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# NORTHWEST ENERGY NEWS

Northwest Power Planning Council

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This issue marks the end of an era for *Energy News*. Judy Gibson, whose formatting finesse and total inability to procrastinate kept us on schedule and looking good, is leaving the Council. Those of us who worked with Judy all these years will miss her very much. She helped us juggle deadlines for power plans, fish and wildlife programs, annual reports, brochures and, of course, the magazine. Her remarkable attention to detail and inherent sense of order left their mark on all of the Council's publications.

We wish her a *bon voyage*.

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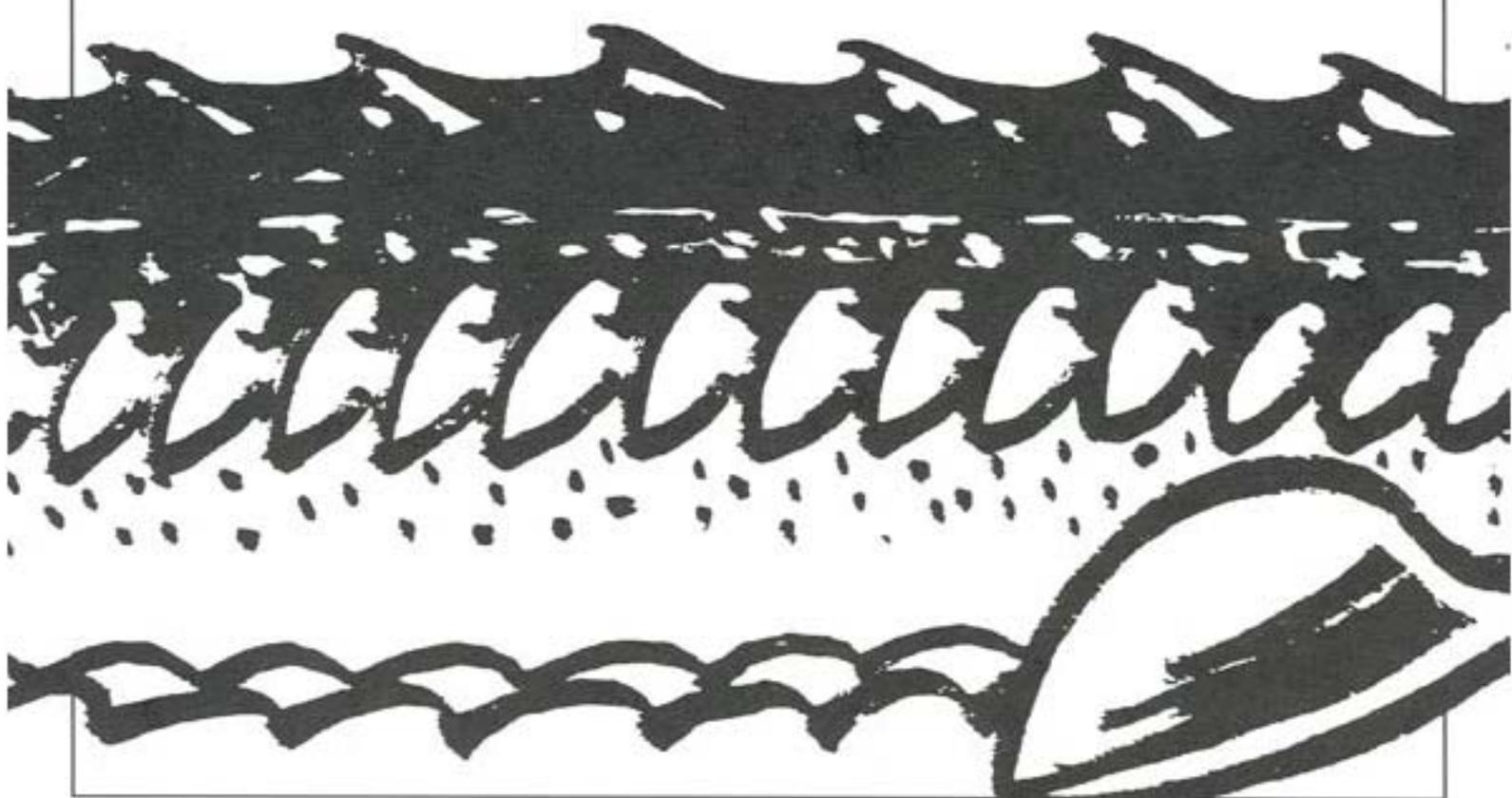
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*This issue's cover illustration is by Frank Farah.*



by John Harrison

## Are Kootenai River white sturgeon the next endangered species?

"It was 75 inches long and weighed 98 pounds," says Vick Applegate, recalling the state-record white sturgeon he helped a friend pull from the Kootenai River in Montana back in 1968. "It was so big we made a stretcher with blankets and poles to haul it out."

At the time, sturgeon were the forgotten fish of the Kootenai. Applegate, a Libby, Montana, native who now is a silviculturist with the U.S. Forest Service in Missoula, and a small number of other sturgeon fishers were

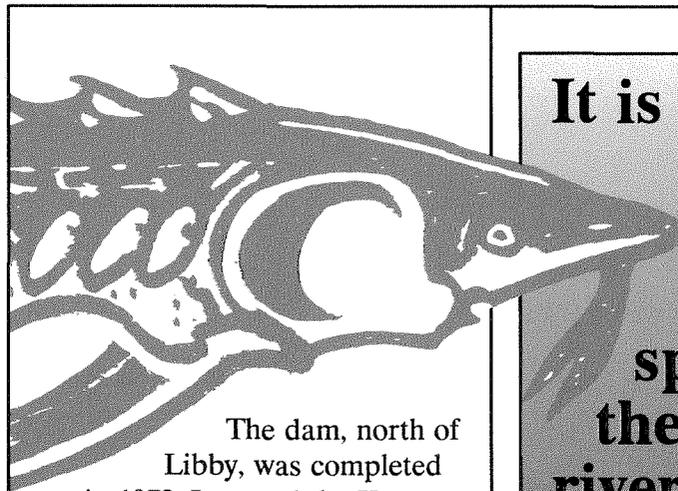
concerned about what they perceived as a decline in the sturgeon population. Each spring, when snow melt engorged the river to a chocolate brown torrent, they baited hooks with handfuls of worms and fished for sturgeon, sometimes spending up to 18 hours to catch a single fish. They kept some—there were no limits at the time—but they tagged and released most, hoping to gather information on the sturgeon population.

Today, the suspicions Applegate and others first voiced in the late 1960s are confirmed.

Kootenai sturgeon appear to be near extinction. Petitions were filed June 11, 1992, with the U.S. Fish and Wildlife Service to protect the last of the species under the federal Endangered Species Act. It appears the population is growing older, not more numerous. Young sturgeon are a rarity in the Kootenai.

Why did the sturgeon stop spawning, if indeed they have? No one knows for sure, but one theory is that changes in Kootenai River flows resulting from the operation of Libby Dam appear to be the main cause.





The dam, north of Libby, was completed in 1972. It tamed the Kootenai's annual spring torrents and impounded a lake—Kooconusa—that stretches north into Canada.

Before Libby Dam, the river ran as fast as 70,000 cubic-feet per second in the spring. Today, peak discharge from the dam is less than half that. In the spring, when sturgeon would have spawned, discharge from the dam can be as little as 3,000 to 4,000 cubic-feet per second. The water is held back to provide flows for power generation later in the year.

**I**t is possible that sturgeon can't spawn—or won't spawn—in the slower river.

"The idea is, the river's not providing the proper impetus for sturgeon to migrate to spawning areas," suggests Don Skaar, a biologist for the Montana Department of Fish, Wildlife and Parks in Libby. The fast flows of the unconfined river may have somehow triggered the spawning reaction, he says. "The other possibility is that when they do spawn, the flow conditions are not conducive to juvenile survival."

For whatever reason, it appears there are no baby sturgeon in the Kootenai River.

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That prompted the Idaho Conservation League, Boundary Backpackers and North Idaho Audubon Society to file the endangered species petitions, drawing attention to the numerous, complex problems the sturgeon face.

Low flows in the Kootenai appear to be one of those problems. Biologists thought heavy metals in the Kootenai's bed might have been another problem, but research showed that the concentration of heavy metals actually is higher in the mid-Columbia region. Sturgeon populations there are healthy.

**W**hat to do? There is no simple answer.

Boosting flows below Libby Dam to aid sturgeon could lower Lake Kooconusa, the dam's reservoir. Lowering the lake could cut production of food organisms and reduce shoreline habitat for the lake's trout and kokanee. It also could harm recreational fishing in the lake, an important segment of the local economy. Boat ramps could be out of the water more often than they are now from dam operations, particularly in the northern end of the lake.

Balancing Kootenai River flows to protect fish both above and below the dam will be tricky, but state fish and wildlife agencies in Idaho and Montana are working on a computer model that will help quantify the amount of usable habitat and identify optimum flows, Skaar said. Armed with that information, biologists will have a better idea how to operate the river for the benefit of sturgeon below the dam and trout and kokanee in Lake Kooconusa above it.

But there is an additional difficulty. While it is possible that boosting springtime flows in the Kootenai could help sturgeon, and also salmon downstream in the Columbia, higher flows could worsen conditions for other fish above the dam in Lake Kooconusa. Could they be next in line for endangered species petitions?

**M**ontana Northwest Power Planning Council Member John Brenden envisions the potential for a sort of Old West shoot-out over water and endangered species.

"If you get an endangered species up in these Montana reaches, you face the problem of whose endangered species is better than the next one?" he points out. "If anyone can figure this one out, I'd sure like to find them. There are so many competing interests—salmon, sturgeon, trout, kokanee, tourism, the local economy."

A committee of experts is trying to work out a solution. The committee includes representatives of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, Idaho and Montana fish and wildlife agencies, the Kootenai Indian Tribe and

others. Their goal is to develop a short-term recovery plan by next spring and present it to the Fish and Wildlife Service, and then develop a long-term plan.

### The biggest fish

Biologists believe white sturgeon have lived in the Kootenai for at least 10,000 years, a distinct population isolated by waterfalls from sturgeon downstream in the Columbia River. Latter day fishers are only the latest to enjoy Kootenai sturgeon. Historically, Kootenai Indians carried sturgeon oil west across the mountains to trade for salmon at the Kettle Falls fishery on the Columbia River. Mid-Columbia tribes

prized the rich sturgeon oil, which they mixed with salmon and berries to make pemmican.

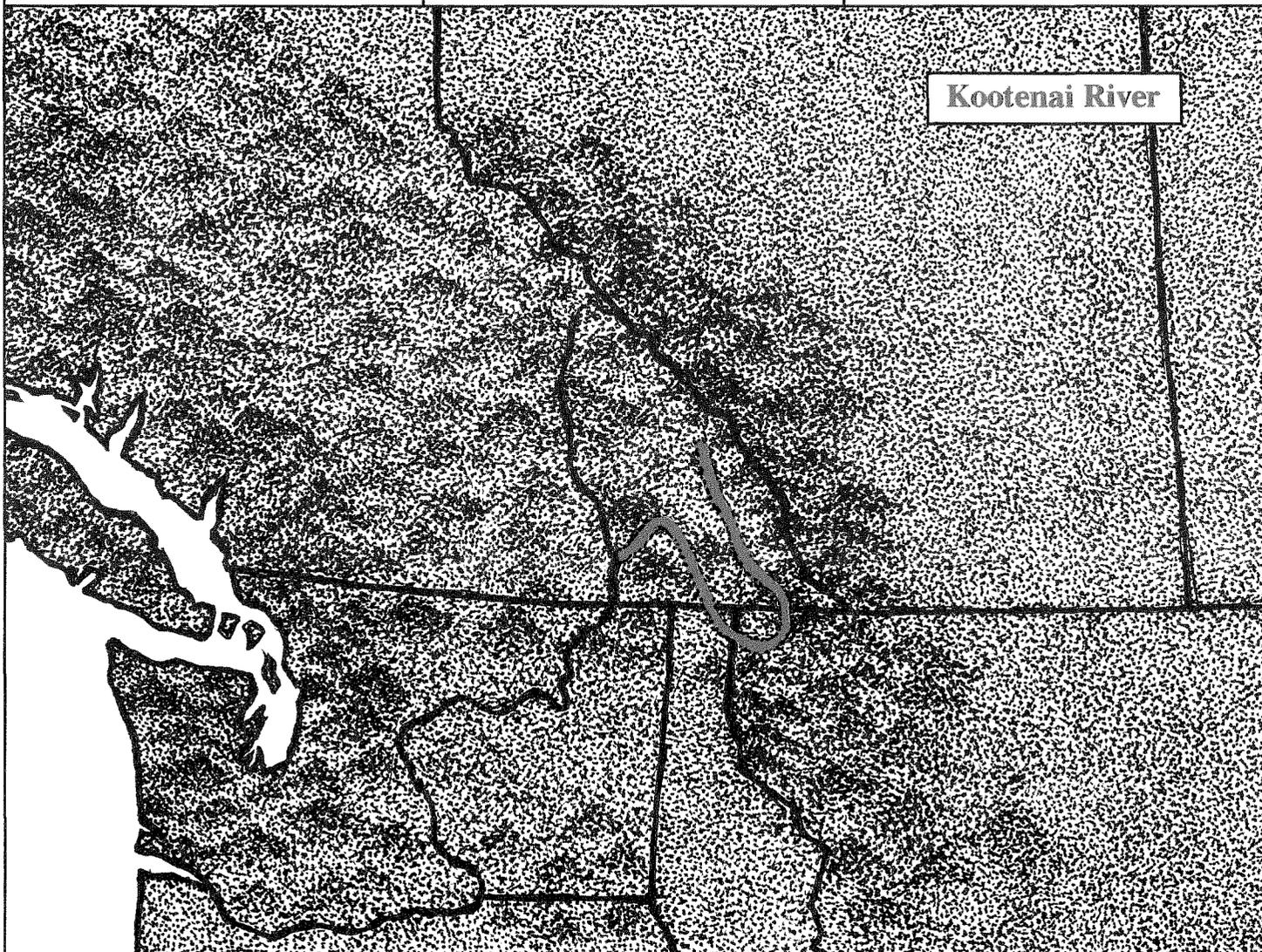
**K**ootenai River sturgeon always have been something of a curiosity. In fact, any sturgeon is something of a curiosity. Sturgeon are the largest freshwater fish in the world. They look like a cross between a shark, a catfish and a torpedo. They can live up to 90 years—60 is average—grow to nearly 20 feet and weigh well over a ton. The record Northwest sturgeon—1,800 pounds—was caught in the Fraser River of British Columbia, but close behind in second place was a 1,500-pounder caught in the Snake River in 1928. The world

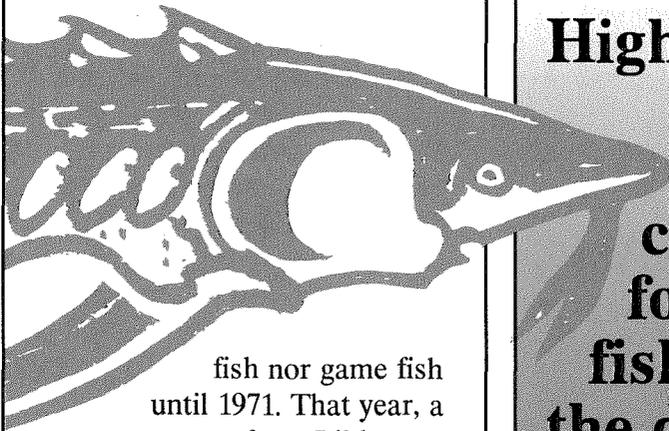
record sturgeon was caught in Russia: 3,221 pounds.

No fish of that size ever came out of the Kootenai, although there are records of a 9-footer that probably weighed close to 600 pounds. Frankly, when today's fishers dream of a day on the Kootenai, they see trout, not sturgeon. But there are exceptions.

"There was an old fisherman in Libby who used to trap sturgeon and bring them into town," Applegate said. "He'd put them in tanks and display them at public places like the bowling alley."

Not only were they an oddity, Kootenai sturgeon were something of a non-entity. Montana considered them neither sport





fish nor game fish until 1971. That year, a state senator from Libby pushed a bill through the Legislature declaring sturgeon a game fish, which allowed the state to set fishing regulations. Applegate and the other fishers' tagging efforts helped biologists gather information on the fish and their habits.

Facts trickled in, and an accurate picture of the Kootenai sturgeon population and its problems began to emerge. It was discovered that their range is from Kootenai Falls, about 25 miles below Libby Dam, to Kootenay Lake in British Columbia, a distance of about 121 miles. Within that stretch of river, there apparently is a distinct spawning area. The current sturgeon population appears to number about 880 fish, down from about 1,200 fish 10 years ago.

Montana banned sturgeon fishing in 1979, Idaho in 1984 and British Columbia in 1991. A small sturgeon hatchery opened in 1991 near Bonners Ferry, Idaho. Idaho state biologists and the Kootenai Tribe, which operates the hatchery, hope to rebuild the population and learn more about the species by tagging juvenile sturgeon, releasing them and studying their movements.

## Higher flows could worsen conditions for other fish above the dam in Lake Koocanusa.

But disaster struck early in the morning of August 3, 1992. A power outage shut down a pump that supplied oxygen to aerate rearing tanks. There was no alarm system. Hatchery workers arriving a few hours later rescued some fish, but hundreds died. One tank held 57 2-year-old fish that were about to be released. Forty-three were dead. In another tank, 742 1-year-old fish died, but 225 survived.

"It set us back, that's for sure," laments Kim Apperson, a biologist with the Idaho Department of Fish and Game. "Still, we tagged and released 14 of the 2-year-olds. We found that 104 of the 1-year-olds were large enough to be released, so we tagged them and released them, too. But with fewer fish, it's going to be harder to study."

### Focus on flow

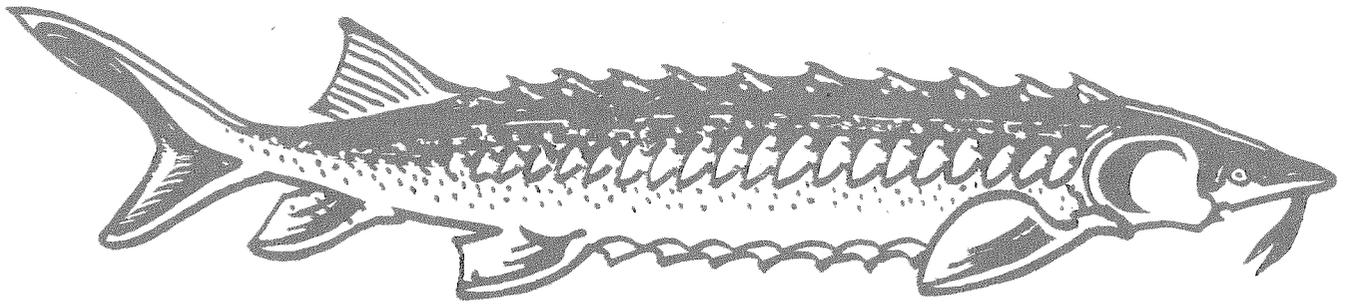
Skaar envisions a future when fishers again will be able to catch Kootenai sturgeon. First, however, the population must be rebuilt. The hatchery will play a role, but not the lead role. In his view, any recovery plan must include changes in the operation of Libby Dam.

"The dam reversed the natural flow of the river," says Alan Scholz, a fish biologist at Eastern Washington University in Cheney. Scholz is working on the sturgeon problem for the Upper Columbia United Tribes, whose members include the Kootenai Tribe. "Because of power production, flows are high in winter and low in spring. There were experiments in 1991 with higher spring flows, and we found that the fish migrated upstream toward spawning areas."

Libby Dam operations also could impact sturgeon eggs, which adhere to rocks in the river.

"In some instances, water levels below the dam have fluctuated as much as three feet in 24 hours," Scholz says. "As flows drop, eggs may be left exposed."

The U.S. Army Corps of Engineers, which operates Libby Dam, recognizes its apparent impact on sturgeon. But Libby Dam occupies a strategic position at the top of the federal Columbia River power system. Changing its operation to help sturgeon could have big consequences downstream.



**W**ater from Lake Kooconusa is extremely valuable for hydropower production because it is used to spin turbines not just at Libby Dam but also at every dam downstream—several small dams on the Kootenai in Canada and then all 11 dams on the Columbia from Grand Coulee to Bonneville. Libby's purpose, like other dams high up in the basin, is to add water to the Columbia system in a way that maximizes power production at the downstream dams. If winter flows from Libby are reduced so that spring flows can increase, power production at Libby and all dams downstream would be affected.

"We're not disputing that there are problems with the sturgeon in the Kootenai River, and we're very interested in doing whatever is reasonable to try to ensure the survival of the species," maintains Bob Schloss, Libby project manager. "But we are concerned about being able to refill [Lake Kooconusa] for

recreational purposes and ensure the best possible fishery upstream and downstream of the dam.

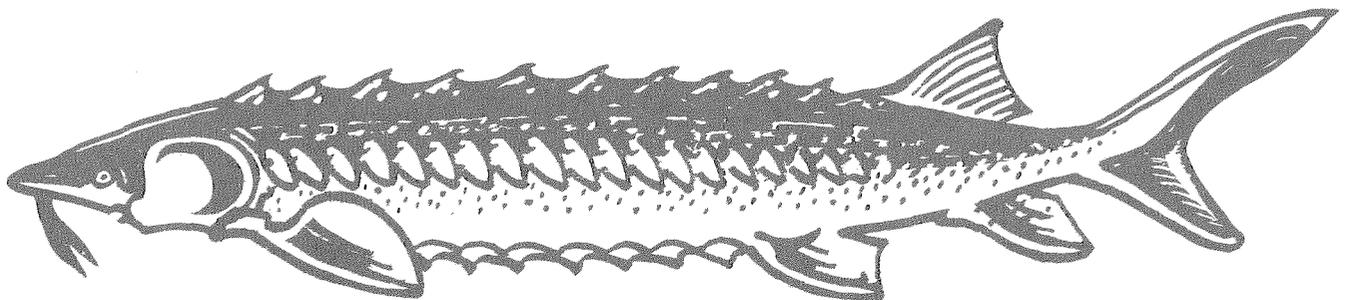
Some of those concerns conflict with each other. If the reservoir doesn't refill, power generation is affected, and pretty soon you get to the point of asking, where is all the water going to come from?"

**E**astern Washington Council Member Tom Trulove calls that scenario "something of a crapshoot."

"I think we need to know a lot more about this. One of the potentials here is that our power system loses capacity," Trulove suggests. "That doesn't mean we can avoid doing it, but we've got to understand how much water and power has to be replaced and how quickly. Because if we don't, we're going to put the region in a situation where we're going to have a cold snap that we are unable to respond to. That's going to be real significant human suffering. We're going to have to be as creative as we can. The fish

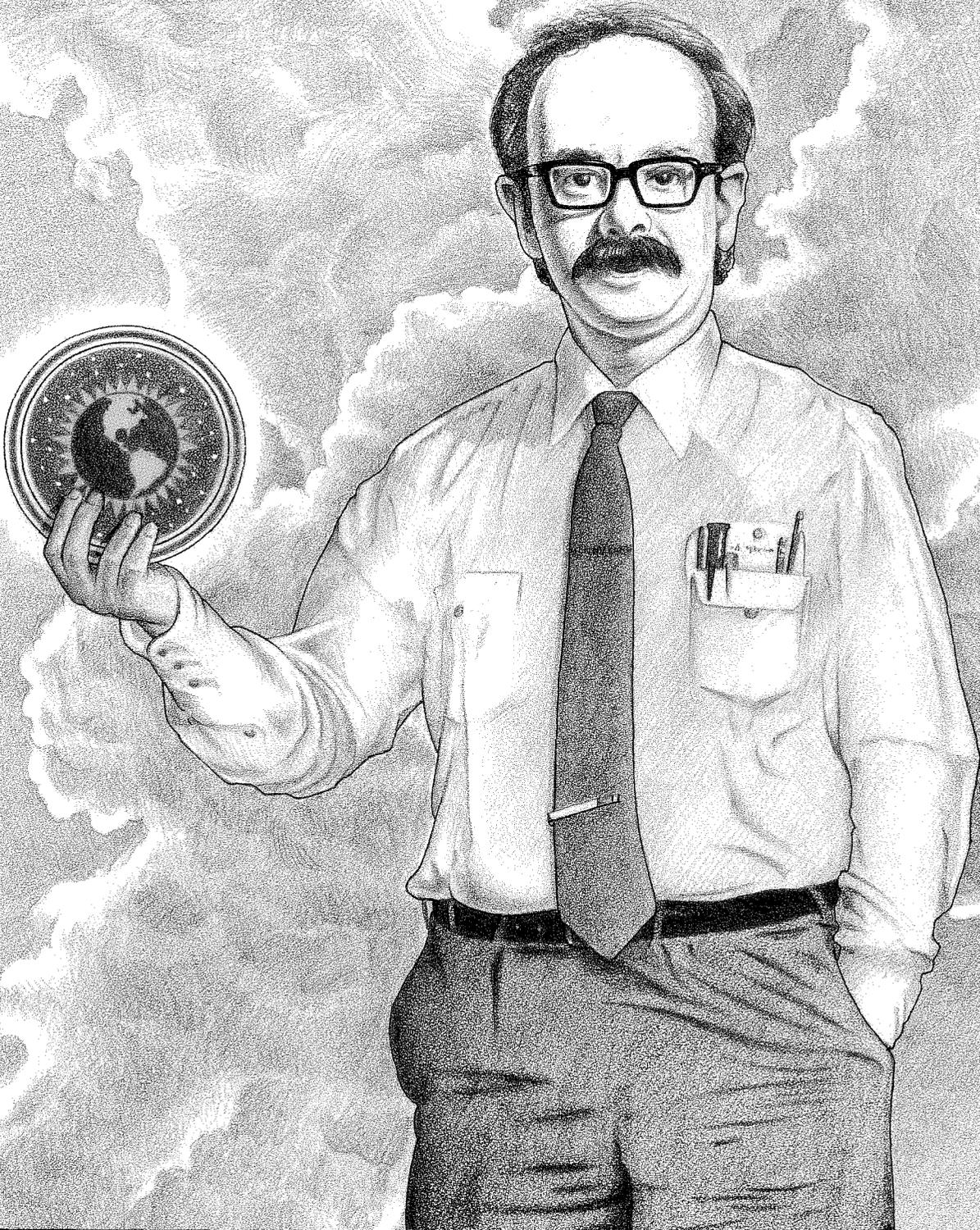
are not going to be taken care of perfectly, and neither is the power system."

In that light, the technical committee devising a short-term recovery plan recently made an ominous recommendation. The committee said sturgeon need a sustained flow of 35,000 feet per second at Bonners Ferry for 40 days from May 25 to July 5 beginning next spring. That's about eight times the current average springtime flow. The Bonneville Power Administration and the Corps of Engineers are studying what that flow would mean for power production and the level of Lake Kooconusa. ■■



Point of View:

# AMORY LOVINS



Portrait by Jerry Kruger

## THE WIZARD OF EFFICIENCY VISITS THE NORTHWEST.

**A**mory Lovins came to Portland this fall and found the Pacific Northwest struggling with the sort of natural resource dilemma he finds most challenging, and therefore, most promising. For more than two dozen years, Lovins has been forging solutions to crises like the ones confronting this region—water and energy shortages, species on the brink of extinction, apparent all-or-nothing choices between today's jobs and tomorrow's environment. Since 1968, he has been arguing that virtually all of these problems can be addressed—profitably—by first rethinking, then reacting to the way we use virtually everything.

Calling for what he termed “soft energy paths,” in an article first published in 1976 in the quarterly *Foreign Affairs*, Lovins reasoned that most energy applications could be compared to “cutting butter with a chain-saw.” The tools and the tasks were an imperfect match, at best. We ought to be carefully examining how we use all of our resources, he explained. We ought

with Carlotta Collette

to be certain we are using resources as efficiently as possible—the right amount and kind for the job.

His approach has always been multifaceted. He blends a longtime study of physics with an equal interest in economics. He mixes climatology with biology. He patiently explains that that's the way the universe is—inter-connected—so it would be foolish to not study the relationships. Both the problems and their solutions lie in the linkages.

Lovins was born in Washington, D.C., and went to high school in Amherst, Massachusetts, a seat of concentrated learning in a state blessed with an abundance of academic institutions. When he was 16, he had hoped Harvard would be a place where he could study broadly, rather than focus narrowly on any one subject.

Harvard had a different notion of education. After two years' study the school administration urged him to pick one subject and focus. He declined and headed instead to England.

At Oxford, where he went next, he was spotted as someone very bright and, after less than two years' study, at age 21, he was named the youngest “don” in the documented history of the school (a college archivist looked back as far as the 16th century). Because Oxford dons should have at least a masters degree, he was granted an honorary masters.

When it came time to select the focus of his doctorate, Lovins chose energy and resource policy, an area that seemed to him to have an acceptable, if minimal, overlap of subjects. Unfortunately, Oxford had no “chair” in energy and resource policy and didn't—two years before the Arab oil embargo—consider it an academic subject. Forced to choose between a confining degree and his broader vision, Lovins declined again and resigned his fellowship.

Meanwhile, to help finance his mountain climbing, a long-time avocation, he and friend Philip Howell Evans had been taking photographs they hoped to sell to *National Geographic*. The editors at *National Geographic* were not interested, but they were

impressed enough to send him to David Brower, father of the modern Sierra Club and of its exhibit format books.

Brower agreed to a publishing arrangement. Lovins' first book, *Eryri: The Mountains of Longing*, came out in 1972.

That year also marked the beginning of a 10-year professional relationship and a continuing deep friendship between Brower and Lovins. When Lovins left Oxford, Brower hired him. Lovins would not be paid a lot, but he would be free to travel the world, study what he wanted, and lecture and write extensively.

He lectured at scores of colleges and conferences. He advised heads of state, nations and corporations. He was awarded six honorary doctorates (some consolation for his never having earned any).

In 1978, he met the woman who would become his wife and partner in planetary preaching, Hunter Lovins. Together they have published about a dozen books and several hundred papers and articles. Hundreds more have been written about them.

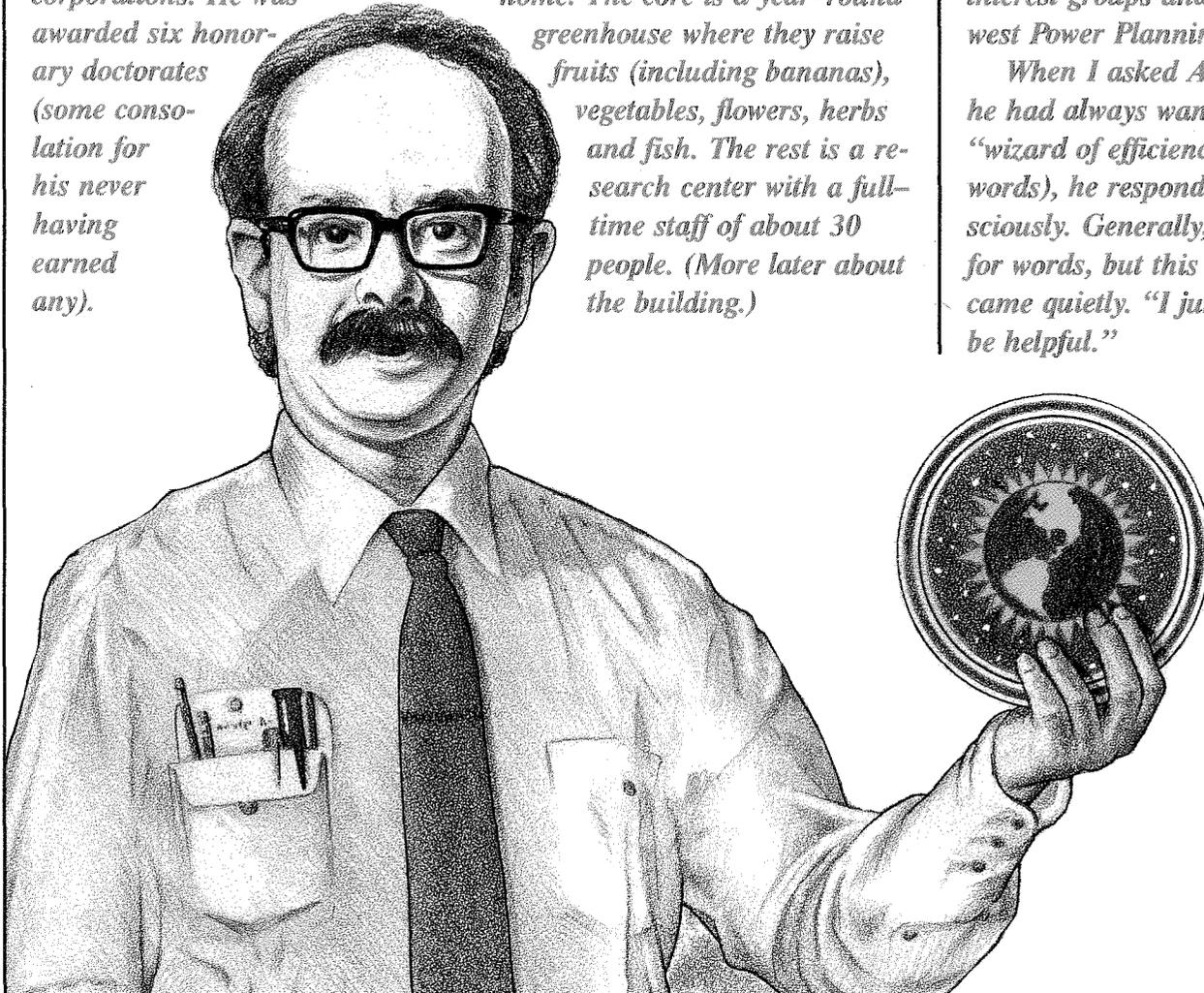
In 1982, they founded Rocky Mountain Institute, a non-profit resource policy center dedicated to the efficient and sustainable use of resources. To house themselves and their enterprise, they built a 4,000 square-foot, light-filled structure high in the mountains in Old Snowmass, Colorado.

The building is a model of all they espouse. One wing is their home. The core is a year-round greenhouse where they raise fruits (including bananas), vegetables, flowers, herbs and fish. The rest is a research center with a full-time staff of about 30 people. (More later about the building.)

Hunter is the Institute's executive director and "administrivator," to use her word. Amory is vice president, treasurer and director of research. Together they created, and recently spun off as a for-profit subsidiary of their non-profit center, a project originally known as "Competitek," and just renamed "E Source."

E Source is a subscriber service that provides information and advice on the newest technologies for efficient use of electricity. It has more than 260 subscribers in 35 countries, including more than 90 utilities, 60 governmental entities, 50 manufacturing and design firms, 20 universities, 20 public-interest groups and the Northwest Power Planning Council.

When I asked Amory whether he had always wanted to be the "wizard of efficiency" (my words), he responded self-consciously. Generally, he is not lost for words, but this response came quietly. "I just wanted to be helpful."



*Q. You first wrote about the connection between climate change and energy use in 1968. Why? What got your attention that early?*

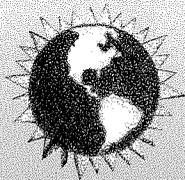
What got me interested were some calculations I did in response to energy experts around the country who were cheerfully projecting exponential growth in energy use over the coming decades. I figured that the earth would be in danger of overheating just from the heat released by using all that energy. Manhattan is already in trouble. If the winds stopped, Manhattan would fry just from the heat buildup.

I figured that the carbon dioxide problem [potential global warming from buildup in the atmosphere of gases that trap heat] would probably overtake us even sooner. This was before we had complex weather models to help calculate these effects, so I was just estimating.

It seemed to me that we had to use less energy and more brains. My first book on these issues had a lot about efficiency, but not so much specifically on saving electricity. That's since become my central focus.

*Q. In those days, you were saying that we had limited supplies of fossil fuels, and efficiency was a necessary response to that scarcity. Has your thinking on these issues changed over the years?*

Globally, we're much more at risk of running out of the *renewable* resources than the non-renewable ones. We'll be able to extend the use of things like fossil hydrocarbons with technological



**If the environment isn't healthy, we won't have people or an economy. The practices and processes that are inherently clean and sustainable are also the most competitive.**

fixes—using more efficient equipment, for example.

Meanwhile, though, we're rapidly depleting our biotic resources, the ones that are supposed to be renewable—water, soil, forests, wildlife. It's a real irony.

You folks at the Power Planning Council, in particular, are starting to create the institutional shifts and perceptions that can make our renewable resources truly renewable, so we can live happily ever after. Your work with energy, water and fish is setting important examples. You're learning lessons that we can apply to other resources like forests, soil and ecosystems.

Right now, we're just mining these resources, but we could be sustainably harvesting them forever. It's urgent, especially in forestry, that we stop mining these supposedly renewable resources before they are irreparably damaged.

The Power Planning Council's energy work is the pathfinder for other resources. The Council, methodologically, is leading the country and the world in how to apply least-cost planning.

*Q. We hear so much about the incompatibility between protecting the environment and preserving the economy. How do you respond to those concerns?*

The attitude that you can't protect the environment *and* the economy is profoundly ignorant.

First, if the environment isn't healthy, we won't have people or an economy.

Second, the practices and processes that are inherently clean and sustainable are also the most competitive. They use resources with elegant frugality. Pollution is a resource out of place. It is an indication of uneconomic and unbalanced production processes, just as a fever or pus indicates an infection in a body. A healthy industry, like a healthy person,

doesn't produce noxious waste. People in China have been growing rice off human wastes for millennia, and they don't become obese. They're generally healthy, happy and productive.

Third, the kinds of improvements in industries and buildings needed to make them save energy and work better, also cost less and drive innovation on a broad front. That's why countries that are the most energy-efficient, like Germany and Japan—countries with strict environmental standards and high energy prices—are also our most formidable competitors. The lean, clean, green production they use to beat us in world markets is where we need to pull ahead of them, and we have the skill to do it—if we have the will.

Fourth, efficient buildings cost less to *build*, if designed right, than inefficient ones. Such efficient buildings are, in effect, net exporters of capital. They free up capital for other productive uses. If you want to create jobs, there's the capital to do it.

Fifth, saving fuel is cheaper than burning it. It cuts pollution not at a cost, but at a profit, and simultaneously saves, in the electric sector alone, investments and subsidies exceeding \$60 billion per year. That's about what we invest in all durable goods manufacturing.

Sixth, savings from energy bills nationwide are already enormous—*\$150 billion annually*—and they could cost-effectively be twice that—*\$300 billion every year*. That's comparable to the U.S. federal deficit.

Seventh, we have trillions of dollars' worth of inefficient buildings to retrofit and huge numbers of tradespeople who need work.



## Efficient buildings cost less to build, if designed right, than inefficient ones.

We need to get them together. We could create decades of good jobs, making the economy cleaner and more sustainable.

*Q Let's talk about some of those efficiency improvements.*

We already know we can save 75 percent of the energy used in existing buildings, at very attractive costs. In fact, for new buildings, increasing efficiency can make the capital cost for the whole building *go down* by several percent. Yet the buildings are more comfortable, even if you save almost all the space-conditioning energy.

We already know how to save about 70 to 90 percent of the lighting energy and still get the same amount of light. It looks better, and you see better. When you put the new design and lighting technologies together with modern [window] glazings and

office equipment, you can actually come up with office buildings that use about one-tenth the normal amount of electricity, and again, they work better and cost less.

But most building retrofits today, with some notable exceptions, are not bundling together the best technologies in the best way. It's as if they just took a list of what's at eye level on the shelves in the efficiency supermarket, and jumbled some of it together, picking things randomly off the shelf, rather than going to "The Joy of Cooking" and picking the best recipe with just the right ingredients combined in the right way to get something really tasty.

I think we all recognize that there is still a lot to be done in properly combining the best technologies, particularly in commercial buildings. It's not hard to come up with savings. What's hard is getting each of the two dozen parties involved in building decisions to do what they ought to do and coordinate their efforts properly. Each of them has perfectly perverse incentives to do otherwise.

We've built up an institutional structure that makes buildings use about 10 times as much energy as they should, be less comfortable and cost more to build. If you were to try to come up with an institutional framework that would produce that result, you could hardly do better than what we've got. So what we have is much more of an institutional problem than a technical one.

For example, if I'm a mechanical engineer designing space-conditioning equipment for a building, if I just do a sloppy job

with rules of thumb and catalog look-ups, and make the equipment inefficient and oversized, it makes my fees and profits for my design engagement go up. But if I do a really careful job of optimization, install equipment that's just the right size and works great, it would make my fees and profits go down. That's nuts, and we need to fix it.

One way to fix it is for utilities to give rebates not just for efficient equipment, but for efficient designs: pay the designers directly according to how much they save. That can reverse their perverse incentives and reward, rather than penalize, efficient design.

*Q. How do you approach businesses to get them to make these changes?*

There is a frequent confusion in business between the top line and the bottom line. I can explain it best by example. I was talking to the head of a "Fortune 50" company a while back. I was able to tell him that at one of his facilities he has an outstanding energy manager—a guy he's never heard of because he's six layers down—who is saving \$3.50 per square foot per year on energy costs. The executive said, "That's a million-square-foot facility, isn't it? At \$3.50 per square foot, that's \$3.5 million a year off the bottom line." He got that right.

But then in the next breath he said, "You know I can't get excited about saving energy, though; it's only a few percent of our cost of doing business."

I had to do the arithmetic and point out to him that if, hypothetically, he achieved the same result at his 92 million square feet of facilities worldwide, his



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corporation's total net earnings that year would go up by 56 percent. That got his attention.

Also, quite often in an industrial setting the most important reason for improving motor systems, for example, is that you get higher quality and more reliability in your production process. You have more control over it. The equipment simply works better. But how many managers understand that?

I mentioned that there are about 24 actors in creating and running buildings. Each of them has a different language in which they express their concerns.

If I were talking to the building manager, whose objective is avoiding or resolving complaints, I would probably talk about tenant comfort. If I were talking to the mechanical engineer, I might talk about kilowatts per ton or square feet per ton. But if I were talking to the electrical engineer, it would have to be in watts per square foot.

The architect probably doesn't talk those languages very well. The architect is usually visual like the interior designer. Lighting engineers will talk "footcandles." Building inspectors will talk "code-section compliance." Commissioners are interested in a punch-list. The contractor is interested in schedule and budget.

You have to speak to each of these parties according to how you're going to satisfy their interests. But the nice thing is that energy efficiency can indeed give them all what they want. You just have to phrase it right.

*Q. What about utilities? How do you get them and their customers engaged in this transformation?*

Utilities are making the shift. One of the big surprises of the past couple of years has been how fast customers were willing to pick up on programs. New England Electric went to 200 commercial customers as a pilot project and said, "Would you like us to fix up your buildings?" Ninety percent said yes in the first two months and ran them right out of budget.

Pacific Gas and Electric [in San Francisco] went to developers a few years back and said, "Would you like us to help you design your buildings better?" And a quarter said yes in the first three months. Well, that was 150 percent of their marketing target for the year. So the next year they raised the target and got all of it for that year in the first nine days of January.

Tucson Electric, a small, almost bankrupt utility, recently launched a commercial lighting retrofit rebate. At the end of the first *day*, they had a hundred companies calling up to get into the program. Their major category had run out of budget in a couple of weeks.

Even in Idaho, Idaho Power had a fluorescent lighting retrofit rebate that ran out of money about that fast.

That is no longer unusual. We have many examples now from all sectors, from all over the country, and from all shapes and sizes of utilities, in which we've found that skillful marketing can actually get customers excited about efficiency a lot faster than we can physically deliver it.

*Q. You mentioned Idaho Power, what about the rest of the Northwest? How about the Bonneville Power Administration?*

I see at the Bonneville Power Administration a very healthy shift beginning toward more "hit-and-run" tactics, "guerrilla" tactics. That is, reducing the cumbersomeness and size of the bureaucratic procedure it takes to learn something and having more of an entrepreneurial atmosphere—running lots of micro-experiments at once in



**All we've  
learned  
about  
saving  
electricity  
applies  
equally well  
to saving  
water  
through  
better  
technologies.**

parallel to find out what we can learn *this week* about what excites the customers. We have to learn more and quicker than we did in the past.

It's what John Rowe at New England Electric calls, "the ready, fire, aim" approach. And I think part of the reason that it has been hard to introduce in many utilities is that they have an admirable dedication to the civil engineering idea that "it must always work. The bridge must not fall down. The lights must stay on."

Well that's fine in power supply, and I'm not saying that efficiency mustn't work, too, but I think the kind of engineering and administering conservatism that

we learned in the power supply business doesn't let us learn fast enough how best to do energy efficiency, because it makes us too risk-averse to learn quickly.

We ought to be giving a "goof of the month prize" for what was the most educational mistake we learned last month, the one that taught us the most the fastest.

*Q. You were asked here to Portland to advise the city on its tremendous water shortage problems. What is your advice?*

Looking at the drought you've got, I'm particularly excited about how all we've learned about saving electricity applies equally well to saving water through better technologies. For example, instead of a five-gallon-flush toilet, you can get a one-gallon-flush toilet that actually works better and is more reliable. The wholesale cost now is down around \$60. The cost used to be around \$250 just a couple of years ago.

You can get a very wet, tingly shower, at least as good as the one you get now, using one-and-a-half gallons of water a minute (or less) instead of six, just by using a better showerhead.

If you're in a place where you can water your lawn, you can apply the right amount of water, in the right place (not on your driveway), at the right time and save most of the lawn watering. You'll get just as green a lawn out of it. There are better washing machines and dishwashers, too.

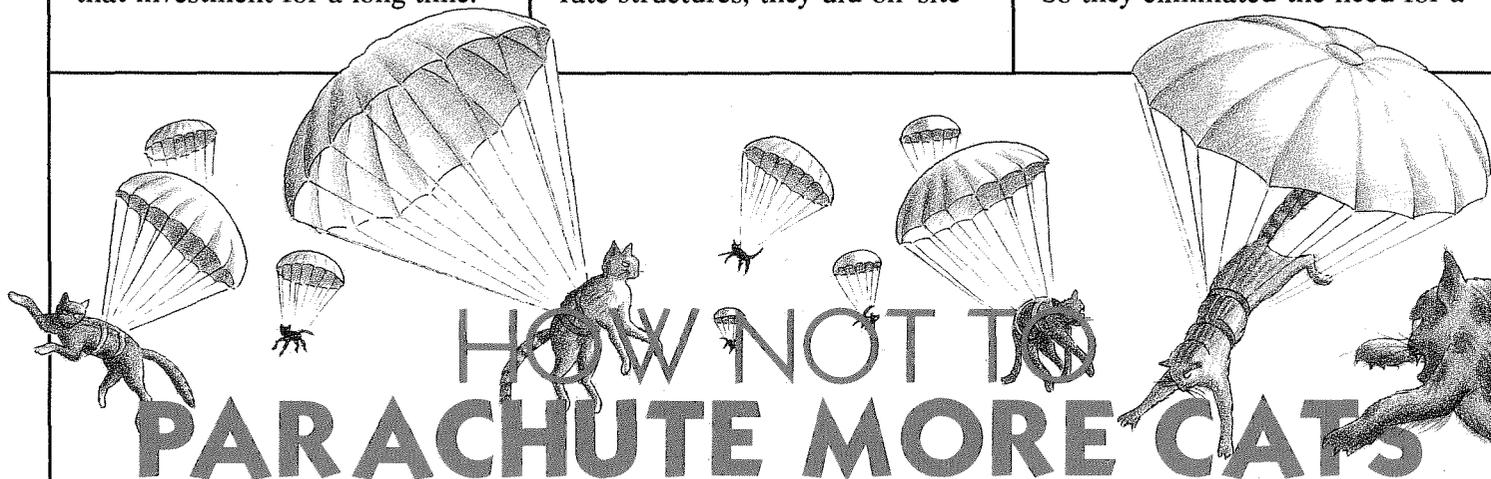
Altogether, you can save roughly half the water that you use as heated water and most of what you use unheated, for toilets and irrigation, and the extra costs are very small. They pay back in months. You also save very large

community investments in wastewater treatment. Communities often have to issue huge bonds to expand those facilities, but their cost depends largely on how much water goes through the facilities. So if you use water more efficiently, you can defer that investment for a long time.

You might want to look, for example, at Goleta, California, where they recently installed over 17,000 ultra-low-flush toilets, mostly with a \$50 to \$80 rebate from the utility. The utility distributed 35,000 high-performance showerheads, they changed water rate structures, they did on-site

water use surveys and educated people on how to irrigate their landscaping better.

These measures, plus a little bit of emergency drought stuff, led to a 50-percent water saving and a reduction in sewage flow of over 50 percent in only two years. So they eliminated the need for a



# HOW NOT TO PARACHUTE MORE CATS

by L. Hunter Lovins, executive director and  
Amory B. Lovins, director of research  
Rocky Mountain Institute

**T**he environmental consciousness of the 1970s taught us many things, but one of the lessons we have yet to take to heart is that everything on this planet is connected. Most of us live our lives as though this were not true. Governments and corporations, in particular, often manage their resources as if the interconnections didn't exist. A parable from Borneo illustrates why it is important to understand these connections.

In the early 1950s, the Dayak people in Borneo suffered from malaria. The World Health Organization had a solution: they sprayed large amounts of DDT to kill the mosquitoes which carried the malaria. The mosquitoes died, the malaria declined; so far, so good. But there were side-effects. Among the first was that the roofs of people's houses began to fall down on their heads.

It seemed that the DDT was also killing a parasitic wasp which had previously controlled thatch-eating caterpillars. Worse, the DDT-poisoned insects were eaten by geckoes, which were eaten by cats. The cats started to die, the rats flourished, and the people were threatened by outbreaks of sylvatic plague and typhus. To cope with these problems, which it had itself created, the World Health Organization was obliged to *parachute live cats into Borneo*.

This illustrates how, if we do not understand interconnections, often the cause of problems is solutions. However, understanding subtle connections can enable us to leverage one solution into many so that the cause of *solutions* becomes solutions. This is especially true in the management of global resources—both such “common resources” as sea, air, climate and the genepool, and such more localized resources as soil, food, minerals, groundwater and energy. ■■

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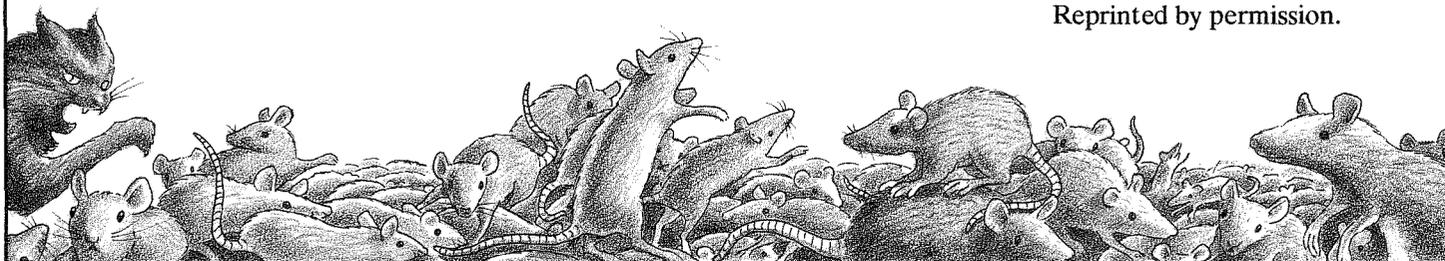


Illustration by Jerry Kruger

multimillion-dollar treatment plant expansion, with no loss of service quality and no complaints.

Of course, if you build that kind of water efficiency into your service infrastructure, not as short-term water curtailment, but as part of how you routinely use water, it's like building new reservoirs, only three times as effective. You're stretching the amount of water storage you have, so in future drought years, you're less likely to run out in the first place.

The water savings from new equipment and practices can have fast enough impacts that you can actually do them when you're in the *middle* of a drought. Just during 1990, Goleta cut its agricultural water use by 14 percent, commercial and governmental use by 11 percent, and residential by 46 percent. They had a 15-percent supply shortage in 1989, so they reacted quickly, and they got the savings quickly.

The other exciting part of water efficiency, which again we've learned from electric efficiency, is that you can do a lot of it through creative use of market forces. Consider the example of Morro Bay, California, where they're short of water. The town told builders, "If you want a permit to build a house in this town, you must first save somewhere else in this town twice as much water as your house will use." And builders wanted permits, so they went out and put water-saving fixtures into a third of the housing stock in the first two years.

Now imagine how this could work. Someone comes to your door and says, "I have this gorgeous toilet here, it's going to cut your water bills and work better. And I want to give it to you and install it free." And you think



**We don't  
have a  
heating  
system.  
We're about  
99 percent  
passive  
solar heated.**

about it for a minute, and you say, "I heard you guys were doing that. What's it worth to you?" Pretty soon you discover what saved water is worth, because you've just made a market for it. How much does the builder want the permit?

*Q. Tell us a little about your house and headquarters.*

I live at 7,100 feet in the Rockies, where it goes to minus 47 degrees on occasion. Our growing season between hard frosts is two months. Winter before last we had five indoor banana crops. We don't have a heating system. We're about 99 percent passive solar heated, using super-insulation and super-windows.

The heating bill runs probably \$60 a year. We use a little bit of firewood, and we burn some energy studies now and then. That's

for a structure that's 4,000 square feet in 8,700 degree-days. The household electric bill runs about \$5 a month. [Office equipment for Rocky Mountain Institute, also in the structure—adds another \$35 a month to the electric bill.]

The extra cost of the efficiency measures in the house was paid back in 10 months. And this is 10-year old technology. Today you could do a lot better. Our refrigerator, for example, uses about 8 percent, and our freezer uses about 15 percent of the electricity typical refrigerators and freezers use. We're using quadrupled-efficiency light bulbs. We're saving half the water just through things like high-efficiency showerheads and toilets. That also saves a lot of water heating energy, but then our water heating is 99 to 100 percent solar, anyway. All these things add up.

*Q. If you could deliver one message to the Northwest, what would it be?*

I would urge you to think about the connections among things. When you buy aluminum, are you really buying dead salmon? Can we fix the dam system so it doesn't create the tradeoff of salmon for aluminum?

When you buy lumber or paper, are you buying the future of a sustainable forest, or a clear-cut that leads to erosion and silting up of habitat?

Our actions have consequences. We need to make sure they will be of the kinds and amounts the seventh generation into the future would want. ■■

# Natural Gas

Is Today's **BARGAIN** Tomorrow's Best Buy?



by Carlotta Collette

**Gas prices are down, but saving energy is still cheaper than generating it.**

It's time for lesson 2,489 (but who's counting) in the study of power planning uncertainties. This is the lesson where we discover that natural gas prices not only fluctuate (we knew that), but when they shift, they take a good deal of other power planning assumptions with them. The important assumption under review today is the relative cost, availability and reliability of various resources to meet future power needs in the Northwest.

In the Northwest Power Planning Council's 1991 Power Plan, conservation was found to be the lowest-cost resource available to the region. Efficiency upgrades of structures and industrial processes cost roughly half as much as power from most new generating plants, and the savings cut consumers electric bills and help make businesses more competi-

tive. These upgrades are important investments in the region's economy.

But the value of conservation (or any other resource) is partly dependent on the cost of other resources the region could develop instead. If the expense of generating with coal, wind or natural gas, for example, changes significantly, then the numbers all shift slightly.

The plan the Council devised in 1991 was a flexible strategy designed to quickly provide the resources the region needed at the lowest environmental and economic cost, and with the least risk exposure for the Northwest. Against those requirements, natural gas looked good. Its cost was beginning to come down, after rapid price escalations in the 1970s and early 1980s. Problems acquiring the fuel in the 1970s

appeared to have been resolved. And the Powerplant and Industrial Fuel Use Act, which had prohibited the use of natural gas in new power plants, was rewritten to allow new gas-fueled power generation.

Gas also has environmental advantages over some other resources. It produces about half the atmospheric pollution of other fossil fuels. And in the Northwest, gas is particularly useful as a substitute for hydropower when water supplies are low. Gas-fired power plants are generally small and relatively inexpensive to build (compared to larger coal or nuclear plants). If gas prices are kept low, electricity from natural gas can be quite cost-effective.

As a consequence of these apparent advantages, the 1991 plan incorporated almost 2,000 average megawatts of gas-fired generation.

Well, the ink was barely dry on the 1991 plan, when it began to appear that what was considered a short-term decline in the price of natural gas could continue much longer.

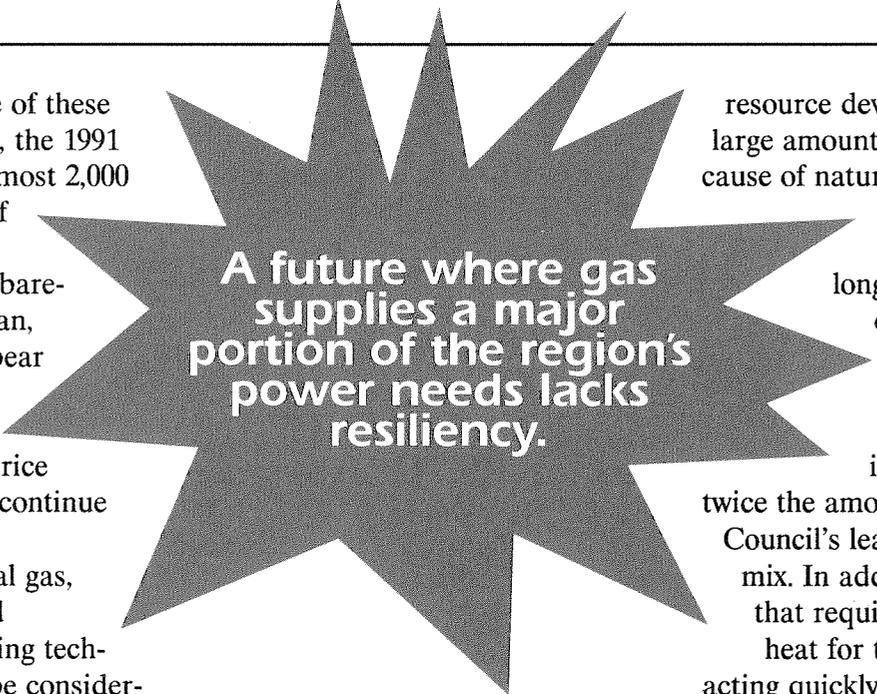
Supplies of natural gas, boosted by improved exploration and drilling technologies, appear to be considerably greater and far less expensive than earlier estimates. Prices for the fossil fuel have dropped, in some counts, by between a quarter and a third of prices from a decade ago.

**I**n most worlds, this would be good news. In power planning worlds, however, it is, and it isn't.

The power plan the Council produced in 1991 had about equal amounts of new natural gas-fired power supplies and efficiency improvements that cut electricity demands. There was some new hydropower and the likelihood of renewable power sources, such as geothermal, wind and solar, making a contribution.

The package was the least-costly mix of resources the Council could assemble. There was also strength in the diversity of its resources. With such a blend, the power system could sustain an upset in any one resource area and still offer electricity at a good price.

To determine whether the changes in the natural gas industry would critically alter the conclusions in the power plan, the Council reviewed its resource stack, plugging in the new



**A future where gas supplies a major portion of the region's power needs lacks resiliency.**

numbers. While the overall cost of the region's new power supplies came down slightly because of the new gas prices, the relative value of conservation and natural gas didn't shift significantly. Even with inexpensive natural gas and much more gas-fired generation in the resource portfolio, there are still huge opportunities to secure all cost-effective energy savings. Conservation is still the region's best buy.

**C**onservation is also critical now because of the balance of resources that ensures system resiliency. A future where gas supplies a major portion of the region's power needs lacks this resiliency. If gas prices begin to climb again (a carbon tax to limit emissions from fossil fuel burning could have this effect), or there is disruption in the supply of gas, the region's low-cost and reliable power supply would be vulnerable.

That gas-dependent future is occurring now. Since the Council's power plan was adopted, the Bonneville Power Administration and several major Northwest utilities have solicited bids from

resource developers to supply large amounts of electricity. Because of natural gas' competitive current price and apparent long-term supply, most of the new resources under consideration are gas-fired. Utility plans include more than twice the amount listed in the Council's least-cost resource mix. In addition, industries that require large amounts of heat for their processes are acting quickly to acquire the newly affordable resource.

What happens if everyone dips their straws in the pipeline at once? Will the gas industry still have sufficient quantities? Will the price still be so favorable? Will the power system remain stable?

**T**hese were the uncertainties that led the Council away from even greater reliance on gas in its 1991 plan and toward an essential retooling in the way we use electricity. Conservation remains the least-costly long-term resource for the region. It provides the greatest degree of flexibility with the least financial and environmental risk. It is still the prudent resource for an uncertain future, and the future is most certainly still uncertain. ■■

# Homes ON THE RANGE

by John Harrison

## Projects aim to improve habitat for Columbia River Basin wildlife.

**P**eregrine falcons, ducks, western pond turtles, Columbia white-tailed deer and bald eagles will benefit from projects now being initiated to improve wildlife habitat in the Columbia River Basin.

During the last 100 years, and particularly in the last 50, hydroelectric dams in the basin inundated thousands of acres of wildlife habitat. The wildlife projects are intended to replace some of the lost habitat and encourage the rebuilding of affected animal populations.

These projects are the latest wildlife habitat improvements undertaken by the Bonneville Power Administration in coordination with the Northwest Power Planning Council. While more than a dozen projects got under way in the last two years, only one is complete—a new wildlife refuge along

the Willamette River near Portland, Oregon. Frustrated by this slow progress, the Council earlier this year pressured Bonneville to step up the work.

“People complained to us that the process was too complicated. It was moving too slow,” said Oregon Council Member Ted Hallock. “The Council shares that view, and we are glad to see that Bonneville is moving ahead again.”

In improving conditions for wildlife, Bonneville and the Council are responding to the Northwest Power Act of 1980. The Act, which allowed Idaho, Montana, Oregon and Washington to create the Northwest Power Planning Council, says human activity, particularly the construction and operation of hydroelectric dams in the Columbia River Basin, damaged

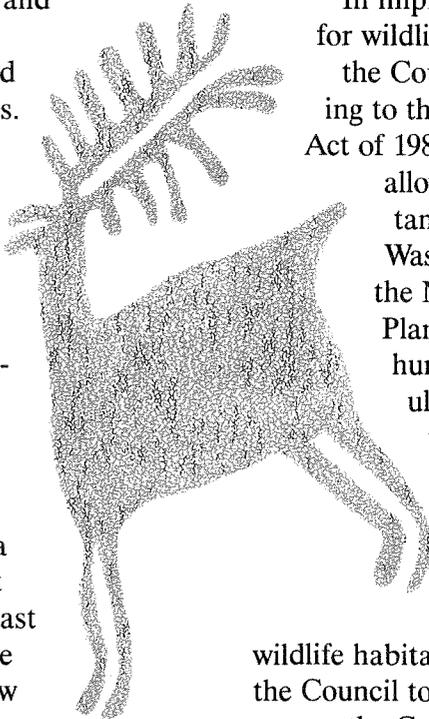
salmon runs and wildlife habitat. The Act calls on the Council to devise a program—the Columbia River Basin

Fish and Wildlife Program—to repair the damage, rebuild fish runs and restore habitat. To the extent that damage is the fault of dams, customers of the Bonneville Power Administration finance the work through a portion of the rates they pay for electricity.

### 1992 and 1993 wildlife projects

#### Peregrine falcons

The National Park Service proposed this project for land along the shore of Lake Roosevelt behind Grand Coulee Dam. A pair of falcons will be released in spring 1993, and additional pairs will be released each spring during the following five years. Peregrine falcons once ranged widely in the Columbia Basin, but much of their habitat was flooded by dams. Habitat losses and the effects of hunting and pesticides damaged falcon populations. Peregrines were declared an endangered species in 1970. There are no active peregrine nests between Grand Coulee Dam and the



Canadian border, according to the Park Service.

#### **Blue Creek winter range**

To benefit birds and game animals, a 5,400-acre segment of the Spokane Indian Reservation southeast of Lake Roosevelt would be protected. The tribe would be compensated for the loss of timber harvest and grazing income from the property.

#### **Hellsgate big game winter range**

A 5,000-acre, privately owned ranch within the borders of the Colville Indian Reservation north of Lake Roosevelt would be acquired to protect birds and big game. The bulk of the ranch provides critical winter range for deer and elk. In addition, the ranch provides year-round habitat for a wide variety of species including black bears, cougars, bobcats, coyotes, badgers, pine squirrels, quail and grouse. The land would be held in trust by the tribe. Bonneville recently signed a management agreement with the Colville Tribe.

#### **Yakima Valley riparian wetlands**

Riparian wetlands within a 4,870-acre section of the Yakima Indian Reservation would be improved as waterfowl habitat. Included are research and habitat improvements for waterfowl, upland game birds and non-game birds. The project would focus on wetlands and riparian habitat along Satus Creek, Toppenish Creek and the Yakima River. Species that will benefit include great blue herons, Canada geese, mallards, minks, California quails, yellow warblers, spotted sandpipers, Western meadow-

larks, black-capped chickadees and downy woodpeckers.

#### **Vancouver Lake lowlands**

Waterfowl, shorebirds, wintering wildlife and migratory birds would benefit from the acquisition of 3,000 acres west of Vancouver, Washington, along the Columbia River. An additional 1,500 acres of state-owned land immediately south of the existing Ridgefield National Wildlife Refuge would be improved for the species.

#### **Western pond turtle**

Western pond turtle populations are declining in Oregon and throughout their entire known range. These turtles are being considered for listing as an endangered species. Oregon's Department of Fish and Wildlife proposed a research project to gather more information about the turtles and their habitat. That information will help biologists determine the improvements needed to rebuild populations and possibly preclude the necessity for protecting the species under the Endangered Species Act.

#### **Amazon Basin/Willow Creek**

To protect existing wetlands and expand wildlife habitat, 331 acres west of Eugene, Oregon, would be acquired as partial compensation for habitat losses caused by Willamette River dams. The property currently is zoned for light industry. Improvements would include fencing and trash cleanup, planting new vegetation and building water-control structures. Species that would benefit include black-tailed deer, beaver, mink, red fox, ruffed grouse, ring-necked pheasants and yellow warblers.

#### **Lake Pend Oreille redhead wintering area**

Wintering redheads, a type of duck that migrates between Canada and Colorado, are the benefactors of 3,100 acres that would be acquired and protected as habitat. Some 98 percent of the redheads that winter in Idaho, and 20 percent of the Pacific Flyway population of redheads that winter in the United States, do so on this property. The site is privately owned and is being considered for residential development. The project was proposed by the Idaho Department of Fish and Game.

#### **Camas Prairie marsh**

Some 6,100 acres in southern Idaho near the Anderson Ranch Dam and reservoir on the South Fork Boise River would be acquired and improved as wetland and upland habitat for wildlife. Currently, the property is privately owned and is being farmed and grazed. The area contains diverse habitat and numerous wildlife species including waterfowl, fur-bearing animals and shorebirds.

#### **1991 wildlife projects**

In 1991, Bonneville began seven other projects, including the now-completed Burlington Bottoms preserve near Portland. These included:

- bald eagle habitat along a 64-mile stretch of the South Fork Snake River in eastern Idaho;
- wildlife habitat along the Pend Oreille River in northeastern Washington;
- a wildlife preserve on a former cattle ranch along the Columbia River in eastern Oregon;

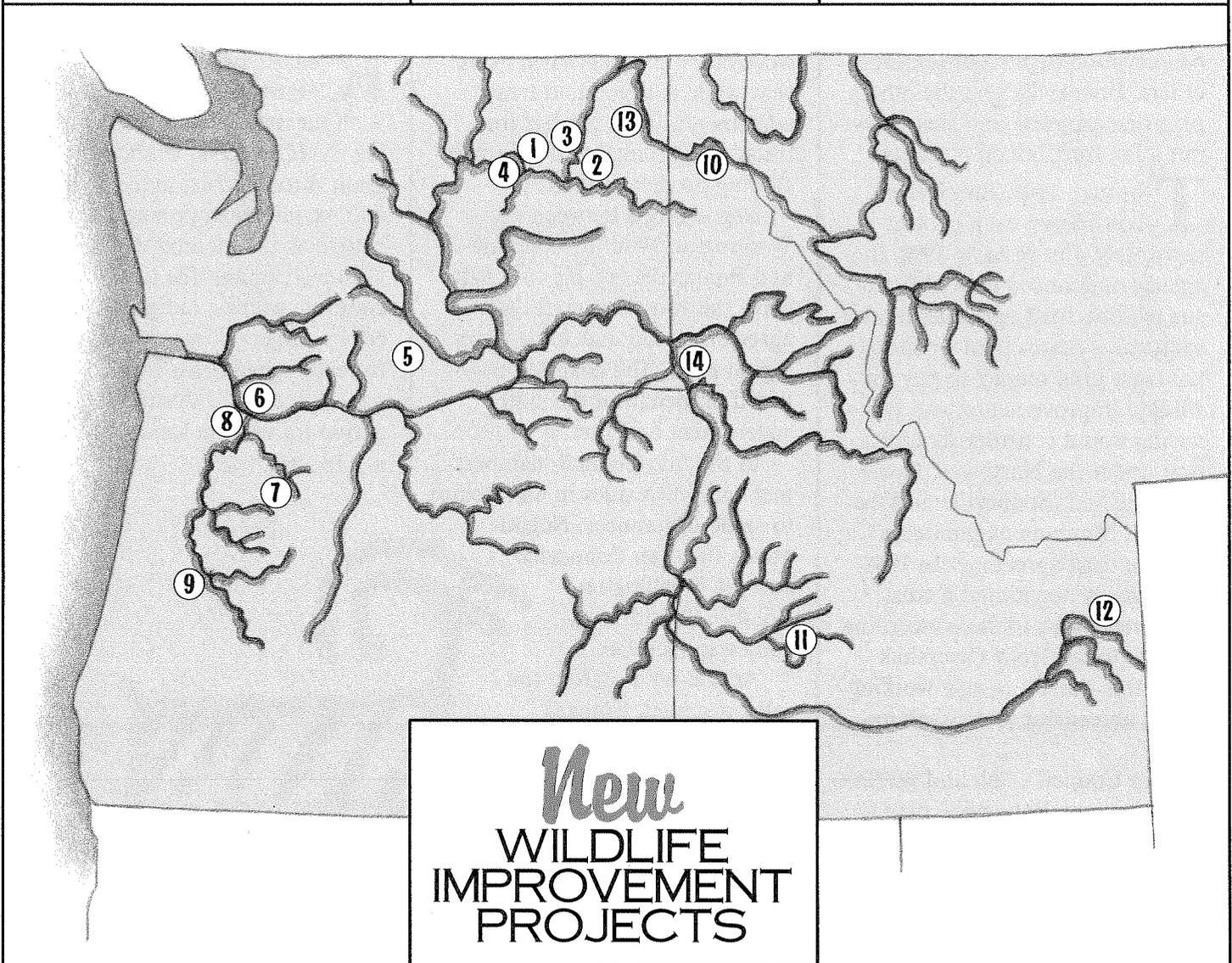
- more than 60,000 acres of forest on Craig Mountain near the confluence of the Salmon and Snake rivers about 25 miles south of Lewiston, Idaho;
- rangeland on the Spokane Indian reservation in eastern Washington;
- rabbit and grouse habitat near Grand Coulee Dam; and
- bald eagle habitat along the Snake River in southeastern Idaho.

### Estimating the damage

Before wildlife projects can begin, the extent of damage and the historic abundance of wildlife must be estimated. These estimates help determine how much habitat the animals will require to recover their numbers. In the mid-1980s, Bonneville paid for assessments of the amount of habitat lost when the dams flooded large stretches of wildlife territory.

In November 1989, the Council established a process for rebuilding wildlife populations and improving habitat in the Columbia Basin. The Council's goal is to find replacement land for 35 percent of the lost habitat by the end of the current decade.

The Council relies on Bonneville and state wildlife agencies to propose specific wildlife projects for financing each year. Bonneville considers recommendations from electric utilities, fish and wildlife agencies, Indian tribes,



- 1) Lake Roosevelt peregrine falcons, 2) Blue Creek winter range, 3) Hellsgate big game winter range, 4) Pygmy rabbit/sharptail grouse, 5) Yakima Valley riparian wetlands, 6) Vancouver Lake lowlands, 7) Western pond turtle, 8) Burlington Bottoms, 9) Amazon Basin/Willow Creek, 10) Lake Pend Oreille redhead wintering area, 11) Camas Prairie/Anderson Ranch, 12) Snake River/Palisades bald eagle, 13) Pend Oreille River wetlands, 14) Craig Mountain.

# REVISING THE REST OF THE FISH AND WILDLIFE PROGRAM

This month (November 1992) the Northwest Power Planning Council will begin revising sections of its Columbia River Basin Fish and Wildlife Program that deal with wildlife and resident fish (those that do not swim to the ocean).

In September, the Council finished revising the salmon and steelhead chapters of the fish and wildlife program. Those amendments, completed in three phases and known collectively as the Council's Strategy for Salmon, are being studied by the National Marine Fisheries Service as it works on recovery plans for threatened and endangered Snake River salmon.

Amendment recommendations from fish and wildlife agencies, Indian tribes, utilities and other interested citizens to the Council regarding wildlife and resident fish were taken through November 1. This fourth and final phase of the amendment process should last about a year. ■■

conservation organizations and others. Bonneville and the others prioritize projects and then submit a list for Council approval.

**T**hrough 1991, Bonneville considered each project separately. But in early 1992, the agency announced it would pursue wildlife trust agreements with each state. States then would use the trust fund money to pay for wildlife improvements, and Bonneville would consider its obligation under the Northwest Power Act satisfied. Bonneville and the state of Montana negotiated a wildlife trust agreement in 1988. The agency negotiated a trust agreement with Idaho concerning wildlife losses from Dworshak Dam this year. It is now working on an agreement with Washington.

The Council's fish and wildlife program says Bonneville may finance wildlife improvements either through trusts or on a project-by-project basis. The Council does not prefer one type of financing over the other, but wants to be sure that any wildlife project is a step toward the 35-percent goal. Bonneville halted

work on all projects earlier this year while it negotiated trust agreements. That is what frustrated the Council and others, including project proponents.

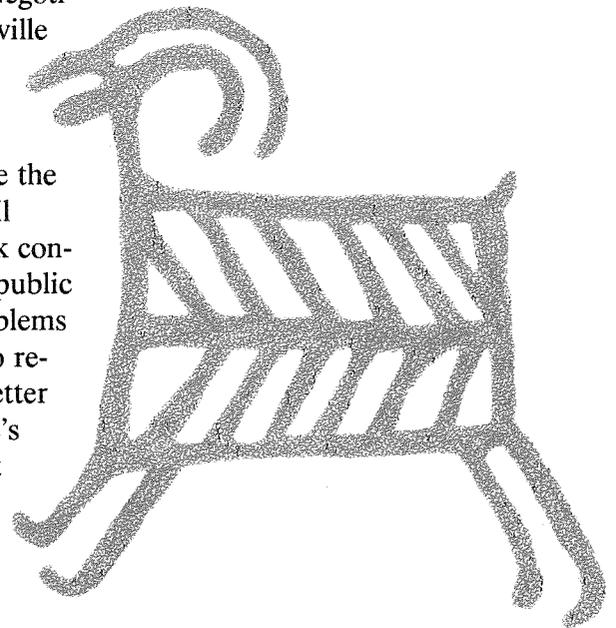
Negotiations between the Washington Wildlife Coalition and Bonneville ground to a halt when the two sides could not agree on an amount for a Washington trust. The coalition negotiated on behalf of the state government and Indian tribes.

In the fall, Council members met with both sides in an attempt to settle differences. Negotiations between Bonneville and the Washington Wildlife Coalition resumed in October.

At one point before the talks resumed, Council Chairman Ted Hallock considered conducting a public hearing to air the problems and investigate how to resolve them. But in a letter to Hallock, Bonneville's Hardy responded that projects already under way would continue.

**R**egarding future projects, Hardy added:

"Our interest is in implementing the [Council's] wildlife program through trust agreements, and we intend to pursue this course as the method of choice. However, Bonneville is ready to continue wildlife mitigation, project by project, if we are not able to reach agreements for any reason. It is not our desire that mitigation [of wildlife losses] come to a standstill." ■■



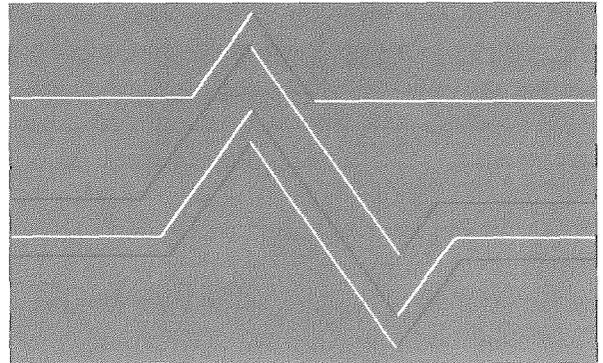
## Grays Harbor The Energy Services Utility

The sign in front of Grays Harbor County Public Utility District (PUD) appropriately reads: Grays Harbor PUD—Electricity and Energy Services. The sign signifies a management philosophy that has evolved over the years to provide public utility district customers with something more than just electricity.

“When our customers have a question, not just about their bill, but about anything related to energy, we want them to think of us,” says Joanne Hansen, energy services manager for the Grays Harbor utility. “We want to be out in front in energy conservation and energy services. We are a real community-oriented utility.”

Hansen, one of four people in the energy services department, oversees an array of conservation endeavors, including eight efficiency programs designed by the Bonneville Power Administration; an elementary school educational effort dealing with electrical safety, energy usage and the environment; and a national program called Green Lights that promotes energy-efficient lighting and carries the motto “Helping America Protect the Environment.” In addition, the utility annually joins forces with the local police to celebrate National Night Out, an event emphasizing crime prevention and security lighting.

Last year, Grays Harbor ran a very successful compact fluorescent light bulb program for residences. Grays Harbor was the second utility in the region to sign Bonneville’s redesigned industrial conservation program contract and the first to complete a project under the program. It was also one of the first public utility districts to sign up for the Washington Conservation and Renewable Energy System (CARES), a joint operating agency that provides tax-exempt financing and technical services to foster the development of conservation and small renew-



able energy generating resources. The utility is also looking into cogeneration projects with its industrial customers.

Hansen says people wonder how the utility manages to provide customers with such a wide array of programs and services. Her response is, “we are a mid-size PUD with a small, but very enthusiastic staff.” The PUD uses energy consultants for complicated commercial and industrial energy reviews, but remains actively involved throughout the process.

The utility won the Washington Public Utility District Association “Helping Hands Award” in 1991 for its community efforts, and the utility continues to be innovative.

“If Grays Harbor customers are shopping for energy services, the Grays Harbor Public Utility District has a very full shelf,” says Tom Trulove, Washington Northwest Power Planning Council member. “Their approach really redefines the role of the modern utility industry.”

For more information on the services offered by Grays Harbor Public Utility District, please contact Joanne Hansen at 206-532-4220. ■■

—Carol Raczykowski  
Washington Council staff

## Old Times, NEW LAMPS

While it may seem that 19th century aesthetics are far removed from many 21st century realities, one Portland company is proving that today's lighting products can combine period form with modern energy-efficient function. In these days of dwindling natural resources and skyrocketing power costs, architects and building owners demand lighting fixtures that conserve rather than waste energy. But many still want the look of historic fixtures.

Rejuvenation Lamp & Fixture Company, one of the nation's leading manufacturers of period lighting, has developed the technology to customize historic brass fixtures to accommodate compact fluorescent and metal halide light bulbs, replacing the more common incandescent bulbs.

Rejuvenation President Jim Kelly said the company began experimenting last year with energy-efficient technology and modifying its lighting products with compact fluorescent and metal halide bulbs.

"Most lighting manufacturers start from scratch and design fixtures around the technology," Kelly explained. "Our challenge is to accommodate the energy-efficient technology without sacrificing period authenticity or elegance."

Increasingly, states are adopting energy-efficient building regulations that require fluorescent lighting in new commercial construction and remodeling jobs.

Compact fluorescent and metal halide bulbs last more than 13 times longer than incandescent bulbs and use only 20 percent of the electricity. Traditional incandescent light bulbs expend 10 times more heat than light and are not considered cost-effective or energy-efficient.

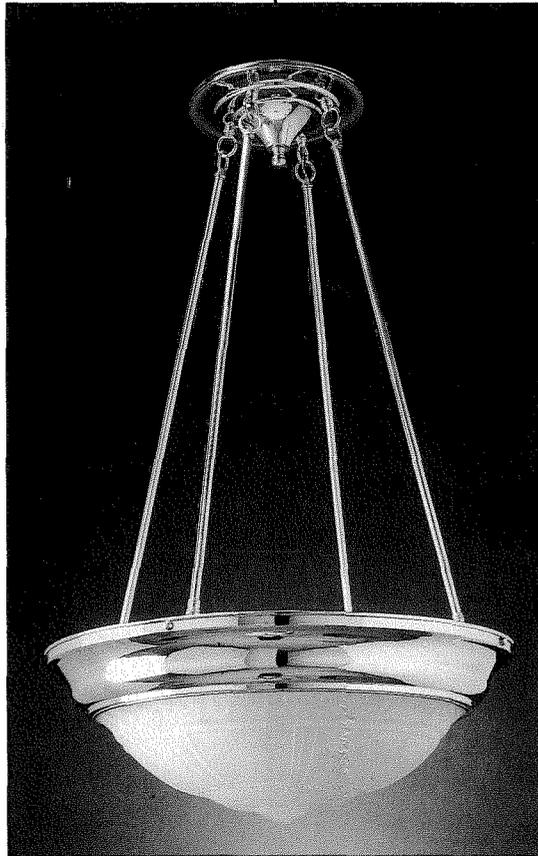
At the same time, however, building restoration is flourishing around the country, and builders are looking to retain authenticity while complying with revised energy codes.

The Smithsonian Institute, for example, wanted to install 35 of the company's period chandeliers in the Natural History Museum. However, the fixtures had to be fitted with compact fluorescent bulbs.

Refitting fixtures to be energy-efficient presents several challenges, including adjusting the fixture for the oversized compact fluorescent and metal halide bulbs; developing a fluorescent that provides the same warm, natural light of incandescent bulbs; and ensuring that the customized fixtures provide the right amount of wattage.

Currently, 70 of the 250 fixtures offered by Rejuvenation can be customized with compact fluorescent bulbs, and 12 can be refitted to accommodate metal halide bulbs. This number continues to climb with constant improvements and changes in the technology. ■■

—Richard Recker  
Oregon Council staff



## ROLE OF MONTANA RENEWABLES EXPLORED

It's time to explore solar, wind, geothermal and other renewable energy sources in Montana, a citizens group believes.

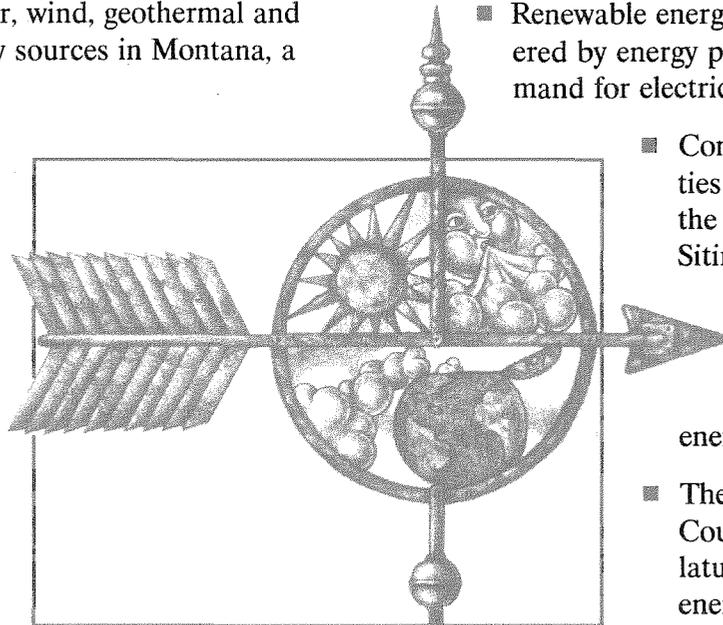
On October 9, 1992, the Alternative Energy Resources Organization (AERO) sponsored its first "Renewable Energy Resources in Montana" workshop in Missoula. The workshop was designed to educate people on renewable energy resources and their potential development in Montana. It was the first of a series of workshops co-sponsored by the Northwest Power Planning Council to be held throughout the region. Speakers included experts in wind, solar and geothermal energy.

The workshop focused on potential problems in developing renewable energy, the scale of development that should be attempted, energy production trade-offs in the event renewable energy is not developed, and social and environmental criteria that should be applied to renewable energy development.

"With the power surplus enjoyed in the 1980s gone, conservation has become the region's resource of choice to meet the new demand," said Al Kurki, AERO executive director. "However, the supply of conservation is neither infinite nor renewable, and the need for the four-state region to develop new generating resources in the immediate future is clear. The region needs to be able to respond to that need quickly with a menu of environmentally responsible renewable resources."

"Now is the time to explore renewable energy options in Montana for several reasons," Kurki said. These include:

- Renewable energy sources are being considered by energy planners to help meet demand for electricity in the next eight years.
- Conservation groups and utilities are discussing changes in the Montana Major Facility Siting Act. There are proposals both to amend the existing act or to write a new law to deal more specifically with renewable energy projects.
- The Environmental Quality Council of the Montana Legislature is developing a state energy policy, and public comment is crucial to their work. The effort may be expanded after the 1993 legislative session.



A second workshop is scheduled for early December in the Bozeman/Livingston area. For information about the Renewable Energy Project or AERO, contact Paul Reichert at the AERO office in Helena, Montana, at 406-443-7272.

AERO is a non-profit education organization in Montana currently working on energy policy. It was founded in 1974 to help citizens develop environmentally compatible technologies and practices to conserve energy, reduce fossil fuel dependency and foster community self-reliance. The organization has approximately 400 members, primarily residents of Montana. ■■

—Ti Dahlseide  
Montana Council staff

## What's Watt for Kids in Idaho

**D**o you need to use a 150-watt light bulb in your lamp, or would a 60-watt bulb be sufficient? What is the difference between wattages? Does one use more electricity than the other? Does one burn brighter or longer?

The Discovery Center of Idaho in Boise opened a new exhibit September 30 called "Hands on Energy" designed to help children (and adults) learn the answers to these and other energy-related questions.

According to the center's Executive Director, Lorette Williams, "Research shows that many elementary school teachers have very little science background and avoid teaching science. Additionally, elementary-age students have a very high degree of interest in science, but only 7 percent of high school-age students intend to major in science or math in college.

"I think we lose students in science because they don't understand the concepts. The Discovery Center fills a need—to provide knowledge and experience to affect a child's idea of science."

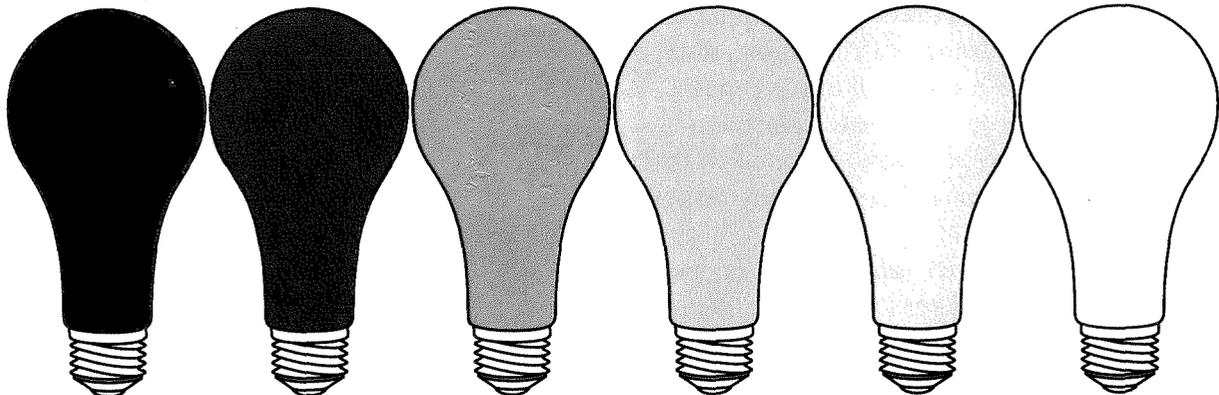
The exhibit was designed by the Discovery Center's Exhibit Director Bill Molina, who takes great pride in the project's 13 different exhibits. Molina recently installed a rooftop "suntracker," which reflects through a window to solar-powered exhibits

inside. There is also a physical demonstration sure to be a favorite with the kids: the pedal generator. Students sit in a stationary bicycle-like contraption and find out how much work is required to generate energy by pedaling it.

The "Energy Over Time" exhibit uses light bulbs of different wattages to demonstrate how power can be consumed—fast or slow, dimmer and brighter. A hand-cranked generator powering light bulbs of different wattage shows how fast each bulb uses electricity. The large-wattage bulb glows brightly for a very short time. The small wattage bulb isn't as bright, but it uses less power so it glows for longer period of time. A new compact fluorescent tube uses one-fourth the energy of a regular bulb *and* lasts 10 times as long.

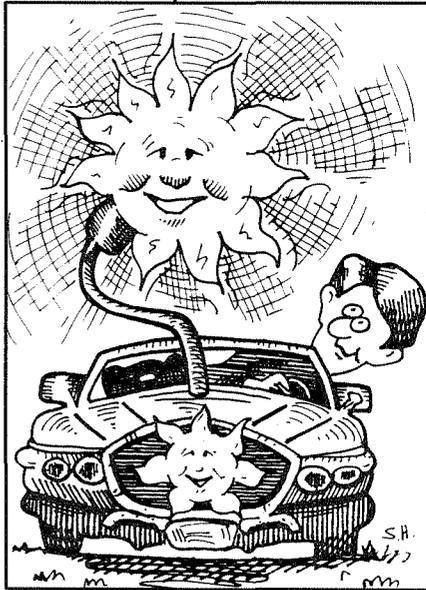
The Discovery Center was one of 10 national recipients of a U.S. Department of Energy grant to provide the public with a hands-on opportunity to explore energy-related issues at a basic, scientific level. Engineers and energy experts at Idaho companies, such as Idaho Power, Northwest Energy Management and the Idaho National Engineering Laboratory, provide guidance and expertise. ■■

—Maridee Turner Buersmeyer  
Idaho Council staff



# SHORTS

Washington solar firm powers an airport in Utah. The San Juan County Airport is the first in the United States to get all of its electricity from solar photovoltaic cells. The airport was built to serve increasing tourism at national parks in southeast Utah. The alternative to solar cells was diesel-powered generators. The \$75,000 solar system is expected to save \$339,000 in fuel costs over 20 years. Solar Engineering of Lacey, Washington, built the system. [Source: *Solar Today*, July/August 1992.]



Tribal leader Bill Frank, Jr., honored with Schweitzer Prize. Bill Frank, Jr., chairman of the Northwest Indian Fisheries Commission, has been awarded the 1992 Albert Schweitzer Prize for Humanitarianism. The prize is given annually by the Alexander von Humboldt Foundation of New York and is administered by Johns Hopkins University in Baltimore. The prize includes a \$10,000 honorarium. Frank was honored for his work to improve salmon runs while protecting tribal fishing rights. [Source: Northwest Renewable Resources Center newsletter, Summer 1992.]

Bonneville co-sponsors "hybrid fuel" auto research. The Bonneville Power Administration is co-sponsoring research to develop a "hybrid" car that runs on both solar energy and compressed natural gas. The goal is to produce a car that travels 100 miles of solar-powered city driving and another 200 miles of gas-powered freeway driving. Bonneville contributed \$25,000 to the project at Western

Washington University, which also received \$25,000 from Puget Sound Power & Light Company and \$200,000 from the state of Washington for the research. [Source: *Journal*, Bonneville Power Administration, July 1992.]

Canadians try genetic engineering on coho. Canadian researchers are growing genetically altered coho salmon in an experiment to determine whether fish can be made to grow faster. The so-called "transgenic" coho in a laboratory at Nanaimo, British Columbia, weigh 30 times more than control fish of the same age.

The experiment involves injecting fish with genes that spur accelerated growth. Canadian fisheries researchers have been working on transgenic technology for more than a decade. [Source: *The Seattle Times*, August 9, 1992.]

Indonesian firm sells clean coal. An Indonesian firm is exporting coal that contains 80 percent less sulfur than the cleanest American coal. It is reported to be the cleanest coal ever analyzed. The ultra-clean coal comes from an area that has unusually high rainfall, and this may contribute to the purity of the coal. The company is mining 2 million tons per year and has identified reserves of 20 million tons. The ultra-clean coal can be mixed with dirtier American coal to help meet U.S. Clean Air Act requirements. [Source: *The Energy Newsbrief*, August 26, 1992.]





**Solar energy helps in wake of hurricane.** Solar energy generators are being donated to residents of south Florida where Hurricane Andrew leveled thousands of homes in September. The Solar Energy Industries Association joined with manufacturers of solar energy equipment to supply generating systems to the area. The first 400-watt system powered emergency radio communications. The systems use

photovoltaic cells, which convert sunlight directly to electricity. [Source: Solar Energy Industries Association press release.] ■■

—Compiled by John Harrison

## CALENDAR

**November 3-4**—“Northwest Energy Expo '92” at the Washington State Convention Center in Seattle, Washington. The conference and exposition will highlight energy saving programs. Sponsored by Puget Sound Power & Light, the Bonneville Power Administration and others. For more information: Jim Croft or Barb Woodward, The Lutgen Associates, 10020 A Main Street, Mail Stop 443, Bellevue, Washington 98004, phone 206-455-9917, FAX 206-453-6354.

**November 12**—“Northwest Energy Professionals Look at Industrial Energy Use,” a one-day regional forum on industrial energy efficiency at the Energy Resource Center in Tualatin, Oregon. The forum's agenda will include presentations on industrial technology monitoring for research and energy savings verification, and linkage between energy savings opportunities and

environmental concerns. Sponsored by Oregon State University, the Bonneville Power Administration and others. For more information: Joseph Junker, Oregon State University, Administrative Services A422, Corvallis, Oregon 97331-2119, phone 503-737-5034, FAX 503-737-0817.

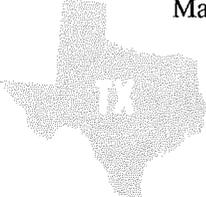
**November 13**—“Navigability: Who Owns Our Waterways?” at the Northwestern School of Law in Portland, Oregon. The continuing education seminar will focus on public use of waterways. For more information: Maureen Breckenridge, Northwestern School of Law of Lewis & Clark College, 10015 S.W. Terwilliger Boulevard, Portland, Oregon 97219, phone 503-768-6629, FAX 503-768-6671.

**November 16-18**—“Energy Opportunities '92 Conference” at the Ramada Renaissance Hotel in Saratoga Springs, New York. The two-

day conference and trade show will cover such topics as energy technology, industrial energy conservation and renewable energy use. Sponsored by the U.S. Department of Energy and others. For more information, Lise Marshall, Northeast Sustainable Energy Association (NESA), 23 Ames Street, Greenfield, Massachusetts 01301, phone 413-774-6051.

**November 16-19**—“The 104th NARUC Annual Convention,” at the Westin Bonaventure in Los Angeles, California. This year's theme is: “In the race for quality, there is no finish line.” Sponsored by the National Association of Regulatory Utility Commissioners (NARUC). For more information: NARUC, 1102 ICC Building, Constitution Avenue and 12th Street, N.W., P.O. Box 684, Washington, D.C. 20044-0684, phone 202-898-2200, FAX 202-898-2213.

 November 18-19—Northwest Power Planning Council meeting at the Radisson Northern Hotel in Billings, Montana.

 November 18-20—The 5th Biennial Marketing Research Symposium at the Grand Kempinski Hotel in Dallas, Texas.

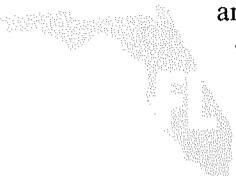
The symposium will offer the latest information on methods, tools and techniques for improving the performance of demand-side management programs. Sponsored by the Electric Power Research Institute and the Electric Utility Market Research Council. For more information: Susan Bisetti, Electric Power Research Institute, P.O. Box 10412, Palo Alto, California 94303-9743, phone 415-855-7919, FAX 415-855-2041.

 November 30-December 4—"Energy Efficiency Business Week" at the Palace of Culture in

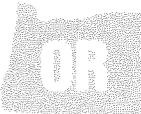
Prague, Czechoslovakia. The international conference will highlight all areas of energy efficiency. Sponsored by The Energy Efficiency Center (SEVEN), U.S. Department of Energy and others. For more information: Ivo Slavotinek, SEVEN, Slezska 9, 120 29 Praha 2, Czechoslovakia, phone 422-256-104, FAX 422-258-556.

 December 7-9—"Reaching Your Potential in DSM," the third annual Association of Demand-Side Management Professionals (ADSMP) meeting at the Arizona

Biltmore Hotel in Phoenix, Arizona. For more information: ADSMP, P.O. Box 4658, Berkeley, California 94704, phone 510-528-5566, FAX 510-526-2727.

 December 7-10—"Thermal Performance of the Exterior Envelopes of Buildings V" conference at the Sheraton Sand-Key

Hotel in Clearwater Beach, Florida. The conference—the fifth annual—will promote the development of energy-efficiency standards. Sponsored by ASHRAE and others. For more information: Pat Love, Oak Ridge National Laboratory, P.O. 2008, Oak Ridge, Tennessee 37831, phone 615-574-4345.

 December 9-10—Northwest Power Planning Council meeting at the Council's central office in Portland, Oregon.

 January 11-13, 1992—"DA/DSM '93," the third international symposium on distribution automation and demand-side management at the Wyndham Conference Center in Palm Springs, California.

Sponsored by the U.S. Department of Energy, Electric Light and Power Magazine and The Eureka Group. For more information: The Eureka Group, P.O. Box 460607, San Francisco, California, 94146, phone 415-647-9003, FAX 415-647-8892.

 January 13-14—Northwest Power Planning Council meeting in Boise, Idaho.

 February 10-11—Northwest Power Planning Council meeting in Washington.

 February 18—"Regional Utility Conference: Laying the Cornerstone for the Conservation Power Plant" at the Colum-

bia River Red Lion in Portland, Oregon. Sponsored by the Northwest Power Planning Council and others. For more information: Judi Hertz, Northwest Power Planning Council, phone 503-222-5161 or 800-222-3355, FAX 503-795-3370.

 March 8-12—"Affordable Comfort Conference" at the Adam's Mark Hotel in Philadelphia, Pennsylvania. Spon-

sored by Affordable Comfort, Inc., the Pennsylvania Energy Office and others. Presentations at the conference will be given by leaders in housing, energy, utility programs and public policy. For more information: Diane Tirio, communications coordinator, Affordable Comfort Conference, phone and FAX 412-373-0482.

 March 24-26—"Making a Difference," the sixth national demand-side management conference in Miami Beach,

Florida. Sponsored by the Electric Power Research Institute (EPRI), the U.S. Department of Energy and others. For more information: EPRI, 3412 Hillview Avenue, Palo Alto, California 94304, phone 415-855-8900, FAX 415-855-2041.

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

—Compiled by Judy A. Gibson

# Thank you

The Council members and editorial staff of *Northwest Energy News* very much appreciate your taking time to answer our questions and return the readers' survey postcard enclosed in the July/August issue. We want to know more about our readers so we can continue to give you articles and information that are interesting and useful.



Almost 1,000 of you responded. Some responses surprised us. Some did not. Who sent in their cards? Most of the respondents are very well educated, working men over 40. Here are some specifics:

- 77 percent of the respondents are over 40 years old.
- The largest single age group (27 percent) is over 60.
- 80 percent of the respondents are men.



- 82 percent of the respondents are college graduates.
- A whopping 55 percent of the respondents have some post-college education.
- 92 percent are employed, and 76 percent of those responding find *Northwest Energy News* useful in their work.
- 65 percent of the respondents live in Washington and Oregon.



What subjects do our well-educated respondents want to read in *Northwest Energy News*? (Remember, you could check more than one interest area.) By far, the most popular subjects are conservation (73 percent), the environment (71 percent) and new energy sources (65 percent).



The next most popular subjects with our respondents are issue debates (52 percent) and policies and politics (51 percent). About 45 percent of the respondents want articles about wildlife, and an equal percentage are interested in stories about business and industry.



What subjects should we avoid?

- Only 9 percent of the respondents are interested in stories about or for young people. We have just started analyzing this information and how it relates to this publication. So, if you still have the postcard and haven't sent it back, please do. We hope to use what you said to make *Northwest Energy News* even more useful for our readers. Again, thanks for taking the time to help us. ■

## Northwest Power Planning Council

### Idaho

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**John Brenden**  
**Stan Grace, chairman**

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**Tom Trulove**

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Toll Free: 1-800-222-3355  
Executive Director: Edward Sheets  
Public Affairs Director: Steve Crow

The Northwest Power Planning Council is required by an Act of Congress to develop a program to protect, mitigate and enhance the Columbia Basin's fisheries and a regional electric energy plan that provides a reliable electricity supply at the lowest cost. For further information, see Pacific Northwest Electric Power and Conservation Act—Public Law 96-501.



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Executive Editor: Carlotta Collette  
Art Director: Stephen Sasser  
Writer: John Harrison  
Production: Judy Gibson

Reprinting is encouraged. Please credit the Northwest Power Planning Council.

## 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
- 91-04 1991 Northwest Power Plan—Volume I
- 91-05 1991 Northwest Power Plan—Volume II
- 92-21 Columbia River Basin Fish and Wildlife Program—Strategy for Salmon
- 92-21A Columbia River Basin Fish and Wildlife Program—Strategy for Salmon—Volume II
- 92-23 1992 Annual Report to Congress

### Mailing Lists

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

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

Please **delete** my name from the mailing lists for the following newsletters (please include the 12-digit number next to your name on the mailing label).

- Northwest Energy News**
- Update**

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Organization \_\_\_\_\_

Street \_\_\_\_\_

City/State/Zip \_\_\_\_\_

(Or call the public affairs division at the Council's central office, 503-222-5161, or toll free 1-800-222-3355.)

## For your viewing pleasure

Salmon and hydropower—two marvels of the Pacific Northwest. Both face severe challenges. The salmon runs are down while the region's need for energy is growing.

**A Time for Action** (15 minutes) and **Journey of the Kings** (28 minutes) tell the story of the unique regional effort to secure the low-cost electricity the Northwest requires, while protecting the salmon that are so much a part of our heritage.

The videos and related information suitable for schools, as well as church or civic groups, are available on loan at no charge. Contact the Council at the phone numbers above to borrow a copy.



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## IN THIS ISSUE

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# Homes

ON THE RANGE

