

## Chapter 15

# The Salmon Crisis

## The Salmon Crisis

By Glen Spain, Pacific Coast Federation of Fishermen's Associations



Photo by Steve Hildebrand, US Fish and Wildlife

### Symbol of the Northwest

One of our most important natural resources, the Northwest's once great salmon runs remain in serious jeopardy. Today, 26 genetically separate runs of salmon and steelhead coast-wide remain federally protected under the Endangered Species Act (ESA). ESA listings for salmon and steelhead still affect roughly one-third of Oregon's landscape. Many good efforts are being made to recover these runs, but often these efforts are uncoordinated or underfunded.

Declining salmon runs are also an indicator of several serious environmental problems affecting our watersheds, and ultimately our economy. Salmon declines are merely one symptom of widespread habitat damage to regional rivers and watersheds, which, in turn, negatively affects municipal water supplies and future economic growth.

### The Economic Value of Salmon

Salmon mean business to many Oregonians. In 1988, the combined commercial and recreational salmon fishery in the Pacific Northwest supported more than 62,000 family-wage jobs and contributed more than \$1.25 billion annually to the regional economy. Oregon's share of this economic bounty was 13,950 jobs and more than \$275 million in economic benefits (Economic Imperative of Protecting Riverine Habitat in the Pacific Northwest, Pacific Rivers Council, January, 1992). Since 1988, however, continuing salmon declines in many rivers have greatly reduced that economic benefit, seriously stressing many coastal and rural fishing-dependent communities.

The decline of Columbia Basin salmon and steelhead has also led to economic disaster, costing the regional economy up to \$500 million per year and destroying up to 25,000 jobs (see *The Cost of Doing Nothing: The Economic Burden of Salmon Declines in the Columbia River*, Institute for Fisheries Resources, October 1996).

Salmon are also highly migratory, thus salmon declines in places outside Oregon can deeply affect Oregon's fishing economy. Widespread commercial ocean salmon harvest closures in Oregon in 2006, for instance, were caused by the collapse of Klamath River salmon runs in northern California which in turn triggered closures over more than 700 miles of coastline. Depressed Columbia River stocks in Washington and Idaho can cause commercial fishing closures all the way into central California and north into Southeast Alaska. The economic costs of these closures to Oregon's coastal fishing-dependent communities are enormous.

On the other hand, investing in salmon restoration creates and restores jobs and economic opportunities (particularly for depressed rural communities). It also protects one of our most



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economically valuable commodities: the region's precious clean water. Clean water, healthy salmon runs and a healthy economy are inextricably connected.

## Cultural Value of Salmon

Salmon have been important to Native American Tribes, both economically and culturally, for at least 10,000 years. When the Yakima, Warm Springs, Umatilla, and Nez Perce Tribes signed treaties with the United States Government in 1855, the Tribes specifically reserved their rights to fish in "usual and accustomed places." Under the U.S. Constitution, such treaties become "the law of the land." The U.S. Supreme Court and many lower court decisions have held that these treaty rights mean that there must be fish available for the Tribes to harvest, including the healthy river systems needed to support them. If salmon runs are allowed to go extinct, the courts will likely rule that these treaties have been abrogated, exposing taxpayers to the potential of billions of dollars in reparations.

## Salmon Declines

Prior to European settlement in the 1840s, wild adult salmon and steelhead populations in the Columbia River Basin numbered 10 to 16 million, the largest in the world. Today, fewer than 300,000 (about two percent) of the Columbia Basin's original wild populations remain. Combined with artificial production, only 1-2 million salmon now return to the Columbia every year.

Oregon coastal coho adult salmon runs once numbered between 1 and 3 million, but just a few years ago dipped below 50,000, less than five percent of historic size. Though we have seen modest improvements in recent years, scientists warn us that recent stronger returns resulted mostly from unusually good ocean conditions and not primarily from human actions. Unfortunately, cyclic ocean conditions have now become less favorable, coho are again on the decline, and any remaining gains may be lost unless we continue to protect and improve streams and rivers in the meantime.

In 1991, the prestigious American Fisheries Society (AFS) identified 214 distinct salmon and steelhead stocks in the Northwest and Northern California as endangered, threatened, or of special concern. Of these, 76 are in the Columbia River Basin and 58 are on the Oregon Coast. The AFS study also identified at least 106 major stocks as already extinct (Nehlsen, W., et. al., "Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho and Washington," Fisheries (1991) Vol. 16, No. 2 (pp. 4-21)).

## Why Are Salmon Populations Declining?

The decline of salmon runs in the Pacific Northwest is due to a variety of interrelated causes, most of which are habitat-related and under human control, including the following.

### Habitat Loss and Degradation

Salmon and steelhead are known as "anadromous" fish, which means they are hatched and spend several months in freshwater streams as juveniles, travel into the ocean to mature, then seek out their freshwater streams of origin to spawn as adults. Good freshwater habitats are thus critical to salmon survival because these are spawning grounds and nurseries. Many human activities have degraded these important habitats.

**Dewatered Rivers:** A major assessment of salmon problems commissioned by the State Legislatures of both Oregon and California in 1995 noted: "Diversion of water is potentially one of the most serious factors adversely affecting salmon in western Oregon and northern

California" (Status and Future of Salmon of Western Oregon and Northern California, a Report by the "Botkin Commission" (1995)). As the region's water demand has grown, maintaining healthy flows of water for fish and wildlife has become a major problem. Low flows decrease habitat, push water temperatures to lethal levels, concentrate pollutants, and allow fish diseases to propagate. Many streams have so much water diverted from them that they now frequently run dry (see Chapter 11, Water Quantity). Global warming may mean even less rainfall in areas of the state that already divert more water from streams than is safe.

**Excessive Logging:** Salmon require cold, clear streams in which to spawn. Although the Oregon Forest Practices Act (OFPA) requires minimal buffers along larger waterways, many smaller streams are not adequately protected. Landslides and erosion from clearcuts and logging roads on steep slopes can smother salmon eggs and kill juvenile salmon. Streamside logging eliminates shade that keeps streams cool, as well as the sources of woody debris that provide habitat complexity important to spawning and juvenile rearing. Excessive logging can reduce this complexity and diminish the ability of forests to collect and store water, leading to more flooding downstream in winters, but less and hotter stream flows during summers.

Recent scientific scrutiny of the OFPA by the Independent Multidisciplinary Science Team (IMST), established by the 1997 Legislature, concluded that current forest practices will not prevent extinction and "are not sufficient for the recovery of critical habitat for wild salmonids" (see "Recovery Of Wild Salmonids in Western Oregon Forests: Oregon Forest Practices Act Rules and The Measures in the Oregon Plan for Salmon and Watersheds," IMST Technical Report 1999-1). An Advisory Committee to the Board of Forestry made recommendations for changes in forest practices in August 2000, but few of these reforms have been implemented (see Chapter 14, Oregon Forest Issues).

**Poorly Planned Agriculture:** Water use for crops and livestock accounts for more than 80 percent of all water consumption in Oregon. Excessive water diversion puts huge stress on salmon (see above and Chapter 11, Water Quantity).

In addition, despite laws against them, unscreened irrigation diversions still lead many salmon to their deaths in pipes and ditches. Fertilizers can accumulate in streams, causing algae blooms that deprive fish of oxygen. Agricultural pesticides and herbicides can cause immediate death or long-term developmental problems. Loss of stream buffers eliminates important riparian vegetation, destroys wetlands, estuaries, and side channels, and also leads to more farmland erosion.

Many of these problems could be alleviated by stronger "Agricultural Water Quality Management Plans," established under SB 1010 (1993 Or. Laws, Ch. 263), a bill originally written by the Oregon Farm Bureau. However, this planning process is still seriously underfunded, often misunderstood by landowners, and all too often results in protections too weak to be effective.

Oregon's new pesticide use tracking law could also help to prevent water pollution that affects both salmon and people, and should be fully implemented statewide (see Chapter 7, Pesticide Use).

**Excessive Livestock Grazing:** Cattle can eat and trample riparian vegetation, which increases water temperatures and decreases stream cover and bank stability, encouraging erosion. Additionally, waste from livestock often directly pollutes rivers. However there is currently no

requirement that ranchers fence off critical riparian salmon habitat and too little enforcement money to prevent water pollution from commercial feed lots.

**Loss of Estuaries:** In recent years, we have gained a far better understanding of the importance of estuaries in the salmon life cycle. Oregon's estuaries have been substantially altered by dredging programs for shipping, and the draining of adjacent wetlands for agriculture and urban development. The Columbia River, for instance, has lost more than 90 percent of its estuarine wetlands - areas vital to the survival of juvenile salmon as they adapt to salt water. Along the Oregon Coast, the loss of estuary over-wintering habitat is considered one of the primary factors for coho declines.

**Pollution from Mining:** Poorly planned or abandoned mines often poison waterways with heavy metals and chemicals. Suction dredging and gravel mining can destroy the riverbed gravel areas that salmon need. Some minimal protections for salmonid habitat are provided for under ORS 196.810, but these only apply to fill and removal permits and not to other disruptive activities. Additional protections are clearly needed, particularly from the growing public health problem of mercury pollution (see Chapter 6, Toxic Chemicals).

**Lack of Adequate Fish Passage:** According to ODFW, there are still more than 3,000 serious fish passage problems in Oregon. Allowing access to blocked spawning areas provides greater "bang for the buck" than any other single habitat restoration measure. Yet, fish passage restoration programs are often poorly coordinated, poorly funded, and laws requiring fish passage are rarely enforced. Passage of HB 3002 in 2001 (now ORS Sections 509.600-645 and 509.910) greatly clarified fish passage laws for larger dams. Much still needs to be done, however, to improve fish passage at culverts, road crossings, and other non-dam obstacles.

**Poor Road Construction:** Poorly planned roads have destroyed salmon habitat in many areas of the state. Former Governor Kitzhaber's Executive Order 99-01 (January 1999) clarified fish passage responsibilities for public road construction by the Department of Transportation (ODOT) under the Oregon Plan for Salmon and Watersheds. ODOT is now required to review and remedy many of these problems, but resources to do so are limited and ODOT only has jurisdiction over public roads. Tens of thousands of miles of private logging and farm roads exist that are "sediment time bombs" in serious need of repair. Programs to cooperatively help landowners deal with these problems are sorely needed.

## The Impact of Dams

Hydropower turbines kill huge numbers of salmon every year. Some dams completely block migration routes for salmon, and others cause heavy mortalities because of inadequate fish passage. According to ODFW figures, as much as 93 percent of Columbia River Basin juvenile chinook, sockeye, and steelhead can be lost annually from the effects of the eight mainstem dams on the Lower Columbia and Lower Snake Rivers. Nearly 30 years of expensive efforts to artificially trap and haul salmon around these dams have resulted in only a few percent increase in survival. This is far from enough to prevent the ultimate extinction of most Columbia River salmon runs. In contrast, juveniles that pass around the dams via spillways and remain in the river as they travel out to sea generally suffer much lower mortality.

The federal dams with the most impact on Columbia Basin salmon are the four Lower Snake River dams (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite). The American Fisheries Society, the Tribes, the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency, several scientific review panels, the Oregon Department



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of Fish and Wildlife, and even the Idaho Department of Fish and Game all have recommended decommissioning the four Lower Snake River dams as giving the highest probability of success for Columbia River salmon recovery. An impressive body of economic analysis also shows this is by far the most cost-effective pathway.

Expensive Columbia River technological fixes, costing the region more than \$6 billion so far, have failed. The region needs to ask if keeping the four lower Snake River dams, which together provide less than 5 percent of the region's power, but which destroy hundreds of millions of dollars each year in fisheries benefits, is really worth the price. Many economists have concluded they are not.

There are also many smaller privately owned dams (such as those on the upper Klamath River) that block fish passage and cause economic or environmental damages that far exceed their benefits. Many irrigation dams could be replaced with more efficient modern pumps (such as the Savage Rapids Dam on the Rogue River) that cost less to operate and have much less negative impact on valuable fisheries.

Dozens of small power dams in Oregon will have to be relicensed within the next few years, an event that happens only once every 40 to 50 years. Yet funding for ODFW staff to analyze the impacts of these dams and recommend changes that better protect the state's fish and wildlife resources has been dramatically cut. Providing the funds to protect state resources in the dam relicensing process should be a high priority for the 2007 Legislature.

## Overfishing

Until the 1920s, overfishing played a significant role in the decline of most Oregon salmon stocks. Today, that impact has lessened considerably, though continued state and federal regulation is necessary to ensure salmon harvest levels remain sustainable. Recent changes to the federal laws that govern ocean fisheries (the Magnuson-Stevens Fishery Conservation and Management Act) make fishery management more science-driven and overfishing controls much stronger.

With very few exceptions, commercial and sportfishing harvests of salmon have been so restricted in recent years that they are simply no longer a significant factor in regional salmon declines. Nevertheless, good fisheries management requires constant vigilance as well as accurate, well funded, and comprehensive monitoring and data collection programs.

## Hatcheries

For 120 years, the main response to the decline of wild salmon has been to build more hatcheries. Unfortunately, hatcheries do not address the underlying causes of salmon decline, including loss of habitat and lack of water. These problems also adversely affect hatchery fish, which generally have much lower survival rates than their wild cousins. As a result, in recent years hatchery fish survival rates have plummeted and hatchery costs have sky-rocketed.

A vast body of scientific literature shows distinct genetic and behavioral differences between most wild and hatchery fish. Salmon adapt genetically to their particular river system, fitting like a key into its lock. Introducing non-native genetic traits by way of hatcheries can greatly decrease chances of fish survival in the wild. Hatchery fish also compete with wild fish for limited food and habitat. Overcrowded hatcheries can also spread disease to wild fish. Most biologists believe that hatchery fish are no substitute for naturally self-sustaining populations in the wild (see for instance *Salmon Without Rivers*, by Dr. Jim Lichatowich, Island Press (1999)).

The Oregon Department of Fish & Wildlife has adopted a Native Fish Conservation Policy to better protect wild populations from hatcheries, a good step in the right direction. However, Oregon's hatchery system is long overdue for major reforms. Hatcheries are also expensive. In most watersheds, investing money to protect and restore damaged habitat is a far more cost-effective means of ensuring salmon abundance. Hatcheries are not an effective substitute for natural habitat.

The practice of killing surplus hatchery fish to protect wild populations, while controversial, is a false issue. Any well run hatchery generates many times more adult fish than can ever be harvested for their eggs. Returning adult salmon naturally die anyway, leaving their carcasses in the river to provide nourishment that supports a burst of insect life for the next generation of juvenile fish to feed upon. Humanely killing the surplus fish and using their carcasses as nourishment for the next generation, or for human consumption in food banks, is a normal part of hatchery practices everywhere.

Whether and when to list hatchery fish under the federal Endangered Species Act (ESA) has also been controversial. In response to past court disputes on this issue, the National Marine Fisheries Service (NMFS) has rewritten its policy on how and when to include hatchery fish under federal ESA protection. However, this policy has been challenged in court, leaving the issue still unresolved.

Bills in past Legislatures have proposed to override or redefine science, limit the use of the tools of conservation biology, or legally ignore the clear biological distinctions between hatchery and wild fish. Any such future legislation should be soundly rejected. Defining science should be left to scientists, not Legislators. Legislative attempts to restrict what constitutes "best available science" could have disastrous consequences.

## **Impacts of Predators and Ocean Conditions**

It is tempting to blame salmon declines on non-human factors, such as too many predators or adverse ocean conditions. While salmon are subject to both, salmon populations have evolved for millions of years through thousands of El Niños, and as part of a normal predator-prey food chain. If salmon populations today are at risk, it is because too few are coming out of our watersheds for the reasons discussed elsewhere in this chapter. Human actions, not natural conditions, are the root cause of these declines.

## **The Oregon Plan for Salmon and Watersheds**

In 1996 and 1997, former Governor Kitzhaber oversaw the creation of the Oregon Coastal Salmon Recovery Initiative (CSRI). It is now referred to as the "Oregon Plan for Salmon and Watersheds," or more simply the "Oregon Plan."

The Oregon Plan's fundamental purpose is not to avoid ESA listings, but rather to recover salmon to the point where such listings are no longer necessary. The goal is to restore Oregon's once vibrant salmon-based economy. Its four basic components are:

- 1) community-based action through local watershed councils;
- 2) better coordination of government agencies;
- 3) extensive monitoring of habitat; and
- 4) full compliance with existing environmental laws.

**Watershed Councils:** Oregon's major watershed enhancement efforts began in 1987 with the creation of the Governor's Watershed Enhancement Board (GWEB). The 1999 Legislature created a new state agency, the Oregon Watershed Enhancement Board (OWEB), superseding GWEB. OWEB oversees the Oregon Plan and distributes funds for salmon restoration projects from a variety of state and federal sources.

Local watershed councils (first created by the 1993 Legislature) lie at the heart of the Oregon Plan. Watershed councils have primarily focused on voluntary restoration projects. The Oregon Plan was formally endorsed and funded by the Oregon Legislature in 1997 and every Legislature since. In 1999, it was expanded to cover steelhead and other salmonid species statewide, include additional agencies in the effort, and formally incorporated the agricultural lands water quality management planning process (SB 1010). It was further bolstered by Executive Order 99-01 (January, 1999), which makes it binding on all state agencies.

In spite of some gaps, the Oregon Plan has taken a long step toward making salmon restoration a major state priority and has been very helpful in galvanizing effective restoration efforts in many places. It deserves continued strong Legislative support.

**Gaps in the Oregon Plan:** There are, however, still problems with the Oregon Plan that should be fixed. One criticism of the Plan is that too little effort is being made to curtail the continuing destruction of salmon habitat still allowed under other conflicting Oregon laws. Patching up habitat, while simultaneously destroying it, is extremely counterproductive and a waste of taxpayer funds. Another criticism of the Oregon Plan is that because of the heavy reliance on purely voluntary and non-regulatory approaches, some of the restoration measures promised under the Plan have never happened, and voluntary future actions can never be guaranteed.

At present, the state has no "Agricultural Practices Act" equivalent to our Forest Practices Act. There are thus no laws to regulate many common but unnecessary agricultural practices that are particularly harmful to salmon and which pollute domestic water supplies. Furthermore, despite the Oregon Plan's attempt to improve forestry practices, NMFS determined that the Oregon Plan would not provide the protections "essential to creating and maintaining the high quality habitat needed to sustain Oregon coast coho over the long term across a range of environmental conditions" (62 Fed. Reg. 24588, 24607 (May 6, 1997)).

Recommendations for much needed improvements to Oregon's Forest Practices Act by both the Oregon Plan's Independent Multidisciplinary Science Team (IMST) and a Board of Forestry-appointed stakeholder advisory group remain largely unimplemented (see above). Measure 37 now complicates efforts to improve forestry land use practices that damage other public resources.

Funding for the Oregon Plan also remains a major concern. Passage of Measure 66 in 1998 was intended to help provide a new, dedicated, stable funding source for salmon restoration. Instead, Legislatures since then have used a significant portion of these new funds simply to backfill other budget cuts in the same agencies, frustrating the will of the voters.

It took 150 years to nearly destroy Oregon's valuable salmon runs, and it is only reasonable to expect that it will take time, and sustained effort, to restore them. Considerable restoration effort under the Oregon Plan is now being made and this effort should by all means continue. The next few years will determine whether Oregon's valuable salmon runs and the many communities which depend on them for their livelihoods plunge into extinction or begin the road to recovery.

Until state-based recovery efforts can be proven effective, however, Oregon's salmon runs will continue to benefit from federal protection under the ESA. One-third of Oregon's damaged salmon habitat also lies on federal lands. The ESA protects against federal actions that deplete salmon habitat on federal lands well outside the jurisdiction of the Oregon Plan.

## Legislative Priorities

- ◆ Measure 66 dollars should be fully dedicated to new salmon recovery projects; the money should not be diverted to pay for items funded in the past from the General Fund, nor used to backfill other cuts in the same programs.
- ◆ One of the biggest threats to salmon is dewatered rivers. Setting aside adequate instream flows of water for Oregon's fish and wildlife should be a high priority for both the Water Resources Department and the Department of Fish and Wildlife. These programs should also be fully funded.
- ◆ Pesticide tracking laws should be fully funded and implemented. At the same time, both regulatory and incentive programs to reduce pesticide and other chemical concentrations in Oregon's rivers should also be supported to protect salmon, public health and public water supplies.
- ◆ Common agricultural and forestry practices are still causing a loss of stream-side habitat and a decrease in water quality that are crucial to salmon recovery. Stream-side buffer zone protection legislation must be passed that protects water quality on all lands and limits disturbances on steep or landslide-prone slopes. This goal can be achieved through a combination of regulatory measures and incentives in ways that are both cost effective and beneficial to landowners. Currently, both agricultural and forestry practices are categorically exempt from the state's water quality laws. These categorical exemptions should be eliminated in favor of a case-by-case review process.
- ◆ Patching up habitat while simultaneously destroying it is extremely, counterproductive as well as a waste of taxpayer funds. Other laws that allow land and water uses working against salmon restoration should be amended to be consistent with Oregon Plan restoration efforts.
- ◆ Correcting fish passage problems can provide more "bang for the buck" than any other salmon habitat restoration measure. ODFW's fish passage problem assessment and correction program, and ODOT's similar program for public roads, should be fast-tracked and fully funded.

## Key Messages

- ◆ Salmon mean business. Salmon recovery will provide more jobs, more dollars, and greater economic stability to hard-pressed coastal and rural communities.
- ◆ Letting salmon slide toward extinction carries a huge economic cost. Not only would we be impoverishing our state's economy, culture, and quality of life, we would also be abrogating Tribal and International treaties, which could ultimately cost taxpayers and government agencies billions of dollars in reparations.
- ◆ Habitat protection and restoration are keys to salmon recovery. Without good freshwater habitat, salmon cannot reproduce. Protecting existing habitat is the most cost effective way to restore salmon, and is much cheaper than restoring habitat once it is already seriously degraded.

- ◆ The protection and restoration of native salmon and steelhead stocks in the wild must take priority over expanding hatcheries. Lost habitat cannot be replaced by more hatcheries. Even hatchery fish need healthy rivers to survive.
- ◆ Oregon's fishing-dependent communities bear the economic brunt of the four lower Snake River dams. To restore Snake River salmon, scientific evidence overwhelmingly indicates that the four lower Snake River dams must be decommissioned so that the river flows more naturally. This can be done cost effectively and with economic dislocations minimized or eliminated through reasonable transition strategies.

## Experts and Resources

National Marine Fisheries Service  
 Attn: D. Robert Lohn, Regional Administrator  
 7600 Sand Point Way NE  
 Seattle, Washington 98115-0070  
 206-526-6150  
[www.nwr.noaa.gov](http://www.nwr.noaa.gov)

Oregon Department of Fish and Wildlife  
 3406 Cherry Ave., N.E.  
 Salem, Oregon 97303  
 503-947-6000  
[www.dfw.state.or.us](http://www.dfw.state.or.us)

Oregon Plan for Salmon and Watersheds  
[www.oregon-plan.org](http://www.oregon-plan.org)

Independent Multi-disciplinary Science Team  
[www.fsl.orst.edu/imst](http://www.fsl.orst.edu/imst)

Columbia River Inter-Tribal Fish Commission  
 Attn: Olney Patt, Jr., Executive Director  
 729 N.E. Oregon, Suite 200  
 Portland, Oregon 97232  
 503-238-0667  
[www.critfc.org](http://www.critfc.org)

Pacific Coast Federation of Fishermen's  
 Associations (PCFFA) and the  
 Institute for Fisheries Resources (IFR)  
 Attn: Glen Spain, Northwest Regional Director  
 PO Box 11170  
 Eugene, Oregon 97440-3370  
 541-689-2000  
[fish1ifr@aol.com](mailto:fish1ifr@aol.com)  
[www.pcffa.org](http://www.pcffa.org)  
[www.ifrfish.org](http://www.ifrfish.org)

## Experts and Resources , cont.

Northwest Sportsfishing Industry Association (NSIA)  
Attn: Liz Hamilton, Executive Director  
PO Box 4  
Oregon City, Oregon 97045  
503-631-8859  
nsializ@aol.com

Trout Unlimited  
Attn: Jeff Curtis, Pacific Salmon Director  
213 SW Ash St, Suite 205  
Portland, OR 97204  
503-827-5700  
jcurtis@tu.org  
www.tu.org

Oregon Trout  
Attn: Brett Brownscombe, Conservation Director  
65 Yamhill Street, Suite 300  
Portland, Oregon 97204  
503-222-9091  
brett.brownscombe@ortrout.org  
www.ortrout.org

Pacific Rivers Council  
Attn: David Bayles, Executive Director  
PO Box 10798  
Eugene, Oregon 97440  
541-345-0119  
www.pacrivers.org

Save Our Wild Salmon Coalition  
2031 SE Belmont  
Portland, Oregon 97214  
503-230-0421  
www.wildsalmon.org

Sierra Club, Columbia Group  
Attn: Jeff Fryer, Salmon Coordinator  
2950 SE Stark, Suite 110  
Portland, Oregon 97214  
503-238-0442  
jeff.fryer@att.net  
www.oregon.sierraclub.org