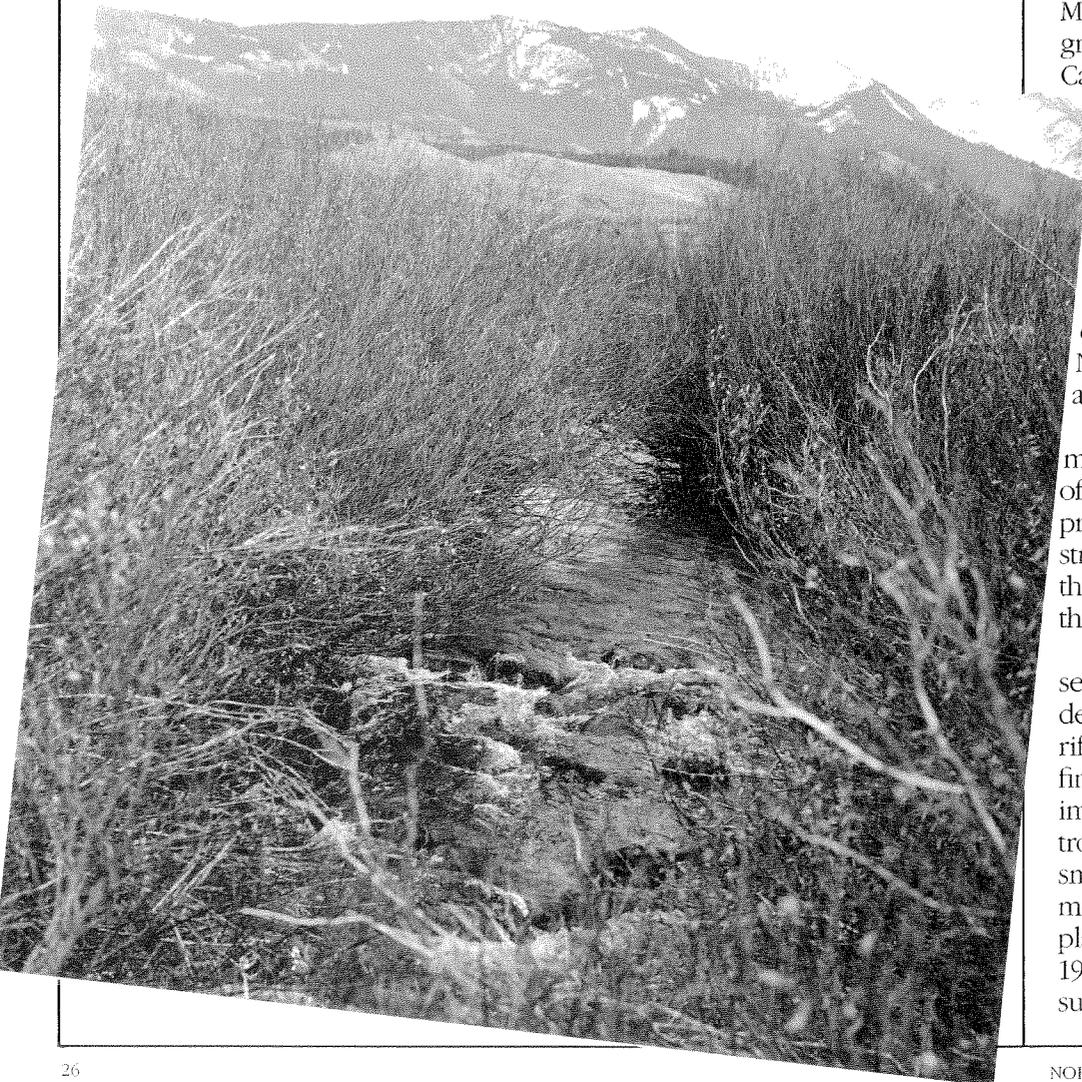
Visitors to Idaho's famed Salmon River are greeted by steep forested walls and the breathtaking beauty of this wild area. Idaho's history books come alive with tales of the river. Lewis and Clark floated its exhilarating rapids. Its big fish attracted Indians; its wildlife attracted trappers and hunters. Miners traveled great distances hoping to scratch the river's bank and find gold, silver and instant fortune.

But all the intriguing history took a toll on the river and its tributaries. Miners left tons of eroded soil and gravel behind in their quest for ore. Cattle grazing caused further erosion, as did road construction.

Eight hydropower dams were built on the Columbia River between the Salmon River and the Pacific Ocean. By 1980, what was once one of the prime spawning and rearing areas for wild chinook and steelhead in the Northwest was slowly coming to an end.

In the past, Bear Valley Creek, a major tributary of the Middle Fork of the Salmon River, was one of the principal spawning and rearing streams for wild spring chinook in the Salmon River and possibly in the entire Columbia River system.

Over the years, increased sedimentation caused a general degradation of the habitat. Spawning riffles were covered with layers of fine soils, while rearing pools, important to salmon and steelhead trout up to and including the pre-smolt stage, filled in with sand. The major cause of the problem was a placer mine, active during the mid-1950s, which deposited over the subsequent years approximately



500,000 cubic meters of sediment into Bear Valley Creek.

Members of the Shoshone-Bannock Indian Tribes have fished in Bear Valley Creek for salmon from aboriginal times to 1978. Since then, the tribes have voluntarily ceased fishing in the stream as a conservation effort. But, their efforts alone could not bring back the declining wild stock.

In 1982, the Northwest Power Planning Council listed the stream as a candidate for a habitat improvement project in its Columbia River Basin Fish and Wildlife Program. The Council was aware of the Shoshone-Bannock interests and treaty rights on the stream and called on the Bonneville Power Administration to fund the enhancement project, with the tribes as project sponsor. Bonneville funded the project as an "off-site mitigation" effort, meaning it makes up for impacts caused by Columbia and Snake river hydroelectric projects on anadromous fish stocks.

"The eroded stream banks have almost been repaired. The planted vegetation in some areas just needs to grow," reports Charlie Petrosky, fisheries staff biologist for the Idaho Department of Fish and Game.

The sediment from the mine, which affected fish habitat downstream, has now been cleaned up, according to Petrosky. Bear Valley Minerals Inc., the private landowner, endorsed the project and signed easements for the feasibility study and construction efforts to speed up the enhancement project. According to Petrosky, private lands and U.S. Forest Service land were fenced to protect the stream from

By 1980, what was once one of the prime spawning and rearing areas for wild chinook and steelhead in the Northwest was slowly coming to an end.

erosion from nearby cattle.

In another part of the subbasin, explosives were used to lower the height of a 9-foot high natural rock fall, which partially blocked upstream passage by adult chinook. Boulder Creek, which enters the Little Salmon River, supported spawning and rearing of summer steelhead and spring chinook. Steelhead apparently were able to pass the falls, but chinook couldn't. Portions of the solid granite sill were removed to provide a "stair-stepping" of two drops of about 4 to 5 feet, with adequate jumping pools below each drop.

In other projects in the Salmon River Subbasin, irrigation diversions have been constructed; small dams have been built to increase gravel bars and pools; streams have been fenced to keep livestock out and prevent erosion; grass and shrubs have been allowed to regrow; and trees have been planted near streambeds to provide shade and cool water in the summer.

The lower Yankee Fork, part of the upper Salmon River country, flows unnaturally straight, restrained into narrow channels by barren

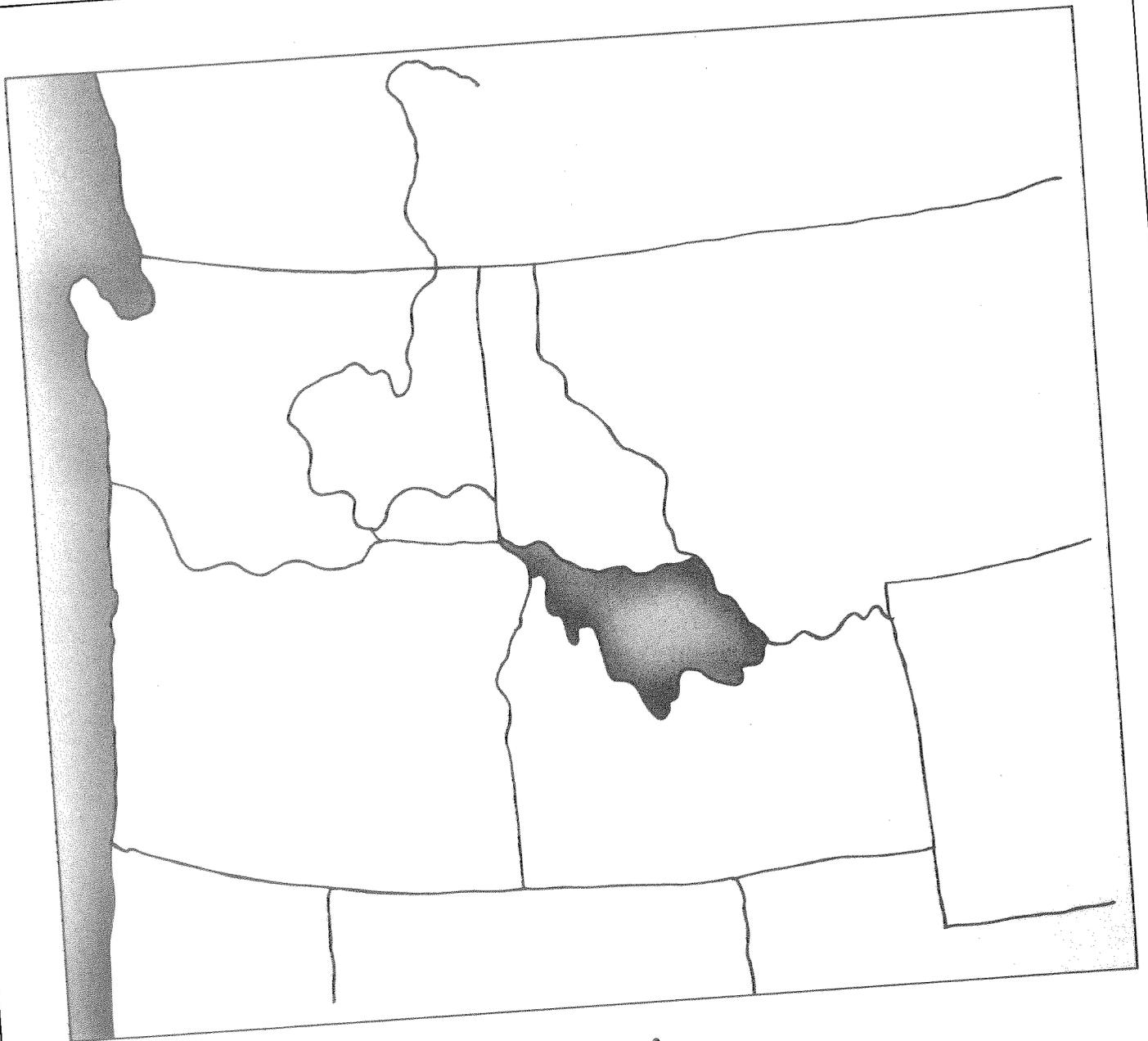
dredge tailings. Its capacity to nurture salmon and steelhead was greatly reduced by miners who began arriving in the early 1870s.

Before long, small-scale panning became quartz-rock mines deep in the mother lode, with mills that crushed tons of ore, leached the gold out with mercury and shipped millions of dollars in bullion to out-of-state owners. Other prospectors dug huge holes in the mountainsides, which quickly eroded the fragile soil. All the mines were broke by the early 1900s.

The Yankee Fork saw another boom time from 1940 to 1953. Gold prospectors this time used a large dredge that could dig 18 cubic yards a minute. Except for the years of World War II, the dredge was constantly active, displacing 6 million cubic yards of streambed in order to remove about \$1 million in gold and silver at a cost of nearly \$2 million. The Snake River Mining Company, a subsidiary of Silas Mason Company of New York, had a net loss of over \$700,000.

But the biggest loss to many was the salmon fishery. According to the Idaho Department of Fish and Game's 1965 analysis: "In 1941, due to excessive siltation caused by gold dredging operation ... the Yankee Fork [is] of very little value to salmon ... In 1957, the stream was closed to salmon fishing."

Nonetheless, chinook continued to come back to the Yankee Fork to spawn. Spawning gravels were still in good supply, but few smolts were surviving because of the lack of sufficient rearing areas. After the mainstem dams were constructed, fewer and fewer spawning fish were



Idaho's Salmon River Subbasin

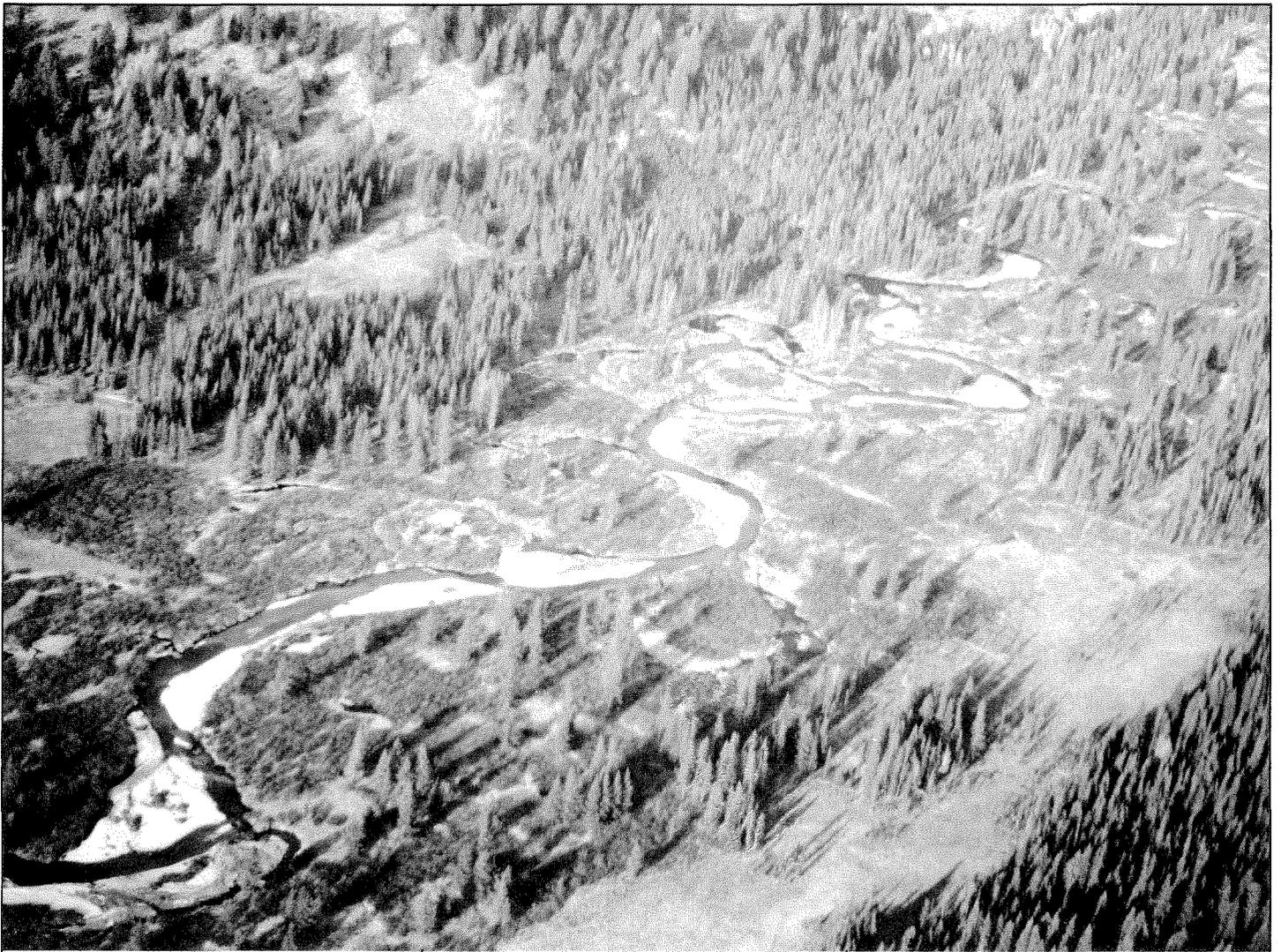
found. In 1980, none were documented.

Almost 100 years after Yankee Fork's salmon runs were in trouble, help arrived. The Council included the stream in its fish and wildlife program. It, too, was targeted for off-site enhancement for anadromous fish losses caused by development and

operation of the Columbia River Basin hydropower system. In 1985, the Shoshone-Bannock Tribes, the Idaho Department of Fish and Game and the Challis National Forest began restoring the fish habitat with funding from the Bonneville Power Administration.

More than 30 adjacent ponds have been connected to the stream

and now provide excellent juvenile salmon habitat. They also compensate for the lack of natural stream meandering. Since the ponds already existed, minimal construction was needed. The current ponds require little maintenance, and biologists say about 200 additional adult salmon each year can now return to the upper Salmon River



for both sport and tribal fishing.

"Spring chinook do well in pond water, so this solution worked. The Yankee Fork can now rear an additional 25,000 salmon smolts. About five times that number of fry can be stocked in the ponds and left to forage on natural food," says Petrosky.

In 1987, the Council adopted a goal of doubling the numbers of salmon and steelhead adults in the Columbia Basin. In order to meet this goal, the Council has funded the Columbia Basin Fish and Wildlife Authority to prepare recommendations for a systemwide plan.

Thirty-one subbasins within the Columbia Basin will be evaluated to determine the numbers and stocks of salmon and steelhead that can be produced. The fishery agencies and tribes, which make up the Basin Authority, are developing these

plans with the assistance of public and technical advisory committees. Two dozen different entities are involved. Once completed and amended into the program, system planning will provide the direction for future action in the basin. The Salmon River area is one of the subbasin plans released for public comment.

While many await the outcome of system planning, the biologists for the habitat enhancement projects in the Salmon River area are waiting to see if these initial restoration projects will succeed as planned.

Habitat enhancement in the Salmon River is only part of the solution. Once the juveniles begin their journey to the ocean, they have to be able to avoid the turbines at eight different dams and survive the increased water temperature, decreased flows and predators in the reservoirs.

Mining operations left tons of sediment lining the shores of Bear Valley Creek.

"Success now depends on improving downstream passage survival of the juveniles," says Petrosky. "That means getting the bypass screens built around the dams and increased flows in the spring."

The Council is the first to agree that these measures are key to rebuilding Idaho's runs. ■

SHORTS

Puget Sound Power & Light Company of Bellevue, Washington, received the 1989 Edison Award for innovative customer outreach and special community programs.

The award, considered the utility industry's highest honor, is given annually to a utility that best serves as a model for other companies in service to customers. The Edison Electric Institute, a trade group that represents the nation's investor-owned utilities, gave the award to Puget at the group's annual meeting, held last June in Portland, Oregon. [Source: *United Press International*, 6/8/89]

Portland General Electric Company last summer celebrated its 100th year of service in Oregon. The utility first delivered electricity to Portland in June 1889, generating it 14 miles away at Willamette Falls in Oregon City. That made Portland the first city in the country to have its streets lit as a result of the long-distance transmission of power.

That power was relatively expensive, however. Customers paid about 20 cents a kilowatt-hour in 1899, four times the average price today, calculated in 1988 dollars. [Source: Portland General Electric, 6/89]

Utilities in Oregon will have to evaluate the environmental impacts of producing power from new generating plants or purchasing energy.

Under a new order made by the Oregon Public Utilities Commission, utilities have to submit least-cost plans that look at all known resources — including conservation — when they contemplate future energy needs, and to choose the least costly means to meet that demand. The order specifically directs utilities to consider "external costs," meaning costs to society that utilities and ratepayers don't currently pay, when planning for new resources.

While Idaho and Washington require that investor-owned utilities draw up least-cost plans, the order makes Oregon the first state in the country to require explicitly that utilities evaluate environmental and other costs when they plan for new sources of power. [Source: *Oregon Insider*, 6/9/89]

The number of summer steelhead returning to the Willamette River during the first five months of 1989 was the lowest in six years.

By May 31 of this year, only 2,179 summer steelhead had returned to Willamette Falls. That's less than one-fifth the number that returned by that date the year before and represents the lowest count since 1983.

Fisheries experts speculate that this year's low count results from extremely low and warm water in spring 1987, when young salmon returning this year as adults migrated to the sea. [Source: *The (Portland) Oregonian*, 6/28/89]

Negotiators from the United States and Taiwan this summer agreed to regulate the Taiwanese driftnet fleet in the North Pacific Ocean.

The agreement is the first step to control the widespread use of driftnets in the North Pacific. Fishing fleets from Taiwan, Japan, Korea and other Far Eastern countries equipped with huge driftnets as long as 10 miles have indiscriminately killed North American salmon, porpoises, dolphins and sea birds in international waters, environmentalists and U.S. fishing groups charge.

The agreement will allow the United States to place observers on Taiwanese boats and place transmitters on 10 percent of Taiwan's driftnet fleet this year and on 100 percent next year, so every boat can be tracked by U.S. satellites.

The agreement also requires that the catch must be unloaded at Taiwanese ports, even if it has first been transferred at-sea onto cargo boats. Moreover, cargo vessels that receive fish caught in driftnets must have satellite transmitters. Cargo boats have been accused of smuggling Taiwan-caught salmon to Singapore, where it is sold to buyers from Thailand and Europe. [Source: *Seattle (Washington) Post-Intelligencer*, 7/1/89]

The Northwest's newest hydroelectric turbine and generator will have "Made in China" signs attached to them.

The Dong Feng Electrical Machinery Works in China's Sichuan Province last summer won a bid to build a \$1.168 million turbine and generator for the Northern Wasco County (Oregon) People's Utility District. That equipment should be delivered in October to a hydropower facility the utility district is installing at the north shore fishway of The Dalles Dam on the Columbia River.

Dong Feng won the job against four other bidders, all owned by non-U.S. manufacturers. When they go online in 1991, the company's turbine and generator will supply enough power for about 2,500 households. [Source: *The (Portland) Oregonian*, 7/6/89]

—Compiled by Gordon Lee

CALENDAR

September 4-6 — "Electric Plants in the Greenhouse" Fifth NARUC Research and Development Seminar, sponsored by National Association of Regulatory Utility Commissioners, in Coeur d'Alene, Idaho. For more information: Bob Smith, Idaho Public Utilities Commission, Statehouse Mail, Boise, Idaho 83712.

September 12-14 — "Energy Strategies for the '90s," the 11th annual industrial energy technology conference in Houston, Texas, held in conjunction with the Gulf Coast Cogeneration Association Exposition. For more information: Texas A&M University, Department of Mechanical Engineering, College Station, Texas 77843.

September 13-14 — Northwest Power Planning Council meeting at the Holiday Inn in Coeur d'Alene, Idaho.

September 18-19 — "Wild Trout IV," held in Yellowstone National Park, Mammoth, Wyoming. For more information: Frank R. Richardson, 404-331-3588 or Gardner Grant 914-428-5553.

September 24-27 — "Windpower '89," the American Wind Energy Association's annual meeting in San Francisco, California. Sponsored by the American Wind Energy Association and the U.S. Department of Energy. For more information: American Wind Energy Association, 703-276-8334.

October 5 — Salmon and Steelhead Round Table in Portland, Oregon. Sponsored by the Northwest Power Planning Council.

October 11-12 — Northwest Power Planning Council meeting in Spokane, Washington.

November 8-9 — Northwest Power Planning Council meeting at the Best Western Colonial Inn in Helena, Montana.

December 13-14 — Northwest Power Planning Council meeting in Oregon.

A more detailed calendar of Council committee meetings and consultations is carried each month in *Update!* See order form on back cover.

Compiled by Ruth L. Curtis

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The Northwest Power Planning Council is required to develop a program to restore the Columbia fisheries and a regional electric energy plan, to be carried out by the Bonneville Power Administration, emphasizing cost-effective conservation and renewable resources.

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Gordon Lee, Duley Mahar
Production: Marty Todd

COUNCIL PUBLICATIONS ORDER FORM

Please send me a copy of the following publications of the Northwest Power Planning Council. (Note: not all publications are available immediately, but they will be sent to you as soon as possible.)

Publications

- (89-24) Proposed Rule regarding Wildlife Mitigation
Revised Draft Subbasin Plans for areas above Bonneville Dam (specify river system)
- | | |
|---|--|
| <input type="checkbox"/> Hood River | <input type="checkbox"/> Wenatchee River |
| <input type="checkbox"/> Fifteen Mile Creek | <input type="checkbox"/> Entiat River |
| <input type="checkbox"/> Deschutes River | <input type="checkbox"/> Methow and Okanogan Rivers |
| <input type="checkbox"/> John Day River | <input type="checkbox"/> Tucannon River |
| <input type="checkbox"/> Umatilla River | <input type="checkbox"/> Clearwater River |
| <input type="checkbox"/> Walla Walla River | <input type="checkbox"/> Grande Ronde River |
| <input type="checkbox"/> Wind River | <input type="checkbox"/> Salmon River |
| <input type="checkbox"/> Klickitat River | <input type="checkbox"/> Imnaha River |
| <input type="checkbox"/> Yakima River | <input type="checkbox"/> Snake River to Hells Canyon Dam |
| <input type="checkbox"/> Columbia River Mainstem from Bonneville Dam to Priest Rapids Dam | |
| <input type="checkbox"/> Columbia River Mainstem from Priest Rapids Dam to Chief Joseph Dam | |
| <input type="checkbox"/> Little White Salmon River and Big White Salmon River | |

Note: Revised draft subbasin plans for areas below Bonneville Dam will be available this winter.

- 1986 Northwest Power Plan
 1987 Columbia River Basin Fish and Wildlife Program
 1989 Annual Report to Congress

Mailing Lists

Please add my name to the mailing lists for the following newsletters. (Note: do not check if you already are receiving them.)

- Northwest Energy News* (this bimonthly magazine)
 Update! (monthly public involvement newsletter that contains the Council meeting agenda, deadlines for public comment and a more detailed publications list)

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Organization _____

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(Or call Judi Hertz at the Council's central office, 503-222-5161, toll free 1-800-222-3355 in Idaho, Montana and Washington, or 1-800-452-2324 in Oregon.)

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