

BEATLES



Duping the Northwest and the Nation

The U.S. Army Corps of Engineers' Economics
of Restoring Endangered Snake River Salmon

Northwest Resource Information Center
December, 2000

BRING WITNESS

BE

This document was produced by the Northwest Resource Information Center as part of its Columbia/Snake Rivers Salmon Project.

Funding support was provided by the Resource Renewal Institute.

Contributing analysts included:

Don Reading, economic consultant,
Ben Johnson and Associates
Anthony Jones, economic consultant
Victor Martino, economic consultant,
Martino and Associates
Terry Holubetz, fisheries consultant

The views expressed in this document are solely those of the Northwest Resource Information Center.

NRIC is a non-profit, scientific, educational organization incorporated in 1976 under section 501(c)(3) of the Internal Revenue Code. Ed Chaney, Director.

Northwest Resource Information Center
PO Box 427, Eagle, Idaho 83616
Telephone: 208-939-0714, Fax: 208-939-8731
www.nwric.org

*The law locks up both man and woman
Who steal the goose from off the common
But lets the greater felon loose
Who steals the common from the goose.*

—Anonymous, from *Social and Industrial History of England*,
Edward Potts Cheyney, 1901.

Contents

Preface	ii
Summary	vi
Introduction	1
The Corps Economic Study	5
Conclusions	19
Endnotes	25



preface

This document continues a 25-year series of occasional papers and related initiatives bearing witness to the epic failure of governance and betrayal of the public trust that threatens extinction of many Columbia River Basin anadromous salmon and steelhead populations and dependent economies.

The Setting

The 260,000 square-mile [673,400 km²] Columbia River Basin produces a unique array of anadromous fishes, including what once were the world's largest populations of chinook salmon and steelhead, estimated at 10 million-15 million adult fish per year.

For many thousands of years, annual migrations of these protein-rich fish were the economic and spiritual foundation of highly developed Native American Indian cultures. After Euro-Americans invaded, these valuable fish also contributed to non-tribal economies for thousands of miles along the Pacific coast and nearly 1,000 miles [1610 km] inland to the Continental Divide.

In the mid 1800s the United States negotiated treaties with Northwest Tribes. The U.S. pledged on its honor to protect the tribes' right to fish in exchange for their peacefully giving up the bulk of their vast territory.

Over the intervening years a multitude of additional national laws and international treaties promised to protect Columbia River salmon and steelhead in development of the publicly-funded Federal Columbia River Power System, the world's largest coordinated hydroelectric system.

All these promises would prove hollow.

The Problem

The Congress appropriated billions of dollars from the Federal Treasury for the Army Corps of Engineers to build dams on the lower Columbia River and lower reaches of its major tributary, the Snake River.

This colossal example of socialism subsidized creation of the world's largest coordinated hydroelectric system. It subsidized aluminum manufacturing and other energy-intensive industry. It subsidized large-scale agriculture to irrigate vast areas of near desert. It subsidized extending waterway commerce 450 miles [725 km] inland. It subsidized the lowest electrical energy rates in the Nation.

This public largess was provided with the explicit understanding that Columbia River Basin salmon and steelhead and dependent economies were to be substantially protected.

the Corps' negligence nearly has done unto
Northwest Indian Tribes what non-Indian buffalo hunters
did unto the Plains Tribes

When the Corps designed the dams, it provided for fish ladders so adult fish could migrate upstream to spawn. The Corps negligently failed to make any provision whatsoever for the resulting progeny to pass downstream to the ocean.

Once the dams were built, the Corps and the Bonneville Power Administration (the federal agency that markets the energy produced by the dams) collaborated with subsidized economic interests to aggressively resist changes in the hydrosystem necessary to fulfill salmon protection laws and treaties.

In consequence, salmon runs and dependent economies throughout the many thousand-mile range of the fish were destroyed or devastated at the cost of many billions of dollars to the region and Nation.

Additional hundreds of millions of public dollars were, and continue to be, squandered on diversionary studies of the studies, and on tinkering with the dams, instead of dealing forthrightly with the Corps' basic design error.

Over time, the Corps' negligence nearly has done unto Northwest Indian Tribes what non-Indian buffalo hunters did unto the Plains Tribes.

The cascade of adverse social, economic, and cultural consequences is a tragedy of epic proportions.



The Columbia River is the fourth largest river in North America. From its source in British Columbia, Canada it flows 1,200 miles [1932 km] to the Pacific Ocean. It drains an area of about 260,000 square miles [673,400 km²] including southeastern B.C., much of the States of Washington, Oregon, and Idaho, and portions of Montana, Wyoming, Utah, and Nevada.

It also is an epic case study of what happens when government slips its public-interest moorings and collaborates with pork barrel economic interests to privatize the profits and commonize the costs of exploiting public resources.

In the instant case, the consequences include the threatened extinction of Snake River salmon and steelhead which once comprised nearly half the Columbia River Basin total of 10 million-15 million adult fish annually.

Confronted with the failure of governance, and with an alarming decline in numbers

[Kaiser Aluminum Company] signed contracts in 1996 to buy power from BPA for \$22 per megawatt hour. It will sell that power back to BPA at more than \$500 a megawatt hour . . .

If current market conditions remain, Kaiser could realize as much as \$500 million from the resale of BPA power until a new five-year contract kicks in Oct. 1, 2001.

Lewiston Tribune, *December 12, 2000.*



The hydrosystem is perfect, absolutely perfect. If you change the hydrosystem, the little old ladies in the I-5 corridor could find themselves without heat during the next Arctic chill event.

Jack Robertson, former Deputy Administrator, Bonneville Power Administration, 1992.



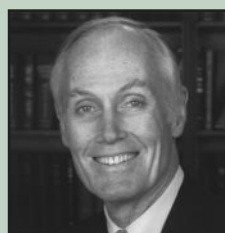
©The Oregonian/Joel Davis

You want to ruin a system that we have today that's the most cost-effective and cheap for energy production in the world. You want to ruin the economy of America and rural America . . .

John Brenden, former Montana Member, Northwest Power Planning Council.

So what do we get by removing the four Snake River dams? Shattered lives. Displaced families and communities who will have seen their livelihoods destroyed, generations of family farmers penniless, industries forced to drive up consumer costs, air pollution.

News release from former U.S. Senator Slade Gorton (R. WA.), June 27, 1999.



of Snake River salmon, desperate public interest groups and Indian tribes in the early 1990s invoked the law of last resort, the Endangered Species Act.

Bonneville, the Corps, and subsidized economic interests (notably electric utilities, aluminum producers and other large industrial power consumers, corporate farmers, and waterway transportation interests) responded with a coordinated multi-million dollar regional and national propaganda campaign.

Abetted by a sound-bite driven news media, they use junk "science" and economic scare-tactics to dupe the public and decision makers.

Borrowing a tactic of the tobacco industry, they assert that it can't be proved with absolute scientific certainty that the dams threaten salmon and steelhead with extinction. And, in any event, "it will cost too much," and "destroy jobs," if they have to obey the law, make changes in the hydroelectric system to restore Snake River salmon and steelhead, and stop begging their neighbors.

They and allied political demagogues cynically pit people against one another in contrived zero-sum economic conflict in order to create political gridlock against change.

This strategy stands in sharp contrast to the creative, can-do attitude that produced the

technologically elegant, albeit ecologically flawed, Federal Columbia River Power System.

It is a strategy that is both ethically and economically impoverished. It corrupts government. It retards local and regional economic growth and diversification by creating economic uncertainty. And it wastes on zero-sum conflict vast amounts of human and economic capital better invested in economic growth.

The Real Threat

The greatest threat to Columbia/Snake River salmon and dependent economies is not the ill-designed Corps dams. Concrete, power production, and energy marketing schemes can easily be modified.

The greatest threat is the Columbia River Pork Alliance, the regional clique of compromised bureaucrats, monopolists, crony capitalists, entrenched pork barrel economic interests, and allied political demagogues who feed off public largess and each other.

To them, maintaining the status quo is an *idée fixe*. The hydrosystem is like a pyramid, fixed in time, rather than publicly-owned infrastructure that can be refined over time to increase overall economic productivity and cultural wealth.

the Nation's honor and
commitment to the rule of law,
hang precariously in the balance

They are addicted to the current flow of public largess, and to the political hegemony, personal power, and sinecures it enables. They collaborate to evade the rule of law and the discipline of the market.

They fight change in the hydro-system, no matter what the economic and human cost to their neighbors and to the general public, now and in perpetuity.

The Project

This NRIC project opens a new front in the citizen-led effort to encourage the Nation to fulfill its long-standing promise that Columbia/Snake River salmon and dependent economies would be protected in construction and operation of the Federal Columbia River Power System.

This project subscribes to the belief of the late U.S. Supreme Court Justice Louis Brandeis that “sunlight is the best of disinfectants” for failure of government and of the market.

Through a variety of narrowly targeted initiatives, the project will put “sunlight” on the ethical and entrepreneurial poverty of entrenched pork barrel economic interests.

It will spotlight the individuals whom current and future generations can give credit for the fate of Snake River salmon and steelhead and dependent economies.

Project objectives:

To facilitate the citizenship necessary to recapture control of the Northwest's political institutions and to, in effect, reclaim the Columbia/Snake River commons for the public good, while protecting legitimate private interests.

To encourage revitalization of the statesmanship, general public-interest vision, and ingenuity that developed the technologically elegant hydrosystem, so they may be applied to making the changes necessary to fix its ecological flaws.

One of the world's most magnificent, perpetually renewable resources, as well as the Nation's honor and commitment to the rule of law, hang precariously in the balance. ■

The myth that wild salmon are the cause, rather than the victims, of BPA's troubles is at the core of the efforts to end salmon protection in the Columbia. Critics say it is time to set the record straight, and begin identifying the real core causes of BPA's financial woes - past investments in failed nuclear generating projects, combined with massive ratepayer and taxpayer subsidies to a small group of special corporate interests in the Columbia basin. These special interests—aluminum smelters, corporate agriculture, and river barge operators—will collectively extract over \$3 billion dollars of subsidies from the regional economy and Federal Treasury between 1996 and 2001.

*Paul Koberstein and Kevin Bell,
Cascadia Times, July-August 1998.*



summary

The Corps' conclusions are presented in *Summary, Improving Salmon Passage, Draft, The Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999.

The United States Army Corps of Engineers in December 1999 concluded that removing downstream migrating juvenile salmon and steelhead from the Snake River and barging them 400 miles [644 km] to the Columbia River estuary for release—a program that for nearly 30 years has failed to halt the fishes' slide towards extinction—would produce positive net annual economic benefits of about \$14 million.

The Corps concluded that breaching—partially removing—four lower Snake River dams to allow juvenile fish to migrate naturally in a free-flowing river would have a net economic cost of about \$246 million per year.

This survey confirmed the findings of others: the Corps “cooked the books” to produce a desired result that does not comport with reality.

But the Corps did much more than merely put a propaganda spin on the economic results of its analysis. The Corps:

—Withheld the fact that the Corps negligently failed to make any effort whatsoever to design the four lower Snake River dams to pass migrating juvenile salmon and steelhead as required by law.

—Attempted to cover up the serious juvenile fish passage problem at the four lower Snake River dams—asserting that any such problem had been solved

by removing the fish from the river.

—Proposed to solve any remaining juvenile fish passage problems by increasing collection of juvenile fish at the dams and barging them 400 miles to the Columbia River estuary, a practice which is a proven failure, and which does not meet the requirements of law.

—Ignored basic economic principles; exaggerated the benefits and minimized the cost of barging, and exaggerated the costs and minimized the benefits of breaching the dams; selectively used data and modeling results; and used assumptions and produced results that do not comport with empirical evidence.

—Attempted to pass off onto others the economic cost of remedying the Corps' own error in negligently failing to properly design the four lower Snake River dams.

—Ignored fish protection requirements of multiple laws, including laws authorizing the dams; laws establishing Wilderness Areas, Wild and Scenic Rivers, and National Recreation areas; the Clean Water Act; and the Northwest Power Act, the latter specifically requiring changes in the dams to restore Snake River salmon and steelhead to productive pre-dam levels.

barging for nearly 30 years
has **failed** to halt the fishes'
slide towards **extinction**

—Made a cost/benefit comparison of two courses of action—removing fish from the river and barging them to the estuary vs. partially removing four dams so fish could migrate naturally—that: a) would produce opposite results; and b) are not cost/benefit comparable; then c) substituted this fundamentally flawed approach for the legally required evaluation of the least-cost means of restoring Snake River salmon and steelhead to productive pre-dam levels.

These and other inappropriate actions systematically biased the Corps' results to create the false illusion that doing more of what 30 years of experience proves doesn't work—barging juvenile salmon and steelhead—would be economically superior to what 10,000 years of experience proves does work—natural migration in a free-flowing river.

Ironically, the economic data produced to support the Corps' analysis hoists the Corps on its own economics petard.

Breaching the dams and mitigating all non-energy related economic effects—e.g., effects on irrigators and waterway users—would produce net economic benefits of \$45 million per year.

Energy-related effects of breaching would result in an estimated \$1-\$3 per month increase in the average Northwest residential electricity bill. These amounts are so small they couldn't be

distinguished from routine monthly variations in the use of electricity. Rates still would be among the lowest if not the lowest in the Nation.

Even if there were no salmon and steelhead benefits of breaching the dams, other economic benefits of breaching would exceed costs by several hundred million dollars per year.

When you account for all the costs and benefits generated for but ignored or minimized by the Corps, breaching the dams would produce net economic benefits conservatively estimated at about \$800 million per year.

Breaching the dams would produce thousands of new temporary and long-term jobs, and create generally larger, more diverse, and more sustainable economies for the lower Snake River region and the Northwest.

This economic boon would have the added benefits of belatedly complying with the oft-expressed will of the people, complying with the law of the land—including treaties with Native American Indian tribes, and of fulfilling moral obligations to current and future generations.

These positive results of breaching the four lower Snake River dams are the opposite of what the Columbia River Pork Alliance would have the public and decision makers believe. ■

In NRIC v. Northwest Power Planning Council, the U.S. Court of Appeals ruled that the Northwest Power Act prevents “power losses and economic costs . . . from precluding biologically sound restoration of anadromous fish in the Columbia River Basin . . . so long as an adequate, efficient, economical and reliable power supply is assured.”



introduction

In December 1999 the United States Army Corps of Engineers completed a 4-year, \$20 million study of ways to improve the survival of migrating juvenile endangered Snake River salmon and steelhead attempting to pass four Corps hydroelectric dams on the lower Snake River in southeastern Washington.

The Corps' study purports to analyze the economic costs and benefits of:

- a) preserving the status quo by removing juvenile salmon and steelhead from the river and barging them 400 miles to the Columbia estuary; b) partially removing the dams from the river so the fish can stay in it.¹



The Snake River is the largest tributary to the Columbia River. It originates in the State of Wyoming and flows 1,038 miles [1671 km] to its confluence with the Columbia. The Snake drains an area of about 109,000 square miles [282,310 km²].

The first of the Corps of Engineers' lower Snake River dams in southeastern Washington, Ice Harbor, was completed in 1961 about 10 miles upstream from the confluence of the Snake and Columbia Rivers. Completion of Lower Monumental [1969], Little Goose [1970], and Lower Granite [1975] extended slack water navigation upstream to Lewiston, Idaho about 450 miles from the Pacific Ocean.

This survey examines the economic conclusions of the Corps study.

It puts those conclusions into context of the Corps' decades-long effort to evade its duty under the law to protect Snake River salmon and steelhead and dependent economies, and into context of the far-reaching adverse consequences.

Context of the Corps Economic Study

A multitude of land and water development activities harmful to Snake River salmon followed Euro-American settlement of the region.

However, millions of acres containing thousands of miles of pristine spawning and rearing habitat, much of which now is in Wilderness, Wild and Scenic River, or other protective status, continued to produce prodigious numbers of fish until the Corps completed the four lower Snake River dams.

The dams were authorized by Congress in the waning years of the Gilded Age of profligate pork barrel politics in the Northwest.

The Corps long had been on notice that building dams to subsidize water transportation to and from Lewiston, Idaho, located 450 miles inland from the Pacific Ocean, posed a potentially serious problem for migratory fish.

the Corps dams were **not designed** to allow juvenile salmon to migrate downstream

Congress authorized construction of the dams with the proviso that they be built and operated in a way that would preserve Snake River salmon and steelhead and dependent economies.

Congress also eventually appropriated more than \$175 million to build and more than \$150 million (to date) to operate large hatcheries upstream of the dams.

These hatcheries were intended to off-set the projected loss of 48 percent of pre-dam chinook and steelhead populations due to juvenile fish mortalities at the dams.² The dams would prove to be more deadly than expected, killing most of the hatchery fish along with the wild fish; the promise of replacement fish was not fulfilled.

When the Corps designed the four lower Snake River dams it included fish ladders to allow migrating adult fish to pass upstream.

The Corps' design made no provision whatsoever for the resulting progeny to pass downstream.

This clearly was contrary to the intent and letter of the law.

It was contrary to previous warnings that the four lower Snake River dams were a threat to survival of Snake River salmon and steelhead.

It was contrary to the glaring lesson provided by the juvenile fish passage disaster just upstream at Idaho Power

Company's Brownlee Dam, which occurred in 1958, prior to completion of the Corps' first lower Snake River dam.

In short, the Corps' failure to design the four lower Snake River dams to pass migrating juvenile Snake River salmon and steelhead was not merely the unfortunate result of inattention to detail—it took effort.

The dams were completed sequentially 1961-1975. As each dam was built, the cumulative effect of the Corps' negligence became more evident.

The problem has two parts:
1) getting the young fish through the slack water reservoirs;
2) getting them safely past the dams.

In years of low runoff, migrating juvenile salmon and steelhead stalled in the slack water reservoirs. Here they were subject to predator fish which thrive in this environment, and were exposed to high water temperatures and to other adverse environmental conditions. Meanwhile, their biological clocks—which over millennia evolved to prescribe limits on the amount of time available to make the transition from fresh to salt water—continued to run.

In years of high runoff, water spilling over the dams created high levels of nitrogen deadly to young salmon.

... It is the oft repeated thesis of the Fish and Wildlife Service that the losses imposed by successive dams are cumulative to salmon both upstream and downstream.

If we are successful in passing the fish over the proposed new dams on the mainstem of the Columbia, we will do so with an indeterminate but significant loss. If these survivors are then confronted with a series of four dams on the Snake there is the strongest doubt that these added obstacles can be overcome.

There is virtual assurance that only a fraction of existing runs could be gotten to the spawning grounds in the Snake River system, and that the progeny of this fraction would suffer further loss in its return movement to the sea.

Director, U.S. Fish and Wildlife Service, 1946.



Juvenile fish forced to pass through the turbines of successive dams suffered chronic high-rates of immediate and delayed mortality at all flow levels.

Over the years the Corps spent hundreds of millions of taxpayer dollars modifying the dams and their operations to improve downstream migrant fish passage. These efforts were unable to overcome the Corps' basic design error.

In the late 1970s a resident of Idaho threatened to file a petition asking the National Marine Fisheries Service to review Snake River salmon for listing under the Endangered Species Act. To dodge this politically charged threat, the Service agreed to do an "informal review" of the situation. While that unenthusiastic effort was in progress, the condition of Snake River salmon worsened.

Finally, in 1980 the U.S. Congress declared it was an "emergency," and passed the Pacific Northwest Electric Power Planning and Conservation Act with a specific purpose to:

"... protect, mitigate, and enhance the fish and wildlife, including related spawning grounds and habitat, of the Columbia River and its tributaries, particularly anadromous fish which are of significant importance to the social and economic well-being of the Pacific

Northwest and the Nation and which are dependent on suitable environmental conditions substantially obtainable from the management and operation of the Federal Columbia River Power System and other power generating facilities on the Columbia River and its tributaries."³

The Act established the Northwest Power Planning Council and charged it with developing a crash program that specifically would:

"Provide for improved survival of anadromous fish at hydroelectric facilities," and "Provide for flows of sufficient quantity and quality between these facilities to improve the production, migration, and survival of anadromous fish as necessary to meet sound biological objectives."⁴

National Marine Fisheries Service immediately turned the Snake River salmon problem over to the Council, claiming, in effect, that the Power Act required more protection than the Endangered Species Act, therefore, the Council's program was the proper venue.

Ironically, 20 years later, the Council would return the favor and claim it had been preempted by the Endangered Species Act, a subject to which we will return in a subsequent survey.

Notwithstanding its clear mandate, and its emergency marching orders, the Council dithered for more than a decade. It bowed to strong opposition to any substantive changes in the hydroelectric system by the Corps, Bonneville, and subsidized electric utilities, aluminum companies and other large industrial power consumers, corporate farmers, and waterway transportation interests.

NRIC finally challenged the Council's dilatory tactics before the U.S. Ninth Circuit Court of Appeals, and won. So to speak.

The Council was embarrassed that it lost the lawsuit, not that it hadn't done its job. Nonetheless, for legal self-defense, it amended its plan to include provisions for drawing down to spillway crest the four lower Snake River reservoirs beginning in 1995, and for an examination of the need to breach them.⁵ The Council promptly ignored its own plan; so did the Corps, National Marine Fisheries Service, and everyone else.

Meanwhile, the plight of Snake River salmon and steelhead degenerated from serious to critical. From 1991 to 1997 all Snake River salmon and steelhead were listed under the Endangered Species Act.

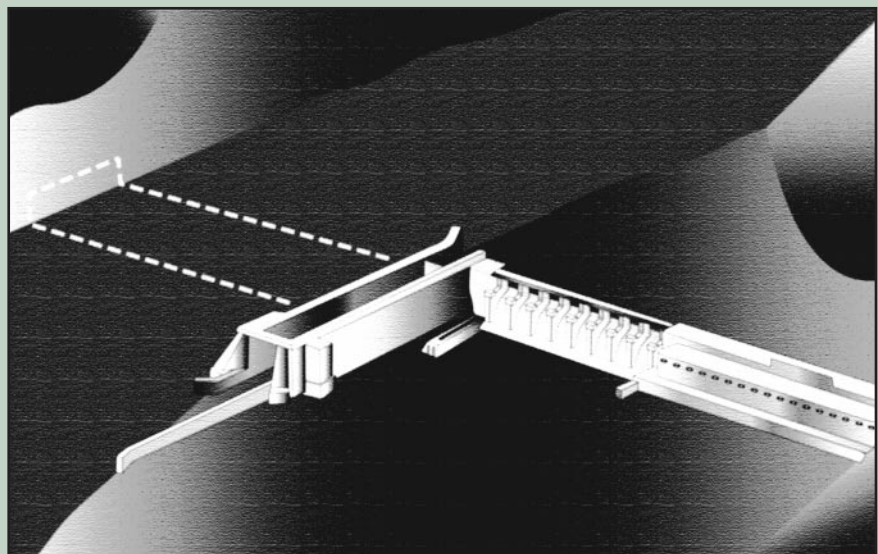
Faced with the threat of the Endangered Species Act, the Corps declared, in effect, that in the four lower Snake River dams

it had created a Salmon Doomsday Machine. I.e., it couldn't be fixed, and was so deadly that either: a) all migrating juvenile salmon and steelhead had to be removed from the river and barged or trucked 400 miles to the Columbia River estuary; or b) the dams had to be partially removed—breached—to restore the free-flowing river.

Insufficiently sophisticated minds find it difficult to reconcile the Corps' consideration of breaching the dams with its denial of a serious fish passage problem at the dams.

In *NRIC v. Northwest Power Planning Council* the U.S. Ninth Circuit Court of Appeals held:

The Council's approach seems largely to have been from the premise that only small steps are possible, in light of entrenched river user claims of economic hardship. Rather than asserting its role as a regional leader, the Council has assumed the role of consensus builder, sometimes sacrificing the Act's fish and wildlife goals for what is, in essence, the lowest common denominator acceptable to power interests and the [large industrial power users].⁶



Breaching the dams would involve removing a portion of each dam, allowing the river to flow freely around the remaining portion.



the Corps' economic study

... a biased picture ... a limited and distorted image ... underestimates benefits of [breaching] and overestimates cost ... ignored impacts of subsidies ... estimates of employment impacts are unrealistic and distorted ... summary of costs and benefits is incomplete and misleading ... incomplete, simplistic, and biased description of [breaching]. . . ignores both economic theory and empirical studies ... unreasonably deviates from commonly accepted principles of economic analysis and ignores market prices ...

... This stacking of the analytical deck conflicts with commonly accepted standards of professional economic analysis and yields results biased against the [breaching] alternative.

*Economic consulting firm
ECONorthwest.⁷*

This survey confirms the findings of others: the Corps “cooked the books” to produce its desired result.

The Corps’ economic analysis systematically violates fundamental economic principles, exaggerates the benefits and minimizes the cost of barging, exaggerates the costs and minimizes the benefits of breaching the dams, selectively uses or ignores data and modeling results, uses assumptions and produces results that conflict with empirical evidence.

This is familiar territory for the Corps.

Commenting on the Corps’ evaluation of the four dams’ and reservoirs’ compliance with Clean Water Act standards—which the Corps ignores in its economic analysis—the U.S. Environmental Protection Agency charged the Corps with “[failure] to interpret or resolve contradictory data and conclusions ... selective use of data ... faulty or misleading interpretation of results ... failure to present important information or assumptions ... and ... unsupported conclusions.”⁸

The agency went on to state that breaching the four lower Snake River dams was the best solution to violation of the Clean Water Act and to the threatened extinction of Snake River salmon and steelhead.

Importantly, the Corps did much more than merely cook the books in its economic analysis of barging salmon versus breaching dams.

The whole foundation, the basic premise, of the Corps’ analysis is designed to evade the rule of law, and to protect the pork barrel status quo from the discipline of the market.

The resulting bias against dam breaching is systematic. Following are examples representative of the problem.

Defining the Problem

The problem with the Corps’ economic analysis begins with the Corps’ definition of the problem.

The Corps states that the dams were “designed with features to aid both juvenile and adult fish.”⁹ That is patently false.

It is difficult to imagine how the Corps could have designed four dams and reservoirs more deadly to downstream migrant salmon and steelhead.

The Corps’ design for the four lower Snake River dams made no provision whatsoever for downstream migrant fish passage.

trying to retro-fix the dams is like trying to **create airplanes**
by adding **wings** to pyramids

The Corps inadvertently admits this in the draft EIS. "Juvenile bypass facilities were installed at each of the four lower Snake River dams *shortly after they were constructed*."¹⁰ [Emphasis supplied.]

Tacking on juvenile fish passage facilities after the dams were built solely for waterway transportation and hydroelectric energy is analogous to trying to create airplanes by adding wings to pyramids.

The Corps asserts that [post-construction add-on] juvenile fish passage facilities were "successful" but, regrettably, all Snake River salmon and steelhead were listed under the Endangered Species Act.¹¹

This is a curious definition of "success."

In fact, the Corps' post-construction efforts to modify the dams to pass juvenile fish were so unsuccessful, and the dams so deadly, the Corps finally decided it had to strain the fish out of the river, pump them through pipes into barges and trucks, and transport them around the dams 400 miles to the Columbia River estuary.

Unsurprisingly, fragile, wild juvenile salmon didn't respond well to this radical intervention in their life cycle. Most didn't survive the stress of the Corps' Rube Goldberg mechanical substitute for natural environmental conditions. Progressively fewer adult fish returned.

No matter. The Corps simply declared barging "successful" because more than 90 percent of the juvenile fish were still alive when dumped out of the barges into the Columbia River estuary.

In context, the Corps' argument is that factors other than the dams and its radical barging program, i.e., harvest, habitat, and hatcheries, must then be responsible for threatened extinction of Snake River salmon and steelhead.

This is the "All-H" mantra—habitat, harvest, hatcheries, and hydropower—by which the Corps, Bonneville Power Administration, and, to its everlasting shame, the National Marine Fisheries Service, seek to divert attention from the dams to all other factors that affect population size, but not the survival, of Snake River salmon and steelhead.¹² We return to this issue in a subsequent survey now in progress.

In plain fact, as the named agencies well know:

Harvest of Snake River spring/summer and fall chinook, sockeye salmon, and steelhead by all except the Corps' dams long has been drastically reduced with devastating economic and social consequences over a vast geographical area.¹³

... there is no scientific basis for concluding Snake River salmon and steelhead are likely to recover with non-breaching alternatives.

*Edward Bowles, Anadromous Fish Manager, Idaho Department of Fish and Game, September 2000.*¹⁴

... studies conducted over the last 30 years have definitively shown that transportation [barging and trucking] has failed as a mitigation tool and is not reversing the decline of Snake and Columbia River salmon and steelhead.

*Oregon Department of Fish and Wildlife.*¹⁵

Barging assumes that these animals don't need to migrate downstream, only to arrive at Point B. It eliminates a whole portion of their life cycle. It's like catapulting cows from the pasture to the barn, and then wondering why the herd has thinned. Their thinking is not that catapulting cows is a problem, it's that we need a better catapult.

Ed Chaney, in Song For the Blue Ocean, Carl Safina, 1997.



... Therefore be it resolved that, based on the best scientific information available, it is the position of the Oregon Chapter of the American Fisheries Society that:

1. The four lower Snake River dams are a significant threat to the continued existence of remaining Snake River salmon and steelhead stocks;
2. If society-at-large wishes to restore these salmonids to sustainable, fishable levels, a significant portion of the lower Snake River must be returned to a free-flowing condition by breaching the four lower Snake River dams, and that this action must happen soon . . .

Resolution of the Oregon Chapter of the American Fisheries Society on Snake River Salmon and Steelhead Recovery, Adopted February 17, 2000 by a membership vote of 103 yea and 0 nay.

Today the Corps' "harvest" of Snake River spring and summer chinook at the dams is more than 10 times—1000 percent—greater than the combined catch of all ocean and freshwater recreational, commercial, and tribal fisheries.

Virtually no Snake River sockeye are caught by fishermen anymore. The dams' harvest continues. Call it 10 times—1000 percent more than by fishermen.

The dams harvest more than 4 times—400 percent—more Snake River steelhead, and more than 2 times—200 percent—the number of fall chinook caught by all fishermen.

The catch by fishermen, unlike the wanton waste of the Corps' harvest, puts money in people's pockets and food in their mouths, and helps keep local communities economically viable.

Importantly, these numbers are based upon aggregates of wild and

hatchery fish, and upon the most optimistic, best-case assumptions about fish survival at and between the dams. Less optimistic assumptions greatly increase the percentage of endangered wild fish "harvested" by the Corps' dams and reservoirs.

The implication that the loss and degradation of spawning and rearing habitat is responsible for the threatened extinction of all the listed fish populations is not supported by the facts.

Large amounts of Snake River salmon and steelhead habitat have been lost or degraded. However, Snake River spring/summer chinook habitat, for example, encompasses about 14 million acres. Roughly half is in federal Wilderness Areas, National Recreation Areas, Wild and Scenic Rivers, and undeveloped National Forest roadless areas.¹⁶

In short, Snake River salmon and steelhead spawn in the



largest contiguous wilderness and roadless land complex in the lower 48 states.

Furthermore, habitat in developed areas accessible to fish generally is in far better condition now than before the dams were built.

There is no shortage of high-quality spawning and rearing habitat—except for fall chinook displaced by the Corps and Idaho Power Company dams and reservoirs. There is a shortage of adult fish to use the available habitat. The major contributing factor is the Corps' severe degradation of critical lower Snake River migratory habitat, and the Corps' harvest of adult and juvenile fish at the dams.

The hatchery argument also is specious. Snake River salmon and steelhead numbers plummeted in lock step with completion of the four lower Snake River dams. Most of the hatcheries in the Snake River basin weren't built until many years, mostly decades, later.

Furthermore, there is no interaction between wild and hatchery-produced fish in the vast Wilderness Areas and most other statutorily protected or geographically isolated areas.

Wild and hatchery fish only substantially interact when the Corps mechanically strains them out of the Snake River at the dams, pumps them through pipes, and crams them together like sardines in barges and trucks

for a 400 mile trip to the Columbia River estuary.

Notwithstanding these facts, the Corps is obdurate in its denial of the cause and effect relationship between the building of the four lower Snake River dams and concurrent near destruction of Snake River salmon and steelhead populations.

The Oregon Department of Fish and Wildlife had this to say about the Corps' disconnect from reality:

"It is hard to imagine another biological resource conservation effort that has this historical and spatial information to evaluate the *a priori* hypothesis that a major perturbation (building of dams) will result in a major decline of a species. It is even harder to imagine that the Corps would ignore this information."¹⁷

The Corps refuses to admit negligently failing to design the four lower Snake River dams to pass juvenile fish as required by law.

It denies there is a serious fish passage problem at and between the dams, insisting on the oxymoronic "success" of barging salmon in face of threatened extinction.

These things, of course, are integral to the Corps' strategy to defend the status quo.

The Corps' denial of reality also has profound economic implications.

If barging salmon is successful and, therefore, there is no serious juvenile fish passage problem at the dams, it follows that:

The precipitous decline of Snake River spring, summer, and fall chinook, sockeye, coho, and steelhead coincident with completion of the lower Snake River and John Day dams in 1975 is well documented. It is further documented that these declines continue despite basinwide efforts to mitigate for impacts of the dams with hatchery production, harvest reductions, fish facility and dam operational improvements including gas abatement, and juvenile fish transportation programs.

*Oregon Department of Fish and Wildlife.*¹⁸



... removing dams in eastern Washington would be an unmitigated disaster and an economic nightmare.

The increased truck traffic on our roads to haul wheat and barley to coastal ports will have an adverse effect on air quality and impose an additional financial burden on the family farm, which for many would be too much to bear and force them to give up their land.

So what do we get by removing the four Snake River dams? Shattered lives.

Displaced families and communities who will have seen their livelihoods destroyed, generations of family farmers penniless, industries forced to drive up consumer costs, air pollution.

News release from Washington Senator Slade Gorton, June 27, 1999.

[breaching the dams would be like] ... taking a sledgehammer to the Northwest economy.

Editorial page, The Oregonian, May 1, 2000.

a) breaching the dams is unreasonable; and b) the Corps is not on the hook for any costs associated with breaching.

The linchpin of the Corps' effort to preserve the status quo is to make dam breaching appear as economically onerous as possible to current beneficiaries of the subsidies provided by the four lower Snake River dams, to the general public, and to political decision makers. This provides ammunition to allied political demagogues and to economics-challenged he-said/she-said news media.

Barging Is Not an "Alternative" to Breaching

Preserving the status quo by removing salmon and steelhead from the river and barging them 400 miles to the Columbia River estuary is not an *alternative* to breaching the dams and restoring a free-flowing river.

Unlike breaching the dams, barging salmon has not and cannot produce the results required by law, i.e., protection of critical fish habitats, including main-stem Snake River habitat, and restoring fish populations substantially to pre-dam levels.

The Corps' purported biological benefits of the barging "alternative" are concocted of unrealistic, rosy-scenario whole cloth, and the economic costs are largely ignored.

Based on the enormous body of empirical evidence, state and tribal fisheries agencies, and many independent scientists, strongly assert that barging—no matter how wistfully "new and improved" by the Corps and its collaborator National Marine Fisheries Service—has very high risk of eventually resulting in extinction of Snake River salmon.¹⁹

In plain fact, the Corps has been barging Snake River salmon and steelhead for nearly 30 years.

The usual measure of an action is whether or not it works.

In the instant case, the more juvenile fish barged, the fewer adults return. Even in the face of impending extinction the Corps baldly calls this consistently negative result "success," and proposes to do more of the same.

It is instructive that the Corps doesn't pretend barging would comply with the Northwest Power Act which calls for much more than merely preventing extinction. It calls for restoring Snake River salmon to economically productive pre-dam levels.

The Corps simply ignores this requirement of law.

the Corps ignores the Northwest Power Act salmon restoration mandate

Furthermore, in passing the Power Act, Congress specifically rejected use of a cost/benefit test to choose among alternative ways to accomplish salmon restoration. Instead, it required selection of the least-cost means of achieving the same sound biological objective.²⁰

Because it carries a high risk of extinction, and even in the Corps' wildest dreams cannot restore Snake River salmon to pre-dam levels, barging salmon would not comply with the Power Act, nor would it be a bargain at any price.

The Corps Minimizes or Ignores Benefits of Breaching

The Corps threw out its own study team estimates of the recreational value of breaching the dams and substituted a much lower value more to its liking.

The Corps recreation study team estimated a range of \$70 million-\$416 million in annual recreational benefits from breaching the dams. The mid-point of that range, \$243 million, was virtually identical to the Corps' \$246 million per year estimate of the total net cost of breaching.

The Corps substituted its own "middle value" of \$82 million.

The Corps ignored the economic benefits of avoiding costs associated with barging salmon.

The U.S. Environmental Protection agency has held

that the four lower Snake River dams and reservoirs violate the Clean Water Act, and that breaching the dams appeared to be the most efficacious remedy.

The Corps economic analysis does not include any costs of complying with the Clean Water Act if the dams were not breached—variously estimated at \$460 million-\$900 million.²¹

The Corps' first position characteristically was that it did not have to comply with the Clean Water Act.²² The Environmental Protection Agency disagreed.

"EPA disagrees that the Corps has no legal obligation to comply with applicable water quality standards in operating the Snake River dams . . .

"Failing to include the costs of improving water quality could have the effect of seriously under-representing the costs of retaining dams, and therefore overpricing the costs of dam removal in relative terms."²³

The Corps also neglected to include the fact that reliance on barging likely would require an additional 1 million acre feet of stored water to augment flows in the lower Snake River.

Even if the Corps' figure of \$300 million doesn't overestimate the net costs of breaching the dams, which it does, and even if the Pacific Northwest had to pick up the full tab for breaching the dams, which it wouldn't, then the cost would amount to one-tenth of 1 percent of our total personal income. It's simply silly to predict that such a relatively minor economic effect would cause a "disaster," or a "nightmare," or would take "a sledge hammer to the Northwest economy."

*Ed Whitelaw, professor of economics, University of Oregon.*²⁴



Benge, a Corps recreation planner, led the agency's recreation team on the Snake Study. Loomis, a Colorado State University economist, is the Corps contractor doing the team's technical work. Now they both believe that Corps officials—under pressure from Sen. Slade Gorton (R-Wash.), a staunch defender of the Snake Dams—manipulated and misrepresented their team's results.

"I really thought this was going to be a different kind of study for the Corps," said Benge, a 20-year veteran of the Corps. "It tears me up that it got hung up in politics."

Loomis ultimately calculated a range for the recreation benefits of breaching the Snake's dams between \$70 million and \$416 million. Instead, after a series of Corps officials insisted that the benefits could not possibly be that high, the agency came up with its own "middle value" of \$82 million.

"It was a classic case of best professional practices saying one thing, and our fearless military leaders caving into politicians and doing something else," Loomis said.

*Michael Grunwald,
The Washington Post,
September 12, 2000.*

According to a study done for the Corps by the U.S. Bureau of Reclamation, diverting an additional 1 million acre feet of stored water from agriculture to instream flow augmentation would take nearly 650,000 acres of irrigated land out of production in southern Idaho at a cost of \$150 million-\$1.3 billion and loss of 4,200-6,500 jobs.²⁵

The Corps ignored "passive use values" that would result from breaching the dams and restoring 140 miles of free-flowing Snake River, riparian area, and scenic canyon, and from restoring Snake River salmon and steelhead populations.

Passive use or existence values have been defined by the National Oceanic and Atmospheric Administration as:

". . . the values individuals place on natural resources independent of direct use of a resource by the individual. Passive use values include, but are not limited to: the value of knowing the resource is available for use by family, friends or the general public; and the value derived from protecting the natural resource for its own sake; and the value of knowing that future generations will be able to use the resource. . ."²⁶

There is no serious argument about the validity of passive use values. There is interminable argument about how best to put a dollar value on them. The problem is easily understood.

How much is Arlington National Cemetery worth in dollars? The bald eagle? Mormon Temple Square? The Lincoln Memorial? A Wild and Scenic River? A Wilderness Area?

What are the salmon worth in dollars to a Native American Indian when "The salmon define who I am"?

How much money is the quality of life in the Northwest worth?

Of course, there is not one perfect dollar answer for any of those questions. However, economists use a variety of techniques to generate economic perspective on passive use values that is essential to informed decision making.

Economists on the Corps study team estimated there would be \$420 million per year in passive use values of breaching the dams and restoring 140 miles of free flowing lower Snake River—independent of any effect on salmon populations. In addition, they estimated \$142 million-\$508 million per year in passive use values of restored Snake River salmon and steelhead runs.²⁷

Former U.S. Senator Slade Gorton didn't like that brand of economics any more than he liked the brand of biological science that called for breaching the dams to avert extinction of Snake River salmon. He leaned on the Corps and the Corps kneeled. No passive use values were included in the Corps' economic analysis.

The Corps study fails to account for the non-market values of salmon and steelhead to Native American Indians.

The Corps study team recognized the special significance of salmon and steelhead to Native American Indians. It acknowledged that the loss of fish and fishing places caused by the lower Snake River dams adversely impacts tribal economic, physical, and spiritual/religious well-being.

It is understandable tribes resist putting a price on what to them is priceless. That's no excuse for the Corps to ignore these values in its economic analysis.

The passive use values developed for the Corps could have been used as a surrogate for the value to tribes of breaching.

At bare minimum, the Corps could have used as a token proxy for tribal values the cost of removing the problem, i.e., its estimated \$48.8 million annualized cost to breach the dams.

Not accounting for these non-market values at all violates the most basic economic principles.

Economist Anthony Jones put it this way:

"It is impossible to measure in monetary terms the total value to tribes of such things as the cultural value of a free running river, of access to burial grounds and traditional fishing sites, and of revitalizing sacred practices.

"However, it is not difficult to posit reasonable assumptions from which to calculate a minimum economic proxy or shadow value to the tribes of breaching the four lower Snake River dams.

"A document that purports to base its final conclusion on the calculation of a NPV [net present value], but fails to include a financial accounting of tribal cost/benefits is incomplete at best, and fatally flawed at worst."²⁸

The Corps Overstates Energy Effects of Breaching

The Corps estimates it would cost up to \$271 million per year to replace the energy that would be forgone by breaching the four lower Snake River dams. This high-end estimate represents 75 percent of the Corps' total estimated gross cost of breaching.

The Corps inflates its estimate of energy loss attributed to breaching by omitting probable substantial reductions in generation that would occur without breaching.

These include additional flow and spill at the dams for fish migration to meet Endangered Species Act requirements, and to achieve Clean Water Act compliance.

According to The Washington Post, former U.S. Senator Slade Gorton (R. WA.), a member of the powerful Appropriations Committee, kept complaining to top Corps officials until the agency finally agreed to eliminate passive use values from its economic analysis.

Gorton didn't want us to find out anything that might hurt his cause, and the generals didn't want to say no to him. I guess they were afraid he'd cut their budget.

John Loomis, professor of economics, Colorado State University, The Washington Post, September 12, 2000.

How can I tell you what the salmon are worth? The salmon define who I am. What else can I tell you?

Antone Mintborn, Confederated Tribes of the Umatilla Indian Reservation, 1984.²⁹



... the right to resort to the fishing places in controversy was part of the larger rights possessed by the Indians, upon the exercise of which there was not a shadow of impediment, and which were not less necessary to the existence of the Indians than the atmosphere they breathed.

*United States Supreme Court, 1905.*³⁰

The taking of anadromous fish from usual and accustomed places, the right to which was secured to the Treaty Tribes in the Stevens' treaties, constituted both the means of economic livelihood and the foundation of native culture. Reservation of the right to gather food in this fashion protected the Indians' right to maintain essential elements of their way of life.

Settlement of the West and the rise of industrial America have significantly circumscribed the opportunities of members of the Treaty Tribes to fish for subsistence and commerce and to maintain tribal traditions. But the mere passage of time has not eroded, and cannot erode, the rights guaranteed by solemn treaties that both sides pledged on their honor to uphold.

*United States District Court, 1974.*³¹

The Corps neglects to put purported rate increases into perspective.

Loss of the energy generated at the four lower Snake River dams would result in increased rates for consumers of power distributed by Bonneville Power Administration.

The Corps estimates residential rate increases ranging from \$1.20-\$6.50 per month depending on what facilities were built and how they were funded.

The Corps' high-end estimate represents a much larger than average residential consumption of nearly 2100 kwh per month.

The Northwest Energy Coalition and Natural Resource Defense Council estimate average residential rate increases of \$1-\$3 per month.³² Rate increases of these magnitudes would be indistinguishable from routine variations in monthly bills.

The City of Seattle, one of Bonneville's biggest customers, resolved that rate increases were "... appropriate and necessary to fulfill our legal and moral obligations for salmon restoration."

The Corps neglects to note that with the energy rate impacts of breaching, Oregon, Washington, and Idaho rates still would be among the lowest in the Nation, if not the lowest.

Washington residential and industrial electricity rates

currently are the lowest in the Nation. Oregon residential rates are second lowest.

In Idaho, where utilities typically get less than 10 percent of their total energy from Bonneville, breaching the four lower Snake River dams would have no discernable effect on rates, i.e., less than 1 percent, for the 85 percent of the population that gets its power from private utilities.

Rate increases for the remaining 15 percent of the population served by Bonneville customers such as the City of Burley, might be as much as 5 percent. This is well within the range of normal seasonal variation, and rates would remain among the lowest in the Nation.³³

The Corps omits essential legal context for rate increases resulting from breaching.

In passing the Northwest Power Act in 1980, Congress mandated changes in the hydrosystem to protect salmon and steelhead.

residential rate increases from breaching would be **virtually undetectable**

This was done with the explicit understanding that these changes would result in reduced generation and increased cost of energy.

Congress also was explicit that fish were not to be sacrificed merely to save money. It specifically rejected limiting fish restoration efforts to actions “with minimum economic cost and minimum adverse impact on electric power production.”

Instead, Congress only required use of the least-cost means of

achieving the same sound biological objective, while maintaining an adequate, efficient, and reliable power supply.³⁴ It authorized Bonneville to acquire energy resources to ensure the latter while meeting the fish protection requirements of the law.³⁵

In *NRIC v. Northwest Power Planning Council*, the U.S. Court of Appeals soundly rejected arguments by Bonneville’s industrial customers that fish restoration measures must meet a cost/benefit test.

... WHEREAS, the City of Seattle acknowledges that partial removal will incur costs that likely will lead to nominally higher prices for Bonneville energy purchased by the City of Seattle, and accepts that paying our fair share of these costs is appropriate and necessary to fulfill our legal and moral obligations for salmon restoration; ... NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SEATTLE THAT:

The four lower Snake River dams should be partially removed; that priority should be given to clean and renewable energy and energy conservation to replace the lost hydro-electric power generated when the dams are removed; energy conservation and renewable energy development be accelerated to help ensure power supply adequacy; federal, state and local governments should ensure a positive transition for the communities affected by the partial removal, plan effective mitigation for any economic, cultural, or other dislocation caused by partial removal, and vigorously pursue economic and community development to build a sustainable future for those communities.

Seattle City Council Resolution #30230 adopted by vote of 8 yeas-0 nays, August 21, 2000.

Estimated Electrical Utility Average Revenue per Kilowatt-hour to Ultimate Consumer, by Sector, 1999.

	U.S. Average		Oregon		Washington	
	¢/kilowatt hour	% U.S.	¢/kilowatt hour	% U.S.	¢/kilowatt hour	% U.S.
Residential	8.19	72%	5.9	72%	5.1	62%
Commercial	7.23	69%	5.0	69%	4.8	66%
Industrial	4.44	77%	3.4	77%	2.5	56%

Source: Energy Information Administration, Form EIA-826, *Monthly Electric Utility Sales and Revenue Report with State Distribution*.



The Curious Case of U.S. Senator Larry Craig (R. ID.)

The State of Idaho—source of most Snake River salmon and steelhead—has been the primary economic casualty of the Corps' failure to properly design the four lower Snake River dams. Idaho has the most to gain economically from remedying that error. If the dams are not breached, Idaho would be put in double jeopardy by Endangered Species Act claims for water from federal reservoirs now used for irrigation.

That notwithstanding, Idaho Senator Larry Craig with missionary zeal relentlessly opposes any substantial changes in the dams.

In 1991 Idaho Governor Cecil Andrus proposed to leave the dams in place. For two months each year during the peak juvenile fish migration period, reservoir levels would be lowered in order to speed passage of juvenile fish to and over the dam spillways. The effects of temporarily lowered reservoir levels on waterway shippers and the handful of irrigators would be mitigated.

Craig immediately joined with non-Idaho interests dedicated to preserving pork barrel subsidies at Idaho's expense in aggressively opposing Andrus' politically and biologically pragmatic plan.

Subsequently, during his 1996 reelection campaign, the Senator's ads contained the following statements.

The very lifeblood of Idaho's future is at risk on Tuesday, November 5, and that is why I am asking for your vote.

My opponent in the race for U.S. Senate has called for breaching of the dams and drawing-down the Columbia and Snake Rivers.

We built those dams to reclaim Idaho's lands, and build a future of prosperity for our people and our state.

But what happens to Idaho if [his opponent] breached the dams?

No Irrigation

No Hydroelectric Power

No Commerce

No Recreation

No jobs for Idaho



In fact, the four lower Snake River dams are in the State of Washington, not Idaho. It follows that no Idaho land was reclaimed nor is irrigated from the reservoirs behind those dams. Idaho utilities get less than 10 percent of their electricity from the federal system and that wouldn't change with dam breaching. Idaho commerce, recreation, and jobs all would increase if the dams were breached.

The court ruled that the law prevents "power losses and economic costs . . . from precluding biologically sound restoration of anadromous fish in the Columbia River Basin . . . so long as an adequate, efficient, economical, and reliable power supply is assured."³⁶

The Corps' economic analysis simply ignores the profound economic implications of these requirements of law.

The Corps Fabricates a Net Job Loss to Breaching

The Corps stacked the deck to concoct a permanent loss of 2,256 agriculture-related jobs due to breaching.

It assumed irrigators could no longer pump water from the reservoir behind Ice Harbor Dam due to breaching, and that 37,000 acres of irrigated land would be converted to non-irrigated grazing land.

The Corps overstates the acreage irrigated from Ice Harbor Reservoir; about one-third of the 37,000 acres is irrigated from wells.

The Corps ignores alternative irrigation methods such as simply extending pumping facilities to the restored river channel, or pumping from groundwater, which are the norm throughout much of the Snake River Basin.

breaching would **create many new jobs,**
not cause a net loss of jobs as claimed by the Corps

It illogically assumes that land no longer irrigated would not be used to produce dryland crops characteristic of the area, e.g., winter wheat.

It overstates future employment impacts of breaching by failing to account for the long-standing and continuing trend of declining employment in agriculture.

Most importantly, the Corps ignores the pivotal fact that it is responsible for failing to properly design the four lower Snake River dams as required by law.

Thirteen irrigators pumping from the reservoir behind Ice Harbor Dam reap a windfall by being able to pump from an elevated water level. But they made good faith investments to do so. It is reasonable to assume the Corps has a duty to mitigate the impact of breaching on those investors and on affected farm workers.

The most obvious mitigation would be for the Corps to fund extending irrigation pump intakes to the restored river, and to subsidize the increased pumping energy costs. The cost to the public would be far, far less than the current public cost of destroyed salmon and dependent economies.

That done, breaching the dams would have no adverse impact on existing irrigated agriculture jobs. In addition, breaching would create new jobs in other sectors, resulting in a substantial net increase in jobs—not a net decrease as claimed by the Corps.

The Corps over-estimates the negative energy-related employment impacts of breaching the dams.

The Corps assumed the worst-case scenario whereby breaching would produce a regional power shortage, and that new thermal generating facilities would be required to produce an equivalent amount of energy. That this energy would be priced higher than the energy foregone due to breaching. And these higher prices would result in permanent job losses.

The Corps acknowledges "the probable reduction in demand for electricity that will occur if electricity prices increase with [breaching]." But then goes on to assume zero price elasticity of electricity demand.³⁷

This is the same kind of voodoo economics that boomers, notably including the Bonneville Power Administration—which markets the energy produced by the four lower Snake River dams—previously used to "justify" spending billions of dollars on eventually abandoned nuclear power plants in the Northwest, which caused the largest municipal bond default in the Nation's history.

. . . Let's focus only on what the Corps didn't measure. Urban and regional economists in the Pacific Northwest widely agree about the importance to economic growth of the region's reputation for a high quality of life. An 1999 Oregon Employment Department survey found that 44 percent of the state's new arrivals list the state's quality of life as the primary reason for moving here. This is the salient economic impact of recreation. The jobs the Corps looks at are only an indirect indicator, a shadow on the cave wall. The dollars outside anglers, hikers, and kayakers bring into the local or regional economy or the workers such activities employ don't capture the biggest economic impact of restored salmon runs and a 140-mile stretch of free-flowing river in a spectacular canyon. That impact is better captured by the number of talented Northwesterners they persuade to immigrate—and their jobs, spending, and investments—whether they ever catch a fish, take a hike, or paddle a kayak. And the Corps doesn't even mention them.

*Ed Whitelaw, professor of economics, University of Oregon.*³⁸



The Corps estimated a maximum of 2,256 jobs would be lost in irrigated agriculture . . . the Corps assumed that for the next century,

- those who lost their jobs — would never work again; local and regional firms that otherwise would have sold goods and services to those who lost their jobs instead would lose those sales and wouldn't find replacement sales;
- owners of the farming enterprises wouldn't switch to any other economic activities;
- everyone throughout this chain who lost her or his job would act exactly the same way as the original job losers in that they would never work again.

That makes the number 2,256—or any other estimate derived from the Corps' nonsensical assumptions—an impossible result and worthless.

*Ed Whitelaw, professor of economics, University of Oregon.*³⁹

Bonneville currently pays more than \$335 million per year to service its multi-billion dollar debt on never-completed, abandoned nuclear power plants.

In a separate study closely related to the Corps' economic analysis of barging salmon vs. breaching dams, the Corps and Bonneville estimated a price elasticity effect of 11 percent. This would lower the high estimate of the energy cost of breaching by about \$30 million per year.

For perspective, \$30 million per year is approximately the Corps' estimated cost of physically breaching the dams—after backing out a preposterous \$20 million per year for 100 years of wildlife mitigation and monitoring.

Accounting for an elasticity effect of 11 percent would not materially change the end result, i.e., residential rate increases indistinguishable from normal monthly variations. The point here is to demonstrate by yet another example the Corps' systematic bias against breaching the dams.

The Corps' assumption of zero price elasticity inflates the purported regional employment impact of the breaching alternative, i.e., higher energy prices = lost jobs. But the Corps does not assume higher prices and lost jobs = less demand for electricity. The Corps characteristically has it both ways in order

to inflate the perceived cost of breaching.

The Corps unrealistically assumes that people and markets will not quickly adapt to changing circumstances. That they will stand immobilized in the face of change like deer frozen in headlights. That people who lose jobs will never work again. This obviously is not realistic.

The Corps ignored the 4,200-6,500 jobs the Bureau of Reclamation estimated would be lost under the barging alternative if irrigated agriculture in Idaho were reduced in order to augment streamflows at the lower Snake River dams.

In sum, to achieve a total net loss of 3,555 jobs that would be permanently lost by breaching dams,⁴⁰ the Corps: uses unrealistic assumptions about the negative employment effects of breaching; evades its duty to prevent or mitigate adverse employment impacts of breaching on reservoir users; minimizes the negative employment effects of not breaching.

The Corps Evades Its Mitigation Duty

Here is where the Corps connects the dots and links its denial of responsibility for negligently failing to properly design the four lower Snake River dams with its effort to portray dam breaching as having Draconian economic impacts.

As noted below, adjusting for only the most egregious bias in the Corps analysis reveals enormous net economic benefits from breaching the dams. However, without mitigation there would be relatively small, but locally significant, negative economic effects. E.g., impacts on waterway users, and on 13 irrigators pumping out of the reservoir behind Ice Harbor Dam.

In the DEIS the Corps states:

"The purpose of this analysis is to describe and document the potential mitigation and/or compensatory actions that could be undertaken to alleviate the impacts associated with the study alternatives under consideration."⁴¹

However, after spending \$20 million and 4 years the Corps in the end defined its mitigation responsibility as being narrowly limited to fish and wildlife mitigation and cultural resources protection.

It is instructive that the Corps includes in its estimate of cost to breach the dams more than \$20 million per year for 100 years to restore, maintain, and monitor wildlife habitat along a restored free-flowing Snake River.⁴² This is nearly half the Corps' total cost of about \$49 million to actually breach the dams.

If the Corps did nothing at all the habitat would restore itself in a small fraction of that time.

The Corps attempts to justify this ridiculously costly action as being required by the legislation authorizing the dams.

The Corps is silent on the fact that it has never met its existing mitigation obligation to replace fish lost attempting to pass the dams. Hatcheries were built upstream of the dams, but the dams and barges kill most of the juvenile salmon produced in these hatcheries, as well as killing most of the naturally produced fish.

Other analysts—at an infinitesimal fraction of the cost of the Corps study—had significantly more success than the Corps at identifying ways to mitigate the relatively small but locally significant negative economic impacts of breaching.⁴³

The Corps' mitigation myopia is, of course, consistent with its core strategy to evade its duty to correct its negligent failure to design the four lower Snake River dams to pass juvenile migrant salmon as required by law, and to create the illusion of economic doomsday if it were required to remedy its error. ■

"The farmer will end up paying the bill," said Jim Fredericks, corps economist. "It's quite possible that some farms would go out of business."

Tri-City Herald, March 4, 1998.

After reviewing the [Corps study], a trusting reader might conclude not only that the bypass [dam breaching] will generate net negative impacts, but that there is almost nothing that can be done about it. Both conclusions would be wrong.

Economic consulting firm ECONorthwest.⁴⁴

. . . dam removal can also bring significant new investments and economic mitigation projects to areas of freight transportation infrastructure, power sources, and agricultural, municipal, and industrial water pumping systems. With these investments, bypassing the dams would boost regional employment and bolster the regional economy.

If the proper investments and mitigation programs are put into effect, dam removal can (conservatively) bring about 23,639 new short-term jobs, and an increase of at least 3,183 permanent jobs. Perhaps most importantly, salmon recovery and a free-flowing river would attract new businesses and help diversify local economies.

American Rivers, July 2000.⁴⁵



conclusions

The Corps negligently failed to design the four lower Snake River dams to pass juvenile salmon and steelhead as required by law. For decades this has had devastating economic, social, and cultural impacts throughout the Pacific Northwest.

The Corps' negligence now threatens to forever rob future generations of the benefits of Snake River salmon and steelhead, one of the world's most magnificent, perpetually renewable natural resources.

The Endangered Species Act, and the Northwest Power Act—among a host of other laws and treaties—provide the Corps with both the opportunity and the mandate to change course.

In its December 1999 study the Corps could have accepted responsibility for correcting its design error. All else would have followed.

The Corps could have acknowledged that the radical Rube Goldberg practice of straining fragile wild juvenile salmon and steelhead out of the river, pumping them through pipes, and barging them 400 miles to the Columbia River estuary, was doomed to fail. And did.

The Corps could have conceded that barging cannot meet requirements of the Endangered Species Act, let alone the far greater Northwest Power Act requirement to restore Snake River salmon to economically

productive pre-dam levels. That barging is not a bargain at any price.

The Corps could have acted on its own conclusion that the dams can't be fixed and evaluated the cost and benefits of a business-like plan to breach the dams and mitigate the relatively small, but locally significant adverse economic impacts.

Such a plan would restore Snake River salmon and dependent economies, while protecting existing economic interests. This would create larger, more diverse, and more sustainable economies for the lower Snake River region and the Northwest.

At bare minimum, the Corps could have simply displayed the full array of the best available information on all the costs and benefits of breaching the dams, including mitigation for adverse impacts. Then the public and elected officials could make informed political decisions.

That's the way the system is supposed to work. But in the Columbia River Basin, the system is broken. More accurately, it has been taken hostage by the Columbia River Pork Alliance.

Unfortunately, the Corps was unable to shed its traditional iron yoke of servitude to entrenched pork barrel economic interests and allied political demagogues. It decided to defend the status quo.

the Corps hoists itself on its own economics petard

The Corps denied the existence of a serious juvenile fish passage problem at the dams—removing the fish from the river and putting them in barges having "solved" any such problem. Then it cooked the books to create the illusion that it would cost too much to breach the dams to correct the "non-existent" juvenile fish passage problem.

This survey confirms the findings of many others: the Corps' economic analysis is fundamentally and systematically biased in favor of preserving the status quo by removing salmon from the river and barging them 400 miles to the Columbia estuary, and biased against partially removing the dams from the river so the fish can stay in it.

The Corps' biased economic conclusions fuel the rhetoric of the monopolists, crony capitalists, and allied political demagogues who cynically pit people against one another in contrived zero-sum economic conflict in order to create political gridlock against change.

They have succeeded. So far.

The Good News

Ironically, the data generated for the purpose of supporting the Corps analysis hoists the Corps on its own economics petard.

In any analysis of costs and benefits, it helps to know who would pay the costs and who would obtain the benefits. In this instance it is useful to break the Corps' estimated costs into

two major categories: energy-related costs that would be paid by the region's ratepayers, and other costs more appropriately borne by U.S. taxpayers.

Breaching the dams would cause 13 irrigators to lose the ability to pump water from the reservoir impounded by Ice Harbor Dam. In addition, instead of using barges from Lewiston, grain growers and other waterway shippers would have to use more costly pre-dam highway and rail transport for a rough average of 70 miles or so to the next downstream barge terminal.

However, if the Corps were to accept responsibility for mitigating the negative impacts of remedying its error, even these relatively small but locally significant adverse economic impacts could be made to disappear.

It would be appropriate for U.S. taxpayers to be responsible for mitigating the non-energy related economic effects of breaching the dams, i.e., the cost of keeping irrigators and waterway shippers whole.

According to the Corps' own estimates, this would cost taxpayers \$88 million per year, produce benefits of \$113 million per year, for a net benefit of \$25 million per year.

Take out the Corp's preposterous \$20 million per year for 100 years of wildlife habitat mitigation and monitoring, and net benefits rise to \$45 million per year.

A Pentagon investigation of the Corps' study of the upper Mississippi River waterway project challenged the overall ability of the Corps to conduct honest analysis.

The investigators noted a "widespread perception of bias among the Corps employees interviewed," including almost every Corps economist interviewed. The investigators concluded that the agency's aggressive recent efforts to expand its budget and mission, as well as its eagerness to please corporate customers and congressional patrons, have helped to "create an atmosphere where objectivity in its analysis was placed in jeopardy."

"The testimony and evidence presented strong indications that institutional bias might extend throughout the Corps," the investigators wrote. They cited "immense" pressure to give questionable projects the green light, noting that even the agency's retired chief economist called Corps studies "corrupt."

Michael Grunwald, The Washington Post, December 7, 2000.



The information in this table provides perspective on the economic costs and benefits of breaching the four lower Snake River Dams.

To be conservative, the Corps' estimates of costs and benefits are used as given.

The estimates of benefits ignored by the Corps'—except the estimate for Clean Water Act compliance—are based on values generated by the Corps' study team, but which were either misrepresented or ignored in the Corps' economic analysis.

To be conservative, the ignored benefits are either the low- or mid-point values from the ranges of estimated benefits.

The point being that even if one compares the high-end of the range of estimated costs to the low- and medium-end of the range of estimated benefits, breaching the four lower Snake River dams would produce enormous net economic benefits.

Perspective on Annual Economic [Costs] & Benefits in Rounded Millions of Dollars of Breaching the Four Army Corps of Engineers' Dams on the Lower Snake River

COE Cost Estimates

Dam breaching	[49]
Waterway transportation	[24]
Irrigation/water supply	[15]
Subtotal	[88]
Replace Energy	[271]
Total COE Cost	[359]

COE Benefit Estimates

Avoided costs	29
Recreation	82
Commercial fishing	2
Total COE Benefit	113
COE net total [cost]/benefit	[246]¹

Benefits not included by COE

Avoided costs

Additional flow augmentation	38 ²
Clean Water Act compliance	31 ³
Recreation	161 ⁴
Passive values	745 ⁵
Tribal values proxy	49 ⁶
Total Ignored Benefit	1,024
Total net [cost]/benefit	778

¹ All included values from *Summary, Improving Salmon Passage, Draft, The Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, Army Corps of Engineers, December 1999, p. 34.

² Mid-point of range of cost estimates by the U.S. Bureau of Reclamation, *Snake River Flow Augmentation Impact Analysis Appendix*, February 1999.

³ Mid-point of range of available cost estimates from *The Three Sovereigns Future Fish and Wildlife Costs Report*, 1998.

⁴ Difference between the middle value of range of estimates produced by Corps economics study team and the "middle" value substituted by the Corps.

⁵ Mid-point of range of estimates developed by Corps economics study team.

⁶ COE cost of dam breaching used here as token, minimal, economic proxy for economic benefit to Native American Indian Tribes.

The Corps' worst-case estimate of \$271 million per year in energy-related costs constitutes about 75 percent of the total estimated cost of breaching the dams.

This cost would be spread among the region's ratepayers, not paid by U.S. taxpayers in general. It would add an estimated \$1-\$3 dollars per month to the average residential electric bill. These amounts are so small they couldn't be distinguished from routine monthly variations in electricity use. Rates still would be among the lowest, if not the lowest, in the Nation.

Furthermore, when you account for other costs and benefits generated for but ignored by the Corps, it turns the Corps' results on their head.

As shown in the accompanying table, the Northwest and the lower Snake River region would share with the Nation net economic benefits from breaching the dams conservatively estimated at about \$800 million per year.

Breaching would create thousands of new temporary and long-term jobs, and help build generally larger, more diverse, and more sustainable regional and local economies.

This economic boon would have the added benefits of belatedly complying with the oft-expressed will of the people and law of the land, and of fulfilling moral obligations to

current and future generations.

These positive results of breaching the dams are the opposite of what the Columbia River Pork Alliance would have the public and decision makers believe.

Only the most unsubtle mind will find this surprising.

Problem "Solved" 20 Years Ago

The legal mandate and mechanism to correct the Corps' error in designing the four lower Snake River dams has long been in place. It's called the Pacific Northwest Electric Power Planning and Conservation Act of 1980.

Among other things, the Act: requires that Snake River salmon and steelhead be restored to productive pre-dam levels; recognizes that changes in the hydrosystem are necessary, will cost money, and will increase the cost of energy; proscribes using economic cost as an excuse for non-action; gives Bonneville the authority to acquire energy resources to ensure a reliable power supply.

The Columbia River Pork Alliance for two decades has successfully thwarted the letter and intent of the Power Act and all previous laws with similar intent. This is a subject to which we turn in a subsequent survey.

The Corps' tortured economic analysis of breaching the four lower Snake River dams is merely the latest installment in

Unfortunately, the hard facts are that the longer Bonneville can avoid changing the way the main-stem dams are operated, the more flexibility—a.k.a. money—it can squeeze out of the regional energy system to help pay its nuclear power plan gambling debts. The longer Bonneville's utility customers can put off acquiring their own, market-priced resources. The longer the aluminum companies can enjoy below-cost power rates. All of these short-term benefits of delay, of course, are at the long-term expense of fish and dependent regional economies.

Delay also has other seductive economic and ideological dimensions. Delay avoids risk in the short term. Delay helps create a favorable "power shortage" political climate. When acquiring new energy resources can no longer be avoided, and rates must be sharply increased, the fish, the environmentalists, and the Endangered Species Act can be used as scapegoats for what at bottom are simply poor business practices.

Ed Chaney, Northwest Resource Information Center, 1991.⁴⁶

the Pork Alliance proposes to send more
hundreds of millions of dollars
to save the dams—**not the salmon.**



Judi Johansen, the administrator of the Bonneville Power Administration, announced Thursday that she's resigning to take a position at PacificCorp, a large Portland-based utility.

. . . Johansen, who makes \$130,000 a year at Bonneville, said she would earn more as PacificCorp's executive vice president of regulations and external affairs.

Jonathan Brinckman, The Oregonian, November 10, 2000.

People of privilege will always risk their complete destruction rather than surrender any material part of their advantage. Intellectual myopia, often called stupidity, is no doubt a reason. But the privileged feel also that their privileges, however egregious they may seem to others, are a solemn, basic, God-given right.

Economist John Kenneth Galbraith, The Age of Uncertainty, 1977.

that unprincipled effort which perpetuates a tragedy of epic proportions.

The economic, social, and political impacts have been traumatic, and widespread.

Billions of dollars have been lost to local, state, regional, and national economies. The U.S. and Canada, states, Indian tribes, local communities, and neighbors have been pitted against each other in internecine conflict over drastically reduced supplies of fish.

Billions of public dollars already invested in salmon and steelhead habitat protection, hatcheries, and fish passage facilities, are at risk of being wasted. Billions of dollars more in future economic benefits are at risk.

Treaties with Northwest Indian tribes and Canada have in practical effect been abrogated. The intent of laws and social contracts with all people of the Northwest and Nation have been thwarted. Government has been corrupted.

National Marine Fisheries Service, Bonneville Power Administration, and the Corps propose to spend many hundreds of millions of additional dollars on ill-fated diversionary measures designed to save the dams, not the fish.

And for what?

For the money, of course.

But it would be a mistake to think it's only about money.

It's about covering up and evading responsibility for egregious bureaucratic error and mismanagement.

It's about preserving the incestuous regional culture of compromised bureaucracy, crony capitalism, monopolies, political hegemony, personal power, and sinecures that the money enables.

This is difficult not to notice. Many have made the necessary effort.

The situation cries out for a forward-looking, public interest-based, business-like investment strategy to reclaim the Columbia/Snake River commons for the general public good, while protecting legitimate private interests.

Unfortunately, the failure of governance in the Northwest to date does not bode well for a sudden outbreak of statesmanship.

But Snake River salmon and steelhead, and the four lower Snake River dams, are national assets. Their fate will be decided at the national level.

The American public and the federal courts may show little sympathy to pork barrel apologists for extinction who, at general public expense, are bent on evading the rule of law and the discipline of the market, and on beggaring their neighbors in the process. ■

Army Corps of Engineers Chain of Command From Onset of the Corps Study in 1996-To Date

Chief of Engineers:

Lt. Gen. Arthur Williams	Aug 1992 to Oct 1996
Lt. Gen. Joseph Ballard	Oct 1996 to Oct 2000
Lt. Gen. Robert Flowers	Oct 2000 to Present



Northwestern Division

Brig. Gen. Russell Fuhrman	Jul 1994 to Dec 1996
Brig. Gen. Robert Griffin	Dec 1996 to Jul 1999
Brig. Gen. Carl Strock	Jul 1999 to Present



Walla Walla District

Lt. Col. James Weller	Jul 1993 to Jun 1996
Lt. Col. Donald Curtis	Jul 1996 to Jun 1998
Lt. Col. William Bulen	Jun 1998 to Jun 2000
Lt. Col. Richard Wagonaar	Jul 2000 to Present



The Corps' role in this study has been as an honest broker, serving our Nation and its citizens.

Lieutenant Colonel William E. Bulen, Jr., Walla Walla District Engineer, Army Corps of Engineers.⁴⁷



- ¹ *Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999.
- ² *Lower Snake River Fish and Wildlife Compensation Plan*, Army Corps of Engineers, 1975. Authorized by Congress as part of the Water Resource Development Act of 1976, P.L. 94-587.
- ³ *Pacific Northwest Electric Power Planning and Conservation Act*, Pub. L. No. 96-501, § 4(h)(7), 94 Stat. 2697, 2709 (1980).
- ⁴ *Pacific Northwest Electric Power Planning and Conservation Act*, Pub. L. No. 96-501, § 4(h)(5), 94 Stat. 2697, 2709 (1980).
- ⁵ *Columbia River Basin Fish and Wildlife Program*, Northwest Power Planning Council, 1994, pp 5-25-5-32.
- ⁶ *Northwest Resource Information Center, Inc. v. Northwest Power Planning Council*, 35 F.3d 1371 (9th Cir. 1994), cert. Denied, 116 S.Ct. 50 (1995).
- ⁷ *Review of the DRAFT Lower Snake River Juvenile Salmon Migration FR/EIS*, prepared for Trout Unlimited by ECONorthwest, April 28, 2000.
- ⁸ *Detailed Comments from the U.S. Environmental Protection Agency on the Lower Snake River Juvenile Salmon Migration Feasibility Draft Report/Environmental Impact Statement*, April 27, 2000.
- ⁹ *Summary, Improving Salmon Passage, Draft, The Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement, Defining the Problem*, Army Corps of Engineers, December 1999, p. 3.
- ¹⁰ *Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999, p. 2-6.
- ¹¹ *Summary, Improving Salmon Passage, Draft, The Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement, Defining the Problem*, Army Corps of Engineers, December 1999.
- ¹² *Conservation of Columbia Basin Fish, Draft Basin-wide Salmon Recovery Strategy, Update of the All-H Paper*, Prepared by the Federal Caucus, July 27, 2000.
- ¹³ *Spawner-recruit data for spring and summer chinook salmon populations in Idabo, Oregon and Washington*. Beamesderfer, R.C.P., H.A. Schaller, M.P. Zimmerman, C.E. Petrosky, O.P. Langness, and L. LaVoy. 1997. In. *Plan for Analyzing and Testing Hypotheses (PATH): report of retrospective analysis for fiscal year 1997*. Compiled and edited by D.R. Marmorek and C. Peters. ESSA Technologies Ltd., Vancouver, B.C.; *Status Report, Columbia River Fish Runs and Fisheries, 1938-1998*. Joint Columbia River Staff Report, Washington Department of Fish and Wildlife and Oregon Department of Fish and Wildlife, 2000; *Spring chinook salmon run reconstructions and updates*. E. Tinus, Oregon Department of Fish and Wildlife, memorandum and spreadsheet to D. Marmorek, PATH facilitator, January 12, 2000; *Plan for Analyzing and Testing Hypotheses (PATH): Decision Analysis for Fall Chinook*. C.N. Peters, D.R. Marmorek, and I. Parnell. (editors), 1999. ESSA Technologies Ltd., Vancouver, B.C.; *Plan for Analyzing and Testing Hypotheses, Final Report for Fiscal Year 1998*. D.R. Marmorek, C.N. Peters and I. Parnell (editors), 1998. ESSA Technologies Ltd., Vancouver, B.C.; *Draft 2000 Biological Opinion on Operation of the Federal Columbia River Power System (FCRPS) Including the Juvenile Fish Transportation Program and the Bureau of Reclamations 31 Projects, Including the Entire Columbia Basin Project*, National Marine Fisheries Service, July 27, 2000; *State of Idaho's Comments on National Marine Fisheries Service Draft 2000 Biological Opinion on Operation of the Federal Columbia River Power System (FCRPS) Including the Juvenile Fish Transportation Program and the Bureau of Reclamations 31 Projects, Including the Entire Columbia Basin Project*, 2000.
- ¹⁴ *Written Testimony of Edward C. Bowles, Anadromous Fish Manager, State of Idaho Department of Fish and Game, before the United States Senate Committee on Environment and Public Works, Subcommittee on Fisheries, Wildlife, and Water*, September 14, 2000.
- ¹⁵ *Comments of the Oregon Department of Fish and Wildlife on The Draft Lower Snake River Juvenile Salmon Migration Feasibility Report and Environmental Impact Statement*, April 28, 2000, p 15.
- ¹⁶ *An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great basins*, Gen. Tech. Rep. PNW-GTR-405. 4 vols. Quigley, T. M; and Arbelbide, S. J., tech. eds. USDA Forest Service, Pacific Northwest Research Station, 1997.
- ¹⁷ *Comments of the Oregon Department of Fish and Wildlife on The Draft Lower Snake River Juvenile Salmon Migration Feasibility Report and Environmental Impact Statement*, April 28, 2000, Executive Summary, p. 8.
- ¹⁸ *Comments of the Oregon Department of Fish and Wildlife on The Draft Lower Snake River Juvenile Salmon Migration Feasibility Report and Environmental Impact Statement*, April 28, 2000, p. 15, citations omitted.
- ¹⁹ See, e.g., *Comments on the National Marine Fisheries Service's "An Assessment of Lower Snake River Hydrosystem Alternatives on Survival and Recovery of Snake River Salmonid (Draft Anadromous Fish Appendix)*, Idaho Department of Fish and Game. August 30, 1999; *Technical Comments on the scientific analysis used for the Federal Caucus Draft All-H Paper*, Idaho Department of Fish and Game (as part of the State of Idaho's comments on the Draft All-H Paper). March 27, 2000; *Technical Comments on NMFS' draft Anadromous Fish Appendix*, Idaho Department of Fish and Game. April 28, 2000; *A technical review of the National Marine Fisheries Service Leslie matrix model of Snake River spring and summer chinook populations*, prepared by state, tribal, and U.S. fisheries agencies, April 28, 2000; *Comments of the*

Oregon Department of Fish and Wildlife on the Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement, Oregon Department of Fish and Wildlife, April 28, 2000.

²⁰ Pacific Northwest Electric Power Planning and Conservation Act, Pub. L. No. 95-50, § 4(h)(6)(C), 94 Stat. 2697, 2709 (1980).

²¹ *The Three Sovereigns Future Fish and Wildlife Costs Report*, July 30, 1998.

²² Letter from Brigadier General Carl A. Strock, Division Engineer, Northwestern Division, Corps of Engineers, to Chuck Clark, Director, Region 10, U.S. Environmental Protection Agency, June 5, 2000.

²³ Letter from Charles E. Findley, Acting Regional Administrator, U.S. Environmental Protection Agency, to Brigadier General Carl A. Strock, Division Engineer, Northwest Division Army Corps of Engineers, July 31, 2000.

²⁴ Ed Whitelaw, *Breaching Dam Myths*, Oregon Quarterly, Autumn 2000.

²⁵ *Snake River Flow Augmentation Impact Analysis Appendix*, Bureau of Reclamation, February 1999.

²⁶ *Natural Resource Damage Assessments; Proposed Rules*. Federal register 58(10): 4602-14, National Oceanic and Atmospheric Administration (NOAA), 1994, p. 1073.

²⁷ *Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999, Appendix 1, p. 14-8

²⁸ Memorandum from Anthony Jones to Ed Chaney, September 2000.

²⁹ Personal communication, Umatilla Indian Reservation, March 1984.

³⁰ *United States v. Wimans*, 198 United States 371, 380 (1905).

³¹ *United States v. Washington*, 384 F. Supp 312 (W.D. Wash. 1974).

³² *Going with the Flow, Replacing Energy From Four Snake River Dams*, Natural Resources Defense Council,

April 2000.

³³ Letter to Idaho Lieutenant Governor Butch Otter from economist Anthony Jones, May 16, 2000.

³⁴ *Pacific Northwest Electric Power Planning and Conservation Act*, Pub. L. No. 96-501, § 4(h)(6)(C), 94 Stat. 2697, 2709 (1980).

³⁵ *Pacific Northwest Electric Power Planning and Conservation Act*, Pub. L. No. 96-501, § 6(a)(2), 94 Stat. 2717 (1980).

³⁶ *Northwest Resource Information Center, Inc. v. Northwest Power Planning Council*, 35 F.3d 1394 (9th Cir. 1994), cert. denied, 116 S.Ct. 50 (1995).

³⁷ *Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999, p. 13-10.

³⁸ Ed Whitelaw, *Breaching Dam Myths*, Oregon Quarterly, Autumn 2000.

³⁹ Ed Whitelaw, *Breaching Dam Myths*, Oregon Quarterly, Autumn 2000.

⁴⁰ *Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999, Table ES-12.

⁴¹ *Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999, p. 113-1.

⁴² *Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, U.S. Army Corps of Engineers, December 1999, p. 113-2.

⁴³ See, e.g., *Creating Jobs by Restoring Salmon: Employment After Partial Removal of the Four Lower Snake River Dams*, American Rivers, July 2000; *Review of the Draft Lower Snake River Juvenile Salmon Migration FR/EIS*, prepared for Trout Unlimited by ECONorthwest, April 28, 2000, pp 8-168-14; *Grain Transportation After Partial Removal of the Four Lower Snake River Dams: An affordable and efficient transition plan*, Dr. G. Edward Dickey, September 1999; *Irrigation After Partial Removal of the Four Lower Snake River Dams*, American

Rivers, November 1999; *Going with the Flow, Replacing Energy From Four Snake River Dams*, Natural Resources Defense Council, April 2000; *Restoring the Lower Snake River; Saving Snake River Salmon and Saving Money*, Philip S. Lansing, Oregon Natural Resources Council; *An Economic Strategy for the Lower Snake River*, prepared for Trout Unlimited, ECONorthwest, November 1999.

⁴⁴ *Review of the DRAFT Lower Snake River Juvenile Salmon Migration FR/EIS*, prepared for Trout Unlimited by ECONorthwest, April 28, 2000, p 8.2.

⁴⁵ *Creating New Jobs by Restoring Salmon: Employment After Partial Removal of the Four Lower Snake River Dams*, American Rivers, July 2000 [citations omitted].

⁴⁶ *Changing Course, A New, More Business-like Approach to Joint Production of Columbia River Basin Anadromous Fish and Hydroelectric Energy—Recommendations for Recovery of Snake River Basin Salmon* *Petitioned for Review Under the Endangered Species Act*, Northwest Resource Information Center, January 1991.

⁴⁷ *Summary, Improving Salmon Passage, Draft, The Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement*, Army Corps of Engineers, December 1999, p. 1.