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New Directions in Salmon Recovery Law and Policy

by

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I. Introduction

In February 1998 the National Marine Fisheries Service (NMFS) listed California Central Valley and Lower Columbia River steelhead as threatened and proposed listing 13 other West Coast salmon and steelhead populations as threatened or endangered under the federal Endangered Species Act (ESA). In anticipation, West Coast salmon recovery efforts have spread rapidly beyond the Columbia-Snake River Basin, where recovery efforts have proceeded under the twin auspices of the ESA and the Northwest Power Planning Act (Brown 1995; Hildreth & Thompson 1994; Patis 1996). For salmon recovery outside the Columbia-Snake River Basin, a more diverse set of federal, state, and local laws and programs—including the ESA but excluding the Northwest Power Planning Act—comes into play. Outside the Columbia-Snake River Basin, the contributing causes to salmon decline tend not to include major dams like those in the Columbia-Snake River Basin, whose operation has been the focus of much of the litigation surrounding salmon recovery there. Two 1997 federal district court decisions allowed continued operation of the Columbia-Snake River dam system without many of the major changes proposed by salmon recovery advocates (American Rivers 1997b, 1997c; Dahlstrom & Hildreth 1997b). Thus, to paraphrase Lewis and Clark College law professor Dan Rohlf, the Columbia and Snake Rivers continue to be operated as a system in which grain travels on the rivers while salmon travel in trucks on Interstate 84 (Rohlf 1995). The four-state Northwest Power Planning Council may revise its 1994 Columbia River Basin Fish and Wildlife Program pursuant to a 1996 amendment to the Northwest Power Planning Act to reflect the latest scientific thinking on Columbia-Snake River salmon recovery contained in several federal, state, and tribal recovery proposals, but the prognosis for successful Columbia-Snake River salmon recovery remains decidedly mixed (Blumm, Schoessler & Beckwith 1997; Volkman 1997).

ESA listings for West Coast coho, steelhead, chum, sockeye, chinook, and cutthroat trout runs can involve legal and physical circumstances that are quite different from those of Columbia-Snake River salmon. Some of these were discussed in Hildreth's Legal Brief in the Summer 1996 issue of Oregon Sea Grant's Restoration newsletter concerning coastal coho recovery and Governor John Kitzhaber's Oregon Coastal Salmon Restoration Initiative (OCSRI) (Hildreth 1996). Governor Kitzhaber's initiative joined two other Oregon salmon restoration initiatives, those mandated by the 1995 Oregon legislature under Senate Bill 1127 and House Bill 2615. The 1997 Oregon legislature reestablished the Coastal Salmon Restoration and Production Task Force, which was created by 1995 Oregon Senate Bill 1127. Like the governor's initiative, the legislative initiatives were oriented toward avoiding further listings under the federal ESA and reestablishing sustainable commercial and recreational salmon fisheries in the state. Similar salmon, steelhead, and bullhead trout restoration initiatives are underway in other West Coast states and on a region-wide basis at the instigation of the region's state governors. For weak Atlantic salmon, in December 1997 NMFS deferred any ESA listing and accepted Maine's comprehensive conservation plan.

Detailed analyses of Governor Kitzhaber's coastal salmon initiative and the federal response are included in this memo. Other significant new directions in coastal salmon recovery law and policy include the following:

1. *Implementing the 1996 Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) salmon habitat protection and restoration amendments.* In amending the MSFCMA in 1996, Congress found in section 2(9) that "one of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats. Habitat considerations should receive increased attention for the conservation and management of fishery resources of the United States." Under new section 303(a)(7), salmon fishery management plans (FMPs) prepared by regional fishery management councils such as the North Pacific Fishery Management Council and the Pacific Fishery Management

Council (PFMC) are required to identify essential fish habitat (EFH) used by managed fishery resources, minimize adverse effects on the identified habitat caused by fishing, and identify actions to encourage the conservation and enhancement of EFH. Under section 3(10), EFH is defined broadly as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity." Thus, NMFS's implementing regulations and accompanying technical guidance manual view these new statutory provisions as introducing ecosystem considerations into federal fisheries management (62 Federal Register 66531 (1997); NMFS 1997). The high priority placed on satisfactory habitat also is stressed in the OCSRI, as discussed further below.

To promote interagency and intergovernmental respect for EFH, new section 305(b) requires that federal agencies consult with the secretary of commerce on any activity authorized, funded, or directly undertaken by them that may adversely affect EFH. Similarly, the regional fishery councils may make recommendations to the secretary and any federal or state agency whose activities may affect the habitat of a fishery resource under council authority, including but not limited to EFH. The councils must comment on habitat impacts involving anadromous fish, and, based on such comments and consultations, the secretary must recommend to the relevant agency measures that would conserve the affected habitat. The federal agency must respond to such recommendations within 30 days with the agency's measures for avoiding the habitat impact and its reasons for not following any of the secretary's recommendations. The federal government's focus on interagency and intergovernmental coordination is mirrored by provisions and policies contained in the OCSRI.

Without the benefit of specifically identified EFH and any statutory basis for secretarial involvement, similar council comment and recommendation provisions in prior law did not appear to have much substantive impact on state and federal agency actions adversely affecting fish habitat. The new habitat provisions more closely parallel the interagency consultation provisions of the ESA under which some substantive protection of habitat (including salmon habitat in the Pacific Northwest) has been achieved. Salmon EFH identified in regional council salmon FMPs will include EFH in coastal watersheds and estuaries, complementing salmon critical habitat designated under the ESA.

A key salmon habitat protection implementation step will be the integration into the new MSFCMA EFH process of the fish habitat protection provisions found in the statutes, regulations, plans, and policies of other relevant federal, regional, state, local, and tribal programs, including the six national marine sanctuaries in the region; the six national estuarine research reserves in the region; the four states' coastal zone management programs, including state ocean and territorial sea plans (Hildreth 1995); the six national estuary projects in the region; the Pacific States Marine Fisheries Commission; federal and state salmon recovery plans, including the OCSRI; the Northwest Power Planning Council's Fish and Wildlife Program; and the salmon habitat protection programs of the region's Indian tribes and coastal local governments, ports, and watershed councils. The first three, as relevant Department of Commerce programs, are mandated by new MSFCMA section 305(b)(1)(C) to "further the conservation and enhancement" of council-designated EFH. In California alone, over one hundred ocean areas have been set aside by a variety of government entities for a range of purposes, including fish habitat protection (McArdle 1997).

Also benefiting the region's salmon will be the integration into the MSFCMA EFH process of the regionally relevant U.S. international fisheries agreements, such as the 1995 United Nations Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks (signed and ratified by the United States but not yet in force) and the agreement among the United States, the Russian Federation, and four distant water fishing nations on pollock resources of the Central Bering Sea.

2. *Orchestrating the recovery of weak species such as cutthroat trout (listed as endangered in the Umpqua River, 61 Federal Register 41514 (1996)) and West Coast steelhead (so far seven populations listed as threatened or endangered), which are fished recreationally rather than commercially, while minimizing the impacts on recreational fishing.* Federal policy (61 Federal Register 27978 (1996)) supports continued recreational fishing where impacts on ESA-listed species are minimized. Habitat conservation plans that are federally approved under ESA section 10(a) are one pathway that Oregon, Washington (61 Federal Register 15959 (1996)), and Idaho (61 Federal Register 28182 (1996)) are pursuing to legalize recreational fishing that targets or incidentally takes an ESA-listed species (Ramsey 1996). Oregon at least identifies continued recreational use of the fishery as an important goal.

3. *Implementing legal and administrative processes that improve water quality and help anadromous fish recovery. Water quality initiatives of potentially great significance to anadromous fish recovery include*

a) The February 20, 1998, listing by the Oregon Department of Environmental Quality (DEQ), subject to federal Environmental Protection Agency approval, of 1163 Oregon stream segments as "water quality limited" pursuant to federal Clean Water Act (CWA) section 303(d), which will require both point and nonpoint source polluters who contribute to the water quality violations to adjust their activities through the total maximum daily load process. The applicable water quality standards were recently amended to include temperature standards designed to aid fish survival. Achieving those standards through the section 303(d) process would be a major step toward anadromous fish recovery. The 1995 decision of the Ninth Circuit Court of Appeals in Northwest Environmental Advocates v. City of Portland, 56 F.3d 979 (9th Cir. 1995), cert. denied, U.S. Sup. Ct. No. 95-1732 (June 24, 1996), provides significant opportunities for citizen involvement in this water quality improvement process. Similar listings are occurring in other states in the region.

b) The application of Oregon's coastal nonpoint source pollution control program (DEQ & DLCDC n.d.) throughout the entire Umpqua and Rogue River basins, which would aid significantly the recovery of weak anadromous fish stocks in those two key coastal basins. The program was prepared and federally approved pursuant to section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990. It requires the use of improved best management practices to further reduce runoff pollution from activities such as forestry, agriculture, and land development that have adversely affected anadromous fish stocks in the past. Federal agencies such as the Forest Service and the Bureau of Land Management have to act consistently with the requirements of Oregon's coastal nonpoint source pollution program now that it has been federally approved pursuant to section 6217. The other West Coast states have developed similar programs under section 6217.

c) The implementation of the 1996 federal district court decision in Oregon Natural Desert Association v. Thomas, 940 F. Supp. 1534 (D. Or. 1996), appeal pending (9th Cir. 1997), requiring federally permitted grazing on public lands to be carried out in compliance with state water quality standards for streams adversely impacted by cattle grazing on adjacent public lands (Dahlstrom & Hildreth 1997a).

d) Rigorous state enforcement of Oregon Revised Statutes (ORS) section 468B.060, which imposes unlimited liability for damages and restoration costs for injuries to fish (such as salmon), wildlife, and their habitat resulting from pollution or the violation of any permit, orders, or rules of the Oregon Environmental Quality Commission (EQC), and ORS section 496.705, which fixes liability to the Oregon Fish and Wildlife Commission for unlawful takings of salmon and steelhead at \$125 per fish. Similar provisions in

California law have played an important role in protecting fish and their aquatic habitat (Department of Fish & Game 1992; California Trout 1990).

4. *Emphasizing the connections between the recovery of weak salmon, steelhead, and cutthroat trout stocks and the recovery of other endangered and threatened species also dependent on healthy watersheds and coastal ecosystems for their recovery.* Actions taken toward the recovery of endangered Umpqua River cutthroat trout and the seven West Coast steelhead populations, which were listed as threatened or endangered in 1997 (62 Federal Register 43937 (1997)) and 1998, will also aid the recovery of weak salmon runs in those same streams and rivers. The Umpqua River cutthroat listing has led to reductions in river sedimentation caused by wintertime highway sanding practices, to litigation challenging a NMFS opinion that the Northwest forest plan adequately protects those trout from the adverse impacts of national forest timber harvesting on their habitat, and to designation of the entire Umpqua River Basin, including its tributary streams, as critical habitat.

Potentially affected Oregon steelhead runs cover the broadest area, including several coastal rivers as well as the Columbia and Snake. Oregon Governor Kitzhaber's staff, working with state agencies, has created a steelhead recovery plan as a supplement to the OCSRI (State of Oregon 1997b). Idaho Governor Phil Batt also released a state wild steelhead recovery plan. That plan included a "normative" river approach that is based on improved river conditions and designed to end the barging of steelhead (Big River News, Spring 1997). Many of the measures utilized to restore coho salmon populations and habitats also will similarly benefit steelhead populations. Like the OCSRI, Oregon's steelhead supplement is an effort to avoid further ESA listings of specific steelhead runs and retain state authority over management of Oregon's natural resources. The steelhead supplement requires similar restoration measures over the expanded geographic area covered by Oregon's steelhead populations—populations that sometimes range into neighboring states. While restoration measures directed at the coastal coho primarily affect coastal areas, the wide-ranging steelhead populations will require efforts that address a much larger area of the state and much more of its waters. Furthermore, the life cycle of steelhead is different from that of coho salmon.

In some streams, salmon recovery also is linked to the recovery of weak bull trout populations, for which the U.S. Fish and Wildlife Service has responsibility under the ESA. Responding to litigation, the Fish and Wildlife Service has proposed listing bull trout in the Klamath River as endangered and bull trout in the Columbia River as threatened (62 Federal Register 32268 (1997)). The Service also is studying the status of bull trout in other rivers, including rivers in Idaho, where recovery has commenced under the state's July 1996 bull trout conservation plan (Big River News, Fall 1997). A federal district court also has ruled that some federal forest management practices in five western states are inadequate to protect bull trout.

Beyond the recovery of connected fish stocks, there are positive connections between the recovery of listed forest bird species such as the spotted owl and the marbled murrelet and weak anadromous fish runs. In a recent court decision important for the recovery of both spotted owls and anadromous fish, the Ninth Circuit Court of Appeals rejected timber industry legal challenges to the validity of the Northwest forest plan, thereby clearing the way for the implementation of its species recovery-oriented provisions (Seattle Audubon Society 1996).

Even more impressive has been the judicial support for the threatened marbled murrelet in the face of harmful logging proposed under the federal salvage timber rider law (most provisions of which expired on September 30, 1996). Twice in 1996, the Ninth Circuit Court of Appeals upheld restrictions on logging in old growth national forests in California, Oregon, and Washington that serve as egg-laying habitat for the marbled murrelet and can be important habitat also for anadromous fish (Dahlstrom & Hildreth 1997b; Marbled Murrelet 1996; Northwest Forest Resource Council 1996). Protection of the marbled murrelet also has been

extended to privately owned coastal forest lands not covered by the now expired federal salvage timber rider. For example, in March 1996, the California Board of Forestry, acting under the authority of both the federal ESA and California's endangered species law, rejected a timber company's proposed road construction activities that would have led to the elimination of marbled murrelet habitat (Environmental Law Reporter 1996). More recently, extensive habitat critical to the recovery of the marbled murrelet, whose protection also will aid anadromous fish recovery, was designated under the ESA in coastal forests up and down the West Coast (61 Federal Register 26256 (1996)), and a final murrelet recovery plan has been issued. In that designated habitat, important to both the murrelet and anadromous fish, regulatory attention will focus on the impacts of logging, farming, grazing, and streamside development on species recovery. Despite the foregoing protective steps, concerns about the survival of the marbled murrelet have led to the filing of a petition to change the murrelet's ESA status from threatened to endangered. Listing of the murrelet as endangered would further strengthen the connections between murrelet recovery and West Coast anadromous fish recovery.

II. Salmon Habitat Protection and Landowners' Property Rights

Approximately two-thirds of coho riparian habitat is in private ownership. Protecting and restoring this habitat requires a combination of voluntary programs, including landowner incentives (62 Federal Register 32178, 32183, 32189 (1997); Thompson 1997), with mandatory requirements sufficient for achieving recovery. However, habitat protection legislation and regulations must not unconstitutionally infringe upon landowners' rights protected under the U.S. Constitution's Fifth Amendment and under similar state constitutional provisions. Recent federal and state court opinions provide important guidance on how to draft and administer habitat protection legislation and implementing regulations constitutionally and fairly.

First, compensation generally is not constitutionally required for the enforcement of restrictions existing at the time the landowner purchased the property (Anello 1997; Good 1997; Kim 1997). Presumably the purchase price paid by the current owner reflected those restrictions (Buechel 1994). For example, a series of recent state court opinions supports enforcement of restrictions on altering wetlands without compensation against landowners who purchased the land *after* the restrictions went into force (Alegria 1997; Basile 1997; Gazza 1997; Kentucky Fried Chicken 1997; Palazzolo 1997).

Second, the constitutional analysis of habitat protection restrictions imposed after the current owner purchased the property is much more complex. Subsequent legislative and regulatory restrictions that render the land completely valueless must be accompanied by compensation unless they reflect use restrictions that the courts would impose under the judge-made common law rules of property or nuisance law (First English Evangelical Lutheran Church 1987; Lucas 1992). Whether restrictions that render only a portion of a parcel valueless must similarly be compensated has not yet been clarified by the courts (Zealy 1995). The Oregon Supreme Court recently recognized that compensation may be required for state timber harvest restrictions imposed on 56 acres of a 64-acre private parcel to protect the spotted owl and remanded the case for a trial in which \$1.8 million was awarded (Boise Cascade Corporation 1997). A much earlier Washington decision supports the imposition of reforestation obligations on private timber landowners without compensation (State 1949). In addition, the Connecticut Supreme Court recently upheld state denial of a permit to clear-cut 55 acres of private timber land that was located in a sensitive floodplain (Cannata 1996).

Even if all or part of the property is not rendered valueless by a subsequently enacted restriction, compensation still may be constitutionally required based on a judicial balancing of factors, including the restriction's economic impact and interference with the owner's

investment-backed expectations (Broadwater Farms Joint Venture 1997; Forest Properties, Inc. 1997; Kavanau 1997). Thus, out of fairness and constitutional concerns, newly adopted habitat protection legislation and regulations should extend hardship relief in the form of variances, exceptions, and transferable development rights to the landowners who are most severely impacted. The role that transferable development rights can play in habitat protection is illustrated by recent litigation challenging California and Nevada's joint scheme to protect Lake Tahoe's water quality (Suitum 1997).

Third, and finally, habitat protection obligations imposed as part of a development permit issued to a landowner must be shown by the imposing government agency to be related to the development's adverse habitat impacts and "roughly proportional" to those impacts (Dolan 1994). Those obligations that include government or public access to the property will be scrutinized especially closely (Dolan 1994). However, use of private property by wildlife, including ESA-listed species, generally does not require compensation, even where the property owner's domestic animals are injured by the wildlife or listed species (Christy 1988).

Even though compensation for such injuries is not constitutionally required, recovery programs for ESA-listed species such as the gray wolf sometimes have included landowner compensation funds provided by Congress, state legislatures, or nonprofit groups interested in the species' recovery.

Proposals to amend the ESA to more broadly mandate compensation to affected landowners so far have not been enacted. Neither have similar proposed amendments to the federal CWA or proposed general federal legislation on landowner compensation rights such as 1997 House Bill 1534, 1991 House Bill 95, 1996 Senate Bill 1954, or 1995 House Bill 925, which only the House passed.

Several states have enacted landowner compensation laws that are more generous than the judicial rules summarized above. In the Pacific Northwest, however, similar state compensation legislation has been defeated: In Washington State, voters rejected a referendum by a 2-1 margin in 1995, and in Oregon, Governor John Kitzhaber vetoed a bill, also in 1995. The 1997 Oregon and Washington legislatures considered similar legislation but none was enacted.

Thus the judicial compensation rules summarized above continue to be generally applicable to compensation issues raised by government actions taken in support of salmon recovery, such as new restrictions on the exercise of previously recognized rights regarding irrigation water diversions. Nationally, courts have found potential violations of water users' Fifth Amendment compensation rights in two disputes, neither involving the recovery of ESA-listed species. State legislation limiting the future exercise of riparian water rights by riverbank owners was struck down in Oklahoma (Franco-American Charolaise 1990), and serious Fifth Amendment questions were raised about judicial restrictions on continued irrigation diversions in Hawaii (Robinson 1985). More relevant to restoring stream flows in support of salmon recovery is a recent Washington Supreme Court decision upholding against a Fifth Amendment challenge of a referee's decision to reduce an irrigator's diversions due to the wastefulness of the irrigation system used (State 1993).

In support of ESA-listed salmon recovery, other recent decisions have upheld, without directly addressing Fifth Amendment issues, uncompensated alterations of Bureau of Reclamation water delivery contracts (Madera Irrigation District 1993; Natural Resources Defense Council 1997) and reductions in diversions due to inadequate fish screens (United States 1992). California courts have applied the public trust doctrine to reduce diversions to achieve fish and fish habitat benefits without compensation (Mono Lake Water Rights Cases

1991; United States 1986). The federal navigation servitude also is relevant to water rights compensation questions (Hildreth, Dahlstrom & Wilde 1998).

Property rights advocates have made some gains in the nation's courts and legislatures. Still, under the evolving legal framework, landowner compensation for regulations protecting habitat is required in limited, fact-specific circumstances identified after relatively complex litigation. The legal trends do suggest that impacts on landowners should be carefully identified and compensated as appropriate and feasible. Therefore, beyond the intangibles of community recognition, public, nonprofit, and private monetary benefits provided to landowners who undertake habitat protection will continue to play a key role in encouraging landowner cooperation (Polaskey, Doremus & Rettig 1997; Polaskey & Doremus forthcoming). An example of a publicly financed incentive is the funding sought by Governor Kitzhaber's staff in January 1998 under the federal Conservation Reserve Enhancement Program. Landowner perceptions of what is fair treatment may well have expanded due to these legal trends.

III. Coastal Coho Salmon Recovery

Jim Martin, coordinator of Governor Kitzhaber's Coastal Salmon Restoration Initiative, estimates that around 1900 there were an average of 1.6 million annually migrating wild coho salmon returning to the Oregon coast south of the Columbia River and north of California. But by the 1990s, annual returns of wild coastal coho have numbered below 100,000. Winter 1996 spawning counts indicated a near record low of 39,000 wild spawners.

Coho runs on 55% of their former habitat are now extinct. Multiple petitions were filed with NMFS to list the remaining West Coast coho salmon species as threatened or endangered under the federal ESA. In July 1995 NMFS proposed listing Oregon and California coho salmon as threatened, but so far only central California (61 Federal Register 59028 (1996)), northern California, and southern Oregon coastal coho have actually been protected with a threatened listing, critical habitat designation, and regulations issued under ESA section 4(d) (Federal Register 62741 (1997)). Environmental and fishing groups have filed suits in federal district court challenging the legal bases of NMFS's April 1997 decision to not list Oregon coastal coho north of Cape Blanco, which NMFS views only as a "candidate species" for listing pending implementation of the OCSRI (Oregon Natural Resources Defense Council 1997).

In the meantime, the PFMC has drastically reduced commercial and recreational coho fishing in federal waters beyond three nautical miles off northern California, Oregon, and Washington. The states have adopted similar restrictions for state coastal waters extending three nautical miles seaward. Millions of dollars in federal compensation have been allocated to individuals and entities adversely affected by these decisions. Even with wild coho harvest largely eliminated, successfully responding to the decline of coastal coho is one of the West Coast's most challenging sustainability issues; it involves watershed land use changes, habitat loss, water quality degradation, and the impacts of these factors on an important marine resource, thus crossing traditional jurisdictional boundaries.

The legal and physical circumstances of coastal coho are quite different from those of the Columbia-Snake River salmon, due to the absence of large hydroelectric dams as a principal factor in coastal coho decline and recovery (Harrison 1993). Coastal coho recovery implicates a wide variety of coastal resource uses beyond the commercial and recreational fishing sectors that have borne the brunt of initial actions taken in support of recovery.

The principal factors in West Coast coho salmon decline include overfishing, adverse ocean conditions, hatchery operations, and freshwater and estuarine habitat deterioration due to forestry, agriculture, and urbanization (Botkin et al. 1995). Habitat alteration in coastal

watersheds appears to be a major factor in the decline of coastal coho. The mix of public and privately owned resources in coastal watersheds complicates the implementation of coho recovery actions. Existing federal, state, and local resource management laws have not been sufficient for preventing the decline, and some factors such as adverse ocean conditions are, for the most part, beyond the control of the relevant legal systems. For other factors such as habitat deterioration, however, changed laws and improved implementation and coordination appear to be necessary, if not necessarily sufficient, conditions for coastal coho recovery.

The long-term decline of coastal coho populations correlates with the deterioration of their freshwater habitat caused by human disturbances. Coho are especially vulnerable to the loss or degradation of their freshwater spawning, summer rearing, and winter rearing habitats. Coho habitat is lost when large woody debris and the stable, complex channels and wetlands associated with floodplain forests are damaged or destroyed by logging, grazing, channelization, crop land agriculture, or urbanization. Sedimentation, debris flows, and increases in stream temperature can result from the disturbance of headwater areas by logging roads and timber harvests. Flow diversions for irrigation and power generation also can cause serious problems for coho.

At least 12 different federal agencies operating under different statutory mandates have water management responsibilities in watersheds. At the state level, 16 agencies are involved in managing watersheds in Oregon, and the figures are similar for California and Washington.

Local governments are significant players in watershed management as well. However, a 1994 U.S. Supreme Court decision appears to impose major information gathering and analysis obligations on local government agencies that regulate private land uses adversely affecting watershed conditions, at least in cases where the local government attempts to impose public access requirements on the landowner (Dolan 1994). Federal courts have required compensation payments to some landowners who were denied permission to fill wetlands on their property (Florida Rock Industries 1994). On the other hand, other federal and state court decisions have been quite supportive of aggressive federal and state agency implementation of CWA, ESA, and other obligations to protect watershed water quality.

The relevance of the legal framework outlined above is illustrated by the key concept in coho recovery, namely, riparian zone protection and restoration. According to Oregon State University (OSU) Professor Stan Gregory,

riparian, or streamside, zones have recently emerged as key areas of consideration in the forest ecosystem management discussion because such zones are critical to maintaining the water quality, temperature, and food bases of streams. One of the challenges to be faced regarding riparian zones is that they almost always span across public and private lands, yet the entire length of the riparian zone bordering a stream must be managed in order to maintain the health of that stream [Bruce 1993, 21].

As compared to the habitat for endangered and threatened Columbia-Snake River salmon, a greater percentage (approximately two-thirds) of the riparian habitat for coastal coho is in private ownership, and the one-third of coastal coho habitat that is in public ownership tends to be more degraded than the riparian habitat for Columbia-Snake River salmon. Therefore coastal coho recovery inevitably will involve federal, state, and local regulation of private riparian land as well as improved management of publicly owned riparian habitat that is important to coastal coho recovery.

Thus, of the many factors contributing to the coho's decline, it is the factor of habitat deterioration for which Oregon Sea Grant-supported work at the Ocean and Coastal Law

Center has emphasized legal remedies. This work has focused on coastal estuaries and their watersheds (Goldfarb 1994; Healey & Hennessey 1994) and, at the federal level, on relevant aspects of the CWA section 404 permit program controlling waterway and wetland alterations and the evolving nonpoint source pollution control programs (Burroughs 1993; Hildreth, Brown & Shavelson 1993). Legal remedies at the state level include state laws and programs implementing the foregoing federal laws, for example, state certification of federal compliance with state water quality standards under CWA section 401 (American Rivers 1997a; City of Klamath Falls 1994), state water allocation laws (Clyde 1989; Tarlock 1995), and state forest and agricultural practices laws protecting watershed water quality and riparian zones. Also included are relevant judge-made rules such as the public trust doctrine (Hildreth 1993) and private and public nuisance law.

Approaches emphasizing cooperative public-private management and incentives for private actions in support of coho recovery should be considered in addition to traditional command-and-control regulatory remedies. Such approaches include cooperative estuary and watershed management, incentive payments or tax reductions to private landowners who take steps to protect and restore riparian habitat, and mechanisms for funding those alternatives.

Governor Kitzhaber's natural resources staff put together the OCSRI for the purpose of avoiding an ESA listing of northern and central coastal Oregon coho as threatened. The initiative is a combination of voluntary cooperative restoration efforts, such as the local coastal watershed councils established and funded under 1993 and 1995 state legislation, and beefed-up state regulatory programs, such as the state Water Resources Department's (WRD's) review of pending water diversion applications involving the north, middle, and south coast and the Rogue and Umpqua River Basins. This case-by-case review was carried out to identify potential impacts on both coastal coho and steelhead populations and was performed as part of the existing WRD public interest review of diversion applications. The WRD also is developing amendments to those review criteria for sensitive, threatened, and endangered fish. In the spring of 1996, as the OCSRI was being assembled, the governor intervened to limit railroad repairs along the coastal Salmonberry River in order to prevent interference with the spawning activities of one of the state's healthiest steelhead runs.

In 1997 the Oregon legislature enacted laws to implement and fund the initiative and established a Joint Legislative Committee on Salmon and Stream Enhancement. Critical to the initiative's success will be (1) support from future Oregon legislatures in the form of needed statutory amendments and continued funding for agency implementation efforts and local watershed councils; (2) citizen monitoring of the implementation of the governor's program; and (3) federal agency cooperation, which is more difficult to achieve outside the ESA framework.

Given the ESA-driven recovery experiences to date for listed Columbia-Snake River salmon, Umpqua River cutthroat trout, and southern Oregon and northern California coastal coho, one could argue that the failure to list northern and central Oregon coastal coho does not significantly decrease the probability of success for recovery efforts. However, the enforceable recovery requirements provided by an ESA listing, but which are missing from the OCSRI, 1997 Oregon Senate Bill 924 and 1997 Oregon House Bills 3700 and 5042 implementing the OCSRI, and the accompanying federal-state Memorandum of Agreement (MOA), include

1. ESA section 7 obligations for federal agencies to not jeopardize endangered species or their designated critical habitat (Pacific Rivers Council 1996);
2. ESA section 4(d) regulations protecting threatened species; and
3. ESA section 9 prohibitions on "takings" of listed species, including seriously damaging their habitat (Loggerhead Turtle 1995; Strahan 1996; United States 1992).

These ESA provisions still could become directly applicable to northern and central Oregon coastal coho recovery if NMFS decides that an ESA listing is merited because the OCSRI is not working or if pending litigation invalidates NMFS's failure to list. Even without an ESA listing, however, implementation of the voluntary and cooperative efforts emphasized by the OCSRI will take place against a backdrop of legal and policy initiatives that are supportive but quite different from those developed in connection with Columbia-Snake River salmon recovery. The balance of this memo focuses on that legal and policy framework, beginning with overviews of the OCSRI, the 1997 Oregon statutes, and the federal-state MOA implementing the OCSRI.

IV. The Oregon Coastal Salmon Restoration Initiative (OCSRI)

Native populations of salmon, steelhead, and cutthroat trout are currently struggling to survive in the face of heavy development and harvesting of natural resources. Most of these populations are unhealthy, some so much so that they are bordering on extinction (and, of course, some populations have been extinct for some time). The remaining populations are approaching a level from which species recovery will not be possible (State of Oregon 1997a, 2-3).

These problems have existed for quite some time, and the state of Oregon has not been blind to them. In the past few years, there have been a variety of restoration plans designed and implemented to halt the degradation of salmon populations and habitat, but, quite clearly, these have not been sufficiently effective to mitigate the damage being done to salmon populations and habitat. If restoration efforts are not successfully implemented now, these salmon populations will no longer swim in Oregon's waters and provide their many irreplaceable benefits to the state and its people.

The OCSRI was created because of the impending disaster of coho salmon extinction. NMFS had been considering recommending that coho stocks be listed as threatened under the ESA. This listing would have allowed the federal government to exert substantial control over the management of Oregon's natural resources. The state, wanting to retain autonomy over its natural resources, offered the OCSRI to NMFS in hopes of staving off a listing under the ESA. This offering has been officially accepted by the federal government in the MOA between the state of Oregon and NMFS.

As will be detailed further below, the OCSRI is based on a set of approaches—ranging from the overall conceptual foundation to the way in which actors within the initiative interact—that is different from those of past efforts. It is a revolutionary and wide-ranging response to a century of decline in salmon stocks and salmon habitats.

V. The Federal-State Memorandum of Agreement (MOA)

To ensure that the state is accountable for the health of the coho salmon stocks, the state of Oregon and NMFS have created an MOA. In this agreement the two entities establish the terms and conditions for their collaboration and express their awareness of their obligation to alter the OCSRI as needed, thus leaving the OCSRI to focus on protecting habitat capacity for coastal salmonids and raising the quality of the habitat back to historic levels.

NMFS retains the right to change the ESA status of the coastal coho if it determines that the OCSRI or any other conservation efforts are not sustaining the Oregon coastal coho (MOA 1997, 3). NMFS will "endeavor" to provide the state with notice if it is considering such a change. This dynamic demonstrates how important it is for the state and other actors to

quickly and effectively implement the measures of the OCSRI. One way in which NMFS will stay abreast of OCSRI developments is through NMFS representation on the many task forces that exist under the OCSRI, including the Salmon Strategy Team, the Implementation Team, the Science Team, and the Outreach Team.

Under the MOA, Oregon must confer with NMFS in developing standardized watershed assessment guidelines. NMFS has final say in whether these guidelines are adequate (MOA 1997, 8). This means that the state's activities within the watersheds will be limited by NMFS-controlled assessment guidelines. Success in this area will depend on the effectiveness of the local watershed councils. From the state's perspective, one potential weak point in the MOA is that many of these councils are not yet formed. Furthermore, effective performance of the existing councils has not been proven, particularly with regards to the increased duties required by the OCSRI. In Oregon there are agencies other than the watershed councils that are currently working in the area of watershed assessments, and the state may have to rely on these actors more heavily than anticipated in order to satisfy NMFS's requirements. Because the state, under the MOA, must consider NMFS's input in developing guidelines for restoration activities, NMFS clearly could have a strong influence over restoration guidelines and thereby affect the immediate and long-term application of the OCSRI.

The agreement requires that the state strengthen or clarify restoration measures in such key areas as forest practices, agricultural practices, flow protection and restoration, designation of core areas, and gravel removal. NMFS also will have a hand in water quality, flow control, and fishery management measures. The strength of NMFS's position in the agreement is particularly evident in the language dictating changes in forest practices. NMFS may propose, at any time, additional modifications to forest practices that it deems necessary for the protection of coastal coho (MOA 1997, 9). Such proposals are to be made to the Oregon Board of Forestry (OBF) or to the Oregon legislature. The state must consider the proposals promptly and institute any needed changes, a process that could involve new laws, rules, or protection programs. Furthermore, "NMFS intends to participate actively in *state administrative and legislative processes* to address proposed changes, and assure that timely progress is being made" (MOA 1997, 9-10) (emphasis added).

The particular areas covered in the agreement are now discussed more fully.

A. *Forest Practices*

The state is having some trouble in dealing with forest practices issues. There are powerful, determined parties in Oregon's industry and conservation groups with strong and often conflicting opinions about how the forests should be managed. Timber interests, while perhaps initially wanting to cooperate with salmon restoration efforts, may not be so accommodating as to weaken their industry and livelihoods too much.

Such reluctance has been demonstrated in the face of NMFS's recent evaluation of Oregon's logging rules. NMFS commissioned three independent panels of scientists to examine the OCSRI and the forestry rules that apply to private Oregon lands. The scientists found four main areas for concern:

1. Stream protection buffers of 50 to 100 feet, as called for by the state, are insufficient (federal officials recommend buffer widths of 150 to 200 feet);
2. State forestry rules do not prohibit logging on potentially dangerous slopes, thereby increasing chances for landslides that will pour sediment into streams;
3. Fifty-year harvest rotations will not allow trees to grow large enough to provide large woody debris or to develop the complex root systems that anchor soil; and

4. The guidelines for watershed councils do not provide for analyses of watershed health that would enable the councils to better direct their efforts and evaluate project results (Jewett 1998).

These findings mean that the state of Oregon must consider changes in its logging rules; the findings also clearly show that both the OCSRI and the state must continue to strengthen certain measures if salmon restoration is to be achieved.

Timber industry representatives were "furious" at the panels' findings, claiming that satisfying the federal recommendations on buffers would amount to a confiscation of private land and that other factors for decline, such as agriculture and urbanization, are not having to share the burden of salmon restoration (Jewett 1998). The timber industry appears to have reached a point where it is not inclined to cooperate voluntarily with the state's efforts. This shows a breakdown in the OCSRI's voluntary aspect and in its coordinated, team approach and is illustrative of the problems that the OCSRI may have in the future. Similar situations will arise, to varying degrees, repeatedly throughout the implementation of the OCSRI and its review by federal authorities.

The OBF has established new rules for forest management policy and planning under the Forest Practices Act. While the rules naturally focus on deriving maximum economic benefits from the forests, they do contain safeguards designed to protect a wide variety of forest resources, including salmon and other fish. The OBF is confident that it will be possible to achieve the "greatest permanent value" (GPV) of the forest lands while also maintaining and restoring properly functioning habitats for salmon, other fish, and other species (Oregon Administrative Rules (OAR) 629-035-0010). One of the criteria that must be satisfied in achieving the GPV is the maintenance of these habitats. The OBF is authorized to acquire forest lands not only for the purpose of continuing to provide forest products and but also for the purpose of achieving watershed protection and development (Jewett 1998). This could be seized by the OCSRI as a tool for obtaining better protection for riparian areas and other salmonid habitat.

Although the new forest management policy rules do offer reason for hope, they also contain some language that could cause problems for the OCSRI. For instance, while one of the stated goals of the forest management policy is maintenance and restoration of habitats, management of forest conditions must have only a "high probability" of maintaining and restoring these habitats (Jewett 1998; see also OAR 629-035-0030). This appears to provide room for a lot of discretion and for allowing mistakes to occur in forest management. Another drawback is that the OBF only is required to review forest management plans "no less than every ten years" (OAR 629-035-0300). Considering the coho populations' critical condition, reviews should be performed more frequently.

Monitoring of forest practices is primarily the responsibility of the Oregon Department of Forestry (ODF). The ODF runs a program that monitors the Forest Practices Act and the implementation of best management practices on state and private forest lands. The program focuses on sediment and temperature monitoring, assessment of flood effects, and evaluation of riparian management measures (State of Oregon 1997a, 16-27). The ODF proposes additional funding for increased levels of OCSRI-related assessment and monitoring activities on state forest lands. However, the ODF's budget does not appear to cover increased monitoring of private forest lands. The OCSRI does not even identify how much monitoring is currently being done on those private lands. At this point, the OCSRI seems to rely on the voluntary assistance of private actors to control activities on private forest lands. The obvious problem with this is that not all landowners will be willing to cooperate of their own goodwill. Stronger incentives or measures may be required, particularly if the coho salmon populations decline further.

Roads contribute to accelerated erosion, and the consequent increase in sedimentation results in much stream degradation. The forest practices program does have rules dealing with existing roads, and while some of the program is voluntary, there also is a road assessment protocol and monitoring program in place to track implementation of appropriate measures. New ODF rules designed to prevent landslides resulting from roads and timber harvesting are under study.

On federal forest lands, the level of riparian protection is relatively high, with 300-foot-wide buffers required for fish-bearing streams. For state and private forest lands, this protection is not as strong and consistent, although the ODF does administer several programs that are aimed at reducing excess sediment supply. Buffer widths have been an inflammatory issue in Oregon, but, as far as the health of salmon is concerned, the wider the buffer, the better.

The OCSRI anticipates the development of a monitoring strategy that will examine the cumulative effects of the factors for decline as well as provide a method for watershed assessment. This watershed assessment will "gather information that can evaluate the magnitude of the various factors for decline, assess limiting factors, identify habitat trends, and identify and prioritize restoration opportunities" (State of Oregon 1997a, 16-28). Essentially, the program will assess how the watersheds are holding up and why they are in their particular states of health. The parties involved in designing this strategy are OCSRI monitoring staff, Governor's Watershed Enhancement Board staff, federal agencies, OSU, watershed councils, and other interest groups. Industrial and other private landowners have participated in watershed assessments in the past and are expected to do so in the future.

B. Agricultural Practices

Under the MOA, the Oregon Department of Agriculture (ODA) addresses the effects of agricultural practices such as animal feeding operations and the logical corollary, animal waste, on water quality. Much of the ODA's authority in this area comes from 1993 Oregon Senate Bill 1010. Water quality management plans developed under this law will address factors relating to physical habitat and riparian functions (particularly through the prohibition of harmful agricultural activities and the protection of streambanks), as well as the chemical parameters of water quality. Successful implementation of these plans will help coastal watersheds meet state water quality standards for temperature, chemical criteria, antidegradation, and biological conditions. One important note is that while Senate Bill 1010 does not mandate restoration to *natural* conditions, it does provide a high level of certainty that improvements will occur.

The ODA has programs for improving riparian conditions over the current baseline for the majority of non-forested lands, including prohibitions of agricultural activities that prevent riparian function. The ODA programs, however, do not require a buffer along streambeds, allowing farmers and ranchers flexibility in how they manage riparian areas to best achieve water quality objectives and protect beneficial uses. To some extent this leaves the protection of riparian areas to those whose livelihoods might be harmed by the requirements for such protection.

C. Water Quantity

Water quantity, fish passage, and fish screening (keeping fish out of water diversions) are major components of the OCSRI habitat restoration effort. Reduced flows provide less habitat for fish, resulting in increased aggression, competition, or predation, and they also cause increased water temperature and other water quality problems.

Water rights are distributed on the basis of priority date (seniority), that is, the actor with the older water right can demand as much water as he is due. Holders of more recent water

rights must make do with what is left. In 1987, a law was passed to allow the state to create instream water rights. However, because there are so many out-of-stream water rights that are senior to these new instream rights, the desired instream flow levels frequently are not achieved. The most senior water rights generally belong to agricultural actors, not to environmental or conservation interests. Strict enforcement of current regulations, coupled with acquisition of surplus water rights, could bring the state to within the flow parameters set by NMFS.

D. Fisheries Management

In the MOA, NMFS agrees to allow current OCSRI strategies to be sufficient but requires that post-2000 strategies be subject to NMFS review and concurrence (MOA 1997, 11). In light of the present grievous condition of salmon stocks, it is easy to believe that, no matter how effective the OCSRI is, the salmon stocks probably will not have recovered sufficiently by the year 2000 and that the post-2000 strategies, particularly after review by NMFS, will continue to cut coho salmon harvest down to almost nothing. Nonetheless, it seems likely that the state will satisfy NMFS harvest requirements, since it has demonstrated a willingness to do so up to this point. Furthermore, there is wide recognition that irresponsible harvesting contributes to the destruction of the resource, and this awareness will result in broad support for Oregon's limitations on salmon harvesting, thereby aiding the state in fulfilling its obligations to NMFS.

E. Hatchery Practices

Under the MOA, the state has a relatively free hand in managing hatchery practices. This may be due to the low emphasis that the OCSRI places on hatchery activity as a practice in general and as a strategy for recovery in particular. The OCSRI does include measures for modifying hatchery practices to supplement wild populations, even though it is recognized that hatchery programs can be dangerous to wild stocks and must be managed with extreme care and foresight. Modifying hatchery practices may become more successful as additional data and knowledge are acquired.

F. Independent Multidisciplinary Science Team (IMST) and the Monitoring Program

Another important element of the MOA, and of the OCSRI as well, is the Independent Multidisciplinary Science Team (IMST). The Oregon legislature established the IMST through 1997 Senate Bill 924, stating that it would consist of "up to seven scientists with recognized expertise in fisheries, artificial propagation, stream ecology, forestry, range, watershed and agricultural management." Seven scientists from federal and state agencies, OSU, and a private consulting firm were appointed to the IMST in October 1997. Under the MOA, the IMST will review the freshwater habitat needs of the salmon and the dynamics therein. The existence of a science-based peer review of habitat measures and implementation was very important to NMFS in making its listing decision, and the OCSRI and the Oregon legislature have striven to create an entity that can perform this role. There will be general cooperation and coordination between NMFS and the state in analyzing the decline of the coastal coho, and the IMST will serve as a review board for both parties (MOA 1997, 7).

The OCSRI contains measures for implementing an adequate and effective monitoring program. The monitoring program will examine the effects of the OCSRI measures on salmon populations and habitats and contribute to achieving accountability among the OCSRI actors. Ideally, these efforts will identify any problems and who is responsible for them.

Monitoring will be conducted at the levels of regions, sub-basins, watersheds, and sites. In addition, monitoring will occur at the level of the Gene Conservation Group (GCG), which is both a geographic and a population designation and represents the fundamental level of

organization of salmon stocks. The GCGs in Oregon represent an important subdivision of the range of coho in the state; they also form realistic management units.

The IMST will shoulder much of the burden when it comes to compiling and interpreting the monitoring data collected under the OCSRI monitoring program. Utilizing the results of the monitoring program and the implementation review, the IMST will be largely responsible for aiding (and influencing) the state in adapting and modifying the OCSRI in order to reach peak efficiency and effectiveness.

Fortunately, many of the tasks required of the monitoring program are already performed by established programs. Unfortunately, the comprehensive monitoring program that feeds the IMST relies heavily on the cooperation and coordination of many state, federal, and private entities; effective management of these groups will require shrewd and strong leadership.

G. Role of the MOA

NMFS has examined the OCSRI and given its conditional approval of the plan through the MOA. If the OCSRI is implemented effectively, the demands placed on the state by the agreement certainly can be satisfied. However, salmon restoration under the OCSRI is a huge project, requiring that a multitude of wide-ranging projects be successfully executed. This project is not just a matter of reintroducing a species to an area and then simply leaving the animals to breed themselves back to a sustainable population, as has been done for some species restoration programs. Rather, it is a matter of restoring, at a regional level, an entire ecosystem, one that is very much intertwined with the economy and the people of Oregon.

VI. Elements of the OCSRI

The OCSRI has three major procedural elements that are designed to ensure the successful short-term restoration of salmon populations and habitats and long-term sustenance of those populations.

First, the OCSRI places a tremendous emphasis on interagency cooperation, at both the state and federal levels. It has been speculated that a great contributor to the failure of earlier plans was the lack of cooperation between various agencies and actors (State of Oregon 1997a, 5-7, 5-9); the efforts of different agencies overlapped or directly interfered with one another. Recognizing the key importance of communication and cooperation in building strong and lasting local-state-federal partnerships, the OCSRI hopes to avoid repeating these failures by emphasizing that the agencies and actors involved must be aware of the activities of others and must work to supplement each other's efforts. Cooperative, coordinated management will be necessary for achieving the OCSRI's population and habitat goals.

Second, the OCSRI intends to make strong efforts in the area of public outreach and education. It has been suggested that past restoration or conservation plans failed partly because the public was not a participant in the restoration efforts (State of Oregon 1997a, 5-11). The OCSRI intends to inform the public about the problems, issues, and motivations involved in salmon restoration efforts. It also will seek input and volunteer assistance from the public in accomplishing some of the plan's elements. Community participation in the watershed councils is but one way in which this will occur. A public that is informed of the issues and involved in the plan's programs are likely to be more accepting of the measures required to successfully restore salmon populations in Oregon.

Third, the OCSRI has been designed to maintain a flexible, evolving format that will allow the OCSRI to accommodate any changes made necessary by the gathering of new information. Because science moves forward constantly, and because what may have been believed yesterday may be proven wrong tomorrow, the OCSRI must be structured in such a way that it is able to recognize when it is working with out-of-date assumptions and beliefs. Once such recognition has occurred, the OCSRI must be in a position to alter its programs on the basis of new scientific data in order to be as efficient and effective as possible. The state would like the OCSRI to continue to evolve as a strategy by taking advantage of advances in science and technology. Programs and policies within the OCSRI are designed to ensure that this occurs.

The OCSRI puts forth a number of overarching, yet connected, salmon habitat and population goals. Much of the OCSRI is directed toward the goal of habitat restoration and maintenance. The OCSRI intends to improve instream habitat, thereby providing salmon with a natural and supportive environment in the water bodies themselves. Similarly, the OCSRI aims to improve estuarine habitat—that area connecting freshwater bodies to the ocean. It will be necessary for the OCSRI to direct restoration measures also at the riparian habitat associated with the instream habitat. Thus the OCSRI will improve streamside vegetation, riparian canopy, and the general environment.

As part of its goal to improve and maintain salmonid habitat through the OCSRI, the state will make substantial efforts to improve the health and general condition of the watersheds contributing to salmonid habitat. Watershed health broadly impacts both instream and riparian habitats, since most of what occurs within a watershed—for example, road building and sewer lines—influences these other habitats. The OCSRI will attempt to ensure that the activities in the watersheds that are affecting salmon habitat will be conducted in ways that are not detrimental to that habitat. It is hoped that other species will benefit incidentally from this broad watershed approach to habitat restoration. The watershed approach may make it easier to incorporate restoration efforts for other species, as evidenced by the steelhead supplement to the Oregon Plan (State of Oregon 1997b). In fact, it is expected that the “coho and steelhead plans will begin to ‘morph’ into an overall species protection plan” (Gillaspie 1997, 3).

The specific goals and areas of concern of the OCSRI are discussed next.

A. *Salmon Population Goals*

The OCSRI intends to implement measures that will cause salmon populations in coastal river basins to reach levels of natural production that are consistent with overall restoration goals. One of the obvious strategies for doing this is to ensure that enough salmon return from the ocean environment to the coastal streams for spawning. Recently, the PFMC and the Oregon Department of Fish and Wildlife (ODFW) eliminated almost all directed coho harvest, and harvest management will continue to be one of the more important means of controlling the level of salmon population. One of the long-term goals of the OCSRI, however, is to return coho salmon populations to a level that permits sustainable harvesting, allowing the state to once again utilize salmon as a regular economic and recreational resource. Achieving this goal will require that the populations reach a point where the ODFW does not have to restrict coho harvest, or at least does not have to reduce harvest to almost nothing. The OCSRI has established a timetable for identifying when populations should reach the desired level of spawner restoration. This timetable, like every aspect of rebuilding salmon populations, is extremely vulnerable to excessive variations in the environment and climate, and it will largely depend on the favorability of ocean survival rates. Through 1997 Senate Bill 924, the Oregon legislature has continued the Coastal Salmon Restoration and Production Task Force, and this task force will focus on restoring salmon to a point where their population levels can support sustainable harvest.

The ODFW will review the factors of harvest impacts (of both ocean mixed-stock and terminal fisheries targeted on hatchery fish) on Oregon coho stocks so that the collective impacts of the factors for decline do not prevent the OCSRI from reaching its timetable targets regarding spawner escapement (State of Oregon 1997a, State Agency Measures, Fish Management, 17B-2). The agency will maintain the current closures of directed coho harvest and further develop fishery management approaches to limit coho harvest impacts. In an effort to protect wild runs, this will apply to the stocks of most coastal rivers and estuaries as well as to the ocean stocks.

One of the most important aspects of future fishery management practices is the breakdown of the total natural coastal coho population into four units. This will allow different units to be managed according to the strength of their particular populations rather than under the assumption that one coho stock is equally as stable as any other stock off the Oregon coast (State of Oregon 1997a, State Agency Measures, Fish Management, 17B-4). Future management of the fisheries was a very important issue for NMFS in its evaluation of the OCSRI and the status of coho salmon, and NMFS considered ODFW's "Proposed Spawner Escapement Goal and Fishery Management Regime" to be a key element.

The OCSRI makes an important distinction between wild coho stocks and hatchery stocks. The plan aims to develop future fisheries management measures that will not interfere with the restoration of wild coho stocks. One method of doing this is the external marking of all hatchery coho. This will aid in the development of selective ocean fisheries and terminal fisheries targeted on hatchery fish, and in the monitoring of hatchery fish behavior. The ODFW will explore the possibility and methods of targeting hatchery stocks in an effort to reopen those ocean fisheries that can be managed in this fashion—that is, those fisheries for which it is feasible to harvest the hatchery fish while avoiding the wild stocks.

While there has been a near-total elimination of the harvest of coho in the ocean fisheries, some coho are still lost due to incidental catch. Coho often do not survive being hooked and released, and the OCSRI includes provisions for achieving a decrease in the mortalities caused by incidental catch. This will involve ODFW studies on hook-and-release mortality rates by gear type and on the effectiveness of selective fishery gear in targeting single species. The goal is to identify gear and fishing techniques that are effective in harvesting specific species, but which, at the same time, will not result in the incidental catch of coho salmon stocks.

B. *Habitat Goals*

As compared to past plans, the OCSRI takes a different approach toward habitat restoration. Its conceptual foundation embraces a holistic approach toward restoration that is broader and less reliant on technology and science to solve the problems of habitat degradation, many of which were caused by technology and science. The OCSRI can best be described as having a natural ecosystem approach toward restoration because it considers the full range of attributes of aquatic health and the entire ecosystem as a whole. The OCSRI stipulates that factors for decline within that ecosystem will be identified and that restoration efforts will then focus on those factors. At the same time, every habitat aspect of salmonid life history will be examined and considered. Overall ecosystem health, not individual battles over specific factors for decline, is the key.

Nondegradation of existing habitat is a very important area of concern in water quality management. The OCSRI includes strong measures to preserve habitats that are currently doing well, and federal agencies will contribute to protecting areas of high water quality through their responsibilities for meeting state water quality standards for core areas on federal lands. These strong measures notwithstanding, the OCSRI aims to retain enough flexibility to allow for some minor degradation to occur for reasons of public health and safety, for improvements to

habitat, or in those stream reaches where no adverse effect on salmonids will occur. This reference in the OCSRI (State of Oregon 1997a, State Agency Measures, Water Quality, 17B-10) implies that there could be quite a few loopholes in this regard—loopholes that could lead to significant habitat degradation, despite the plan's intent. The Oregon EQC, for example, has explicit power to allow a lowering of water quality in high-quality waters if it finds that certain criteria or circumstances exist. In cases such as this, economic and social needs are deemed to outweigh environmental needs.

One resource on which the OCSRI can rely, if necessary, is the Outstanding Resource Waters Policy. Under this policy, the Oregon EQC could designate core areas for protection and thereby potentially further restrict activities in designated watersheds. State and federal agencies, as well as private actors, would have to follow these restrictions. The OCSRI does note that this might unfairly restrict the activities of some landowners who are located near core areas. The OCSRI claims, however, that use of the Outstanding Resource Waters Policy should not be necessary because the ODA, the ODF, and other agencies already have the responsibility of protecting these waters from degradation.

Based on a review of the literature, on the professional judgment of state agency staffs, and on the advice of NMFS staff, the OCSRI has identified the key physical habitat factors for decline. These include larger stream shade, smaller stream shade, pool area, pool frequency, gravel availability, gravel quality, large woody debris places, large woody debris volume, and large riparian conifers. As there are different views about the value and application of the different factors, there may be some discretion used in prioritizing the habitat factors and in assessing the adequacy of any particular measure. It will be important to ensure that discretion involving habitat factors is not misused or misapplied to further specific interests.

In many coastal streams, human activities have simplified or otherwise modified channel complexity, braidedness, and interconnection with the floodplain, to the detriment of salmonids. Because juvenile coho salmon have a body shape that is not well suited for swimming in fast water, they require slow water and backwater habitat during the winter months. Indeed, in winter, the highest coho density is found in the slow water areas. Complex channels have both slow water and fast water, providing the necessary habitat for young coho. Streams that have been cleared of debris and wood for one reason or another tend to lack complexity. Surveys show that, although the amount of pool habitat is relatively good in such situations, the complexity of that habitat has been reduced due to the depletion of woody debris (State of Oregon 1997a, Physical Habitat, 17B-22). Fortunately, the storms and flooding of the last few years have provided much large woody debris to Oregon coastal streams.

Human activities in many of the state's coastal streams also have resulted in the loss, redistribution, simplification, burial, or other modification of streambed particle size and distribution, again to the detriment of salmonids. Increases in stream substrate sediment supply and changes in routing dynamics potentially can have detrimental results. These include channel instability and widening, pool filling, and the intrusion of fine sediment into coarser particle beds, all of which decrease aquatic insect production and possibly the egg-to-fry survival rate of salmonids. Stream cleaning activities, on the other hand, can lead to the loss of large roughness and eliminate all substrate in channel beds. Waterbody substrates are very fragile structures, and great care must be taken when attempting to mitigate the factors for decline, as such efforts could have the opposite effect.

With regards to physical habitat restoration needs, the OCSRI focuses on more than just channel morphology. Human activities in coastal streams have resulted in the loss of instream roughness elements, including boulders and large woody debris, and this loss negatively affects both the quality and quantity of anadromous fish habitat. Large woody debris and other elements of channel roughness are key factors in the development of channel form, aspects of

which include off-channel rearing backwaters, side channels, and pools and riffles that are important for salmon. Large woody debris also provides cover and "territories" for smolts and aids in the winter survival of these smolts.

Reductions in woody debris will often result in habitat simplification, but this simplification does not always result in a decline in *total* fish productivity. Fish of certain species and age classes may increase in numbers as they occupy space vacated by fish of other species or age classes for which the habitat simplification was detrimental. However, overall increase in the productivity of the basin is undesirable if particular species of fish, such as coho salmon, are lost entirely. It is not yet clear what the optimal amount or size of large woody debris is.

The OCSRI has four objectives for resolving instream roughness issues. It aims to (1) identify the levels of instream roughness necessary to support healthy salmonid stocks in all coastal streams by 2001; (2) ensure that existing programs do not allow the present-day (1997) instream roughness elements important to salmonids to be modified or removed by human activities; (3) ensure that any instream roughness elements created by flooding and other natural events remain in place, so long as this presents no danger to human lives or property; and (4) promote active restoration of instream roughness in those coastal streams in which restoration will not occur naturally.

There is reason to be optimistic that all these objectives can be achieved. There seems to be sufficient funding for these projects, as well as plenty of initiative on the part of many large forest landowners (probably because the landowners do not need to do much in order to satisfy the requirements of this part of the plan). In addition, buffers of trees and brush along streams will naturally provide most of the necessary large woody debris and instream roughness.

C. *Reliance on Existing Programs*

The OCSRI is intended to evolve into a plan that restores salmonid populations to levels that are naturally sustainable and salmon habitat to a condition that will adequately support those populations. It relies on existing programs, statutes, and regulations to accomplish the majority of its restoration and conservation goals. Although these programs are fragmented among many agencies and actors and clearly have not had the kind of effect that will be necessary, they do have some utility. Many of them are already funded, and, furthermore, the agencies responsible for these programs and regulations have experience in administering the programs and enforcing the regulations. The OCSRI incorporates these programs and regulations into its comprehensive plan and tailors their operation and enforcement to contribute to the success of the OCSRI.

Each of the state agencies involved with natural resources is responsible for enforcing particular programs that contribute to salmon restoration. This was also the case in the past, but past efforts, unlike the OCSRI, were carried out by different agencies acting independently of one another to conserve salmon populations. As discussed earlier, those programs failed partly because of this lack of coordination. The OCSRI was formulated to address this problem, and it thus contains a strategy for achieving a coordinated enforcement program. Simply stated, the strategy calls for all the natural resource agencies to do what they already are supposed to be doing—namely, enforcing existing regulations and gaining compliance—but in an effective and coordinated manner.

It would appear that while the framers of the OCSRI felt that existing laws and regulations may be adequate, they questioned whether the agencies have the capability to execute them thoroughly. As is true for many aspects of the OCSRI, implementation will require increased funding. This does not mean, however, that the OCSRI should place the blame for

past failures wholly on funding problems. Many of the natural resource agencies have taken a soft approach toward enforcing programs. Simply providing these agencies with more money will not be productive if the agencies do not take the steps that are necessary to effectively enforce these programs. The Implementation Team will need to examine whether the agencies are implementing responsible and effective strategies.

Some of the currently existing regulations and programs have evolved from the restoration and maintenance plans of the past, all of which were executed with less success than anticipated (State of Oregon 1997a, 5-1, 5-10, 5-11). Yet the OCSRI is based on the belief that, with proper implementation and compliance, these existing, but until now, ineffective programs will bring about the restoration of salmon populations and habitat. Some of this optimism stems from the conceptual foundation of the OCSRI. Never before have these existing programs been expected to operate with such an emphasis on interagency coordination, and the state believes this will make a difference in the effectiveness of the programs. Also, these programs have not previously operated within a framework of holistic ecosystem management, but, rather, they have focused on particular elements of the salmon life cycle without taking into account the interdependence of these elements. The OCSRI maintains that the proper approach to salmon restoration is the holistic ecosystem approach, and it intends that the existing programs will be implemented within the framework of that conceptual foundation.

One potential problem with this approach is that the existing programs were not designed to work within the broad, ecosystem framework. The OCSRI's conceptual foundation requires the consideration of a very wide range of factors, but the existing programs currently may not be capable of such comprehensiveness. The OCSRI emphasizes the necessity of taking a flexible, adaptive approach, implying that the existing programs can be adapted to match the requirements of the ecosystem framework. However, modification of the existing programs would eliminate much of the advantage and economy of utilizing them.

Also incredibly important for the success of the OCSRI is adequate funding. The plan represents a massive undertaking that will increase the responsibilities and duties of every agency and actor currently involved in natural resources protection. All of these actors, as well as the new entities that will be drawn in, will need considerable financial resources. Furthermore, NMFS wants the state to be as zealous as possible in protecting and restoring identified core areas of salmon populations and habitat. This will require not only additional assessments to determine the appropriate core areas, but also special efforts to protect and restore these areas. Presently, much of the required funding is designated for use in the areas that need it the most, particularly these core areas. If future legislatures do not provide sufficient funds for the OCSRI, however, the plan will not succeed.

D. Predation Threats to Juvenile and Adult Salmon

Predation is a natural part of the ecosystem in which salmon live. Adult and juvenile salmon population levels are decreased by natural predators, including birds, insects, and pinnipeds. Normally, the effect of these predators on the salmon population would not be significant, but at the current depressed levels of salmon populations, the effect is disproportionately greater. A seal population consuming 200 salmon out of a natural run of 25,000 fish does less damage than a seal population consuming 200 salmon out of a depressed run of 1,500 fish. Furthermore, several exotic species have been introduced into the ecosystem, and in some instances this has resulted in a potential for unnatural increases in the degree of predation (State of Oregon 1997a, State Agency Measures, Fish Management, 17B-28, 17B-31). The OCSRI recognizes the appropriateness of predation as a natural function, however, and plans to exercise only information-gathering measures at this time. The information that is collected will guide any future actions by the OCSRI actors.

There is widespread concern, despite much scientific evidence to the contrary, that natural predation does have a significant impact on coastal salmon populations (State of Oregon 1997a, 3-6). One basis for this concern is the observation of increases in the abundance of certain predator populations in areas of low coho salmon density (State of Oregon 1997a, State Agency Measures, Fish Management, 17B-29; State of Oregon 1997a, 3-6). These are potential danger areas that must be watched, and any remedial measures must take into account the ecosystem approach of the OCSRI.

The ODFW will develop a set of state policies and guidelines designed to deal with salmon predation should it become necessary. This work will be done in cooperation with NMFS, the U.S. Fish and Wildlife Service, and other western states. The ODFW will deal with any obvious predation problems using current information and levels of understanding. The agency will monitor populations of salmonid predators, potentially to relate predator abundance to the timing of adult coho returns and coho smolt out-migration. Specific problem sites will be monitored and reviewed, and action will be taken if necessary. The state policies and guidelines that are developed by the ODFW will be very important for consistent and effective management of predation problems.

Predation problems extend to the presence of introduced, exotic fish in coho habitat, including important spawning grounds. The coastal lakes that once were rich coho salmon spawning grounds no longer account for much coho production; those habitats have largely been taken over by introduced species. The ODFW does not, at present, have a clear understanding of the extent and significance of the impact of the exotic fishes on coho salmon. In particular, the ODFW would like to analyze the extent of predation on coho salmon by these exotic fish species. This task is especially difficult because the environmental changes that have occurred in many coho waters make it tricky to sort out and determine the impacts of the relevant variables. Substantial monitoring of introduced fish must be done in order to determine what kind of effect they are having on coho salmon and what measures can be taken to lessen their impact. It should be noted that it is difficult to remove exotic species or to reduce their numbers.

E. Watershed Councils

Watershed councils will play an integral role in the physical habitat restoration efforts, as well as offer an opportunity for maximizing education and outreach efforts by including a wider range of people in the decision-making process. Fortunately, many watershed councils already are fairly active and will require little work to adapt their procedures for assisting with the plan. When declining to list the coho salmon, NMFS considered the effectiveness of the mechanisms within the OCSRI that are designed to create and maximize the potential of these councils. In order to avoid a listing in the future, the OCSRI must encourage and facilitate the rapid development of the remaining necessary watershed councils and assist them in quickly and effectively starting their various programs.

A watershed council is a locally organized, voluntary, and nonregulatory group that is established to assess the local watershed and establish measures to implement enhancement and protection activities within that watershed. Watershed councils provide an opportunity for local residents to become involved, at the local level, in making decisions that affect their watersheds.

Some watershed councils were developed under the Watershed Health Program (WHP), which was created in 1993 by the Oregon legislature. The WHP originally targeted the Grand Ronde River Basin and the South Coast and Rogue River Basins. The result has been better coordination in the areas of data collection, watershed assessment, project design and

implementation, and monitoring protocols, among others. Large industrial forest landowners and Soil and Water Conservation Districts have assisted the watershed councils.

There are now watershed councils all along the Oregon coast. They are comprised of representatives from all the major interest groups within the watersheds, including timber, agriculture, mining, conservation, recreation, and business interests. Interested parties and private landowners have contributed their time and resources to make the watershed councils successful. The duties of the councils include

- Assessing and addressing specific limiting factors to salmon recovery;
- Assessing entire watersheds across ownership lines;
- Integrating the role of local landowners;
- Prioritizing and implementing on the ground work through action plan development and implementation;
- Making habitat improvement decisions based on the best available science;
- Receiving and disseminating technical habitat information; and
- Monitoring the effectiveness of action plan implementation [State of Oregon 1997a, 17A-3].

In the past, funding for council support relied largely on the Oregon lottery. With so many demands currently being put on the lottery revenue stream, this source of funding may not be reliable in the future. Councils have managed to leverage about half of their funding through in-kind and cash contributions, but these sources of funding also may not be dependable. Fortunately, it now appears that much of the necessary grant funding could come from the timber industry tax created by 1997 Oregon House Bill 3700.

Watershed councils are expected to be the backbone of the habitat portion of the plan. Recovery efforts within the watersheds must be made across all ownership boundaries, and the ability to coordinate across federal, state, and private ownership boundaries is a goal of all watershed councils. Thus far there have been varying degrees of success in the efforts made by the councils, depending on the strength of the particular council and the cooperation of its partners. Success must be consistent within all watersheds if the overall goal of the plan is to be achieved. Regional planning and coordination between state, federal, and private restoration efforts also must be achieved.

F. Fish Passage

In establishing the requirements for salmon restoration, the OCSRI had to take into consideration salmon mortality due to lack of adequate fish passage. Many juvenile, as well as some adult salmon, are killed by contact with unscreened water intake or diversion structures. Currently, 1,300 unscreened water diversions exist in Oregon's coastal rivers (State of Oregon 1997a, State Agency Measures, Water Quantity, Fish Passage, and Fish Screening, 17B-12). In order to mitigate against this adverse factor, the WRD requires fish screening on all new diversions occurring in areas where fish are present. It should also be noted that the ODFW is working with the Oregon State Police and the Governor's Office to develop and implement a comprehensive compliance strategy for diversion screening.

Existing state laws (Or. Rev. Stat. §§ 498.268 and 509.605) require that fish passage be provided and maintained on all stream crossings and instream structures. The fish must be able to move through a watershed without encountering significant artificial obstacles. The big enemies here are the diversion or "push-up" dams, particularly in the Rogue River and South Coast Basins. Regulation of these structures is difficult because no single agency has exclusive jurisdiction over them.

Ensuring that fish passage will be adequate begins with ensuring that new water diversions do not create barriers to fish passage. Another solution is to replace diversion or push-up dams with structures that do not obstruct fish passage. Many of these structures, however, are put in place by individuals on out-of-the-way streams, and it will be difficult to identify these barriers and address the problems that they create.

G. Water Quality

Water temperature is one of the more important aspects of water quality concerns and must be addressed by most of the OCSRI actors. Currently, water temperatures in most coastal streams are too warm for optimal salmon spawning and survival. Warmer temperatures can affect spawning, fry emergence, smoltification, maturation period, migratory behavior, and many other aspects of the salmon life cycle. Water temperatures fluctuate due to factors such as riparian canopy modification, water withdrawal and other flow issues, and channel morphology changes. It is important to remember that riparian canopy issues can be resolved only as quickly as trees grow, which is to say, not very quickly.

The OCSRI establishes a timeline for the goal of restoring salmon-supporting streams to a healthy temperature. Depending on how significant temperature is as a factor for decline, lowering the water temperatures may not be sufficient, even if the timeline is realistic. By 2007, the OCSRI hopes to have 35% of these streams matching the temperature standards set by the DEQ. By 2012, 45% of the streams would meet this standard; by 2017, 65%; and by 2027, 90%. Salmon populations have dropped dramatically in just the last decade or two. Under this timeline, it could take that long to get just 65% of the streams back to a healthy temperature range. Whether this measure will be sufficient is unknown. It may simply be an unfortunate fact that healthy water temperatures will be difficult to fully restore, and then only in the long term. The OCSRI should look for ways in which to compensate for its relative impotence in this area.

If restoration of healthy temperatures is to occur, it will be through the efforts of many state (and federal) agencies. One such agency is the Oregon DEQ, which will manage nonpoint and point sources of pollution that affect stream temperature, work with watershed councils on the water temperature problem, and improve the review and enforcement of CWA section 401 certification conditions for activities in coastal salmonid waters. The DEQ also will apply for instream water rights to satisfy water quality standards.

A particular area of concern is the effect of sedimentation on salmonids and whether the plan's biological objectives are adequate for addressing this problem. The OCSRI anticipates that it will be difficult to establish water quality standards pertaining to sedimentation issues. As a case in point, the DEQ currently does not have water quality standards that address all the adverse effects of sedimentation on salmonids through their various life stages. State agencies would like to address the sedimentation problem through the triennial water quality standards review process and, at the local level, through watershed council activities. The DEQ, for example, will participate in the EPA's physical habitat indicators project, reviewing and revising its water quality standards for sediment during the next triennial review process, the results of which will be incorporated into the OCSRI. The DEQ also will work cooperatively with state and federal agencies as well as local governments, watershed councils, and other actors in developing water quality standards for sediment. However, it is questionable whether a review every three years will be adequate. Reviews should be incorporated into monitoring activities on a more frequent basis.

VII. Conclusion

The OCSRI intends to restore declining native coho salmon populations and avoid an ESA listing of these coho as *threatened*. It combines the best of past efforts with some new programs and structural elements within a new conceptual framework—that of holistic ecosystem management. This approach, combined with the emphasis on coordination and cooperation between agencies and actors, has promise.

The MOA between NMFS and the state of Oregon attempts to ensure that, under the OCSRI, the coho salmon resource will be managed properly and that coho populations will sufficiently recover to avoid a threatened listing. NMFS has demonstrated a desire to work with the state in resolving the coho problem, and it is important for future species recovery efforts in the Pacific Northwest and elsewhere that Oregon demonstrate that this kind of partnership can maximize the chances for success. While it is likely that the state can satisfy the demands placed on it by NMFS in the MOA, this alone does not ensure that coho populations will reach the state's desired levels for harvest resumption.

First, there is no guarantee that the OCSRI actors will achieve the level of coordination and cooperation necessary to prevent extinction. To do so will require exceptionally strong and diplomatic leadership. It is not yet possible to say whether this kind of leadership will consistently exist. Another question that arises is whether private actors will be willing to continue cooperating sufficiently if such cooperation begins to significantly hurt their interests. Cooperative efforts on this scale have not yet been tried in Oregon (or, for that matter, in any other state, to the best of the authors' knowledge).

Second, public expectations could affect the success of the OCSRI. The public is a very important actor in the OCSRI, and the state will rely on the public for voluntary financial support and work effort. It is difficult to imagine, however, that the public will act favorably if significant, positive results do not occur rapidly.

Third, there are many program areas within the OCSRI in which agencies and other actors are allowed to use their discretion. This is not necessarily a weakness of the OCSRI, but such discretion could become problematic if not used wisely, or if the actor allows itself to be unduly influenced by factors other than that of salmon restoration.

Finally, the OCSRI's heavy reliance on watershed councils could create problems. These councils are not state agencies, but rather regional entities comprised of regional and local actors (both public and private). Consequently, funding for the councils is somewhat tenuous, even though they are expected to carry out an enormous amount of the implementation of the OCSRI. Whether or not the state will be able to fund these watershed councils at a level sufficient for them to perform successful implementation efforts is not yet known.

Yet there are several aspects of the OCSRI that provide grounds for cautious hope that success can be achieved. Understanding the importance of keeping up-to-date on the plan's implementation activities and levels of success, the framers of the OCSRI established a comprehensive monitoring program that promises to closely chart the progress of coho salmon restoration. The framers of the OCSRI repeatedly expressed the need for constant evolution of the plan so that it might adapt to the issues, problems, and successes brought to light by the monitoring program, thereby ensuring that programs and actions are implemented in such a way so as to maximize efforts towards success. The framers also wisely decided against scrapping all past programs and efforts and instead stressed full enforcement of and compliance with existing useful programs and regulations. Furthermore, they identified accountability of the OCSRI actors and agencies as an important goal. Such accountability was often lacking in the past, and this may have crippled many earlier efforts.

The OCSRI is a valiant effort in the face of rapidly approaching tragedy. It should be admired for its vision and optimism, two qualities which make the successful restoration of coho salmon and other anadromous species in Oregon far more likely. While the framers structured the OCSRI with one eye toward NMFS's listing criteria, it is clear that they focused on restoring salmon populations to healthy levels as their primary motive. No matter what the results may be, it is entirely likely that the OCSRI will be a model for other species recovery and habitat restoration efforts within the Pacific Northwest and elsewhere.

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ACRONYMS

- CWA - Clean Water Act
- DEQ - Department of Environmental Quality
- DLCD - Department of Land Conservation and Development
- EFH - Essential Fish Habitat
- EQC - Environmental Quality Commission
- ESA - Endangered Species Act
- FMP - Fishery Management Plan
- GCG - Gene Conservation Group
- GPV - Greatest Permanent Value
- IMST - Independent Multidisciplinary Science Team
- MOA - Memorandum of Agreement
- MSFCMA - Magnuson-Stevens Fishery Conservation and Management Act
- NMFS - National Marine Fisheries Service
- PFMC - Pacific Fishery Management Council
- OAR - Oregon Administrative Rules
- OBF - Oregon Board of Forestry
- OCSRI - Oregon Coastal Salmon Restoration Initiative
- ODA - Oregon Department of Agriculture
- ODF - Oregon Department of Forestry
- ODFW - Oregon Department of Fish and Wildlife
- ORS - Oregon Revised Statutes
- OSU - Oregon State University

WHP - Watershed Health Program

WRD - Water Resources Department

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