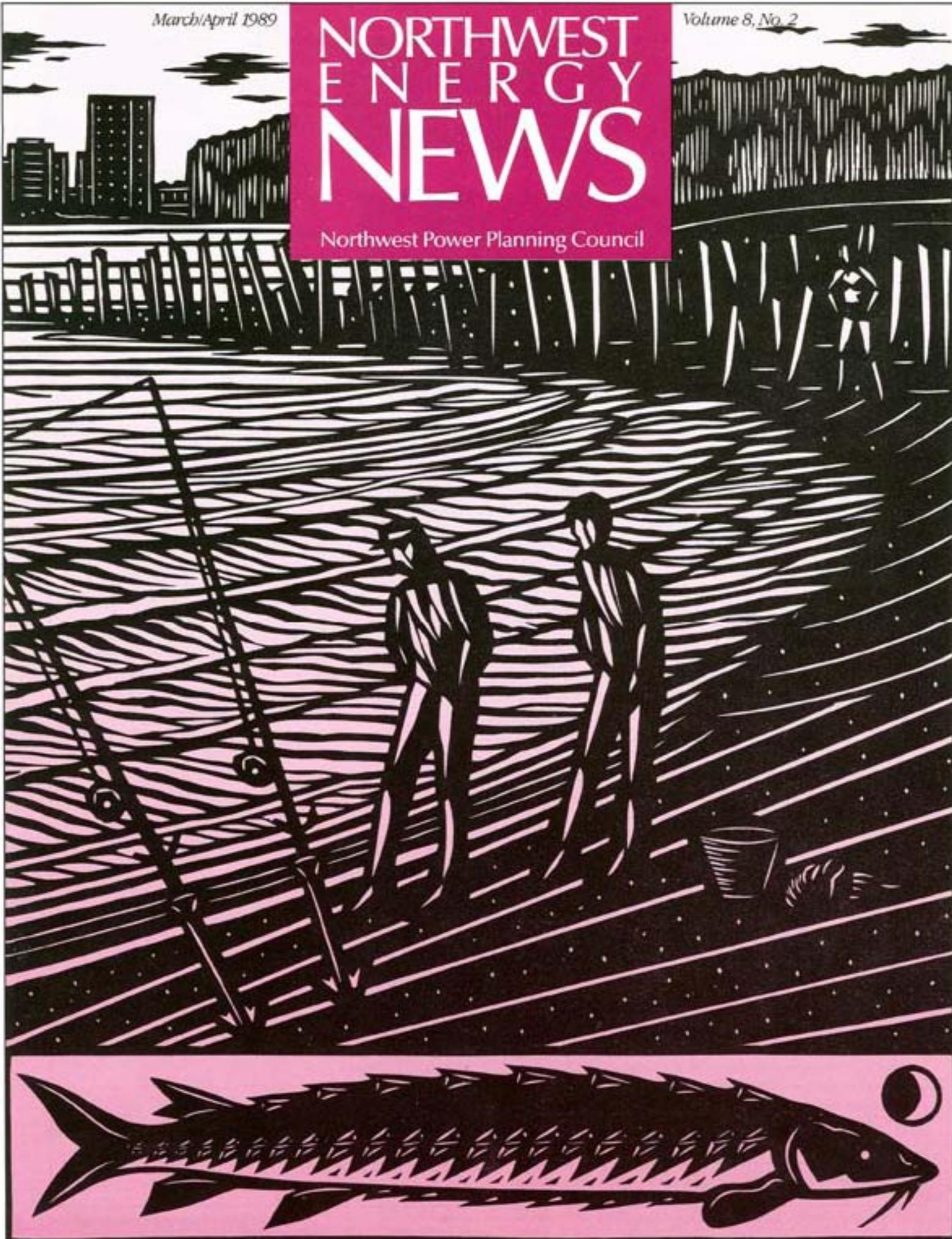


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# NORTHWEST ENERGY NEWS

Northwest Power Planning Council



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### Editor's Notes

The transition from January to February was considerably harsher this year than we have come to expect from the Maritime Northwest. Record cold, snowfall and ice all combined with Arctic gusts and an apparent jinx in the region's power delivery system.

While virtually everyone in the region turned their thermostats up, part of the power line that transmits electricity between the Northwest and California blew down. One utility had to fire up an expensive coal plant that had been dormant for four years, and the only operating Washington Public Power Supply System nuclear plant was out of commission during the coldest days of the spell. Supplies of cheap power to aluminum plants were cut, and some Northwest utilities had to buy electricity from California.

All of which could lead one to the conclusion that the Northwest's power supply is not inviolable. Nor is the power surplus we had begun to take for granted.

The argument that energy conservation can help secure and bring stability to electricity supply and demand is almost a cliché. But like most clichés, it is used often because it is so appropriate. In the face of so much uncertainty — over weather, major climate shifts, new resource costs and more — using the energy we have as efficiently as is cost-effective is still our best option.

This issue's cover is a detail from a linocut, "Willamette White Sturgeon," by Oregon artist Dennis Cunningham.

# TRACKING WILDLIFE MITIGATION

## WILDLIFE DEBATE TAKES DIFFERENT PATHS.

by Gordon Lee and Peter Paquet

**T**o many people, "wildlife mitigation" might sound like a behavior modification project conceived by naturalists, an effort to make animals less ferocious in the wild. But for people in the Northwest's electric utility business, wildlife mitigation may be the topic that dominates environmental and power debate for the next year.

At issue is whether the region should compensate for damage and disruptions to wildlife caused by building hydroelectric dams in the Columbia River Basin, when that compensation should take place, and how much it should cost.

It's a debate that will explore the region's willingness to pay for efforts to boost wildlife populations and restore habitat in Idaho, Montana, Oregon and Washington.

Supporters of these wildlife recovery efforts argue that they are the next step in the Northwest Power Planning Council's legal charge, a mission spelled out in the 1980

Northwest Power Act "to protect, mitigate and enhance fish and wildlife" populations in the Columbia Basin that have been disrupted by hydroelectricity.

Some utilities counter that it may be an expensive environmental experiment, a 20-year effort that has no firm timetable, goals or guidelines.

**T**he 1980 Northwest Power Act obligates the Council to draft plans to repair, reclaim or replace fish and wildlife populations and habitat lost by construction of hydroelectric dams in the Pacific Northwest. Most of the Council's early efforts have focused on programs to restore the Northwest's runs of salmon, steelhead and other fish that have been decimated by hydroelectric production.

But the wildlife component of that charge is receiving intense public scrutiny this year as the Council — which has authority to guide

Bonneville Power Administration fish and wildlife expenditures — considers whether to call for increased spending on mitigation programs throughout the Columbia River drainage. The damage runs from the obvious — such as animal habitats inundated by reservoirs, or fast rivers reduced to slow streams — to the subtle, such as changes in ecosystems brought on by depletions or departures of certain animal species.

How extensive those programs should be, how much money should be spent, and who should pay for the efforts remain open questions.

**T**he Council addressed wildlife mitigation in 1982, when it adopted its first Columbia River Basin Fish and Wildlife Program. That document sketched a blueprint for how state and federal wildlife managers, Indian tribes and dam operators should plan for wildlife

mitigation at each hydroelectric dam.

The Council suggested that wildlife managers first review mitigation measures taken in the past at each dam. Next, they should calculate how many animals and how much acreage has been lost at each facility. This process would determine the net loss of wildlife and habitat in specific areas.

Only after completing those steps, should wildlife professionals draft detailed mitigation plans for each dam. And only when those plans have been reviewed by the public, should the Council modify its fish and wildlife program to incorporate those plans.

So far, officials have gone through the first three steps and prepared mitigation proposals for 14 major hydroelectric dams whose streams drain into the Columbia River: Hungry Horse and Libby dams in Montana, Grand Coulee Dam in Washington, eight dams in Oregon's Willamette Basin, and the Palisades, Anderson Ranch and Black Canyon dams in Idaho.

**T**he Council, in amending its program in 1987, adopted mitigation measures at the two Montana dams. Those measures were proposed in consultation with the state fish and wildlife agencies and the tribes.

Proposals submitted by the agencies and tribes for the other 12 dams suggest that states, utilities, Bonneville and others buy acreage and take other actions to replace wildlife lands lost to hydroelectric dams. The agencies and tribes estimate these proposals could cost \$109 million to \$169 million.

The Council is in the early stages of examining scope, timing and cost of these proposals. It has neither accepted nor rejected them.

However, the Council now is considering whether to use these plans as models for remaining mitigation efforts in the region. It released an issue paper on these initial proposals last fall, which asked the public to comment on their advantages and disadvantages.

Here's a summary of some comments that issue paper generated:

### **Utilities and irrigators**

Utility representatives acknowledged a responsibility to support some level of wildlife mitigation, but many questioned the expense of implementing the proposed plans. For example, the Pacific Northwest Utilities Conference Committee, which represents Bonneville's three major customer groups, expressed concern that mitigation efforts might be costly and could cause rate hikes in the region.

Some utilities' irrigation customers also focused their comments on the rate impact of mitigation efforts. They urged the Council to look at the effect of higher rates on their operations, and they questioned whether ratepayers should be the sole source of funds for wildlife mitigation. Other groups, such as sportsmen and recreationists, also would benefit from mitigation efforts and should be tapped to fund the efforts, they said.

Several utilities also questioned the extent of wildlife losses that come from hydroelectric development. They contended that, in some cases, there's been a net benefit to wildlife, as dams and irrigation have created new wetlands. They believe that's led to record counts of deer and elk in some parts of Washington and Idaho.

Many irrigators encouraged the Council to coordinate mitigation efforts with measures already under way, such as the Conservation Reserve Program, a federally sponsored effort that pays farmers to take land out of production for 10 years.

In the Hungry Horse and Libby dams wildlife effort, Bonneville set up a trust fund to finance the work. Utilities and irrigators typically prefer such trust funds to finance wildlife mitigation. But those funds should not be open-ended, they argue. Rather, the funds should set financial caps on Bonneville spending and allow for flexible funding so that Bonneville's contributions can vary as revenues rise or fall. In addition, those trust agreements should contain language releasing Bonneville from further financial exposure for wildlife mitigation, most utilities and irrigators said.

Washington Water Power Company suggested that, before further mitigation efforts begin, the Council set limits on how much should be spent per flooded acre and on total yearly spending in the Northwest. The utility believes that would encourage cooperation and result in wildlife plans having a broad base of public support being tackled earlier than those steeped in controversy.

### **Bonneville Power Administration**

Bonneville suggested that the Council postpone amending its 1987 Fish and Wildlife Program until it develops wildlife program standards and a wildlife program goal.

Those standards should be drafted by fish and wildlife agencies and by Indian tribes over the next year, Bonneville suggested. Once they're completed, the Council would match the standards with the mitigation plans to decide which projects would be included in the fish and wildlife program. Mitigation standards might include mitigation objectives, species of emphasis and land acquisition criteria.

Mitigation efforts wouldn't have to be put on hold during that period, however. Bonneville said the region should use the implementation planning process developed by Bonneville and the Columbia Basin Fish and Wildlife Authority, an umbrella organization that represents the region's fish and wildlife agencies and Indian tribes, to rank, select and implement projects in the interim. Current mitigation plans for Grand Coulee, the Willamette, Palisades, Anderson Ranch and Black Canyon could guide this process. Bonneville also urged the Council to consider other trusts similar to the wildlife mitigation agreement for Libby and

## **Wildlife mitigation may be the topic that dominates environmental and power debate for the next year.**

Hungry Horse dams in Montana. That trust agreement was executed December 21, 1988.

### **Fish and wildlife agencies and Indian tribes**

Agencies and tribes generally have stressed the importance of proceeding with wildlife mitigation proposals that have been made to the Council. They argue that, even though the Northwest Power Act places equal emphasis on wildlife and fish, little progress on mitigation has been made since 1982, when the Council adopted its first fish and wildlife program.

The plans before the Council represent a balanced approach to wildlife mitigation, they say, and take into account the needs of both game and non-game species. The current proposals—which were drawn up according to the procedures mandated in the Council's fish and wildlife program—mesh with state and tribal mitigation planning objectives and would contribute to regional wildlife enhancement.

However, they generally accept the cost estimates of the first mitigation proposals. But, beyond noting that the Northwest Power Act obligates Bonneville to pay for these projects, they disagree on other funding sources.

### **Environmental groups**

The National Wildlife Federation recommended that the Council adopt some or all of the mitigation proposals that already have been submitted and use them as a guide to develop an overall mitigation planning procedure. It also suggested that the Council explore different avenues for funding of mitigation for the next year.

The Nature Conservancy, arguing that the current mitigation plans overemphasized game hunted by sportsmen, suggested that the plans reflect a broader biological perspective. Those plans should focus on finding and preserving intact examples of native ecosystems lost to hydroelectric development or crucial to rare or endangered species, the Conservancy said.

The Conservancy also offered to assist the Council in its mitigation efforts. It noted that it has carried out more than 2,000 cooperative projects with federal and state agencies that have acquired more than 1.5 million acres of biologically important habitat. In most cases, its help shaved the agencies' acquisition and management costs, the Conservancy said. ■

*Peter Packet is a senior biological associate with the Northwest Power Planning Council.*

# Conservation Transfers

by Gordon Lee

An innovative agreement is in the works that would allow utilities in the Northwest to sell electricity they've conserved to utilities in need of power. The agreement would mean that power-poor utilities could plug into energy saved by other utilities in the region

before they consider building expensive generating facilities on their own.

The potential agreement is between four Washington and Oregon public utilities and the Bonneville Power Administration. It would allow the utilities — all of which have sufficient power supplies to serve current customer loads — to make energy-efficiency improvements and sell the power those measures save to utilities that need electricity. The conserving utilities would be able to sell that power at a profit, so they could recover the costs of the conservation measures.

Bonneville, the federal power marketing agency that supplies electricity to the Northwest's utilities, would act as a go-between in the transactions.

The deal also would fulfill a key goal of the Northwest Power Planning Council's regional power plan, which calls for utilities in the Northwest to tap conservation



The Northwest's  
Next  
Energy Move

programs before they build expensive new generating plants to meet growing electricity loads.

**K**nown as a conservation transfer, the potential agreement involves Snohomish County Public Utility District, Mason County Public Utility District No. 3, Clark County Public Utility District — all in Washington — and Salem (Oregon) Electric.

Those utilities are not short of power. They're supplied by Bonneville, which is legally required to meet all of its public customers' power needs. Bonneville last summer had a surplus of 800 megawatts and today has a 300-megawatt excess, about half the amount a city the size of Portland, Oregon, consumes. As a result, those utilities in the past have had little incentive to spend money on conservation programs, which would only add to Bonneville's surplus.

The deal they're working on would give them a financial push to start energy-efficiency programs by allowing other utilities to pay for part, or all, of the improvements. It would work this way: the surplus utilities would make residential and commercial efficiency improvements over the next five years, paying for them out of their own pockets. While Bonneville still would charge those utilities for their full electricity loads, the agency would allow the utilities to resell power their measures save at a mark-up, which would help pay for the conservation steps.

**A**t the end of the agreement in 2001, Bonneville would get the conservation benefits for as long as the utilities had contracted to sell the power.

"Bonneville ultimately will get what we estimate will be 15 average megawatts at no expense," says Terry Mundorf, an attorney in Mill Creek, Washington, who has represented the four utilities in negotiations with Bonneville.

The agreement would be timely because Bonneville's surplus is declining. According to the Council's most recent projections, the federal power marketing agency may need

## Conservation trading allows power-short utilities to turn to the region's least costly source for new energy.

new sources of energy as early as 1995, if the Northwest's energy demand grows at a moderately high pace. While slower growth in energy demand pushes the time Bonneville would need new power sources beyond the turn of the century, the federal power agency eventually will have to find new power sources.

This conservation trade agreement also would represent a change of heart by Bonneville. The federal power agency in the past has been reluctant to let its public customers buy more power than they would consume, says Jim Litchfield, director of power planning at the Council. But now Bonneville appears willing to give those customers authority to buy power in excess of their load.

**M**embers of the Council say the possible agreement would dovetail with their long-range effort to identify ways to meet the Northwest's growing energy needs at the lowest cost. "The Council is very interested in this," says Ted Bottiger, one of Washington's two members on the four-state energy planning body. "It had been put on the back burner when we were in surplus. But as that surplus declines, it's now become a critical issue."

While this would be the region's first such agreement, conservation transfers aren't a new concept. The Council estimated in its 1986 Power Plan that ratepayers in Idaho, Montana, Oregon and Washington could save \$1.3 billion over the next two decades if utilities developed and traded low-cost conservation kilowatts rather than build more expensive generating plants.

The Council for years has urged the region's utilities to explore conservation trades. By conserving and

selling the electricity they save, surplus utilities bring in extra revenue. They also get efficiency improvements paid for by outside parties. At the same time, conservation trading allows power-short utilities to turn to the region's least costly source for new energy. As a result, conservation trades keep energy costs down for ratepayers throughout the Northwest.

**C**onservation has been the preferred resource in the Council's recommended energy mix for the Northwest since 1983. It is inexpensive, compared with alternative new power sources. It is environmentally benign. It is relatively easy to implement. And its impact grows as demand for electricity increases.

Moreover, conservation is an abundant resource. Throughout the region, utilities could conserve 2,600 average megawatts over the next 20 years, under conditions of high energy demand. That's enough energy to replace almost six large coal plants. But electricity obtained through conservation would cost only 2.4 cents a kilowatt-hour, half the price of power generated from a new coal plant. Under those high energy-demand conditions, developing conservation rather than constructing coal plants would save the region \$1.3 billion over the next 20 years.

While only a small portion of that conserved energy might be available for trades, it nevertheless would be a way to minimize the region's energy costs.

Conservation trades are good deals for utilities that need electricity. Trades allow utilities to get an assured supply of low-cost power for the life of the agreements.

At the same time, conservation trades are not subject to the recall provisions that color Bonneville's standard power sales contracts. Recall provisions allow Bonneville to change or scale back its scheduled delivery of power under certain conditions.

"Bonneville puts elements in its deals, recalls for example, that may not be involved in this type of arrangement," says Mundorf. ■

# Global Warming: A Northwest Perspective

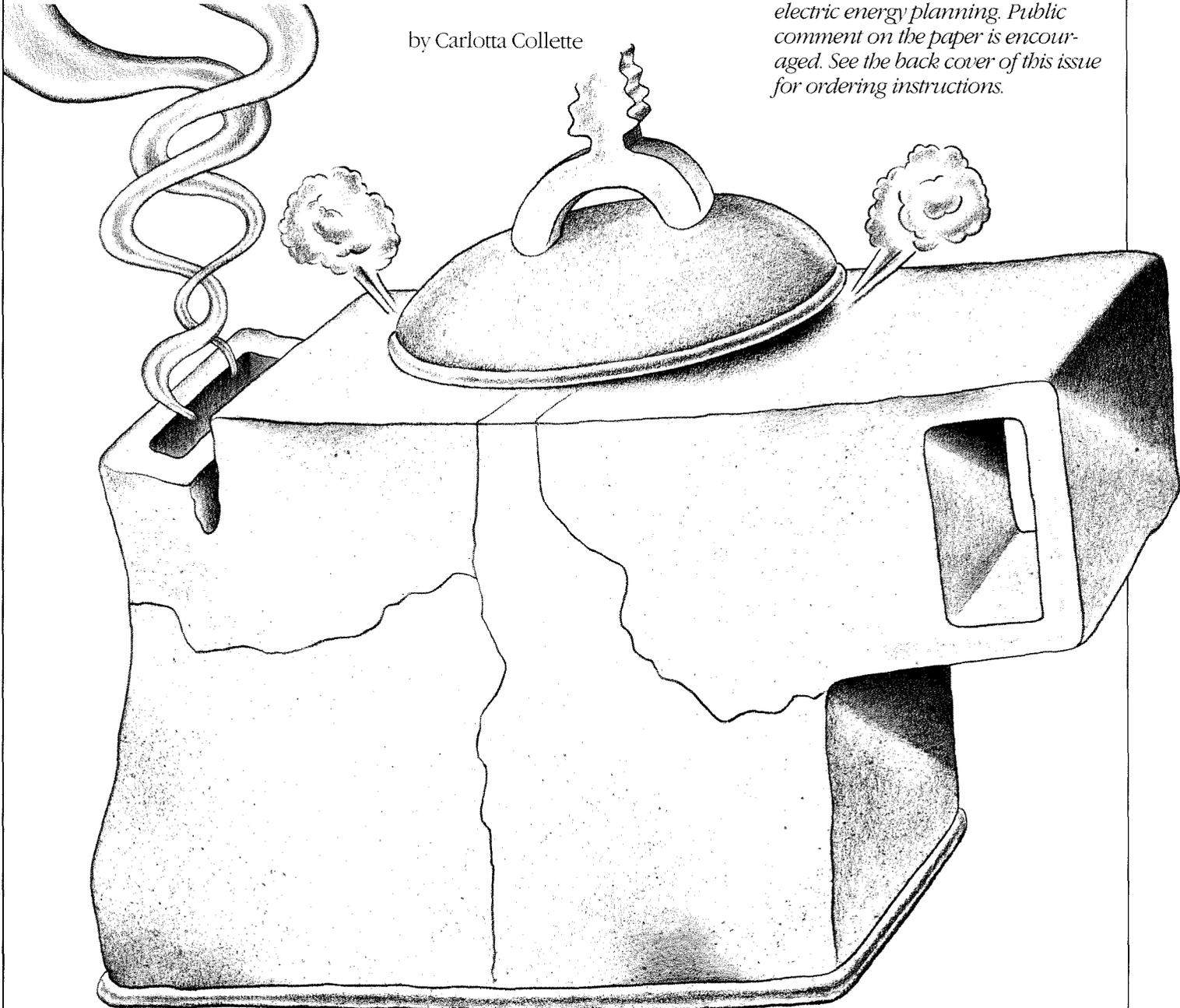
An overview of the Council's meeting on the greenhouse effect.

**O**n February 9, 1989, the Northwest Power Planning Council invited experts from around the United States to spend the day briefing Council members and the

public on the much-publicized phenomenon known as "global warming." Copies of the proceedings of that event (publication #89-2) are available from the Council's

public involvement division. Council staff has also prepared an issue paper (publication #89-7) which looks at ways to incorporate environmental costs of resources in electric energy planning. Public comment on the paper is encouraged. See the back cover of this issue for ordering instructions.

by Carlotta Collette



**“We’re talking about a warming greater than a million years of climate history ... and we’ll be doing this in less than 100 years.”**

— Dr. John Harte

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throughout the planet, an activity that, according to Dr. John Harte of the University of California at Berkeley, might be contributing about 20 percent of the greenhouse gas increase. This is because trees, like all growing plants, transform carbon dioxide into oxygen and biomass through photosynthesis. Take away the trees, which could make use of the carbon, and we are left with the carbon dioxide.

Atmosphere samplings taken in Hawaii over the past 30 years indicate that there has been an increase in carbon dioxide concentrations of 15 percent, just during that time period. Atmosphere trapped in Antarctic ice can be measured back to the mid-1800s. These samples suggest that carbon dioxide and other greenhouse gas concentrations have increased by 25 percent since preindustrial times.

Climate records also show an increase of nearly 1 degree Fahrenheit in earth’s temperature over the past 30 years. Furthermore, the four warmest years in this century occurred in the 1980s. Scientists, including Schlesinger, have used computer models to simulate future changes in greenhouse gas levels. Their findings cover a broad range of likely effects, the most likely being a doubling of these gases by the middle of the next century — about 60 years from now.

**T**echnically speaking, the “greenhouse effect,” which triggered major concern last summer when the heat and droughts were portrayed as precursors of a global warming, is nothing new. So called greenhouse gasses — predominantly water vapor, carbon dioxide and ozone — make up less than ¼ of 1 percent of the earth’s atmosphere. They are the blanket that keeps earth’s surface temperature warmer than the true atmospheric temperature outside the gas layer.

They do this by trapping solar radiation before it can reradiate off the planet, much the way windows let sunlight enter, but block some of it from leaving. Without greenhouse gasses, earth’s surface temperature would be about 60 degrees Fahrenheit colder than it is, explained Dr. Michael Schlesinger, professor of Atmospheric Sciences at Oregon State University.

Schlesinger described the earth’s atmosphere in terms of a theoretical air column running from the surface six miles out into space. “Of that six miles, carbon dioxide makes up only 10 feet,” he said.

But scientists have learned through historical and geological records that the concentration of carbon dioxide is increasing. Carbon dioxide is given off when fossil fuels, such as coal, oil and gas, are burned. The world’s growing dependence on these fuels for transportation and electric power, among other uses, has resulted in enormous amounts of carbon dioxide being released into the air.

Compounding the problem has been the trend toward deforestation

“But what difference if the carbon dioxide concentration doubles, and the six-mile column of atmosphere has 20 feet of carbon dioxide instead of 10 feet?” Schlesinger asked.

Answering his own question, he explained, “The increase in carbon dioxide will change the climate of the earth. What we don’t know is exactly how and where.”

To draw some conclusions about possible effects of this gas-concentration change, scientists are looking both backward into geologic history and forward by studying mathematical probabilities. In the long look back, scientists have had to go three or four million years into history to find a time when earth’s temperature was equivalent to that expected as early as 2050.

**S**chlesinger told of a Soviet scientist with whom he had worked, who was embracing this potential tropical transformation. This scientist concluded that his policy would be to “burn more fossil fuels ... to return to paradise lost, a time when the earth was warmer and more humid, and when, therefore, man did not have to toil and, instead, could pick the bounty of nature without aggression.”

No one at the Council’s briefing shared the Soviet scientist’s enthusiasm. There seemed to be no question that carbon dioxide levels in the earth’s atmosphere are increasing, and that this growing density will cause worldwide warming.

Alarm is triggered as much by the pace of this climate shift as by the degree. “We’re talking about a warming greater than a million years of climate history,” explained Harte,

"and we'll be doing this in less than 100 years."

But Harte also argued, in an effort to point out "what's fact, what's a hunch and what's pure unadulterated hogwash," that, "We have a much poorer idea of the effects of this on moisture than we do on temperature ... the models disagree tremendously on moisture effects, but most models say it will be dryer in the bread basket [of the United States] and in parts of the Soviet Union."

When asked whether natural weather cycles could be causing the changes and could be expected to correct apparent problems, Harte responded, "There's no way, unless we're completely wrong about those [global climate] cycles and their relative regularity, that all of a sudden, in the next hundred years, they're going to conspire to save us. We know where we are in those cycles, and they're slow. They don't change anything very much over hundred-year time periods. They only cause change in 20,000-year time periods."

Following Schlesinger on the agenda, Dr. Dennis Lettenmaier, from the University of Washington, described how he has used climate change models, including Schlesinger's, to attempt to quantify changes in the West's hydrology, or water system. The most likely difference he could perceive would be a decrease in snowfall and a complementary increase in rain, due to the general warming projected in the climate models.

The decrease in snow accumulation could reduce the amount of usable hydroelectric power in the Northwest because this region has limited storage capacity in its system of dams. Snowpack provides the

Northwest with its ability to store "water" for hydropower generation later in the year, when it is needed. Lettenmaier predicted that the region would see much higher runoff in the winter, including more extreme flooding, because there would be much more rain instead of snow.

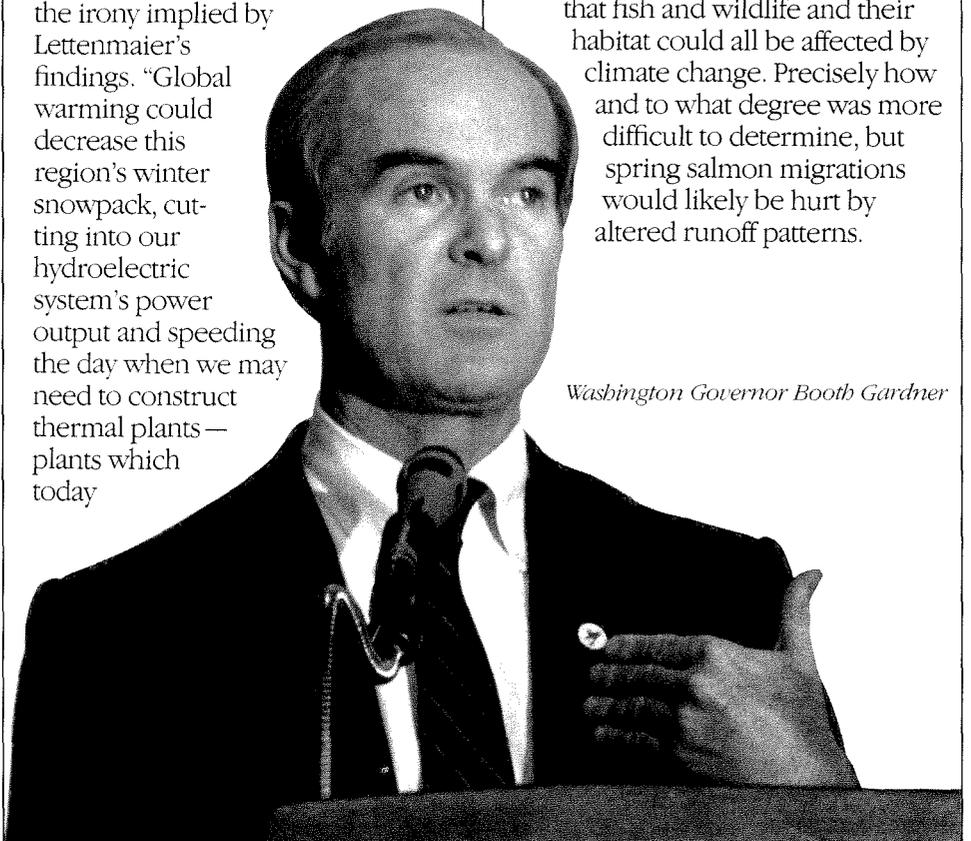
Global warming could also affect Northwest agriculture, because the predicted increase in runoff and resulting energy production would occur during the winter months, which is the wrong time to be of use to most farmers. This change was not construed as a result of a shift in precipitation levels at all. Only the change in temperatures was figured into this projection.

**A**t lunch, Washington Governor Booth Gardner spoke of the irony implied by Lettenmaier's findings. "Global warming could decrease this region's winter snowpack, cutting into our hydroelectric system's power output and speeding the day when we may need to construct thermal plants — plants which today

are a major contributor to the greenhouse effect," he said. (Dr. Gordon MacDonald, who spoke later in the afternoon, noted in his presentation that electric power generation accounts for nearly 35 percent of the greenhouse gas emissions worldwide.)

Dennis Neitzel, a Battelle scientist working on the aquatic ecosystem effects of global climate change, elaborated on the possible impact of global warming on this region's salmon and steelhead. By studying the life history of these ocean-migrating (anadromous) fish and archaeological records, he has been mapping relationships between fish populations and water flows and temperatures. Drawing from both his work and that of other scientists, including Lettenmaier, he concluded that fish and wildlife and their habitat could all be affected by climate change. Precisely how and to what degree was more difficult to determine, but spring salmon migrations would likely be hurt by altered runoff patterns.

*Washington Governor Booth Gardner*



Photograph by Carlotta Collette

Neitzel pointed out that the Council's fish and wildlife recovery program relies on existing environmental conditions — conditions that are likely to change if the global warming phenomenon occurs. He urged flexibility in these efforts, recommending a look at policies that require more efficient water use, temperature control measures at large water storage projects, and better management of flows for fish and wildlife.

Every speaker seemed to concur with Governor Gardner on the role of energy conservation in reducing the amount of carbon dioxide released into the atmosphere. "Without question, the least-cost solution is energy efficiency," announced Dr. MacDonald, who came to the meeting from the MITRE Corporation, a research facility near Washington, D.C., where he is vice president and senior scientist. "However, in this country, we're taking steps away from that," he added.

MacDonald and others who spoke after him described ways in which national policy in the United States has moved away from efficiency — rolling back fuel economy standards for new automobiles, not acting on appliance efficiency standards and not establishing higher levels of efficiency for new construction.

Governor Gardner called first for action in the area of transportation, "which is the biggest source of carbon dioxide in Washington and the Northwest." He argued in favor of increased fuel economy standards, more use of car pools and mass transit systems, and better land use planning to discourage the need for transportation.

**"If we used energy now as we did in 1972, we would be spending three billion more dollars each year on energy. And we would be producing 40 percent more carbon dioxide — 30 million tons more."**

**— Governor Booth Gardner**

The Governor also supports "efforts to make the Power Council's model conservation standards part of Washington's building code. It's the kind of action which we know is effective and which is best done here at the state level," he added. Conservation in the Northwest has already helped, the Governor noted. "If we used energy now as we did in 1972, we would be spending three billion more dollars each year on energy. And we would be producing 40 percent more carbon dioxide — 30 million tons more."

The incremental addition of carbon dioxide from energy use was illustrated best by Richard Watson, director of the Washington State Energy Office. Watson explained that energy conserving buildings in the Northwest are already preventing considerable amounts of carbon dioxide emissions. Flame retention burners for oil furnaces, for example, are cost-effective, he said, and they reduce carbon dioxide emissions by 2,370 pounds per year per house.

Electrically heated homes built to the Council's model conservation standards reduce emissions that would otherwise have resulted from coal-fired generators by 4,300 pounds per year per house. Savings in the commercial sector are even more impressive. Watson showed a picture of a restaurant in Washington that, because of energy conservation

efforts, cuts the amount of carbon dioxide that would have been emitted by electric power plants by 205,000 pounds every year.

He also outlined a two-part strategy that focuses on improving efficiency and some fuel switching to natural gas in the near term, and more energy efficiency, use of renewable resources and possible increasing dependence on nuclear power in the long term. Like several speakers before and after him, Watson called for a "carbon tax" on polluters, and a "least-cost/least-carbon" planning framework for energy policy-makers.

Environmental policy-makers are moving at a somewhat slower pace, studying the greenhouse effect and attempting to determine where global warming may have the most significant impacts, explained Dr. Peter Beedlow, who heads the Environmental Protection Agency's Global System's Team. Beedlow thought that the Northwest is likely to be affected by the climate change because of the region's dependency on natural resources — agriculture, hydropower, the fisheries, etc. More than \$2.5 million is slated for research in ecosystem planning by the agency over the next two years.

Natural Resources Defense Council attorney Ralph Cavanagh, whose presentation followed Beedlow's, said that this region "has done perhaps as much as any in the world to re-educate all of us on the point that conservation is not synonymous with sacrifice or doing without or economic stagnation, that conservation is a word for a concept connoting a way of getting more work out of less energy. Global warming,

**Global warming, with all of its uncertainties, is one more addition to a very long list of reasons to support energy-efficiency measures.”**

**— Ralph Cavanagh**

with all of its uncertainties, is one more addition to a very long list of reasons to support energy-efficiency measures,” he added.

In the past, Cavanagh explained, energy use was expected to grow because the trends had all been upward. “This body,” said Cavanagh, referring to the Council, “showed that what happened to energy consumption trends was not destined ... it was something we had control over, it was something we could influence, something we could make choices about. And it will be this body’s great heritage,” he added, “that it has shown us how, if we only have the will to do it, we can choose a different future ...”

Cavanagh, also had a list of things to do to postpone and ameliorate the potential climate disaster. He called first for the inclusion of the model conservation standards in Washington’s building codes. Second, he called for tighter efficiency standards for the commercial sector. Third: “We need to change the system so a utility’s profits do not rise and fall in lock-step with the number of units of energy it persuades people to buy ... Why on earth do we want to reward our utility managers based on their sales volumes?” he asked.

Cavanagh also asked that the Council “anticipate those costs [of mitigating for carbon emissions in future power plants] and accommodate them up front, so that we aren’t in a position of investing in a 50-year resource that becomes dramatically more expensive to run than you could have anticipated, five years after it is built ... It is absolutely critical,” he emphasized, “... that we bring in the costs of dealing with

carbon dioxide emissions and treat them up front as part of what is relevant in evaluating whether we go for conservation, whether we go for generators, and what’s the best buy for the ratepayer.”

**M**ichael Totten, legislative aide to Rhode Island Congresswoman Claudine Schneider, echoed Watson, Cavanagh and others who claimed energy conservation is the first step to take to deter the effects of global warming. Totten summarized the Global Warming Prevention Act, which Schneider introduced during the last session of Congress. (In this session, the bill has 45 cosponsors in the House and in the Senate.) He explained that it is built on the “least-cost planning model from the Northwest Power Act of 1980 [which led to formation of the Council], broadened to encompass transportation.”

Then Totten drew from a study called “Energy for a Sustainable World,” which looked at alternative ways the world could accommodate a doubling of its population and a quadrupling of the total planet gross national product. That growth could require “a new Alaskan pipeline every one to two months ... or a 500-megawatt coal plant every two to four days.” This would result in a tripling of carbon emissions by the beginning of the next century, he said.

The alternate view is that such growth could be accommodated using currently available efficiency technologies. One example he gave was of energy-efficient high pressure sodium lightbulbs to replace conventional incandescent bulbs. Two factories that produce these bulbs could, he reasoned, “displace three million tons of coal or a half billion dollars per year in savings off consumers’ energy bills.”

Raising fuel efficiency standards for automobiles to 45 miles per gallon and for light trucks to 35 miles per gallon would “save in 30 years about eight billion barrels of oil from being combusted.” This is equivalent, he went on, to “all the oil expected from the offshore drilling off California, the Alaskan pipeline, the Arctic National Wildlife Refuge and the Atlantic Coast.”

At the beginning of the seminar, Council Chair Tom Trulove had quoted former director of the Tennessee Valley Authority, David Freeman. “I am not a doomsayer by nature, and do not believe we face a choice between an unliveable climate and freezing in the dark,” Freeman had said. “But I do believe that our quality of life can be sustained and improved with a dramatically lower level of energy consumption.”

Trulove, and all of the speakers throughout the day, concurred. “Ultimately, it is not what we have that can make us a great region or a great nation,” Trulove said. “It is how we use it. It is how we use the environment we have and the advantages with which we are blessed.” ■

Dulcy Mahar Interview with

# Marc Sullivan

*In many ways, Marc Sullivan represents what a lot of people hoped they'd never outgrow—the youthful idealism, zeal and willingness to sacrifice a big paycheck to work for big, deeply-felt causes. Undoubtedly, there are others who think he has characteristics that should have been outgrown—youthful brashness, feistiness and the readiness to put a black hat on “The Establishment.”*

*But those aren't necessarily polarized views of Sullivan. Often, the same people, regardless of what side of an issue they're on, hold these mixed feelings about the man. He can be abrasive, but he can also be wonderfully articulate and witty. He is passionate about his causes, but he is also pragmatic and willing to negotiate.*

*The pragmatism did not come easily to Sullivan. But pragmatism may be what has made him and the coalition he represents most effective. “We're trying to win policy changes,” he explains, “not to just get media.”*

*For the last five years, Sullivan has been executive director of the Northwest Conservation Act Coalition, a job he is about*

*to leave. The coalition was set up in 1981 to watchdog the implementation of the Northwest Power Act. It is an umbrella organization for 41*



Illustration by Lynn Carson

groups encompassing some 500,000 people, although it is also open to individual memberships.

Its member organizations include a number of environmental groups — Sierra Club, the Natural Resources Defense Council, Friends of the Earth and state environmental groups. It also represents electric ratepayer groups, alternate energy associations, community action agencies, government education groups such as the League of Women Voters, and even some utilities — or what Sullivan calls “progressive utilities.”

Originally, the coalition’s focus was intended to be purely regional, according to Sullivan. It would work with the Bonneville Power Administration and the Northwest Power Planning Council. In fact though, the coalition has ended up spending a lot of its time working with state and local utility decision-makers. This is in part due to what Sullivan describes as the “stability of the [Northwest power] plan ... that has freed us up to go out there and spend more time on implementation at the local utility level than we had originally expected.”

Sullivan claims no prior background in energy issues. In fact, he says he fell into coalition work purely by accident. It seems a canvasser for a Seattle ratepayers’ activist group knocked on his door. The ensuing discussion got him interested, and he attended a meeting. From there he became an activist and joined a group called “Don’t Bankrupt Washington,” which opposed the state’s nuclear power projects. After a year with this group, he joined the coalition.

A political science major at Stanford, he says he wasn’t big on career plans back then. Apparently, that’s still true, because he’s leaving the coalition without another job on the horizon. “I have a low boredom threshold, and so I like dealing with different issues. That’s one of the reasons I’m moving on. Six years in one job is quite a stretch by my standards. I’m leaving for a change,” he adds.

## Why doesn’t Bonneville just develop a resource acquisition process and not create divisions between “generating” and “conservation” resources?

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*His short-term plans include something “completely different.” He’s applied for jobs ranging from park ranger to cook on a schooner, and is seriously thinking of going to Bolivia for a few months of mountaineering. His wife, Adair Dammann, is a union organizer and mountaineering guide. He says she shares his sense of adventure and hasn’t tried to discourage him. For the long term, he’s “open to suggestions.”*

**Q. More than most, you have had an opportunity to monitor the Council and implementation of the [Northwest Power] Act over the past eight years. What changes have you seen? Where do you think there have been achievements, and what has disappointed you?**

There is a good news side, which is how far we have come, and the bad news is how far we have yet to go. On the good news side, every time that I start to get a little discouraged, I go back and look at PNUCC’s<sup>1</sup> 1975 forecast of [electrical] loads and resources, which projected that by 1995, in addition to the thermal plants that we actually have built, we would have completed Creston coal plants 1 through 4, Skagit Hanford nuclear plants 1 and 2, Pebble Springs nuclear plants 1 and 2, Washington nuclear plants 1 and 3 through 5, thermal plants A through J of unspecified character totaling 12,000 megawatts, and

9,400 megawatts of new hydro and pumped storage.

When you compare that to the 1986 [Northwest power] plan, the revolutionary difference is obvious. Virtually all of those plants have disappeared from the forecast or, at a minimum, they ain’t going to be built by 1995. There have been substantial changes on that side of the ledger. And of course, even more crucial is a resource that didn’t even appear in PNUCC’s 1975 forecast. Conservation is now the highest priority resource in the entire plan.

The bad news side is a lack of accomplishment on both the conceptual front and in actually implementing some of our new concepts. Let me start with the concepts that I think have proven difficult. To me, the most fundamental changes that the regional Act made in the way that utilities were supposed to plan for the future were, first, a change in focus from rate-per-kilowatt-hour to a focus on long-term system costs, that is, the total cost of electrical energy service.

Second, treating conservation as a resource equivalent to new generating plants. Third, treating environmental costs fully as seriously as economic costs. And fourth, opening the planning process to folks not traditionally a part of it. I guess that on each of those conceptual fronts I’m a little disappointed at how far we have come.

I do not believe that the majority of the utilities in this region have yet convinced themselves that minimizing long-term system costs is a more fundamental goal than minimizing rates per kilowatt-hour. And I’ve been particularly disappointed at the focus on near-term rates. It would be bad enough if we were focused on long-term rates as opposed to long-term costs, but in fact we are focused almost exclusively on near-term rates.

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<sup>1</sup>PNUCC — Pacific Northwest Utilities Conference Committee; umbrella organization of Bonneville’s major power customers.



Bonneville's decisions on what conservation to fund are the clearest example of this problem. They, themselves, have made a finding that it would be cost-effective to spend \$25 million a year more for conservation than they actually proposed to spend, and that we would realize net present value<sup>2</sup> benefits of about \$50 million, if they were on the least-cost conservation path in Fiscal Year 1990 and Fiscal Year 1991. But they're not going to do that. And as far as I can tell, the reason is because of the desire to avoid what I would have to characterize as really miniscule near-term rate increases.

Bonneville's estimate is that fully funding the least-cost path of conservation would increase Fiscal Year 1990 rates by .15 mills — that's half a percent at the wholesale level. Of course, by the time they got to the retail level, even for a utility that bought 100 percent of its power from Bonneville, that would be a quarter of a percent rate increase.

But they've made that choice. They have decided that they are willing to sacrifice what they themselves think are long-term cost savings to avoid that very modest near-term rate impact and a very modest amount of near-term borrowing. That's the sort of evidence that makes me believe we are still excessively focused on rates rather than costs, and that we're particularly focused on near-term rates.

We continue to hear from Bonneville that — and I think I can say this word for word because they've said it so often — "low and stable rates are the greatest contribution Bonneville can make to Northwest economic development." I emphatically disagree.

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<sup>2</sup>Net present value — Value in 1989 dollars of returns expected in the future.

I think that the Council from the beginning was willing to read the Act and then respond to what it actually said, rather than attempting to twist the truly revolutionary concepts of the Act into comfortable old channels.

Minimizing the region's total cost of energy services over the long term is the greatest contribution Bonneville can make. This goal has the added advantage of being consistent with the regional Act, which the rate focus does not.

The second concept is that conservation is truly a resource. Obviously, we've made some progress there, but I've got to say that the continuing reluctance of utilities to pay a substantial portion of the cost of conservation improvements, in the same fashion that they would routinely expect to pay the cost of new generating plants, raises in my mind a lot of doubts about how fully the utility community has taken in the concept that a conserved kilowatt-hour is completely equivalent to a newly generated kilowatt-hour.

**Q. Do you think that's because conservation doesn't show up on the revenue side?**

That may be a factor. Clearly, the effect on revenues, the no losers test,<sup>3</sup> those sorts of things, have been a factor, but that gets us back to that first conceptual leap. If your focus is on minimizing system costs, then the rate



impacts are not going to concern you seriously if you see reductions in costs. But it's been a slow movement to get equitable treatment of conservation on the same basis as resources.

Bonneville has recently announced that they're developing a generating resource acquisition process, which, once again, raises the question of why we continue to draw these distinctions. Why doesn't Bonneville just develop a resource acquisition process and not create divisions between "generating" and "conservation" resources?

The third conceptual change was taking environmental costs as seriously as we take economic costs. We've seen some progress there. The protected areas decision<sup>4</sup> was, in our view, one of the more sweeping and significant steps to really take environmental costs of power development seriously. At the same time, though, we have been disappointed in the progress made in counting environmental costs in energy resource planning.

Seven years ago, we argued that a conservative estimate of the unmitigated environmental costs of new coal-fired power plants was 20 to 30 mills per kilowatt-hour. To the best of my knowledge, that hasn't been refuted by anybody, but neither has it been incorporated into the Council's planning. Our view is that, taking those numbers seriously would have a really significant effect on our thinking about future resources.

If, in fact, our marginal resource is not a coal plant costing 50 mills per kilowatt-hour, but is an 80-mill resource taking into account either the unmitigated costs of the CO<sub>2</sub> [carbon dioxide] production or the cost of removing the CO<sub>2</sub>, that has some real significance for

<sup>3</sup>No losers test — Using the no losers test, expenditures for conservation are limited to those which will have no rate impacts on any users.

<sup>4</sup>Protected areas decision — In 1988, the Council agreed to designate about 44,000 miles of valuable fish and wildlife stream habitat closed to future hydropower development.

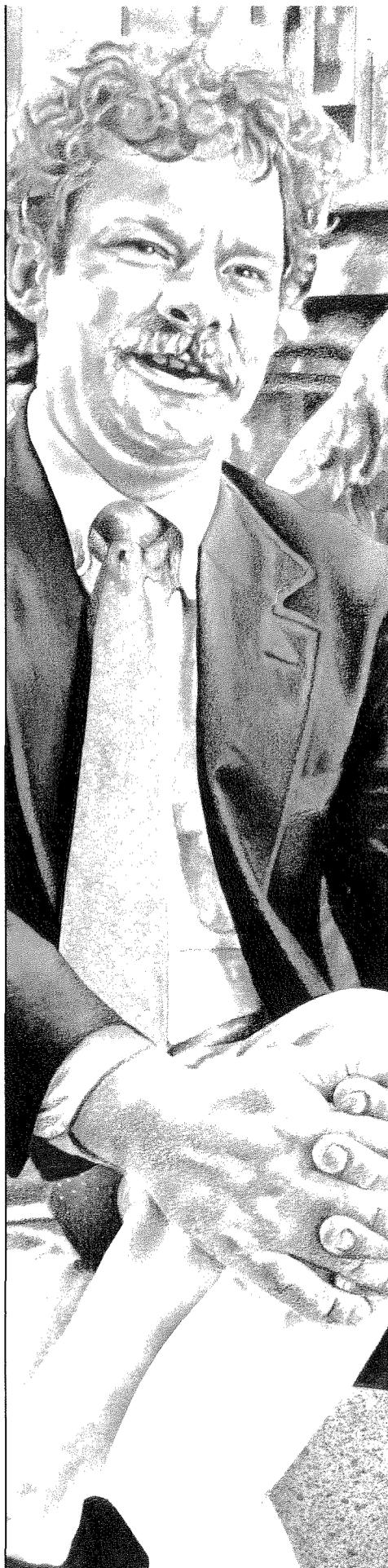
what amount of conservation is cost-effective. It has enormous significance for the cost-effectiveness of renewable resources such as geothermal and wind.

Up until now, the Council has felt that it could comfortably put off much of the analysis of environmental costs until it had to consider site-specific decisions to build particular resources.

The fourth conceptual change was opening up the process — granting the legitimacy, in fact more than that, the necessity of participation by parties other than the utilities and the traditional participants in this process. Partially I'm thinking of my group, but I'm thinking also of folks like Indian tribes, fish and wildlife agencies, state and local governments, a whole host of players who were not actively involved in this process 10 or 15 years ago. I think that's the area where we have made the greatest progress.

I'd give the Council the first large piece of credit for showing the way. The process that went into the development of the first regional energy plan was really unprecedented, and I think it set a standard that we have effectively managed to hold other entities to.

But I'd have to give Bonneville a lot of credit for having made substantial progress in opening up their decision-making process. I was frustrated at some of the outcomes of the Programs-in-Perspectives<sup>5</sup> process. We didn't get the results we wanted in terms of conservation funding. But I thought that it was still emblematic of an agency that's opening up the books to an unprecedented degree. Bonneville was willing to send all of its top managers around for a couple of weeks at a time, get them out of the office and make them go out there and listen to folks. That's an area where I think the progress is incontestable.



A consumer dollar formerly spent on energy, that is shifted to the average of all personal consumption expenditures, will double or triple its job-creating power just by that shift. That's the largest way in which conservation drives economic development activity.

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**Q.** As a result of Programs-in-Perspective and the concerns they heard about fish and wildlife spending, Bonneville has been working with the Council to pin down fish and wildlife program costs and to provide information to customer groups about what their investment is getting them.

I wish that Bonneville would take that aggressive an attitude on conservation. I freely concede that the message they heard from the vast majority of the utilities was "no rate increase, no how, no way." Their budget may very well be responsive to that message. But, that is *not* the message they heard from the Conservation Act Coalition. That is *not* the message I think they heard from the Power Planning Council. That's not the message they heard from state and local governments. But they chose to respond to the utility message they received.

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<sup>5</sup>Programs-in-Perspective — In 1988, Bonneville held a series of public meetings around the region to examine specific programs the agency funds.

I heard Jim Jura [Bonneville's administrator] lament that they are unable to do a lot of things they would like to do in the conservation area, precisely because of what he saw as the necessity to respond to that overwhelming pressure for no rate increases in the near term. I would have been happier if Bonneville had turned around and worked with those parties that were willing to invest a little bit now to save a lot later and engaged in a major educational effort, rather than simply acquiesce to what I think is fairly nearsighted pressure from too many of its customer constituents.

**Q. In your membership letter, you have stated that conservation may have saved as many as 400,000 jobs in the Northwest. How did you arrive at that figure?**

One of the members of my executive committee is Jim Lazar, who is pretty well known to most folks in this business as a consulting economist in Olympia. Jim thought it would be useful to go back and, using some standard input/output models and standard multipliers, figure out the economic development effects of the energy conservation that we were already doing.

What he basically came up with was an estimate that if Northwesters were using as much energy per capita as we were a decade ago, at least 75,000 people who are employed today would not be employed simply because of the drain of money out of the Northwest economy. This could be as many as 400,000 jobs that are employing Northwesters today, which wouldn't be there if we hadn't been conserving that energy. That's completely consistent with a number of other studies that have been done on the economic development benefits of conservation.

A lot of attention has been focused on the fact that conservation directly creates more jobs than building power plants, that it's a more labor-intensive way of producing energy. But what has

**Folks outside the utility sector are beginning to understand how much energy efficiency could serve as a foundation for sustainable economic growth.**

proven to be even more significant is not the production side, but the consumption side. Because it turns out that, if job creation is what you're after, no investment in energy is a very good way to create jobs, and that includes energy conservation.

It's far better to just free up dollars previously spent on energy, put them back into the pocket-book of consumers and the bank accounts of businesses, and let them spend that money on what they will. What they will spend it on is almost certain to create more jobs than spending it on energy. For instance, a consumer dollar formerly spent on energy, that is shifted to the average of all personal consumption expenditures, will double or triple its job-creating power just by that shift. That's the largest way in which conservation drives economic development activity.

Back in 1984, we hired a consulting economist to do a study of economic development benefits of model conservation standards [MCS] adoption. What he found was that every year's worth of MCS homes constructed would, over just the first 30 years of their life, result in 18,000 more job years around the region than producing the equivalent amount of energy from new coal-fired power plants.

Bonneville, two years earlier, hired a consultant to do a study comparing the economic development benefits of their residential weatherization program to nuclear plant construction. They found

similar results that showed, as a result of the greater labor intensity of conservation and the cost savings, there were enormously greater economic development benefits out of energy conservation.

In Washington, the state economic development board is recommending adoption of model conservation standards precisely as an economic development measure. This is a really significant breakthrough. Folks outside the utility sector are beginning to understand that dynamic, and how much energy efficiency could serve as a foundation for sustainable economic growth.

**Q. Over the years, I've heard you joke about being Bonneville administrator. Seriously, if you were, how would you change things? What decisions or new moves would you make?**

Oh, a couple of things right off the top. The first has to do with conservation funding. I already talked about how I fundamentally disagree with the decision to depart from the least-cost conservation path in order to avoid these very modest amounts of borrowing and near-term rate increases. So, first and foremost, I would get Bonneville back on the least-cost path.

Another approach that I expect you have heard from me before is an emphasis on allowing the utilities greater freedom to design conservation programs. I have an instinct that Bonneville and the region as a whole have missed some learning opportunities by offering conservation programs whose features are centrally dictated.

We should try dozens of different things around the region and see what works and then junk those things that don't work and more widely adopt those that do.

It's occasionally a frustration that this region has about 130 different utilities, because that means you have to convince 130 different entities of something before you get all the action you want. But on the other hand, the presence of those 130 utilities has always seemed to me to be an enormous opportunity for experimentation.

**Q. Bonneville is working on one such new program idea—conservation transfers [see related story]. How do you feel about that?**

As far back as 1983, we were among the first to strongly urge the benefits of conservation transfers. We did it in the context of proposals for increased inter-regional transmission capacity and suggested that accelerated development of conservation could be used to support long-term sales down to California to benefit the Californians at that end, but also to partially subsidize the development of conservation resources here.

The proposal has taken a while to get off the ground and is not exactly flying yet, but it's encouraging to see that it's actually moving forward. My only reservation about it is that I fear that Bonneville is thinking of using conservation transfers as a substitute for billing credits.<sup>6</sup> The failure to provide the billing credits that were promised in the Act to encourage independent utility development of conservation has been one of the real disappointments in the first six or seven years of implementation.

I have heard too many suggestions from Bonneville that they think that conservation transfers can completely fill whatever role billing credits might have originally been expected to fill in encouraging independent initiatives by utilities. I don't think that that covers the field, and I think we need to get the billing credits rolling as well.

**Q. To be fair, I should also ask how you would deal with things differently if you were on the Council?**

I think the Council has been going through what I see as an encouraging evolution toward being a more politically effective body. Dan Evans, when he was the chair, made a statement that I fear has been taken too literally by some of his successors. He described the Council as an analytical and not a political body.



What we have amply proven in eight years is that no analysis, no matter how sophisticated, is going to convince all parties. There's going to be a political element in making things happen. All the studies in the world cannot make things happen by themselves.

I think we have a Council now that probably has greater political strengths and experience and sensibility than any we have had before. I say that without having met the two new Montana members, and in some respects I have to leave them out of that simply because I'm in no position to judge their background and abilities. But the other six members are all folks who have had lengthy experience in the give

and take of real-life politics, and I think that we're seeing a more politically effective Council.

I think that what Ted Bottiger is doing up in Washington—working for a model conservation standards bill in the legislature—is a great example of how a politically aggressive and sophisticated Council can get more movement than a Council that relies purely on the persuasiveness of its analysis and its studies.

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<sup>6</sup>Billing credit—A payment by Bonneville (in cash or reduced billings) to a customer for actions taken by that customer to reduce Bonneville's need to acquire new resources.

**Q. If you were to go over some of the key things that the Council has done, how would you grade them? For example, I know you have been concerned over what you perceive as foot-dragging on commercial conservation. Where do you think the Council has done well, and what do you think are the weak spots?**

The Council's willingness to adopt whole-heartedly those conceptual changes in utility planning that I started off talking about has been the most encouraging thing to me. I think that the Council from the beginning was willing to read the Act and then respond to what it actually said, rather than attempting to, as some parties have, twist the truly revolutionary concepts of the Act into comfortable old channels. The whole least-cost planning thrust of the Act has been something we have been real comfortable with.

The protected areas decision was obviously one that had an enormous significance to my members. It indicated a willingness to make some tough calls to actually implement the environmental promises of the regional Act.

You're right that we have been disappointed about lack of progress on commercial model conservation standards. The Council conceded as long ago as 1983 that our criticisms of the current standards were based on proven and commercially available technology, but in the succeeding six years we have seen less action to actually get that proven and available technology on the street.

I'm not sure that we would blame the Council for having placed a higher priority on dealing with anadromous fisheries resources than on wildlife, but I think that we are certainly going to be disappointed if the wildlife mitigation process, now under way, doesn't produce some fairly prompt action for wildlife. We recognize the critical state the anad-

romous fishery was in when the Council started its work and the rationale for making that the highest priority. But I think that it is *at least* time and perhaps past time for some action for mitigation on wildlife.

**Q. One of the major things that your membership has been concerned with is the environmental impact of resource development. Do you feel that there is more sensitivity to this now in the utility community?**

Yes. Our utilities have gotten more sensitized to the reality of environmental costs. Partially, that's purely pragmatic. They have figured out that projects that have the least trouble, that do not end



up canceled millions of dollars down the road, are those that get a clear sense of what opposition they might arouse right at the beginning.

I think that we have seen some progress on taking these things seriously in a heartfelt as well as a purely pragmatic sense. And I think that the mitigation and enhancement programs of the Council under the Act have done a lot to accomplish that.

More than anything, they have made it clear to people that these things can't be swept under the rug, that they will come back to haunt you if you don't deal with them up front. I guess that I'm still not convinced that our utilities by-and-large take environmental costs as seriously as economic costs.

**Q. What has made you most angry? What do you think has been the worst example that's occurred in your tenure as NCAC's director — something that tells you that NCAC still needs to be around?**

Bonneville's refusal to fund the least-cost path of conservation. By their own analysis, they spent less than the least-cost amount in Fiscal Year 1988, they are currently spending less in Fiscal Year 1989, and their current plans and projections would have them underfunding conservation through Fiscal Year 1994. In other words, it's at least seven consecutive years of shorting conservation.

I don't know if there has been anything that has been more frustrating to me than Bonneville, which needs to play a leadership role, failing to play that leadership role in conservation, in least-cost planning.

One of the most striking comments that I heard during the Programs-in-Perspective process was Morris Brusett, then the Montana member and chair of the Council, saying to Bonneville, "How on earth can I go back to Montana and encourage Montana Power Company to engage in least-cost planning and resource development, when all they have to do is turn around and say, 'Bonneville isn't even following the least-cost path.' It puts me," Morris said, "in an impossible situation." So that's been an enormous disappointment, both on its own merits, on the impact that it's going to have on the region's energy future and on the unfortunate example that it sets for other utilities all around the region.

**Q. What has been the most rewarding part of your work? What's been the most fun?**

Well, broadly, I've had an enormously good time in this job. I have found the issues intellectually challenging and socially significant. I've had the pleasure of working with a number of the ablest people I have ever had the opportunity to work with — some of whom are on my side and some of whom are on the other side. All of that has been a real personal pleasure.

In terms of accomplishments, I think that probably the survival of the organization is the accomplishment that I am proudest of. Given the low profile of energy issues, given the history of public interest groups not sticking around for the grinding, nitty-gritty, day-by-day implementation phase, it would have been very easy for us to go out of business, to disappear. I'm proudest of the fact that we did not do that, that we stuck around, that we were able to maintain our viability through all of this period and continue to make a contribution.

**I don't know if there has been anything that has been more frustrating to me than Bonneville failing to play a leadership role in conservation, in least-cost planning.**

I think it's fair to say that there are even a number of utilities which, while they would disagree with much of what we say, have concluded that we play a useful role, and it's to everyone's benefit to have us around. Some of these utilities have helped to financially support the coalition.

Without our coalition, we would be back to the situation where we were in the '70s, where my constituents were not involved in the early stages of things. Programs such as the hydro-thermal power program got years down the road before my folks finally filed suit and helped bring the thing to a screaming halt. At a minimum, I think that folks recognize the useful role we play as an early warning system, letting them know from the beginning what is likely to arouse opposition and concern. ■

# The State of the Region Tomorrow

**A forecast of the Northwest's future,  
and the power plan it plugs into.**

by Ruth L. Curtis

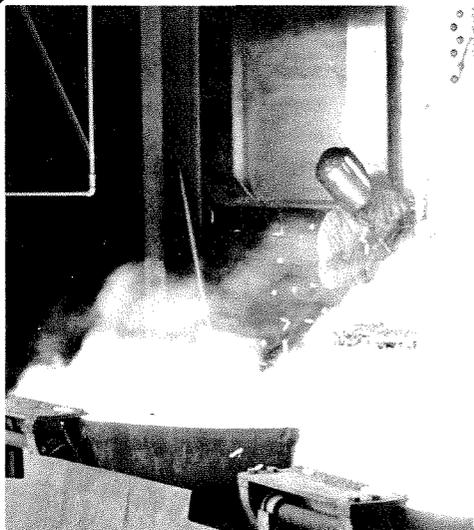
**T**he structure of the 20-year Northwest Power Plan is created by welding together many component parts. The final framework that emerges determines how the Northwest will meet its future electricity needs economically. At the foundation of the entire structure, is the detailed analysis of the region's economy contained in the economic forecast.

Over the past year, the Council has been working on updating its 1986 Power Plan and, as is always the case, a new economic forecast is the first step in that process. The economic forecast is the key factor used to determine just how much electricity will be needed in the future. With this decided, the plan can lay out steps — the infrastructure — needed to ensure that

sources of electricity are ready when they are needed.

This year for the first time, the economic and electricity demand forecasts were developed jointly by the Bonneville Power Administration and the Council. In the past, each had developed its own forecast; the Council's is used in the 20-year power plan, and Bonneville's serves a number of different purposes.

## Northwest Snapshots



**Using nearly half of all the electricity consumed by Northwest industries, primary metal production, such as aluminum, steel and copper, is the largest industrial consumer of electricity in the region.** Most of this energy is consumed by the region's 10 energy-intensive aluminum plants.

The aluminum industry has experienced dramatic swings in

the price of its product, increasing electricity costs and increasing competition from other areas of the world. Just three years ago, a number of Northwest smelters were closing or threatening to shut down. But most recently, the smelters have increased their production in response to higher worldwide aluminum prices and more attractive electricity rates.

To eliminate redundancies and to provide a single procedure for the public to follow, these forecast development activities were merged this year. Terry Morlan, the Council's manager of demand forecasting, says "the process of working with Bonneville and challenging each other about the assumptions we've both used in the past improved the forecasts. And there is no doubt that the public process was much simpler. People didn't have to follow two forecast processes."

The economic forecast develops a range of five different growth trends. These trends span a low to a high forecast, with medium-low, medium and medium-high forecasts in between, bounding the most probable pace of growth. The full range is carried over into the electricity demand forecast and the rest of the power plan. Individual resource portfolios are developed for each growth pattern to ensure that if the region has rapid economic growth, limited power supplies will not constrain that growth, and if slower growth occurs, large and unnecessary resource development costs will not be imposed on the region.

**F**orecasting future energy demand can never be a precise science, as the future by definition is uncertain. But, by closely inspecting each sector of the economy, understanding

## The economic forecast is the key factor used to determine just how much electricity will be needed in the future.

its composition and its many possible futures, one can develop plausible boundaries for each sector's future need for electricity.

"The forecast is built from the details into the aggregate," says Morlan. "For instance, for each Northwest manufacturing industry that uses electricity, we read forecasts about it, talk to people in the industry, and try to get a feel for the good things and the bad things that could happen to it over the next 20 years.

"Then we put together a range of possibilities for the industry, and factor into it such things as inflation, interest rates, and productivity growth rates for the industry. The resulting range shows a spread of possible futures for the industry,

ranging from low to high growth. These ranges are then used to determine what the industrial demand for electricity may be."

Non-manufacturing or commercial industries are studied in much the same way to estimate their potential for economic growth. But future electricity demand is determined in a slightly different fashion. In these industries, it is the buildings that consume the largest amount of electricity, not the industrial processes, so these are grouped according to 10 categories of building types — stores, hospitals, office buildings, schools, etc.

The Council's forecasters know approximately how much energy each building type uses. By estimating the potential growth in each type, they can project how much electricity may be needed in the future.

Future prices of natural gas and oil are also important indicators in the forecast, because they can affect demand for electricity. When alternate fuel prices are low, consumers may switch from electricity. The opposite is true when prices are high.

The residential and commercial sectors are especially sensitive to fuel prices, because the different fuels compete for space and water heating, air conditioning and cooking. In addition, these fuels and coal

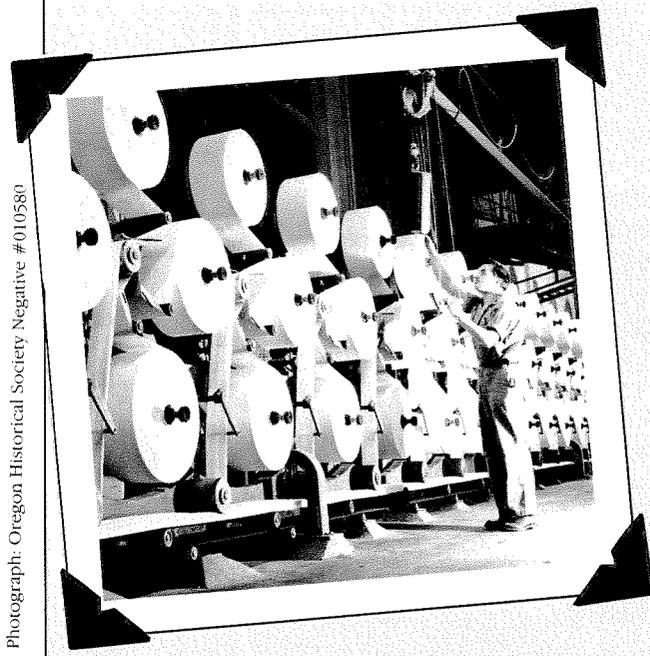
**The pulp and paper industry is the second largest industrial consumer of electricity in the Northwest.** In 1981, pulp and paper production accounted for 21 percent of the industrial consumption of electricity.

The Council's forecasts show that production is expected to grow, while the number of employees is expected to decline due to increased employee productivity.

Several factors affect this industry, such as the cost and availability of wood chips (the raw material for paper), the proximity to markets in the West and the Pacific Rim, and labor

and electricity costs. Pulp and paper producers in the southeast United States are major competitors.

Traditionally, while labor was cheaper in the Southeast, electricity was cheaper in the Northwest. But large increases in electricity rates since 1979 have undercut the Northwest advantage. Not only are electricity costs a major portion of direct operating costs, but they affect the costs of chemicals used in the paper-making process. The production of chlorine and caustic soda (used in the bleaching process) is particularly electricity intensive.



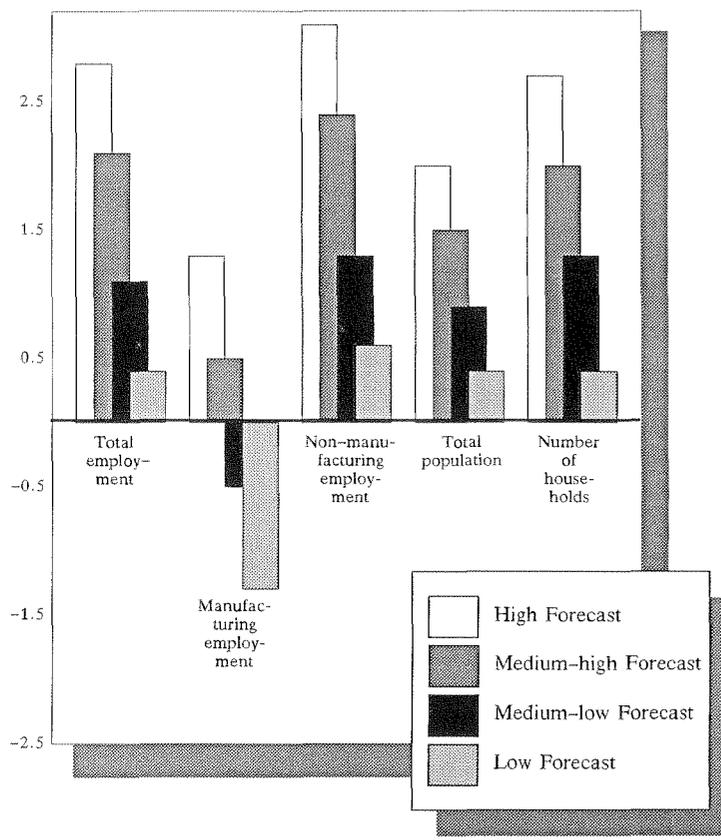
Photograph: Oregon Historical Society Negative #010580

are often used to generate electricity. This means that their costs influence electricity's cost and, hence, how much electricity may be used. To develop the fuel price portion of the forecast, the Council's staff looks at about 30 other forecasts developed by the fuel industries and other economists.

Changes in the Northwest's population are important because, explains Morlan, "population trends relate directly to the number of households, which are then key inputs to the residential demand forecast." Age and income of the population are also important to forecasters. Are many people reaching the age when they would set up their own households? Will people have extra money to buy more appliances? What percentage of the population is at the age likely to be in the work force?

The economic forecast this year suggested several major trends that may occur in the Northwest. The first is that the average age of the region's population is expected to

### PACIFIC NORTHWEST AVERAGE ANNUAL RATE OF GROWTH (%) 1987-2010



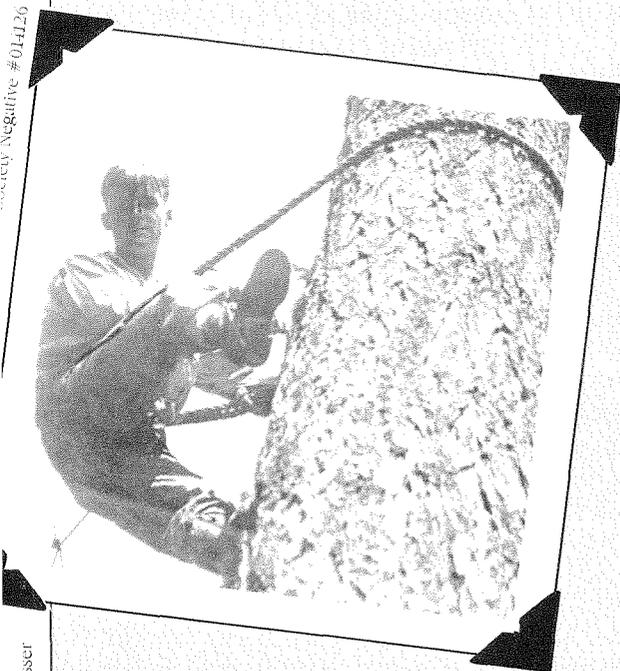
**The lumber and wood products industry is the largest manufacturing employer in the Pacific Northwest, accounting for 22 percent of the region's manufacturing jobs in 1987.** In 1986, the Northwest accounted for 38 percent of the lumber production in the nation, and more than half of this occurred in Oregon.

In recent years, the industry has experienced wide swings in production and employment caused by swings in housing starts (40 percent of the industry's market) and changes in international and domestic demand.

In addition, the Northwest's lumber industry has experienced increasing competition from the southeastern United States over the last several decades. Because of higher transportation, labor and stumpage costs, the Northwest faces

higher production costs than the Southeastern producers. Northwest mills have responded by seeking lower wages and investing in equipment to use labor, materials and time more efficiently. Throughout all of the growth scenarios, these trends are shown to continue—the output per employee will grow, while the actual number employed will decrease.

One area of uncertainty is the amount of future timber that will be available to both the Northwest and the Southeast. Recent studies show that a great deal of the Southeast's privately held timberlands are being lost to other uses—agriculture and urban development. In the Northwest, the U.S. Forest Service is in the midst of developing resource plans that may affect the allowable timber harvest from lands under its management—more than half of the commercial timberlands.



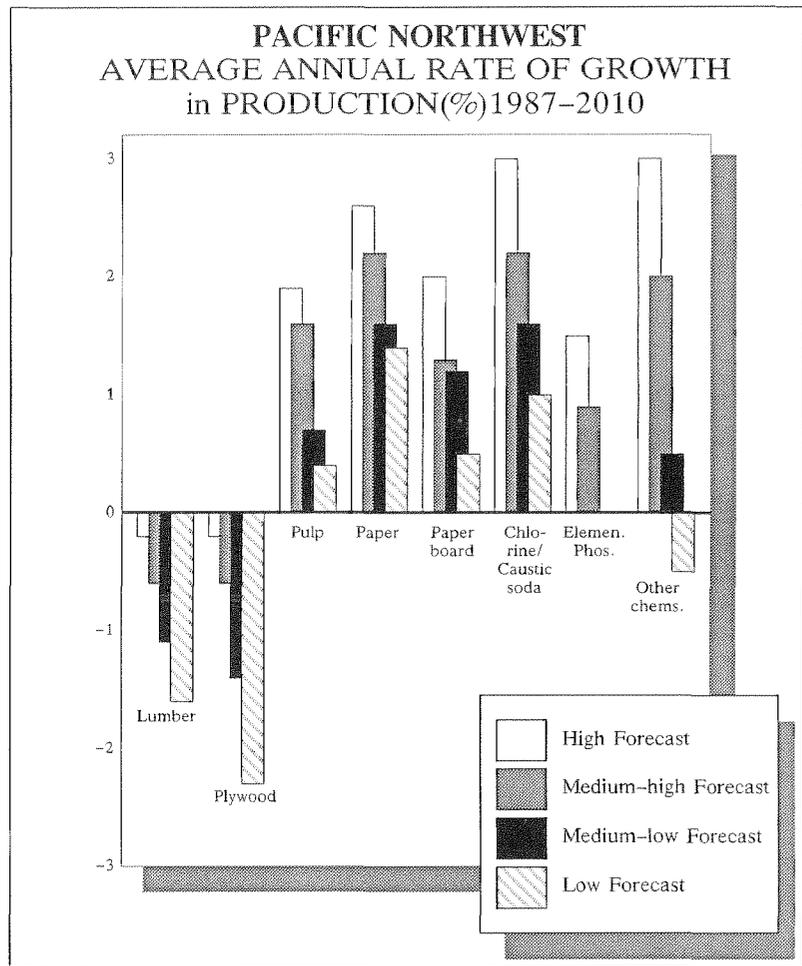
Graph by Stephen Sasser

By the year 2010, the number of citizens over 60 years old will increase by 37 percent.

increase significantly in the next 20 years. By the year 2010, the number of citizens over 60 years old will increase by 37 percent, the number aged 45-59 is projected to increase more than 80 percent, while the number aged 25-34 will decline by more than 10 percent.

As populations get older, they spend a higher proportion of their income on personal services, clothing, travel and health services. At the same time, the labor supply will tighten as the number of young people entering the labor force increases at a slower rate than in the past. Wages are expected to increase as the labor market tightens, and employers will look for ways to increase labor productivity.

Another trend is the increasing proportion of women in the labor force. From 1960 to 1987, the proportion of women who were a part of the labor force increased from 37 percent to 57 percent. This trend is expected to continue, although at a slower rate.



Non-manufacturing industries are expected to continue to grow in importance in the Northwest. In 1987, non-manufacturing industries accounted for 84 percent of the total employment in the region.

In addition, the outlook is especially strong for industries, such as communications and machinery, that play a key role in changing technologies and enhancing productivity.

In the manufacturing sector, the



**The third largest industrial user of electricity in the Northwest is the chemical industry — primarily the producers of elemental phosphorus, chlorine and caustic soda.**

Elemental phosphorus is used in cleansers and detergents, foods and beverages, and for treating metals. Half of the total U.S. production is located in the Northwest near deposits of phosphate rock — two plants in Idaho and one in Montana.

Manufacturing chlorine and caustic soda involves using elec-

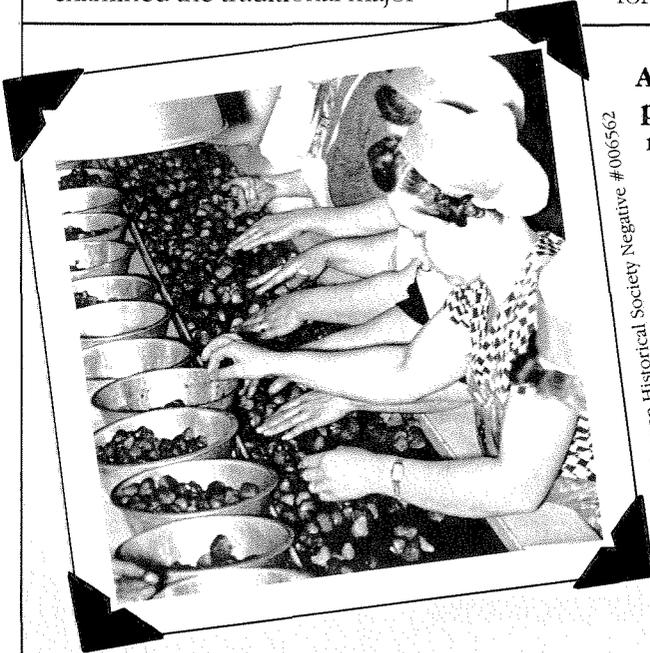
tricity to separate salt into two products — chlorine and sodium hydroxide (caustic soda). Chlorine is used in the manufacture of a variety of chemicals and, especially in the Northwest, in the production of paper. Caustic soda was once considered an undesirable by-product. But, with the tougher environmental standards in recent years, it has been in demand to neutralize waste acids. Five plants in Washington and Oregon produce chlorine and caustic soda.

traditional industries in the region — lumber, paper and food products — are not expected to be important sources of economic growth for the region even in the high economic growth scenarios.

As the Council and Bonneville compiled this forecast, they examined the traditional major

industries in the Northwest. They also studied other industries that, while they are not considered major in terms of profits or employment, are significant in terms of the electricity that they consume. (See boxes for brief descriptions of the industrial components of the economic forecast.)

The Council's economic forecast is still in draft form until the Council decides whether to adopt it or not this spring, when it makes a decision on a supplement to the power plan. Copies of the forecast are available from the Council's public involvement division. (Request document 88-25.) ■

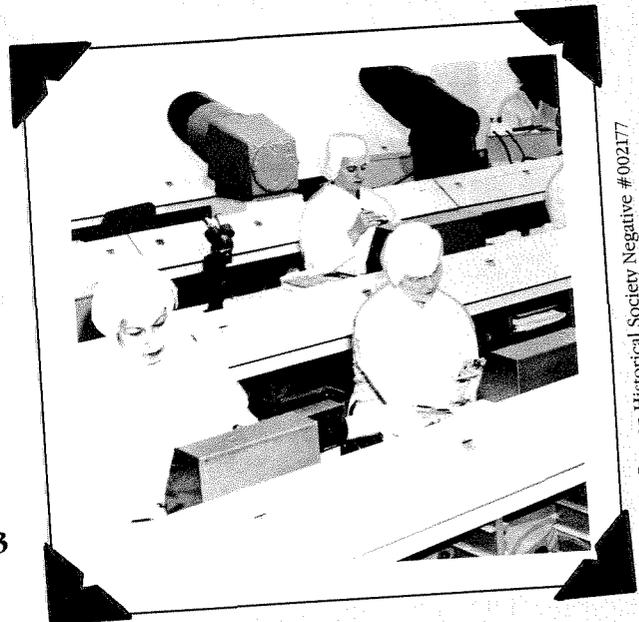


Photograph: Oregon Historical Society Negative #006562

**Agriculture in the Northwest supports a large food processing industry, representing 12 percent of the region's manufacturing jobs.**

Most of the electricity use in this industry is concentrated in frozen and canned fruits and vegetables, especially processed potatoes.

The Northwest's largest agricultural industries are cattle and grain crops, which are not particularly electricity intensive.



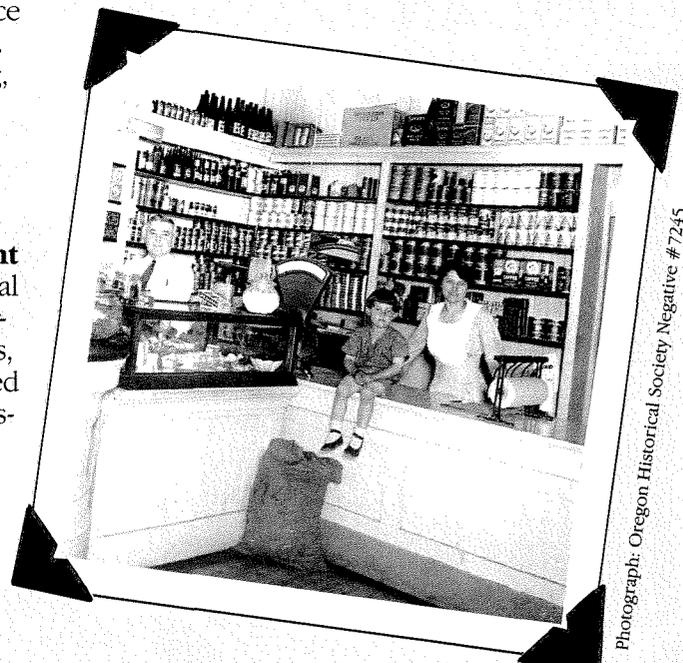
Photograph: Oregon Historical Society Negative #002177

**“High tech” industries — which include the computer industry, the transportation industry and medical instruments — comprise about 5.5 percent of the region's employment, compared to 5.3 percent nationwide.** Since 1970, high technology industries have been increasing faster in the Northwest than the national average.

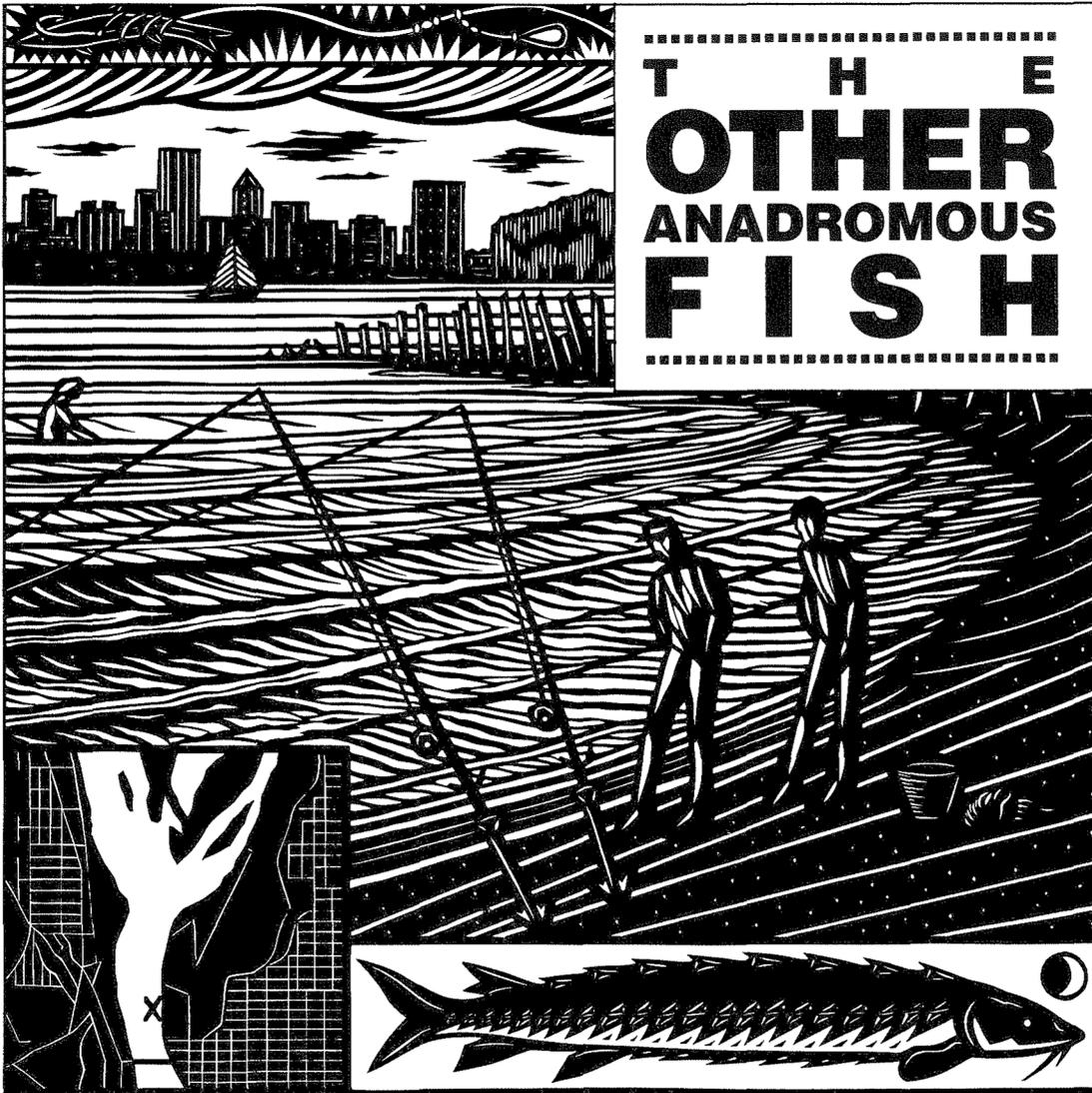
Almost a third of high tech employment is in the aerospace industry, dominated by the Boeing Company in Washington. The market for commercial aircraft is projected to be strong, although it will, as in the past, be highly cyclical.

**Employment in the non-manufacturing sector has grown faster in the last two decades than employment in manufacturing.** This growth has occurred at the national level as well as at the regional level, because a larger proportion of manufactured goods are produced in other countries, and, within the United States, productivity gains have lowered the number of people employed in the manufacturing industries relative to the output in goods.

In 1987, 84 percent of the Northwest's labor force was employed in non-manufacturing jobs. The largest categories of the sector are wholesale and retail trade, services (health, business and personal), and government (including local, state and federal government, as well as education). — R.L.C. ■



Photograph: Oregon Historical Society Negative #7245



## Sturgeon stewardship is also a goal of fish and wildlife program.

by Carlotta Collette

If genetic memory could be recorded, played back and translated into narration, the 200-million-year history of sturgeon could trace a peerless path through time. This old species lived a million centuries before the dinosaurs disappeared. They survived another million centuries after. Sturgeon were sucking primeval slime off the bottom of the sea when there was only one great earth ocean surrounding the single continent, Pangaea. As the enormous landmass began to crack and drift apart, sturgeon swam deep in the rivers that became new oceans between new continents.

They were well designed for such longevity, and they've changed less in their long life history than most mountains. They grow slowly and

live long — up to 100 years. They are this continent's largest freshwater fish. A record 1,800-pound white sturgeon nearly 20-feet long came from Canada's Fraser River, and 1,200-pounders are not altogether uncommon. The world's largest recorded fish was a 4,350-pound beluga sturgeon taken in the Caspian Sea.

Built to last, they are covered in armor. Ridged plates called scutes (similar to scales on a snake, but tougher) march down their backs. Even their heads are protected by stiff cartilage-like shields. As infants, they are rarely consumed by larger fish because the spiny scales of baby sturgeon are sharp. In fact, their only true predators are people. And

people have come awfully close to terminating this ancient beast's stay on the planet.

Sturgeon may have beat our species' arrival on the planet by nearly 200-million years, but from the time sturgeon flesh and roe — better known as caviar — were seen as valuable, the species had less than a decade more in which to flourish. Seven years after the commercial sturgeon harvest on the Columbia began in the 1890s, the fishery was virtually dead. The same fate had befallen sturgeon on the East Coast and in the Great Lakes. Europe's sturgeon populations had all but disappeared years earlier. Only the Soviet Union, which initially depleted its sturgeon fishery but recovered it with innovative

hatchery production (see sidebar), still has sturgeon large enough and in great enough numbers to harvest caviar.

In every other case, the combination of overfishing the larger broodstock and the sturgeon's slow reproductive cycle (females don't bear young till they are about 20 years old) have done in the great fish. In the Columbia River Basin, and parts of Europe and Russia, huge dams landlocked the giant migrants (like other anadromous fish, sturgeon spawn in freshwater streams and rear in the sea) further challenging their ability to survive and adapt.

**B**ut these are heroically resilient titans. In the Columbia, remnant groups cut off between dams have persisted, but their numbers are declining. In the lower basin, below the first dam — Bonneville, North America's largest (and the world's second largest, next to Russia's) sturgeon population still resides. Most of these sturgeon feed in the estuary, but some have been caught as far north as Bristol Bay, Alaska, and as far south as Huntington Beach in Southern California. Fishing restrictions begun as early as the 1890s, broadened in 1950 and expanded over the past few years, are bringing encouraging news to fisheries managers.

It is above Bonneville Dam, in the pools between dams, that there are still serious problems keeping viable sturgeon populations. Part of the problem has been the lack of information about this seemingly deliberately secretive species. Salmon and steelhead have been the subjects of endless studies, but biologists trying to solve the mystery of the sturgeon disappearance often found they didn't know enough about how sturgeon survived to be able to figure out what was killing them off. In some reaches, such as the upper Kootenai River in Idaho and Montana, resident sturgeon that had been fished successfully for hundreds of years simply vanished.

**I**n 1982, when the Northwest Power Planning Council assembled its first Columbia River Basin Fish and

Wildlife Program, designed to reverse some of the harm caused by hydroelectric development, sturgeon were on the agenda. The Council called for research to fill some of the vast gaps in understanding about the ancient fish.

About one year later, the Bonneville Power Administration, which funds and implements the majority of program activities, convened a workshop of sturgeon researchers. The invited scientists came from state and federal fisheries agencies in the Northwest, the Columbia River Inter-Tribal Fish Commission (which had sponsored a similar workshop), the Council and several universities. Among these scientists was Doctor Serg I. Doroshov, one of the Soviet scientists credited with developing sturgeon production technology in the Caspian region of Russia. Doroshov now lives and works in California, at the University of California, Davis (see sidebar).

The goal of this gathering was to agree on research strategies that would identify the effects of hydroelectricity on sturgeon populations in the basin and find ways to reverse the damage, where possible. The scientists evolved a list of over 30 research needs. They refined this list into five categories:

1. Researchers would conduct an assessment of existing stocks through sturgeon tagging and other tracking means;
2. They would also study the habitat needs of these populations;
3. Current migratory patterns would be analyzed, both inriver and at sea;
4. A review of sturgeon production potential would be carried out; and
5. Means to protect genetic integrity of various stocks would be proposed.

To some degree, much of this research fit with work that had been ongoing, particularly in the univer-

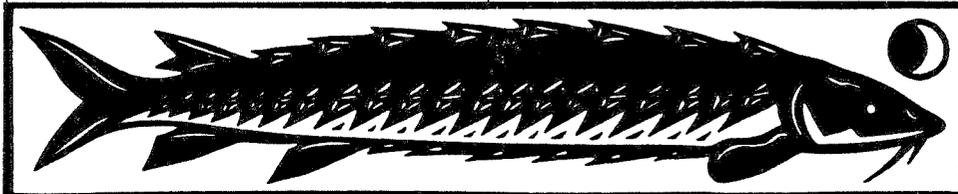
sities. But for the first time, the academic community, the fish and wildlife agencies and the tribes began to coordinate their efforts in behalf of sturgeon. Even the Canadians, whose own sturgeon population had suffered similar setbacks, became interested in the project.

**V**ery early in the research, it became clear that, although sturgeon populations might be increasing temporarily, the more rapid growth in sturgeon harvests was potentially outpacing the population's ability to replace the harvested fish. Sturgeon is now the most popular fish in the lower Columbia sport fishery. Anglers caught nearly twice as many sturgeon below Bonneville Dam in 1987 than all other sport fish combined.

Because of the slow reproductive cycle of sturgeon — males do not mature until they are 12 years old or roughly 4 feet long, and females do not spawn until they are about 20, or 5 feet long — the fish are available for harvest for a decade or more before they grow beyond the 6-foot length restriction set for harvesters.

Sport fishers below Bonneville Dam, whose sturgeon take has more than doubled in recent years, have only been allowed to keep catch that are 3 feet to 6 feet long. Commercial sturgeon fishing is limited to fish ranging from 4 feet to 6 feet. Above Bonneville, where sturgeon populations are known to be very limited, and only Indian fishers are permitted to harvest, the tribes voluntarily cut their harvest back to only 40-inch to 6-foot sturgeon.

**O**ne of the goals identified in this research is a halving of harvest rates on sturgeon below Bonneville Dam by 1991. To help reach that goal, the Columbia River Compact, which sets fishing seasons on the Columbia, proposed that, beginning this April, the minimum keeping length of white sturgeon in the sport



fishery will also be 40 inches.

The difference of 4 inches is more significant than one might think. Of the 62,400 sturgeon caught in the sport fishery below Bonneville Dam in 1987, more than a third (26,000) measured between 36 inches and 39 inches. In 1988, fully 80 percent of the total sport and commercial white sturgeon harvest below Bonneville Dam measured 3 feet to 4 feet.

When 318 anglers from the Lower Columbia sport sturgeon fishery were presented with this information, largely garnered through fish and wildlife program and related research, 57 percent of them agreed that annual catches need to be cut back. Fifty-four percent of these same fishers conceded that increasing the minimum length from 36 inches to 40 inches was the way to reduce harvests and help maintain the sturgeon population.

1987's record sport harvest of 62,400 sturgeon taken in 175,000 fishing trips was nearly double the number of fish caught at the peak of the first great sturgeon harvest in the 1890s. And while the actual number of sturgeon taken in the commercial harvest is small, the high price paid per pound and the relatively larger size of sturgeon compared with salmon or steelhead, give this venerable species the highest commercial value per fish of any Columbia River stock.

Clearly, this is a fishery worth keeping. The lessons of that early sturgeon fishery collapse are not being lost on this generation. Sturgeon have been here since prehistoric times. With luck, adequate information and thoughtful management, they may have a future, too. ■



## N U D G I N G M O T H E R N A T U R E

**S**cientists believe that sturgeon in parts of the upper Kootenai River in Idaho have been landlocked for about 10,000 years. Nonetheless, they were a thriving population, a traditional food and ceremonial fish of the Kootenai Indians of that area. Then in 1972, Libby Dam was constructed, turning 90 miles of the Kootenai River into long, thin Lake Koocanusa, and altering river flows and shorelines both above and below the dam.

Harvests of sturgeon in the Kootenai in Idaho, Montana and British Columbia were quickly slashed to a fraction of their earlier levels. But surveys of the Kootenai River sturgeon population carried out by the Idaho Department of Fish and Game from 1979 to 1982 produced an even more frightening fact than the alarming cut in harvest — no young sturgeon were found! Sturgeon in that stretch of the Kootenai have apparently stopped reproducing.

Through the Columbia River Basin Fish and Wildlife Program, the Kootenai Tribe is working with the Idaho Department of Fish and Game to determine what combination of factors precipitated this sturgeon disaster and whether there remains hope for recovering the population. If egg-carrying females can be located within this genetic stock either in the United States or from Canada (Canadians are participating in this research), a small experimental hatchery may be constructed on the Idaho Kootenai Reservation.

But scientists have only begun to understand sturgeon reproduction. First attempts to produce sturgeon in hatcheries, nearly a century ago, had very limited success. In the wild, sturgeon may produce as many as four million eggs per female. The eggs are released into turbulent, silty streams. In hatcheries, the eggs tend to stick together and spoil.



In the 1950s, the Soviets, whose sturgeon fishery had also collapsed, discovered that mixing silt with sturgeon eggs in the hatchery prevented the eggs clumping. Today, the Soviet Caspian Sea and adjacent hatcheries are the world's primary source of sturgeon caviar. The world's largest sturgeon population comes from the Caspian, augmented by more than 100 million hatchery-produced sturgeon fingerlings each year.

In 1980, Doctor Serg Doroshov, one of the Soviet scientists credited with successful hatchery reproduction of sturgeon, pushed the technology further at the University of California at Davis, where he had recently moved. Using hormones, Doroshov induced ovulation and sperm production in captured wild sturgeon. He also raised sturgeon using artificial feed. California now has at least 12 private commercial sturgeon aquaculture projects in operation. Eggs must be surgically removed from wild fish, which are then stitched up and returned, once they have healed, to the river. Growth of the young sturgeon is speeded up by warmer water and ample, effortless dining.

The current yield is used largely for stocking other similar operations and providing meal-sized fish to a growing market. Still, there's little question that a long-term goal of the budding industry will be growing sturgeon to broodstock size. That could make the Sacramento Delta the caviar capital of California. At over \$100 a pound, the business is likely to boom. — C.C. ■

# Research proves value of energy-efficient housing.

by Jim Erickson and Liz Klumpp  
Washington State Energy Office

**W**hen Johnny Douglass speaks about energy efficiency in homes, people listen. That's because he speaks with confidence.

"A heckuva lot of controversy can be settled when solid data replaces speculation," says Douglass, a Washington State Energy Office engineer specializing in residential energy research. "In the Residential Standards Demonstration Program (RSDP) we collected data. In the Residential Construction Demonstration Project (RCDP) we're collecting more. If you can show the cost-effectiveness of building to higher [energy-efficiency] standards, you can state your case with confidence that energy codes are valuable."

Over the past five years, Douglass has worked side by side with other Pacific Northwest energy professionals on these two major regional research projects. Both are efforts of the Bonneville Power Administration, the region's largest financial contributor to energy-efficient hous-

ing. Bonneville's current residential conservation research efforts are primarily conducted within the scope of the Residential Construction Demonstration Project. This project grew out of extensive prior work.

Bonneville — working through the Idaho, Montana, Oregon and Washington state energy offices — began the Residential Standards Demonstration Program in 1984 to demonstrate practical applications of the model conservation standards adopted the year before by the Northwest Power Planning Council. The Council's standards set energy-efficiency levels for new electrically heated housing.

**T**he demonstration program had a variety of missions. First, it was designed to market energy-efficiency features to both builders and home buyers in the course of constructing 423 model-standards-level homes. Through the program, builders learned cutting-edge energy-

efficient construction techniques. The program also provided an actual test of how well the standards could work. Electricity consumption for space and water heat was monitored in both the model standards homes and 383 "control" homes built to 1980 codes.

The Residential Standards Demonstration Program resulted in five general conclusions:

1. Builders can effectively build energy efficiency into new homes.
2. Home buyers will purchase homes with energy-efficiency measures.
3. Homeowners in the model standards home, on average, used about half the energy for space heating used in the comparable 1980-level homes. (This was consistent through two heating seasons.)
4. Actual costs for building homes to the model conservation standards were very nearly what was originally predicted. The two

**BUILDING  
BETTER  
BUILDINGS**

exceptions were the costs of air-to-air heat exchangers and of the air vapor barrier. Both of these were innovative and relatively untested technologies.

5. As with costs, the average actual energy consumption for these homes came very close to the predicted consumption. This confirmed that computer modeling was an effective tool for estimating the actual heating energy use.

**B**ut were the homes livable? After homeowners had lived in their homes for two heating seasons, they were queried about their experience. The feedback, while not all complimentary, was all very useful.

Most of the homeowners were delighted:

"We enjoy our Residential Standards Demonstration Program home. It is inexpensive to heat and quiet."

"The extra cost for construction was worth every extra dollar spent."

"Works great. I have no plans to put in a wood stove. If I were to build another new home, I would go Residential Standards Demonstration Program again."

Some also had a few concerns:

"I would like a separate fan in the bathrooms in addition to the heat-exchanger vent. This would clear the room of steam in a shorter time."

"The heat exchanger is a little noisy."

Jim Maunder, an energy education specialist in Montana, knows first-hand how much homeowners enjoy the comfort of their energy-efficient homes.

"In Montana's cold climate," he says, "what people notice, because the home is tighter, is that they have to look out the window to know that the wind is blowing. The best selling points of the home are the quality of construction, freshness of the air, and comfort and quietness."

What happened after the Residential Standards Demonstration



Program? Program results were reviewed and used to help modify the standards themselves. Controversial and costly technologies, such as the air-to-air heat exchanger and the air vapor barrier, were eliminated as mandatory features of the standards, although both were retained as options.

Essentially, the program had instructed builders in how to build energy-efficient houses along a certain path. But there still was no way to measure how effective alternative methods could be for achieving similar energy savings. Bonneville needed to develop additional cost-effective and innovative conservation strategies for the Pacific Northwest, and this need spawned the Residential Construction Demonstration Project.

**B**onneville invited Northwest utilities to participate in a program to construct and market electrically heated homes built to the newly modified model standards, while the agency's residential research program provided technical and research support for this new marketing effort.

The marketing program is called Super Good Cents. Participating utilities throughout the Northwest work with Bonneville to market Super Good Cents homes, instructing builders on the construction

**“Our interest in conservation is a practical one. Any energy we can save we can sell for a higher rate.”**

techniques, and provide quality assurance to buyers and ratepayers by inspecting the construction of these energy-efficient homes.

The Residential Construction Demonstration Project is acquiring data on both the cost and energy savings of the homes' efficiency innovations. The project's primary objective is to expand the home-building industry's capacity to provide cost-effective, energy-efficient housing by demonstrating new construction techniques and product innovations.

The Washington State Energy Office manages the project in cooperation with the Oregon Department of Energy, the Bureau of Energy Resources of the Idaho Department of Water Resources, and the Energy Division of the Montana Department of Natural Resources and Conservation.

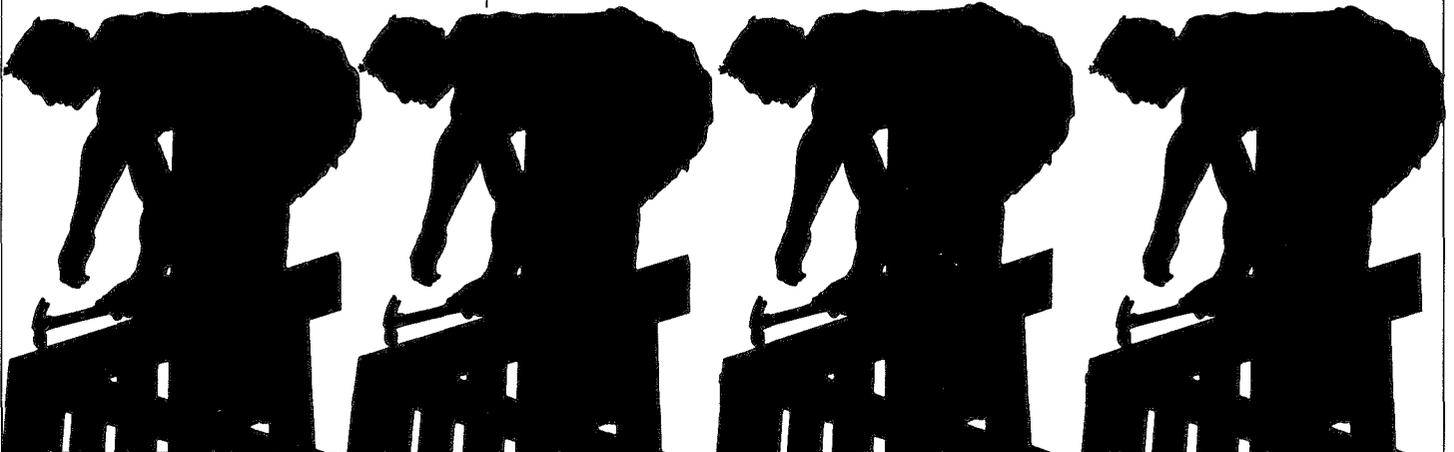
Gary Curtis, of the Oregon Department of Energy, finds the analyzed data very useful as he works daily with residential contrac-

tors and utility representatives. “Now we have real-world evidence on measures that are cost-effective to consumers,” says Curtis. “We've told utilities what we learned. And we've used utilities to help recruit builders. The utilities liked being the primary contact with builders.”

Dick Gorman of Snohomish County Public Utility District's Super Good Cents program in Washington echoes those sentiments: “It's crucial for the utility to be an active participant. We work with builders on a daily basis. We can elaborate on the intent [of a program] and we can troubleshoot, too.”

Dave Cassel, energy conservation engineer for Grant County Public Utility District, believes that utilities are concerned about these programs for conservation's sake, noting, “I think utilities feel that conservation is the lowest cost resource. It makes sense to us even though we own two dams (Priest Rapids and Wanapum) and our rates are among the lowest in the nation (about 1.45 cents per kilowatt-hour). Our interest in conservation is a practical one. Any energy we can save we can sell for a higher rate.” (See related story on conservation transfers.)

Dennis Sweeney, president of the Inland Energy Efficient Builders Association in eastern Washington,



can speak for builders on what the research programs mean. "A few builders are on the cutting edge," he says. "We're looking to build more energy-efficient homes. The seed has been planted by the research programs and should eventually flourish with the rest of the builders. We need to keep the edge sharp and address the need for deeper inroads into the larger building and buying community."

So far, 165 homes have been built under the Residential Construction Demonstration Project's first phase (called Cycle I). With the building segment of the second phase (called Cycle II) now winding down, there will be 182 site-built and 150 manufactured homes constructed throughout the region.

During the two cycles, innovations such as air-to-air heat exchangers, exhaust-air heat pumps, non-heat recovery ventilation, and super-efficient manufactured housing were studied.

Some early results from Cycle I indicate that the houses are performing as well, if not better, than the homes constructed during the earlier Residential Standards Demonstration Program. Homeowners involved in Cycle I now are receiving results of monitoring that took place during the 1986-87 and 1987-

## "The extra cost for construction was worth every extra dollar spent."

88 heating seasons. They are learning how their homes' energy performances stack up with others throughout the region.

Ed and Alice Haynes of Ocean Shores in Grays Harbor County, Washington, had a home built in the Residential Construction Demonstration Project, Cycle I.

"We were just thrilled when we read the report," says Ms. Haynes. "Our house is so comfortable. When we go anywhere else, we freeze. The advantages of our home are wonderful. More people should know about these homes."

Residential Conservation Demonstration Project homes were designed to reduce air leakage through ceilings, walls, floors, etc. The leakiest home studied in Cycle I was tighter than the average conventionally built home.

Cycle I homeowners ventilated their homes with air-to-air heat exchangers an average of 8.7 hours a day. The extremes covered the full spectrum — one homeowner didn't

operate the air-to-air heat exchanger at all, and another operated it 24 hours a day.

Much has been learned from both research programs. Project researchers have identified costs, measured home performances and tested effective ventilation. They have produced information about energy efficiency as a resource and helped facilitate the adoption of more cost-effective energy codes in Washington and Oregon. They have also helped utilities by providing technical credibility and support for the Super Good Cents marketing program.

Johnny Douglass, of the Washington State Energy Office, offers this outlook on the project's future: "The majority of performance analysis lies ahead. We've only just begun to collect data on Cycle II. Results of Cycle I are still coming in and being analyzed. I have to stress we're not through learning yet. There might be a gem in that pile of data. Who knows?"

Researchers hope for quicker identification of those information gems and more effective outreach so that utilities, electric resource planners, builders and buyers can make their choices educated ones. ■



# SHORTS

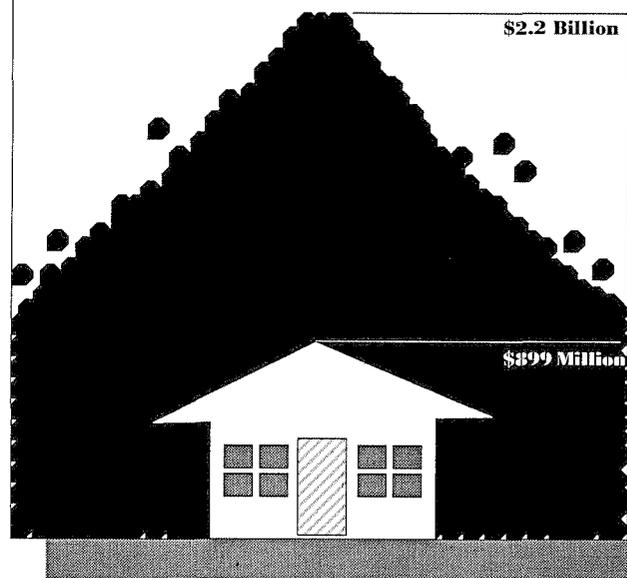
The United States uses twice the energy Japan uses to produce a dollar of gross national product, according to the Washington D.C.-based World Resources Institute. In its report, "World Resources 1988-1989," the Institute lists the United States as among the world's least energy-efficient nations. The report was developed in collaboration with the London-based International Institute for Environment and Development. Copies of the report are available for \$18.95 (includes postage and handling) from: World Resources Institute Publications, Box 620, Holmes, Pennsylvania 19043.

In a recent poll, 33 percent of 1,500 people surveyed said they expect nuclear power to be the nation's primary source of energy in 10 years. Another 17 percent think the country will lean more heavily on solar power than other resources. Only 11 percent favored coal, but natural gas, hydropower and oil were at the bottom of the respondents' lists. The survey was conducted by Cambridge Reports, Inc. (Source: *Tri-City Herald*, Pasco, Washington.)

Oregonians responding to a survey on wildlife agreed almost unanimously (96 percent) that the extinction of wildlife species should be prevented. Fully 95 percent of the respondents favored an active government role in saving endangered species, and 88 percent want the government to play a strong protective role in keeping species from becoming endangered. Three-quarters of those surveyed would even go as far as taxing industries that harm or threaten wildlife. The survey was conducted by Intercept Research Corporation, for the Defenders of Wildlife.

Ellensburg, Washington, will be the first city in the nation to participate in a citywide demonstration project linking energy efficiency and economic development. The project, called "Rebound: A Community Energy Management Program," is funded in part by the state's oil overcharge funds and part by the municipal utility. Through the project, which is being coordinated by the Washington State Energy Office and a citizen's advisory team, local industries and commercial buildings are being audited and upgraded. The project will tap into existing residential weatherization programs as well as industrial and commercial demonstration programs offered by the Bonneville Power Administration. For more information contact: Mike Grady, project manager, at 206-586-5050.

## COST OF ELECTRICAL ENERGY CONSERVATION vs. COAL



During the last 10 years, conservation programs in the Northwest improved efficiency at a cost that is \$1.3 billion less than the cost to obtain the same amount of electrical energy from coal. This was one conclusion recently reported in a draft review of conservation efforts published by the Northwest Power Planning Council. The conservation was "acquired" in programs designed to help the region prepare for the time when large inputs of electricity may be needed. The Bonneville Power Administration, the Northwest's federal power marketing agency, and the region's utilities spent \$890 million and secured roughly 350 average megawatts of electricity at an average cost of 1.8 cents per kilowatt-hour. A comparable amount of coal-fueled electricity would cost \$2.2 billion to develop and 4.5 cents per kilowatt-hour.

The report also found that, while the region has gained a great deal of experience in the residential sector, much more effort is needed in the commercial and industrial sectors. Copies of the report, "Assessment of Regional Progress Toward Conservation Capability Building," are available from the Council. See order form on back cover.

# CALENDAR

**April 5-6** — "The 1989 HVAC and Building Systems Congress" of the Association of Energy Engineers, in Santa Clara, California. Cosponsored by the Western Area Power Administration, the National Energy Management Institute, and Pacific Gas and Electric. For more information: Association of Energy Engineers, 4015 Pleasantdale Road, Suite 420, Atlanta, Georgia 30340, 404-447-5083.

**April 12-13** — Northwest Power Planning Council meeting at the Chumaree Hotel in Salem, Oregon.

**May 9-12** — National Symposium on Practical Approaches to Riparian Resource Management, at the Holiday Inn, Billings, Montana. Sponsored by the Montana Chapter of the American Fisheries Society, the U.S. Bureau of Land Management, the Western Division of the American Fisheries Society, the U.S. Forest Service, the Society for Range Management, the Montana Riparian Association, and the U.S. Fish and Wildlife Service. For more information: Glenn Phillips, Montana Department of Fish, Wildlife and Parks, Capitol Station, Helena, Montana 59620, or call Marilyn Goetzinger at 406-444-2406.

**May 9-10** — Northwest Power Planning Council meeting in Idaho.

**June 13-14** — Northwest Power Planning Council meeting in Seattle, Washington.

**July 5** — Symposium on Indian Fisheries, at the Sheraton Towers in Seattle, Washington. Sponsored by the American Fisheries Society-Western Division and the Native American Fisheries Committee. For more information: Frank Halfmoon, Symposium on Indian Fisheries, P.O. Box 14929, Portland, Oregon 97214, 503-231-6749.

**July 12-13** — Northwest Power Planning Council meeting at the Outlaw Inn in Kalispell, Montana.

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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## 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

- 1987 Columbia River Basin Fish and Wildlife Program
- 1986 Northwest Power Plan
- (88-24) Revised Paper: Economic, Demographic and Fuel Price Assumptions
- (88-25) Revised Forecast: Demand for Electricity in the Pacific Northwest
- (89-1) 1989 Supplement to the 1986 Northwest Power Plan
- (89-2) Proceedings from Global Warming Seminar
- (89-3) Fish and Wildlife Division Work Plan
- (89-4) Power Planning Division Work Plan
- (89-5) Spill Amendment to the Columbia River Basin Fish and Wildlife Program.
- (89-6) Draft Proposal to Amend the Commercial Model Conservation Standards in the Northwest Power Plan
- (89-7) Issue Paper: Accounting for Environmental Effects in Power Planning
- (89-8) Assessment of Regional Progress Toward Conservation Capability Building

### 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 newsletter that contains the Council meeting agenda, deadlines for public comment and a more detailed publications list)

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(Or call Judi Hertz at the Council's central office, 503-222-5161, toll free 1-800-222-3555 in Idaho, Montana and Washington, or 1-800-452-2324 in Oregon.)

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