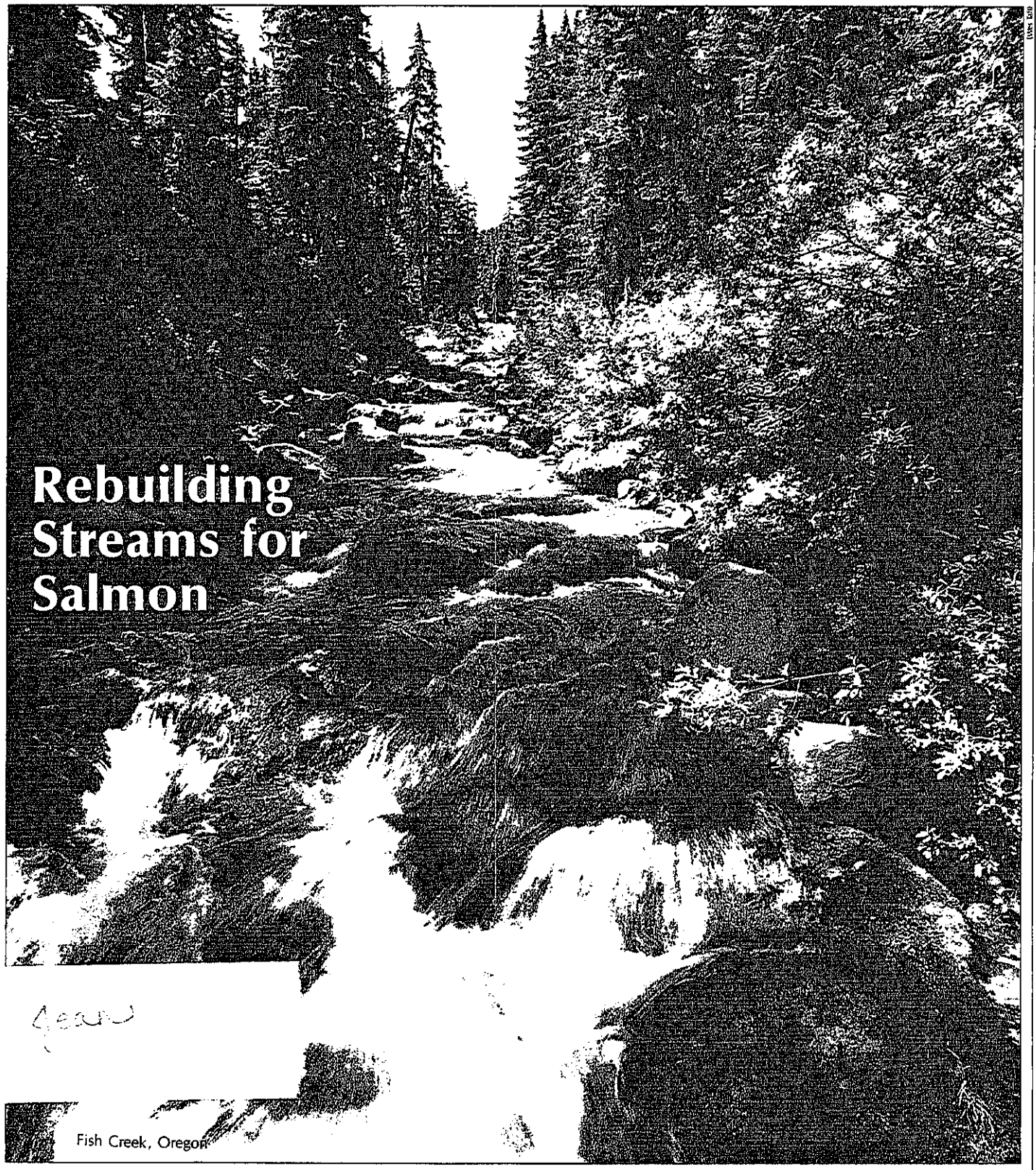


# Backgrounder

FEBRUARY 1987

**Bonneville**  
POWER ADMINISTRATION



## Rebuilding Streams for Salmon

*Gean*

Fish Creek, Oregon

Along the banks of the great river, tribal fishermen cast nets into the Long Narrows.

Salmon and Indians at the rapids (Oregon Historical Society)



## The year is 1775.

Along the banks of the great river, fishermen of the Wasco tribe cast nets into the Long Narrows. The clear, cool waters ripple with swarms of silver-backed *tshawytscha*, the revered creature that has returned to this place every year.

Young men are spearing salmon that are almost too big to haul in. Others work in pairs with 100-foot long seine nets woven of spruce roots and weighted with grooved stones. They pull them ashore, heavy with squirming fish.

The ceremonial feasting and thanksgiving will soon begin. Villagers will dry most of the catch in the sun or over fires. They will pound some into pemmican to store for the winter or trade with neighbors. They will waste nothing, not even skins and bones.

There seems no end to the great water's abundance. Millions of migrating fish will pass upstream before winter. Their natal streams lie among 163,000 square miles of undisturbed spawning habitat.

Between a quarter and a half of these fish will feed more than 50,000 mouths in several hundred villages along the way. And there will still be more than enough adult salmon and steelhead left to ensure that the endless cycle is repeated, as it has been for 10,000 years.

## The year is 1975.

The Columbia River and its tributaries have been completely transformed since the Wasco Indians speared and netted the plentiful fish at Long Narrows. It is no longer a natural system. The Long Narrows is at the bottom of a reservoir. A city of 11,000 now stands near the tribe's ancient fishing camp.

It is a time of crisis, with record low fish runs. This year, an estimated 1.5 million adult salmon and steelhead of all species will return to the Columbia. This is but a small fraction of the combined run of 200 years ago. Less than one quarter of these fish are wild; most started life in hatcheries.

Both spring and summer chinook and summer steelhead runs are in a precarious state. Some experts believe their very survival is in question. Responding to this emergency, authorities close the entire mainstem Columbia to upriver spring chinook fishing for the first time in history. Fishing is also banned on the Snake River tributaries in Idaho.

Indian commercial fishing is totally prohibited. The descendants of the Wasco and other Chinook-speaking tribes are allowed only token catches for subsistence and for their age-

old ceremonies to mark the return of the *tshawytscha*.

Since 1975, the situation for salmon has changed once again, this time for the better. Millions of dollars and hundreds of people have worked to bring back the wild salmon-and with good results. There has been a resurgence in salmon numbers.

But to know what it takes to save the wild salmon and prevent future losses, we need to understand what caused their decline. And we need to weigh what these efforts will cost

## The Price of Progress:

### A Shrinking Natural Habitat

Salmon and steelhead runs lost ground for decades. Since the turn of the century, a growing human population has subjected these ancient species to new and deadly environmental pressures.

Human enterprise completely overturned the delicate biological balance in some three-quarters of the salmon's original habitat. It became increasingly difficult for them to adapt, reproduce, and thrive in the wild.

First, fish were overharvested by canning companies. Then logging operations silted up spawning sites. Miners dredged and destroyed stream beds. Toxins seeped from mining wastes into the water. Irrigation, streamside cattle grazing, housing developments, and recreational fishing - all took away a portion of the salmon's habitat.

The development of the hydroelectric power system added to the damage. Dams cut off passage to many upriver streams. Huge reservoirs flooded spawning grounds.

### Crisis as a Catalyst for Change

A new era of industrial and economic development finally culminated in a crisis for salmon in the mid-1970s.

Municipal and industrial pollution seriously depleted the numbers of salmon and steelhead trying to migrate through the Willamette and other rivers. Until the new environmental laws of the 1960s began to change things, cities were dumping raw sewage and some pulp and paper mills were pouring untreated effluent into the river. Sludge piled up on the river bed, consuming the water's oxygen.

Several years of drought and low river flows plus a growing demand for electricity put increased pressure on the hydro system. There was simply not enough power to go around.



**Hydroelectric dams - along with over-fishing, mining, logging and growing numbers of people - damaged fish runs. Building Bonneville Dam (Corporation of Engineers)**

Predictions of dire shortages, electric rationing and brownouts got everyone's attention. From the late 1960s through the mid-1970s, the number of dams on the mainstem Columbia more than doubled.

In 1972, high river flows and heavy spilling at dams caused water at the base of the dams to become supersaturated with nitrogen. Millions of young fish died from gas bubble disease when exposed to this supersaturated water.

The following year, extremely low flows sent great numbers of fish through the turbines at successive mainstem dams and stalled many more in the reservoirs. The results were disastrous.

Biologists warned that without a different kind of human intervention one that collaborates rather than competes with nature some types of salmon could join the long list of the world's extinct creatures.

## Sharing an Energy Future with Fish and Wildlife

By the end of the 1970s, public awareness focused on the dwindling Columbia River salmon. The outcry prompted Congress to try to

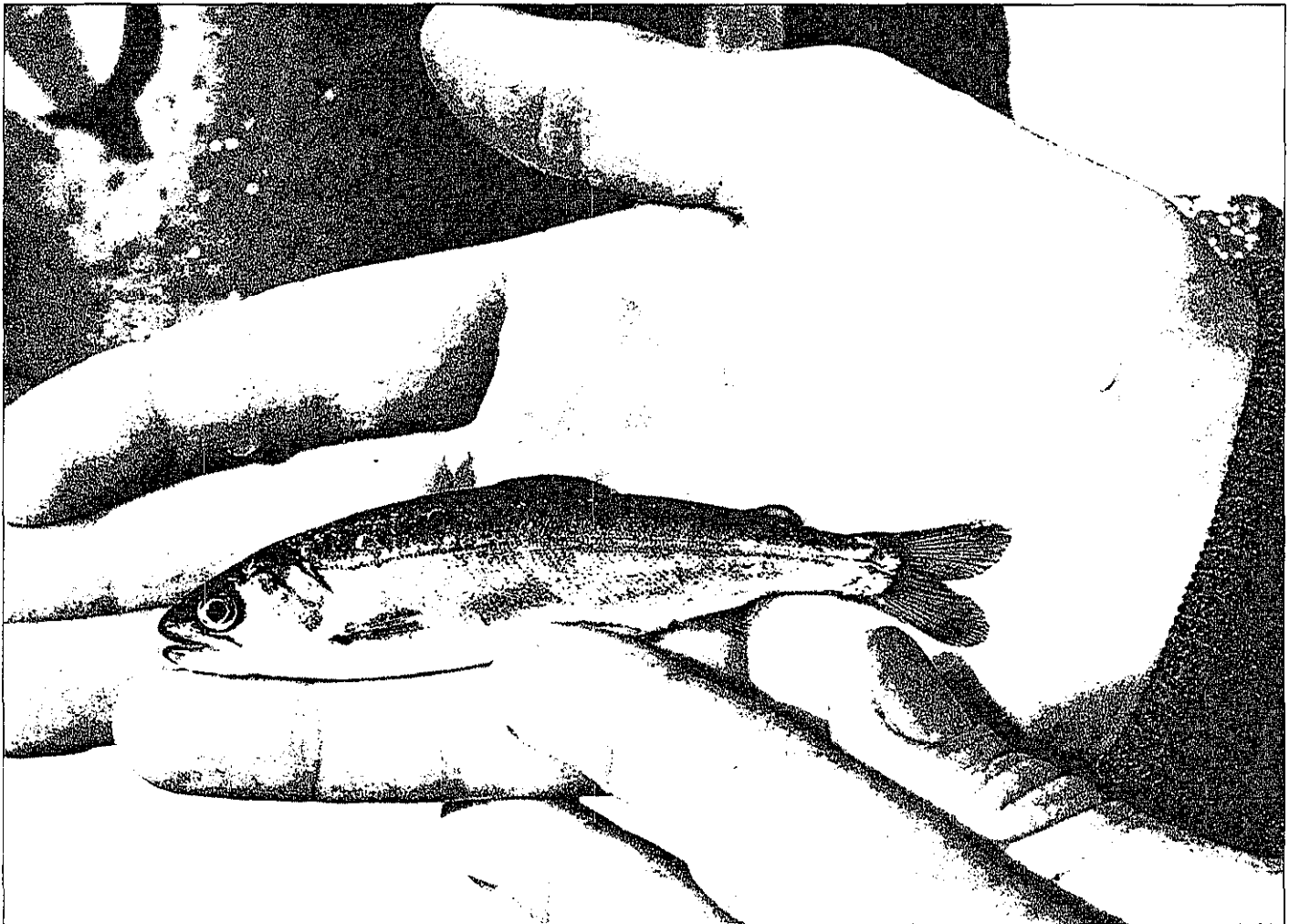
reverse the trend through the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Act).

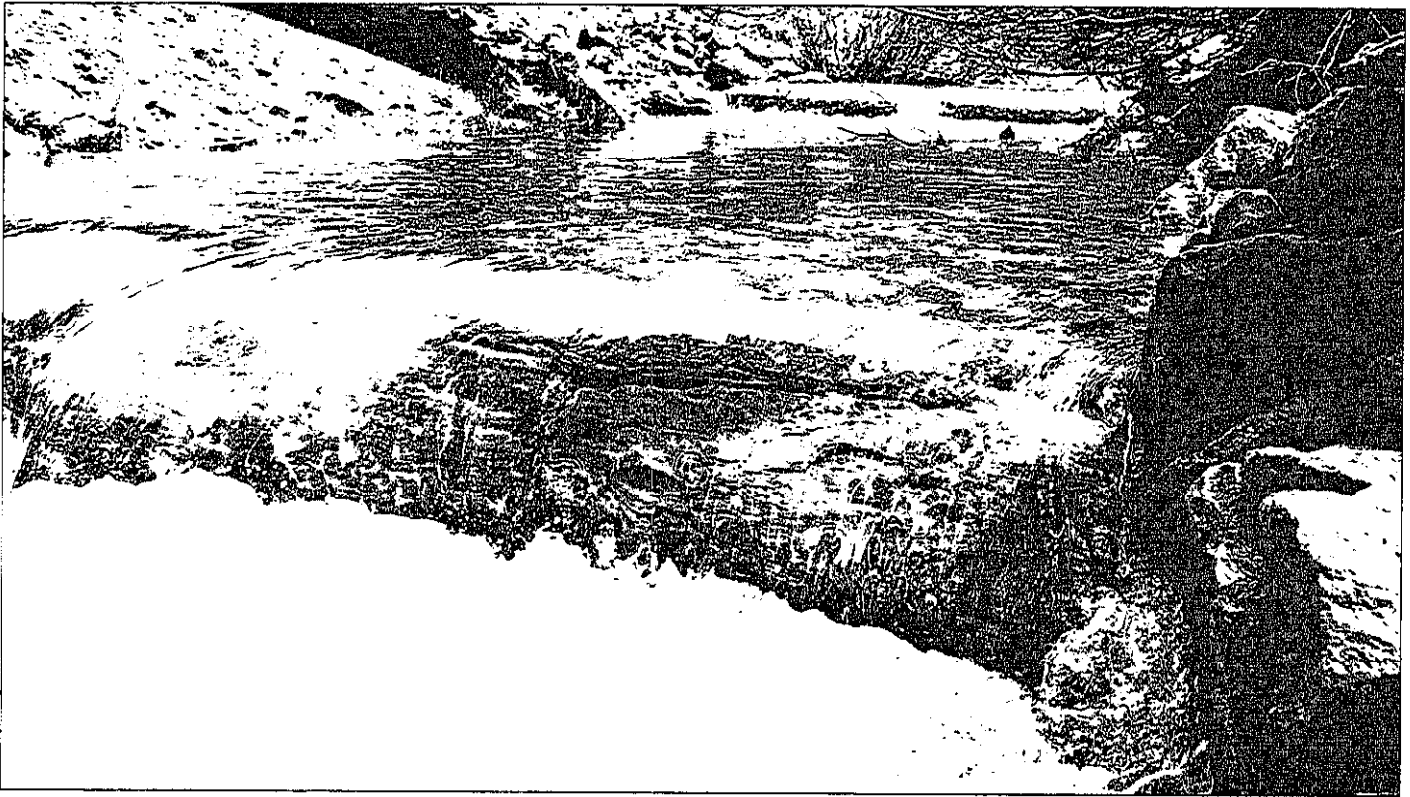
The Act created the Northwest Power Planning Council (Council), a new body charged with developing an overall plan to accomplish these objectives. Acting on recommendations from the region's fish and wildlife agencies, Indian tribes, and other interested parties, the Council adopted the original Fish and Wildlife Program in 1982. Subsequent editions of the Program refined the original and added new ideas from the agencies and tribes.

The Act assigned an important new role to EPA. BPA's primary function is to market power from the Columbia system's Federal dams. Now, BPA is also required to use its legal and financial resources "to protect, mitigate, and enhance fish and wildlife to the extent affected by the development and operation" of hydroelectric dams on the Columbia River and its tributaries.

BPA became the newest member on the team of public and private agencies working to increase the numbers of wild salmon and steelhead. Others include the U.S. Fish and Wildlife Service; National Marine Fisheries

**The Bonneville Power Administration is the newest member on the team of agencies working to increase the numbers of wild salmon and steelhead. Young chinook salmon** (Wes Taft)





**One of the best ways to increase the number of fish is to increase and improve the streams in which they spawn.**

Log weir on Murderer's Creek in eastern Oregon  
Sharon Blair

Service; Oregon, Idaho and Washington Departments of Fish and Wildlife; Indian tribes in four states; the U.S. Bureau of Land Management and the U.S. Forest Service. The list also includes the U.S. Army Corps of Engineers and Bureau of Reclamation, builders and operators of the Columbia's 30 Federal dams, and several utilities and volunteer organizations.

Since the mid-1970s, the Corps of Engineers has been working to minimize fish losses at dams by installing fish screens and digging channels to bypass fish away from turbines. They also created "Operation Fish Run." The Corps collects young fish at upriver dams and transports them by barge and truck for release below Bonneville Dam. In 1985, they transported 15 million young salmon and steelhead.

The Bureau of Land Management and the Forest Service are responsible for huge tracts of Federal lands where spawning streams are located. New land management practices are helping to halt the decline in available fish habitat and, in some cases, restore spawning and rearing areas.

Biologists for the state fish and wildlife agencies, Indian tribes, utilities and volunteer groups have also worked to rebuild and preserve salmon habitat.

Efforts over the past 20 years to clean-up Pacific Northwest rivers have been a source of pride and encouragement. Today, large numbers of salmon and steelhead can once again swim past our cities to spawn upriver.

## A New Perspective

The work of all the different groups has received a tremendous boost from the Act and the Council's Fish and Wildlife Program. These documents offered a common focus for their efforts and an opportunity to share resources, data, and expertise.

The overall purpose of the Program is to increase the number of Columbia River salmon and steelhead. It aims to do that by attacking problems at all points in the salmon's life cycle. And it recognizes that one of the best ways to increase the number of fish is to increase and improve the streams in which they spawn.

Of over 200 specific measures in the Council's Fish and Wildlife Program, BPA has been assigned almost half. The Program listed more than 150 habitat sites on 25 Northwest rivers needing improvement.

BPA now spends about \$30 million a year to rebuild fish and wildlife populations harmed by the hydro system. The largest single block of these funds - about 20 percent - is spent on some 50 projects to rebuild or improve salmon and steelhead streams.

Two aspects of BPA's responsibilities under the Act provide the muscle to put worthwhile projects in place. One is the concept known as offsite mitigation. Sometimes nothing can be done directly about the more severe or large-scale impacts of the hydro system. BPA cannot dismantle dams or drain reservoirs that have flooded spawning sites.

## Bringing the Salmon Back to Idaho's Streams

Over the past ten years, Indian tribes and Federal and state agencies have worked to reverse declines in Idaho's fish runs, in part, by improving habitat. In 1983, BPA joined that effort.

BPA contracted the Forest Service to rebuild several miles of fish habitat in Lolo Creek, Crooked Fork Creek, and White Sands Creek. These creeks, at one time, produced a third to a half of the Clearwater River's wild salmon and steelhead.

Project leaders brought in heavy equipment to move logs and boulders into the stream. Workers installed 25 log weirs, anchoring them into the stream bank either with large boulders or with smaller logs.

They then laid wire mesh screens underwater on the upstream side of the weirs. The screen will trap spawning gravels washed down by spring rains. Notches in the logs will concentrate water and scour out nursery pools for young fish. Boulder clusters, felled trees and old tree stumps were also hauled into the creek.

By the end of the project, a total of 450 structures were in place on 21 miles of stream. Salmon now have many more of the pools, riffles and protected areas they need to successfully

## Replanting Stream Banks Helps The John Day's Wild Fish

Only wild salmon and steelhead run in the John Day River. Biologists want to keep it this way and they want to keep the wild runs strong.

But chinook returns have been declining for the past decade. Like elsewhere in the Columbia system, their habitat has suffered from mining, dredging, overgrazing, roadbuilding, logging and land development. Losses at downstream dams have accelerated the decline.

In 1983, BPA funded several salmon habitat projects on the mainstem John Day and six of its tributaries. The Oregon Department of Fish and Wildlife, the U.S. Forest Service, and the Bureau of Land Management are carrying out the projects with the cooperation of Indian tribes, landowners, and other local government agencies.

As in Idaho, crews are installing logs and boulders to achieve the right combination of pools and riffles for spawning adults and growing young fish. But here they are also working on riparian recovery - reclaiming and stabilizing the stream banks.

Eroding stream banks release sediment. Sediment can settle on salmon redds and

## Workers and heavy equipment install log weirs on wild salmon and steelhead streams. On the Clearwater River



reproduce. Results will not be apparent until perhaps 1990, but biologists are hopeful. They expect the number of chinook and steelhead to double or triple.



## Plant root systems anchor the soil; their limbs shade the stream from the blazing summer sun. Willow planting - Malheur National Forest

smother eggs and young fry, as well as the insects they feed on.

Forest workers are building rock jetties and deflectors to prevent the river from eating away loose earth at the streamside. They are planting grasses, shrubs, and trees along the banks. Healthy vegetation will also reduce water velocities, while root systems anchor the soil.

## Helping to Recreate the N

Projects to rebuild and habitat fall under four br

- improving spawning ar streams
- protecting and rebuildi
- helping fish get past n. keep them from reachi
- improving passage faci manmade barriers.

A representative exam project is described below

## New Ladders Mo Above Dams

Over the years, state a utilities have built and ir most of the Columbia's n are still many small damr tributaries blocking vast r habitat.

Such is the case at Tur Dams. Both are located within 25 miles of the c: central Washington. Thre the Wenatchee joins the Tumwater and Dryden 1900s. Electricity produce provided power for the C to move its electric railwa the Cascade Mountains. I for both hydropower — e and Seattle — and irrigati produced power since Cf Utility District bought the maintains them for possil production.

High water temperatur problem for cold water fi changes the water's chen chances of disease. Most surface needs shade if yc survive the hot summer r vegetation provides the n from solar radiation:

To enable plants to gr are also building fences ; keep animals away. In fer growth can reestablish its

As a result of these m expect average wild salm production to triple in th

## natural Balance

improved salmon categories:

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the riparian zone  
natural obstacles that  
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## Fish

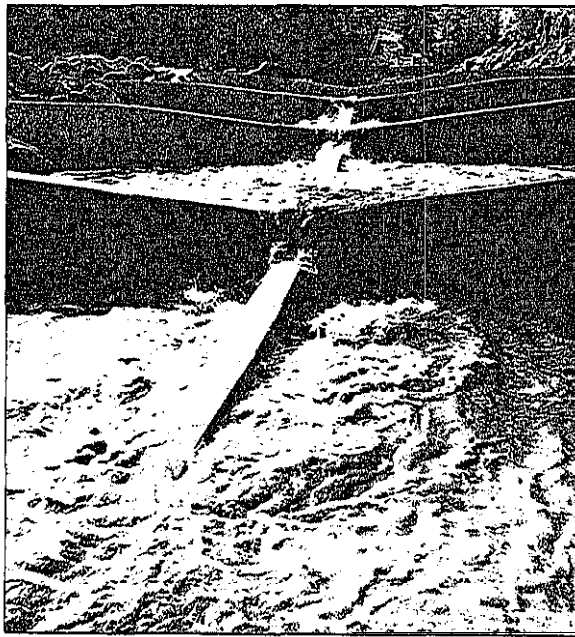
Federal agencies and  
moved fish ladders at  
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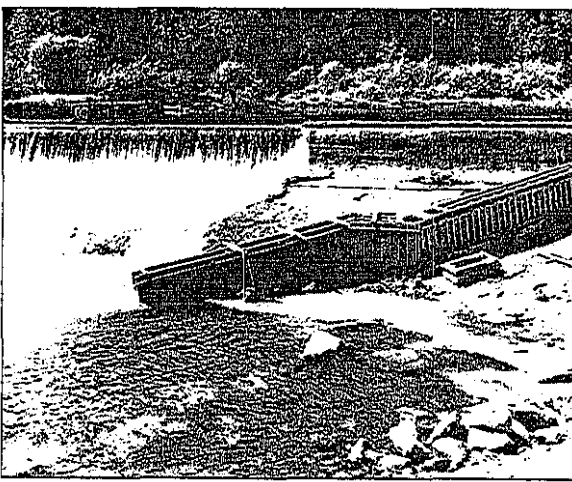


**A giant fish ladder replaced an impassable falls with a gentle cascade, allowing steelhead to pass into spawning grounds.** West Fork Hood River Falls (PUD photo) and Ladder (Sharon Quinn)

### Giant Stairway at Waterfall Helps Fish Migrate

Natural stream conditions can occasionally keep migrating fish from reaching spawning grounds. This was the case on the West Fork of the Hood River in Oregon. Once, summer steelhead and, spring chinook had access to over 23 miles of prime habitat above the West Fork

Chinook salmon as well as steelhead trout spawn in the Wenatchee. At one time, the Wenatchee was the second largest producer of



**New ladders mean more chinook and sockeye salmon spawning in the Wenatchee River.** Tumwater Dam fish ladder construction (PUD photo)

Falls, making it one of the most productive areas for wild fish in the Hood River system.

Over the past 10 to 15 years, however, rushing waters cut through about 5 feet of hardened volcanic ash on the stream bed. This exposed a 16-foot layer of loose sand and gravel. The river easily cut through this layer, creating a 12-foot waterfall. Because the river was constantly eating away at the stream bed, the waterfall was moving upstream about 5 feet each year.

Few fish were able to leap over this natural barrier. Each year, hundreds of fish would gather helplessly in the pool at the base of the falls, a favorite spot for poachers.

Engineers had considered several ways of overcoming the barrier. They tried to blast a passage in the falls. But the continuous erosion defeated this effort. They thought of a fish ladder. But conventional fish ladders are usually placed along one bank. Since the falls were constantly moving upstream, within a few years there would have been a ladder leading to nowhere.

BPA and the Oregon Department of Fish and Wildlife decided the best solution was to terrace the entire 32-foot stream channel with a series of 10 concrete weirs. This ladder, one of the first of its kind in the region, turned the falls into a giant stairway. Each weir (or step) is separated by wire baskets filled with rocks (called gabions) to help stabilize the stream bed.

The falls are now a gentle cascade, easily negotiated by adult fish on their way to spawn. Biologists estimate the ladder will increase the West Fork's steelhead population by 1,000 to 2,000 adults a year.

sockeye salmon of all the tributaries of the Columbia River.

Workers installed fish ladders when the dams were built in the early 1900s, but the ladders were never considered adequate. In the spring, water in the ladders was too high. In the fall, it was too low. Low flow means insufficient oxygen for the fish. Biologists have seen sockeye crowded below the ladders, gasping for breath. Lack of ladders cut the fish runs by 80 percent.

Then in 1948, a flood washed out the fish ladder on Dryden's left bank. It was never replaced. Dryden's remaining ladder-built of wood was slowly rotting away. Floating logs and debris battered away at Tumwater's only fish ladder, leaving its steel skeleton exposed.

Starting in 1986, contractors for BPA and the PUD began to replace the fish ladders with new designs especially suited for each dam.

Biologists expect that nearly all of the migratory fish moving into the Wenatchee will now be able to pass upstream to traditional spawning grounds.



## The Mystique of the Wild Salmon

Since the 1970s, fish and wildlife agencies, Indian tribes, regional utilities, the Bonneville Power Administration, and others have done much to rebuild and protect wild salmon runs. But to better know the dangers and opportunities of intervening in a natural system, we need to understand the mysterious forces that lie behind it.

For several thousand years, four migrating salmon species (chinook, sockeye and coho salmon, and steelhead trout) have been very successful in adapting to the inland waters of the Pacific Northwest. These fish are called *anadromous*, from the Greek words for "up river"! Scientists believe their migratory behavior originated over 10,000 years ago. It was then that the great glaciers of the Ice Age melted, revealing safe places for spawning and for rearing young.

Millions of wild salmon hatch in the Columbia's tributary streams and creeks, where they grow for a year or two. Then the young fish - known as *smolts* - allow river currents to carry them downstream to the ocean. They spend from one to three years in the Pacific, depending on the species. Then, as adults, they embark on their unique and dramatic reproductive cycle.

A powerful biological urge turns them from the ocean and in the direction of the stream where they hatched. In ways that are still not totally clear to biologists, the salmon use the sun, stars, water temperature, ocean currents, and the earth's magnetic field as navigational aids. The homeward journey may take them as much as 2,000 miles.

As they near the coast, an uncanny homing mechanism guides them to the mouth of the river that leads to their natal stream. Years before, the stream left a chemical "imprint" on them; they "remember" the distinctive odor of the surrounding soil and vegetation.

Then comes the hard part. Swimming against fast-moving freshwater currents, they leap seemingly impossible barriers - waterfalls, weirs, whitewater rapids. They do their best to evade predators and fishermen. In recent times they have also had to find their way up fish ladders at dams.

Using every last ounce of energy to complete the journey, they undergo profound physiological changes. Skin thickens, bones become soft; their aging process during these few days would be the equivalent of 20 to 40 years in humans.

Battered and grazed from their exertions, they finally arrive within a few yards of their birthplace. Here the female searches the stream bed for a suitable place to spawn. It must be a cool, shallow, swift-flowing stretch with a gravel bed free of silt. She uses her tail to dig a nest, or *redd*, among the rocks. As she lays her several thousand eggs, her male partner fertilizes them. Finally, she covers them with gravel.

Their reproductive task complete, the pair no longer have their brilliant pink and silver hue. They are spent and discolored. Within a few days the salmon die. Only steelhead can live to repeat the cycle.

ir?

### Spawning salmon

Northwest Power Planning Council



## The Key to Survival in the Wild

The ideal wild salmon habitat is a fast-flowing stream away from human habitation. The water is cold, clear, and pollution-free. It meanders at varying depths over gravel and rocks, churns around boulders and fallen trees, and now and then swirls into quiet backwater pools.

Gravel, rocks, and boulders are an essential element, as they break up the flow and allow the water to fill with oxygen. The aerated flows serve to cleanse salmon eggs of silt and waste. Rocks also provide a breeding ground for the aquatic insects on which young salmon feed. And boulders create whitewater areas where juvenile fish can hide from natural enemies.

The streamside - or *riparian* zone - is a critical habitat feature. Ideally, the banks are undercut by

the current, forming small jutting ledges.

Undercut banks offer shade and protection for young fish.

At the water's edge is a lush undergrowth of shrubs, plants, and grasses and a thick canopy of overhanging vegetation. Root systems act as an anchor to prevent soil erosion. Vegetation stabilizes water levels by alternately soaking up rainfall and releasing moisture. Thick summer foliage over the stream keeps the waters shaded and cool.

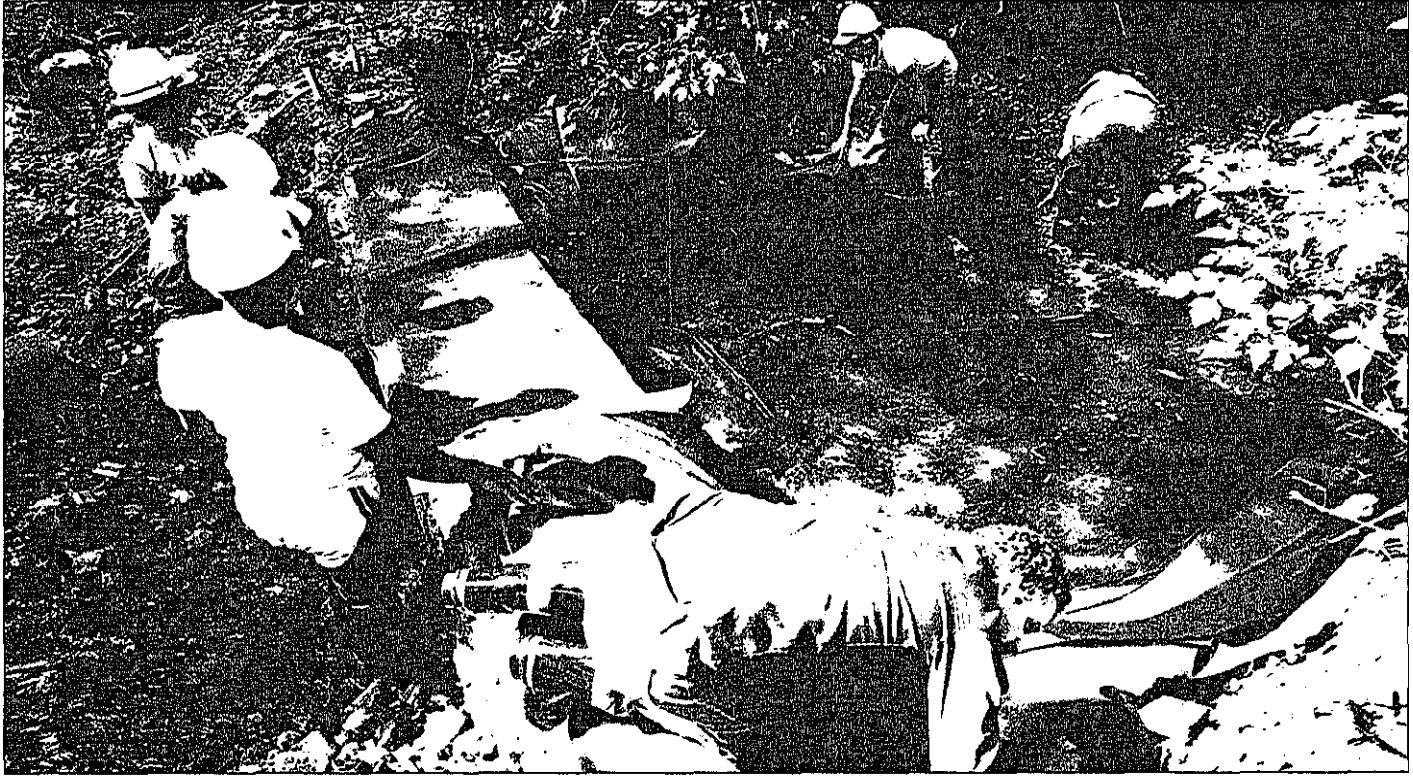
A few dead trees in the stream, far from being litter, actually help to trap gravel and create perfect spawning sites. Water flowing over the logs scours out deep, slow-flowing pools that serve as natural rearing pens.



**Improving habitat alone will not dramatically increase the numbers of Columbia River salmon and steelhead.**

Coho en route from Bonneville Hatchery

(Ron Smith)



But it is possible to compensate for this damage by, for example, improving spawning grounds elsewhere (i.e. "offsite"). This is the basis for many BPA projects.

The other provision ensures that BPA's activities under the Act are in addition to, and not in lieu of, other programs required by law. In other words, BPA will fund projects that add to, not replace, work already underway on the Columbia.

## Recreating our Rivers

The number of streams that combine to create the Columbia is finite. We cannot create new rivers. However, we can work to improve what we have. There are many tributary streams and creeks waiting to offer places for salmon to spawn.

Some of these sites are blocked by natural obstructions. In other cases, small dams have kept fish from reaching historic spawning sites. And irrigation canals have siphoned young fish away from the main river, ending their journey to the ocean. But rocky cataracts can be removed. Fish ladders can be built around waterfalls and small dams. Irrigation canals can be screened.

Other sites are unused by wild fish because they lack one or more crucial habitat requirements. But this time people and machines can come to the rescue to help, not hurt salmon. The natural elements in and around the stream

can be scientifically "landscaped" to recreate all the natural conditions that will make prime spawning and rearing spots for wild fish.

## Balancing Habitat with Hatcheries

But why bother? Why not replace wild fish with hatchery fish?

The problem is that hatchery fish are not nearly as adept at surviving as wild fish. Hatchery conditions reduce the genetic diversity of a population. The fertilized eggs of one pair are all that is needed to produce several thousand fry, all with similar traits. The manmade, controlled environment allows almost all to survive.

In the wild, only the fittest survive. Wild fish pass on their proven resilience by breeding with other well adapted individuals. Adaptation is the mechanism that ensures the long-term survival of a species.

But while they cannot match the genetic efficiency of natural breeding, hatcheries have become indispensable to the Columbia River fishery. While wild salmon were losing habitat, more hatcheries were being built and more hatchery fish were being released. Hatcheries now produce about 80 percent of the Columbia River's fish.

And there is another link. Biologists often need suitable hatchery fish to stock newly-opened habitat until a wild-spawning run can establish itself.

**We cannot create new rivers.**

**However, we can work to improve what we have.**

Workers on Fish Creek (Dennis Maxwell)

## Habitat - Just One Part of the Puzzle

But improving habitat alone will not dramatically increase the numbers of Columbia River anadromous fish. Salmon and steelhead need help every step of the way to survive their perilous journey to the sea and back.

Dry weather and low river flows can force more fish through hydroelectric dam turbines. Passing through turbines kills or injures many young salmon. The dazed survivors are often picked off by predatory fish and birds.

In the reservoirs, high water temperatures and slow-moving currents exposes fish to disease and predators. Dam operators must release water and increase the river's current to help move young fish - known as *smolts* - downstream more quickly.

Less than a quarter of the *smolts* leaving upriver spawning grounds ever make it to the ocean. In low-water years, it can be as few as one tenth. BPA is conducting dozens of projects to increase the number of survivors.

Once in the Pacific, wild fish have to compete for food not only with their hatchery-reared cousins but also with scores of other species. Other natural dangers include predators and changes in climate.

But their greatest enemy is man. One estimate shows that more than half of the Columbia's naturally spawning chinook are caught by commercial fishermen off the Pacific coast between Alaska and northern California.

When vessels troll for fish, they do not discriminate between the few wild fish and the plentiful hatchery stocks. As a result, naturally spawning salmon have been overharvested. While some biologists call for reducing harvest rates, harvest management agencies are looking for ways to separate wild from hatchery fish.

The ultimate success of the habitat program depends to a great extent on the success of all of these efforts.

## Keeping Score

The success of the habitat enhancement effort can only be measured over a period of years. Fish released this year will not return for two to five years. And humans can only intervene to a certain extent in the delicate biology of wild salmon reproduction - the rest must be left to nature.

But BPA - and the Pacific Northwest electric ratepayers who ultimately pay for BPA's projects need to see a return on their fish and wildlife investment.

BPA takes part in efforts to count fish on both the downstream and upstream portions of their migration. Biologists mark *smolts* to track their movements, monitor their health, and determine their survival rate.

An essential part of the scorekeeping is a system of "credit." BPA is working with the Council, fish and wildlife agencies, tribes and utilities to set up ways of measuring the results of BPA's projects. These measurements will be checked against BPA's overall responsibility for fish and wildlife.

**Rebuilding habitat will go a long way toward ensuring a future for our wild salmon.**

Spawned male chinook in the Yakima River

(By Dan Peterson)



The effort to create and maintain this system is long-term. It will remain open for review and adjustment. But it is only through such an evaluation that BPA can explain and attribute the results of its projects.

## Optimism Grows As Salmon Runs Increase - But Will This Continue

"The Columbia River is alive with salmon. For thirty minutes I stood at Fort Vancouver's dock and watched over 200,000 of the beasts churning their way up the river."

This is what explorer David Douglas saw back in 1825. It is doubtful we can recreate the wild runs he witnessed now that the Columbia River has been harnessed to serve a very different world. But rebuilding habitat will go a long way toward ensuring a future for our wild salmon.

During the past few years there have been dramatic increases in several runs of steelhead trout, fall chinook, and sockeye salmon. In 1975, only 85,540 steelhead passed over Bonneville Dam's ladder. Ten years later, that number had jumped to 344,001.

The increased runs are cause for optimism, but it is too early to be sure that the long-term downward trend has been reversed. Whether fish will continue to return in higher numbers depends on several factors, some beyond human control.

The future of the wild salmon is still not guaranteed. But a massive commitment has been made to reverse its decline.

## For More Information

If you would like more information on BPA's fish and wildlife effort or on the projects described here, contact your nearest BPA Area or District office, the BPA Division of Fish and Wildlife, or the BPA Public Involvement Office. BPA maintains a mailing list of people who want to keep abreast of the agency's fish and wildlife activities. If you want to be on that list, contact the BPA Division of Fish and Wildlife at the number listed below.

BPA Division of Fish and Wildlife P.O. Box 3621  
Portland, Oregon 97208  
(503) 230-4981

BPA Public Involvement Office  
P.O. Box 12999  
Portland, Oregon 97212  
(503) 230-3478

800-452-8429 (toll free in Oregon)  
800-547-6048 (toll free in other Western States)

BPA Area and District offices:

Portland (503) 2303490  
Eugene (503) 687-6952  
Seattle (503) 442-4130  
Spokane (509) 456-2515  
Missoula (406) 329-3060  
Wenatchee (509) 662-4377  
Walla Walla (509) 522-6226  
Idaho Falls (208) 523-2706  
Boise (208) 334-9137  
Washington, D.C. (202) 252-5640

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February 1987  
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**To know what it takes to save the wild salmon, we need to understand what caused their decline. And we need to weigh what these efforts will cost. Salmon leaps over Dugan Falls** (Sharon Blair)

