

RESTORATION

A NEWSLETTER ABOUT SALMON, COASTAL WATERSHEDS, AND PEOPLE

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Salmon Habitat Protection and Landowners' Property Rights

By Richard G. Hildreth

Approximately two-thirds of coho riparian habitat is in private ownership. Protecting and restoring this habitat requires a combination of voluntary programs and mandatory requirements sufficient to achieve recovery. Habitat protection legislation and regulations must not unconstitutionally infringe upon landowner rights protected under the U.S. Constitution's Fifth Amendment and similar state constitutional provisions. The Fifth Amendment requires that governmental "takings" of private property be compensated. Recent federal and state court opinions provide important guidance on how to draft and administer habitat protection legislation and implementing regulations constitutionally and fairly.

Compensation generally is not constitutionally required for the enforcement of restrictions existing at the time the landowner purchased. Presumably the purchase price paid by the current owner reflected those restrictions. For

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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; Gazza 1997; Kentucky Fried Chicken 1997).

The constitutional analysis of habitat protection restrictions imposed after the current owner purchased is much more complex. Subsequent legislative and regulatory restrictions which render the land completely valueless must be accompanied by compensation unless they reflect use restrictions the courts would impose under the judge-made common law rules of property or nuisance law (First English 1987; Lucas 1992). Whether restrictions which render only a portion of a parcel valueless must similarly be compensated has not yet been clarified by the courts (Broadwater Farms 1996; 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 full trial on the question (Boise Cascade 1997). A much older Washington

decision supports the imposition of reforestation obligations on owners of private timber land 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 which was located in a sensitive floodplain (Cannata 1996).

Even if all or part of the property is not rendered valueless by a

COURTS HAVE NOT CLARIFIED WHETHER RESTRICTIONS WHICH RENDER ONLY A PORTION OF A PARCEL VALUELESS MUST BE COMPENSATED

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 expectations. 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 affected. (The role 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]).

Habitat protection obligations imposed as part of a development

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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). Obligations imposed which 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 like 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 Clean Water Act or proposed federal legislation on landowner compensation rights such as 1991 House Bill 95, 1996 Senate Bill 1954, 1997 Senate Bill 953, or 1995 House Bill 925.

Outside the Pacific Northwest, several state legislatures have enacted landowner compensation laws which are more generous than the judicial rules summarized above. However, in the Pacific Northwest, similar compensation legislation was defeated by a 2-1 margin when it was referred to Washington voters for their approval in 1995, and vetoed by Oregon Governor John Kitzhaber. The 1997 Oregon and Washington legislatures considered similar legislation but none was enacted.

Other Compensation Cases

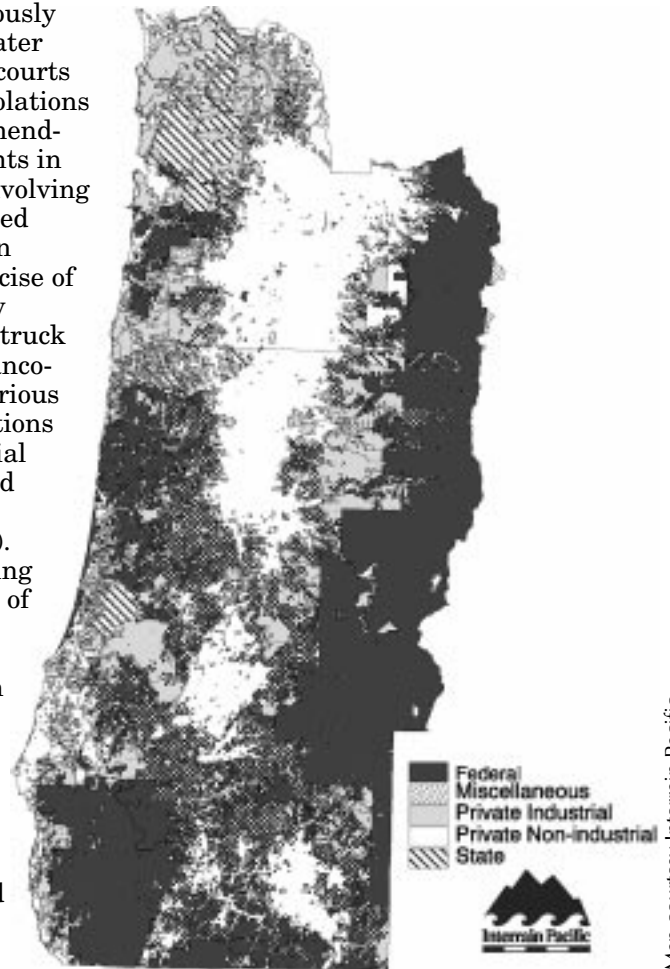
The judicial compensation rules summarized above continue to be generally applicable to compensation issues raised by government actions taken in support of salmon recovery, such as new restrictions

on the exercise of previously recognized 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 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 a referee's decision to reduce an irrigator's diversions because of the wastefulness of the irrigation system used (State 1993). The irrigator had invoked the Fifth Amendment in challenging the referee's ruling.

In support of ESA-listed salmon recovery, other recent decisions have upheld uncompensated alterations to Bureau of Reclamation water delivery contracts (Madera 1993, Natural Resources Defense Council 1997) and reductions in diversions due to inadequate fish screens (U.S. 1992). California courts have applied the public trust doctrine to reduce diversions to achieve fish and fish habitat benefits without compensation (Mono Lake 1991; U.S. 1986). None of these cases directly addressed Fifth Amendment issues.

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Private and public lands of the Oregon coastal region.

Map courtesy Intertrain Pacific

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Conference Highlights Salmon, Restoration Issues

Editor's Note: The 1997 annual meeting of the American Fisheries Society, the organization of fisheries professionals, contained numerous presentations of potential interest to readers of *Restoration*. The meeting, held in August in Monterey, California, was well attended by researchers and managers from the West who are deeply involved in salmon and watershed issues, and their presentations to colleagues provided a useful window on the state of knowledge and belief about significant issues of science and policy. We requested permission from a number of them to reprint the abstracts of the talks they presented at the meeting. These abstracts follow, accompanied by contact information for the authors.

Pinnipeds in Oregon: Status of Populations and Conflicts with Fisheries, Fish Resources, and Human Activities

Steller sea lion numbers in Oregon have increased at 2 percent per year, since the mid-1970s, to 3,500–4,000 animals, with annual pup counts of 600–700. Peak counts of California sea lions (fall–spring) have increased from 1,000–2,000 to 5,000–7,000 over the same period. Statewide harbor seal counts have increased at 7 percent per year to an estimated population of 10,000. Small numbers of elephant seals (<100) have regularly occurred at one location, and 2–8 pups have been born here in recent years. This site is within a National Wildlife Refuge and is bordered by a state park where conflicts with recreational activities have resulted in seasonal closures to beach access. Steller sea lion rookeries are protected by similar restrictions to boat operations and fisheries. Increasing numbers of harbor seals and California sea lions in bays and rivers have resulted in growing concern over impacts to various fish stocks, including salmonids listed or proposed for listing under the ESA. California sea lions regularly haul out on private property, destroying docks and damaging boats at many locations. Concern for public safety

has grown following several injuries and close encounters with aggressive sea lions. Conflicts with fisheries (e.g., Columbia River area salmon gillnets) result in damage to gear and catch, and mortalities to pinnipeds. Since 1990, increasing numbers of California sea lions have preyed on salmonids at fish passage facilities at Willamette Falls, over 125 miles up the Columbia and Willamette rivers. It is predictable that this developing situation could lead to problems similar to those encountered with California sea lions at the locks at Ballard, Washington.

—Robin F. Brown (Oregon Dept. of Fish and Wildlife, 7118 NE Vandenberg Ave., Corvallis, OR 97330; 541/757-4186; Robin.F.Brown@state.or.us)

Do Pinnipeds Impact Fisheries? The Klamath River Example

The effects of pinniped predation on commercial and sports fisheries has been a topic of debate amongst biologists, fisheries managers, anglers, and commercial fishing industries for decades. Popular opinion usually holds that pinnipeds do pose a significant threat to fisheries stocks. The debate is no greater or contentious than along the northwest coast of North America from San Francisco Bay to Vancouver Island where the rapidly declining populations of several species of salmon has intensified the debate recently. At the Klamath River in northern California, the interaction between pinnipeds, harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*), and salmonids, including Chinook



Oregon Sea Grant photo

What are the effects of pinniped increases?

salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and steelhead trout (*O. gairdneri mykiss*), have been investigated by both the California Department of Fish and Game and graduate students from Humboldt State University. On the Klamath River, there is no evidence that pinnipeds represent a threat to the health of salmonid populations migrating up that tributary.

—Kevin Shaffer (California Department of Fish and Game, 1416 Ninth Street, Sacramento, CA 95814, 916/327-0713; FAX 916/324-0475; kshaffer@kirk.dfg.ca.gov)

How to Make Conservation Acceptable: The Quincy Library Group Example

The Quincy Library Group was initiated to resolve conflicts between the timber industry, local government, and local and regional environmental groups in

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California's northern Sierra Nevada. The geographical area comprised by the Library Group includes the Lassen and Plumas National Forests and the Sierraville Ranger District of the Tahoe National Forest. The substance of the agreement encompasses some of the thorniest issues in public land management and resolves them at the local level. The solution is based upon the land-base maps proposed by local environmentalists in the last round of natural resource planning. The land is divided into two categories: the previously managed land becomes the matrix on which active land management is practiced; the previously unmanaged land is left alone. The term of the agreement is for five years or until the Forest Plans for the area can be reexamined according to existing laws. The agreement concentrates economic activity in the small and medium-size tree classes; big old trees are not cut. It is consistent with and subordinate to all existing laws including present spotted owl regulations. The Clinton Administration and Republican and Democratic legislators have been supportive. The attempt to implement the agreement administratively has resulted in improved conditions much more like the pre-settlement conditions we all support. Members of the Quincy Library Group have educated ourselves to the point that there is strong support in our area for additional flows from Federal Energy Regulatory Commission projects on National Forests during relicensing. Watershed restoration has become the goal of all sides of the public land dispute, and our community now understands that logging, grazing, and tourism must be sustainable and long-term. We have learned that conditions in the water, the watershed, and the fisheries are the measure of our success. We want the salmonids back in the Sierra. We will change our economy to restore our natural resources and range of species. Will the rest of California?

—Michael B. Jackson (P.O. Box 207, Quincy, CA 95971; 916/283-1007, FAX 916/283-4999)

Modeling of Habitat for Coho Salmon in Oregon Coastal Basins

A model designed to identify coho salmon habitat limiting factors and smolt production capacity was used with data from stream inventories in coastal Oregon basins and survival rates between life stages to describe habitat quality. A primary component of this analysis is a relationship between habitat quality and overwinter survival of juvenile coho salmon. Results of the analysis illustrate differences in habitat quality among basins and explain the skewed distribution of spawner abundance typically observed in most basins in recent years. The results were used: 1) to estimate production as part of the Oregon Coastal Salmon Restoration Initiative, 2) to define spawner needs, 3) to compare habitat quality among basins, 4) to examine relative risk of various harvest levels, and 5) as the basis for a population sustainability model.

—T. Nickelson (Oregon Department of Fish and Wildlife, 28655 Highway 34, Corvallis, OR 97333; 541/737-7660; FAX 541/737-2456; nickelson@fsl.orst.edu)

Consequences of Habitat Degradation to Life History and Production of Chinook Salmon

W. F. Thompson visualized the salmon's habitat as a "chain of favorable environments connected within a definite season in time and place, in such a way as to provide maximum survival." Within a single population there may be several of these chains or pathways through the freshwater, estuarine, and oceanic habitats. A life history pattern is one of those pathways and it represents the salmon's solution to the problems of survival through a particular chain of

habitats. Salmon populations are often composed of several life history patterns which are tightly linked to the structure of the habitat template. Those life histories are an important part of the population's biodiversity. Habitat degradation breaks the chain of habitats reducing life history diversity. The consequences of loss of life history diversity are described through an examination of case histories of chinook salmon in tributaries to the Columbia River. This study points out the need to give explicit consideration to the restoration of habitat characteristics which will permit the expression of phenotypic diversity in chinook salmon populations.

—James A. Lichatowich (Alder Fork Consulting, 182 Dory Rd., Sequim, WA 98382, 360/681-0748; FAX 360/681-2938)

Spawning Salmon and the Maintenance of Healthy Stream Ecosystems: How Many Fish do We Need?

Spawning salmon have been shown to make important contributions to the productivity of Pacific Northwest freshwater habitats in several ways. The eggs and flesh deposited by the fish are eaten directly by juvenile fish and some invertebrates. Dissolved organic matter released by decomposing fish carcasses is sorbed onto the streambed substrate where it becomes available to invertebrates grazing these surfaces. Material deposited



How many salmon carcasses are good for a stream?

Oregon Sea Grant photo

by spawning fish is ultimately mineralized and becomes available to aquatic and riparian plants, which are consumed by invertebrates. These uptake pathways are temporally segregated with direct consumption being the primary pathway during spawning, chemical sorption dominating while carcasses are decomposing and autotrophic uptake occurring primarily during spring and summer. Methods of establishing escapement goals do not currently consider the role of spawning fish in maintaining stream ecosystem productivity. We have used stable isotope analysis to determine that the amount of marine-derived nitrogen in juvenile coho salmon tissue increases rapidly with increased density of spawning fish up to approximately 200 spawners/km. Spawner densities greater than this have relatively little impact on the proportion of marine-derived nitrogen in juvenile coho. This information combined with data on stream habitat characteristics could be used to develop basin-specific escapement goals to maintain or enhance watershed productivity.

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The Scale of Biologically Unique Pacific Salmon Stocks and Implications for Management

Interfacing the harvest management system with salmon population structure and biological diversity is one of the most difficult challenges precluding recovery and maintenance of sustainable salmon fisheries. Recent genotypic and phenotypic evidence from our studies, as well as others, supports the hypothesis that intraspecific spawning aggregations in relatively close proximity are sometimes distinct populations. If this is the case, then it can be conjectured that, when these populations have unique and different productivity rates, common harvest rates estimated for the more productive stocks will lead

to overharvest of the less productive stocks. While this has been fairly well understood on a relatively broad scale, the new data demonstrates the importance of reducing the scale of management units because loss of smaller and/or less productive stocks continues to contribute to declining abundance and biodiversity. Recommendations are made to protect and sustain abundance and biodiversity by developing new and innovative harvest management strategies and technology.

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Riparian Status and Future Management Strategies from the Sierra Nevada Ecosystem Project

Riparian conditions were assessed and strategies for future management were recommended for the congressionally mandated Sierra Nevada Ecosystem Project. Regions adjacent to aquatic habitats (e.g., streams, lakes, springs, peatlands, marshes, wet meadows) are critical habitat for 20–40 percent of the terrestrial vertebrate species of the Sierra Nevada and most of the aquatic invertebrates. Present conditions are highly fragmented from roads, dams and diversions, other works of humans, logging, grazing, and mining. More than 1,000 km of stream riparian corridors are inundated by reservoirs. On average, 14 percent of Sierra stream channels include a road within 100 m, as determined by GIS. Future management of riparian areas should recognize the ecological functions and physical processes that take place in three areas at varying distances from the aquatic system: a community area (based on living requirements of dependent species), an energy area (based on inputs and controls of matter and energy to an aquatic system), and a land-use influence

area (based on an exponential model of adjacent slope). Recognizing these three regions results in variable land use buffers with greater protection on steeper slopes and headwater streams and small water bodies, a reversal of present riparian management.

—D. C. Erman (Centers for Water and Wildland Resources, University of California, Davis, CA 95616; 916/752-8070; FAX 916/752-8086; dcerman@ucdavis.edu) and N. A. Erman (Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, CA 95616; 916/752-7182; FAX 916/752-4154; naerman@ucdavis.edu)

Evaluating the Biological Integrity of Sierra Nevada Watersheds in California

The biological health of one hundred Sierra Nevada watersheds was evaluated using a single index of biotic integrity (IBI) for each watershed. The scores were based on the distribution and abundance within each watershed of native fishes and amphibians. The IBI scores indicated that the biological communities of seven of the watersheds were in excellent condition, thirty-six were in good to very good condition, forty-eight were in fair condition, and nine were in poor condition. The biggest factors contributing to low IBI scores were large darns and introduced fishes, although factors affecting local stream habitats, especially roads and activities associated with roads, were also important. All watersheds in the Sierra Nevada have experienced at least some loss of biotic integrity through the loss or decline of native organisms, but many have considerable potential for recovery. Others, however, have been permanently altered through the loss of salmon runs, native fish communities, and native frogs. The watershed evaluations raise the question as to whether or not they should be used to prioritize watershed conservation efforts.

—P. B. Moyle (Department of Wildlife, Fish, and Conservation Biology, University of California, Davis, CA 95616; 916/752-6355; FAX 916/752-4154; pbmoyle@ucdavis.edu)

Dungeness River Floodplain Function Restoration

The Dungeness River in Washington State supports two salmon stocks listed by state and tribes in

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critical condition with production levels so low that permanent damage to the stock is likely or may have occurred. For the last eight years, escapement of lower river pink salmon and chinook have averaged less than 500 fish and 43 to 335, respectively. The poor survival of these stocks is due primarily to degraded hydraulic conditions in the four to ten miles of river that constitutes their primary spawning and rearing habitats. These conditions are associated with levees that constrict flood flows, low flows due to irrigation withdrawals, and spawning habitat instability due to sediment and lack of debris and channel structure. A combination of state and local processes of watershed planning and public involvement has led to the generation of a watershed management team with representation from diverse interests in the watershed. The Dungeness stocks are managed as wild stocks; habitat must be the key to their survival. A recovery plan and a set of habitat restoration recommendations have been developed. Challenges to successful implementation of the restoration plan include a short time line before stock extinction and achieving broad public acceptance of habitat restoration practices. Successful habitat restoration will depend on combining fisheries restoration with flood hazard reduction.

—Ken Bates (Lands and Restoration, Washington Department of Fish and Wildlife, 600 Capitol Way N, Olympia, WA 98501-109; 360/902-2545; FAX 360/902-2946; bateskmb@dfw.wa.gov) and Mike Reed (Jamestown Sklallam Tribe, 1033 Old Bly Highway, Sequim WA 98382, 360/681-4615; FAX 360/681 -4643)

An Ark a Few Cubits Short: Shortcomings in Existing Laws to Protect Vulnerable Species

Congress enacted the Endangered Species Act (ESA) and Clean Water Act (CWA) to conserve endangered species and their habitats and to ensure fishable/swimmable waters. These laws have enjoyed great success, but have been unable to reverse the decline of many at-risk species or prevent additional degradation of numerous habitats. The ESA suffers from

three primary shortcomings: 1) a single-species, project-specific focus that hinders comprehensive conservation of ecosystems; 2) intervention only when species are severely depressed and recovery is most difficult and expensive; and 3) implementation mechanisms driven primarily by development proposals, rather than recovery needs. Past agency initiatives have alternatively exacerbated and mitigated these shortcomings. The CWA does not adequately address non-point source pollution or the relationship between water quality and instream flows, though recent developments have begun to address these shortcomings. State water quality standards often do not reflect the needs of aquatic species. Critics have responded to the deficiencies in these laws by urging abandonment of their basic goals. A more reasoned response is to correct the defects. Refinement of existing tools can address some of the weaknesses, but legislative proposals being advanced by fishing and conservation groups may be necessary to achieve full conservation of vulnerable species.

—A. J. Berger (Sierra Club Legal Defense Fund, 705 Second Avenue, Suite 203, Seattle, WA 98104- 1711; 206/343-7340; FAX 206/343-1526; scldfwa@igc.apc.org)

Loving vs. Respecting Nature: Indigenous Peoples vs. Contemporary Western Culture

In the Western tradition, people assume they love nature because they feel affection for animals, and imbue animals with human emotions and thoughts. Thus, some oppose hunting and fishing, and some refuse to eat meat. Such people often assume that their attitudes are similar to those of Native peoples, since they think “loving nature” brings them closer to “harmony with nature”, and are often shocked to realize that Native peoples regard hunting, fishing, and meat-eating to be strong

cultural traditions. This conflict results because they fail to realize that Native people do not anthropomorphize animals, but instead recognize that lives of animals and plants exist on their own terms, and have value independent of any value placed upon them by human beings. Native people understand themselves as predators, part of the world of the prey, connected to the prey in a profound experiential sense. In contrast, nature lovers identify with prey, and show hostility towards predators. Therefore, predators are viewed as marauders capable of “slaughter of helpless prey”, and worthy of killing. Western culture demands the killing of any predator that attacks a human. In contrast, Native peoples identified with predators, and respected them, since they know how difficult it is to take lives, and that predators are most connected to prey they have just taken.

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Social Complexity and Change: A Challenge to Adaptive Management

Adaptive management has been advocated for assessing management-induced changes in ecological

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How different are Native and non-Native cultures' views of nature?

Oregon Sea Grant photo

Task Force Report

Recommendations for Salmon Restoration and Production

Editor's Note: The following recommendations are excerpted from the final report of the Coastal Salmon Restoration and Production Task Force, published in July.

The 11-member task force was established by the 1995 Oregon Legislature under Senate Bill 1127, and was given the responsibility of developing a coastal salmon restoration and production strategy based on established scientific principles, studies, and available data. Although it might seem that parallel efforts initiated by Governor Kitzhaber would have overtaken this legislative task force and limited its significance, the task force report indicates that it “offered unique legislative insights” to complement the Governor’s Coastal Salmon Restoration Initiative (CSRI) and provided legislators a “ready-made second opinion regarding the CSRI program.” In any event, “the findings of the CSRI and the Task Force are virtually identical,” according to the task force report. Nonetheless, *Restoration* readers might well be interested in the summary of recommendations for their own sake. The task force’s tenure has been extended for two more years, with its membership expanded to 15, and it will have two roles, according to Onno Husing, director of the Oregon Coastal Zone Management Association, which provides staff support to the task force. The group will be active on a new work plan that builds upon the findings of the 1997 report, and will provide oversight on the implementation of the CSRI.

Recommendations for Restoring Natural Production:

- The Oregon Legislature must provide adequate funding to undertake a comprehensive watershed rehabilitation program (an estimated \$30 million); this rehabilitation strategy must encompass entire watersheds and not just narrow riparian corridors or “core areas” of salmon habitat.

- Watershed councils and other local watershed groups (such as soil and water conservation districts) will hopefully provide the means to implement a locally based watershed rehabilitation program. The Task Force recommends watershed councils do not need and should not be granted additional statutory or regulatory authority to accomplish their mission. However, these local groups need adequate funding, scientific technical support, and community support to prepare and implement watershed management plans. Watershed councils should be encouraged to develop numerical natural production goals for their basins working in close cooperation with state and federal agencies.
- Healthy wild salmon populations are fundamental to the vitality of all salmon stocks, wild and hatchery both, and to removing some of the constraints that are presently precluding many fisheries. Thus, healthy wild salmon stocks are a fundamental key in achieving the public benefits to all the investments in salmon in the Pacific Northwest, including investments in hatcheries as well as habitat. Without fisheries, public interest in continuing and expanding these investments, both in habitat and hatcheries, may significantly decline.
- Efforts to recover wild salmon must take into account ocean productivity cycles and other changing natural environmental conditions. This will require a more complete understanding of the estuarine and marine portions of their life cycles. A serious research effort must be undertaken that investigates factors affecting survival during low ocean productivity cycles, and factors affecting mortality from predators such as marine mammals and birds.
- State agency activities must be coordinated so that one agency doesn’t undermine another to the detriment of salmon populations. Many of these measures have already been identified under the Governor’s Coastal Salmon Restoration Initiative (CSRI).
- The legislature should examine the tax codes, the land use planning system, the Forest Practices Act and other state laws and regulations to explore ways to expand the range of incentives available to property owners, and identify and eliminate disincentives to participation in salmon recovery programs.
- A strong monitoring and evaluation program in conjunction with independent peer review must be a major component of a watershed/salmon rehabilitation program to gain needed information and boost public confidence in salmon recovery efforts.
- A fisheries management framework must be implemented that can take into account changing ocean and freshwater environmental factors.

Recommendations on Hatchery Practices:

- Production of coho salmon from public facilities should be concentrated in the lower Columbia River to support coast wide distribution for coho fisheries in a cost effective and ecologically sensitive manner.
- All sectors of Oregon government must unite to secure continued federal funding of the Mitchell Act providing for the operation of mitigation hatcheries, primarily along the Columbia River. Under some circumstances, to address problem stocks that are an important management con-

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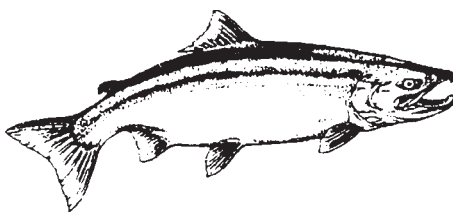
- straint to fisheries, some Mitchell Act funds should be also be spent on activities other than hatcheries (i.e., habitat work).
- To provide opportunities for selective harvest on hatchery fish, the use of innovative and improved rearing techniques and technologies to boost survival of fish, such as net pen facilities, should be encouraged.
 - Coastal public hatchery facilities should be reprogrammed where possible and when advantageous to serve as "conservation hatcheries" to help restore and improve natural production of salmon. Promoting natural production may not necessarily be the only mission of these facilities. However, among the various roles hatcheries can potentially assume, assistance to natural production should be the first priority.
 - All coastal public, cooperative/non profit, and private hatcheries, must be operated consistent with conservation principles. Such measures could include: marking of all hatchery fish, the establishment of terminal fisheries at locations where harvest of fish has little or no incidental mortality on wild stocks, the use of wild fish for brood stock so hatchery releases are genetically compatible with wild stocks, adjusting the number of hatchery releases to be consistent with basin size, finding appropriate geographic areas within basins for hatchery activities, and, other means to minimize negative interaction with wild stocks. Consensus was not achieved, however, over the recommendation to mark all hatchery fish. Task Force member Keith Hatch of the Columbia River Inter-Tribal Fish Commission believes marking all hatchery fish leads to harvest activities that cause unacceptable levels of incidental mortality of wild stocks.

Recommendations for Funding:

- Unite to secure full funding of Federal Mitchell Act Mitigation Obligations.
- Office to establish a state bonding mechanism modeled after the Tillamook Burn Bonding Program or General Obligation (G.O.) Bonds.
- Support and establish ground-work for a salmon affinity credit card program.
- Consider using General Fund dollars as a means to share the burden of salmonid recovery.
- Examine ways to generate fees from non-consumptive uses of wildlife (such as viewing access fees and excise taxes on sporting goods equipment).

Conclusion

Today's Oregonians are presented with an enormous opportunity to rescue coastal salmon populations. Future generations of Oregonians will be grateful if we seize this historic opportunity. Sadly, it is too late to save salmon in many regions of the world (especially northern Europe and the east coast of North America) and for some Northwest salmon populations. Fortunately, for us, it is not too late to save most of the remaining salmon populations in coastal Oregon. . . .



References

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Conference Highlights Salmon, Restoration Issues

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systems at scales ranging from small watersheds to river basins. Its rigorous experimental logic of tracking alternative actions to consequences makes it especially appealing as a way of improving management decision making. Yet regardless of its promise, the use of adaptive management is fraught with challenges. This paper will summarize adaptive management as a decision aid and review several of its systematic applications with the objective of illustrating some of the challenges it faces. Foremost among the challenges to be examined are: 1) social definition of environmental states to be measured and monitored, 2) complexity of identifying and tracking valued environmental attributes resulting from the large number of stakeholders, 3) constant change in stakeholders and their valuation of the environment, 4) difficulties of arriving at a social consensus among stakeholders that will provide agreement on states of the environment to be measured and monitored, and 5) limited utility for aiding decisions where there is lack of agreement on values and methods. An alternative approach, termed "holistic experimentation," will be suggested as a means for better assisting decision making processes conducted under conditions of social complexity and change.

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Restoration Back Issues Available

When a publication gets to its twelfth issue and third year of publication, it seems reasonable to list the previous issues and invite readers to acquire copies they may be missing. We have anywhere from a handful to about 50 copies of our previous issues, except for the spring (April) and fall editions of 1995, which are out of print.

Libraries and offices may obtain up to one set (10 available issues) at no charge. Individuals may request single copies of two issues for no charge, but for three or more issues please send \$3 to cover postage and handling. Indicate the dates of the issues you want, make check payable to Oregon Sea Grant, and mail to us at our address on the back cover of *Restoration*.

#1—September (Fall) 1994

Watershed Health Mobilizes Agencies and Communities (Gentle)

An Endangered Species Act Primer (Hildreth, Thompson)

Federal Agencies Focus on Key Watersheds (Cone)

Smith River Projects Address Water Quality (Finley)

Diversity: An Asset in Watershed Improvement (Cooley)

#2—January (Winter) 1995

Coastal Salmon Decline: The Scientific Background (Cone)

Private Rights and the Public Good: Finding Common Ground (Paschal)

Lesson and Implications from the Coquille (Cooley, Heikkila)

A Preference for Community Values (Cooley, Heikkila)

Salmon Solution: Everybody Must Contribute (Stelle)

Public Involvement in Federal Planning: What's Happened (Kight)

#3—April (Spring) 1995—OUT OF PRINT

#4—Summer 1995

State Watershed Program Changes: Legislative Background (Coontz)

Priority Funding vs. Open Competition (Kight)

Studies Summarize Forestry Effects on Fish (*OSU, Botkin*)

Expert Panel Recommends Ecosystem Management (*Nat. Research Council*)

Ecosystem Management: What's in a Name? (Lackey)

#5—Fall 1995—OUT OF PRINT

#6—Spring 1996

Issue feature: "Toward a Restoration Culture"

- Learning Salmon (Cross)

- "I can spread the word" (Culver)

- Suggestions for Fisherman Involved with Salmon Habitat Restoration (Merz)

- Salmon Speak: A Parable for Humans (Sundstrom)

- *Queen Salmon: A Stage Play About Salmon and People* (Simpson)

Sustainable Fisheries Focus Attention

Salmon's Salt Water Survival Poorly Understood (Kight)

OSU Press Publishes Salmon History Anthology (Kight)

#7—Winter 1996

Issue feature: Upstream report

- Introduction to *Upstream* (Cone)

- What the National Research Council Said

- Perspectives from *Upstream's* Producers

- Observers See Strengths, Weaknesses in Report

Oregon Develops Coho Strategy (Kight)

Toward a Restoration Culture (Bottom)

#8—Summer 1996

Salvage Logging in Key Watersheds (Kight)

Salmon: What Can We Do? (Cone)

Aspects of Coastal Coho Recovery (Hildreth)

Salmon: Crisis Began Century Ago

Ecological Perspectives on Sustainability (Lubchenco)

Environmental Improvement to Sustain Coastal Communities (Doppelt)

Supplementation of Naturally Spawning Populations Risky (Reisenbichler)

#9—Fall 1996

Issue feature: Oregon Coastal Salmon Restoration

- Overview of the Governor's Coastal Salmon Plan

- OSU Specialists Review the Draft

- New Directions in Coastal Salmon Recovery (Hildreth)

"Salmon Watch" Nets Student Enthusiasm (Ridlington)

Making the First Step Toward Community Service (Alexander)

Watershed Source Book Useful (Corcoran)

#10—Winter 1997

Toward a New Vision for Pacific Salmon (Lichatowich)

A New Human-Influenced Disturbance Regime—I (Reeves et al.)

Building Trust and Fostering Relationships (Corcoran)

The Cost of Salmon Extinction (Spain)

Salmon Carcasses Help Juveniles (Stahlberg)

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How the Coast Public Views Salmon Restoration (Cone)

Scientists Question Oregon's Plan (*AFS*)

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The "Interconnected Story" (Bottom)

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Artificial Propagation & Coho Salmon (Weitkamp)

Courts Deconstructing ESA (Dahlstrom; Hildreth)

Trust Critical for Salmon Restoration (Smith; Gilden)

Oregon Legislative Wrap-up (Weber)

Biologists Weigh Survival Rates of Wild, Hatchery Coho in Bays

By Carmel Finley

B iologist John Spangler gunned the engine of his skiff, letting out a billow of net that sank into Alsea Bay.

“Keep the net on the bottom — we’ve got a load of coho,” Spangler called, holding one end of the net as he scrambled out of the boat.

While Bob Buckman and Mark Lewis hauled the other end of the net toward the shore, Spangler started sorting his catch.

Oregon Department of Fish and Wildlife biologists are trying to figure out why wild coho have such poor survival rates on the Alsea River when they do so well on the Yaquina River, a scant dozen miles to the north. Of the 10 largest rivers in the Coast Range, four—the Nehalem, Tillamook, Siletz and Alsea—have had the largest and most consistent hatchery programs.

“In recent years, wild coho returns have declined in these four basins, while they are stable or increasing in the six other watersheds without similar hatchery programs,” said Buckman, the department’s district biologist.

Biologists know the conditions of river habitat and ocean environment are significant factors. But now they think the coho’s transitional period in the estuaries might be a critical factor in why some stocks recover while others decline.

As Spangler sorted, bright-silver coho smolts from the Fall Creek Hatchery 30 miles up the Alsea River went into one bucket. Wild coho smolts, mottled dark and light, a third the size of their hatchery cousins, landed in a second.

Brief detour for smolts

He quickly measured each fish and called out the length to Lewis, who noted the data on waterproof



Carmel Finley photo

Biologists think that the time coho spend in estuaries is critical in their survival.

FOUR COAST RANGE RIVERS SHOW DECLINES IN WILD SMOLTS, AND STATE CREWS STUDY INFLUENCES OF HABITAT AND PREDATORS

paper. Then each fish was placed gently back into the bay, finning for a second before darting toward deeper water, ending this brief detour on the coho’s trip to the Pacific Ocean.

As the wildlife crew members worked, their only audience was an interested line of cormorants on the Alsea Bay Bridge.

Since 1993, less than one-half of one percent of Oregon’s hatchery coho have survived. A \$30 million, multi-agency state program is trying to increase wild coho

populations and head off an endangered listing under the federal Endangered Species Act.

“We used to think that coho passed quickly from the rivers to the ocean,” Buckman said. “But recent information suggests the period when the smolts are in the estuary may be a critical factor.”

During the past three years,

wild coho returns to the Yaquina River at Newport have increased eightfold, to more than 4,000 fish. But the numbers of coho coming back to the Siletz River to the north and the Alsea to the south have decreased.

“The freshwater habitat and water quality are generally the same in all three basins,” Buckman said. “They are close enough together that the ocean should exert a similar influence. That suggests the period in the spring when young coho migrate through the estuary is important,” as they adapt to ocean conditions.

Spangler’s spring netting on the Yaquina caught a few wild coho at each site in the bay, leading him to think the smolts were widely distributed.



Carmel Finley photo

Do abundant, larger, hatchery smolts draw predators that also consume their smaller wild coho cousins?

But the Alsea story was different. In one morning's sampling, the seine caught 651 hatchery fish and 74 wild fish, as well as a selection of marine flatfish and miniature Dungeness crabs.

Seals, cormorants prey on fish

Spangler also counts the harbor seals and cormorants. Both species prey on salmon, and the Alsea has a much greater population than the neighboring rivers.

Fall Creek Hatchery releases 1 million coho a year. Under the Coastal Salmon Restoration Initiative, that will drop to 200,000 smolts in 1998. The department will consider eliminating all coho smolt releases from Fall Creek in 1999.

Seabirds drawn by hatchery releases "can be a very significant mortality factor," said Carl Schreck, a professor of fisheries and wildlife at Oregon State University. "There's no question that birds can kill an awful lot of fish."

Schreck wants to radio-tag smolts next spring, hoping to learn how much time they spend in the estuaries.

Buckman said he was uncertain how significant the impact of harbor seals can be on Alsea coho populations. One surprising piece of information from the summer's seining is that wild smolts school with their hatchery cousins in the bay. As the seals feed on the abundant hatchery fish, they're probably taking a few wild smolts as well. Although a plump hatchery fish is a tempting target for harbor seals, he suspects it might not be worth their while to chase 4-inch wild coho or even smaller wild chinook in bays.

"With only wild smolts scattered throughout the bay, like they are in the Yaquina, opportunistic predators like harbor seals will likely turn to more abundant food sources, such as marine fish in the ocean," Buckman said.

"I expect that as we reduce hatchery coho smolts, the apparent estuary survival problem may take care of itself."

NEWS SHORTS

Governors Lead Collaborative Steelhead Restoration Effort

In August, Governor John Kitzhaber joined Washington's Governor Locke, California's Governor Wilson and Idaho's Governor Batt in committing to lead a collaborative effort to restore steelhead populations.

"Oregonians on the coast are already working hard to restore coho salmon. Restoring our steelhead runs, which extend through much more of the state, will take an even more expansive effort by most Oregon residents. I am very pleased to cooperate with our neighbor states in this effort, and I am confident that we can restore our fish populations faster through our voluntary, collaborative plans," Governor Kitzhaber said.

On August 11, the National Marine Fisheries Service (NMFS) extended by six months the decision point for possibly listing steelhead as "threatened" or "endangered" under the Endangered Species Act in the lower Columbia, on the Oregon coast, in the Klamath Mountains Province and in two areas wholly in California. In the Snake River Basin (Washington, Idaho and Oregon), the central California coast and the south-central California coast, the service listed steelhead today as "threatened." The service listed Upper Columbia River (Washington) and southern California steelhead as "endangered."

The governors have already set in motion a four-state effort by state agencies and public and private partners to develop steelhead restoration plans. In areas where the National Marine Fisheries Service has extended the listing deadline, the state plans could alleviate the need for a listing and enable the states to lead restoration through voluntary, rather than regulatory, efforts. Where steelhead are now listed as threatened or endangered, the states will work in partnership with the service to

support local restoration activities with as little federal intervention as possible.

"It has long been time to lessen the human impact on our watersheds and improve stewardship of our resources. We have begun that process with the coho plan. Now we need to extend our efforts to more of the state and throughout the region," Kitzhaber said.

(source: news release, Oregon Governor's Office)

Endangered Species Recovery Act Introduced

Rep. George Miller (D-CA) introduced the Endangered Species Recovery Act (ESRA) on July 31, 1997 with 55 original cosponsors including key Republican supporters. ESRA works in a number of ways to improve on the ESA and to help promote the recovery of threatened and endangered species. Some of the more important aspects of ESRA include

- A vast improvement in the process of requiring federal agencies to consult with each other in the management of imperiled species and public land habitat used by threatened and endangered species,
- Better opportunities for public participation by requiring public notification when a federal activity may impact threatened or endangered species.
- Use of the best available science to plan for the recovery, not just the survival, of threatened and endangered species.

ESRA also incorporates tax proposals endorsed by both property-rights and conservation organizations including estate tax deferrals that would encourage large private landholdings to stay intact while urging private landowners to take proactive conservation measures.

(source: Endangered Species Coalition)

Calendar

Organizations involved in coastal watershed work are welcome to send the editor calendar items and announcements of broad interest. Deadline for the next issue is December 15, covering the period January 1 through March 31.

Coast Conference, Oct. 18–19

“Natural History and Landforms of the Oregon Coast” is the theme of this year’s Coast Conference, sponsored by the Oregon Shores Conservation Coalition, in Newport. Presentations in Newport’s Performing Arts Center on Oct. 18 include coastal geology, archaeology, marine debris, offshore rocks, and bird nesting (9:30 a.m. to 5 p.m.). On Oct. 19 the venue changes to the OSU Hatfield Marine Science Center and the subject to the CoastWatch program (10 a.m. through midafternoon). All are welcome. Registration is at the door; a small fee covers a buffet lunch and coffee. Contact: Phillip Johnson, CoastWatch Coordinator, 605 S.E. 37th Ave., Portland, OR 97214; (503) 238-4450, or OSCC, P.O. Box 1344, Depoe Bay, OR 97341; (541) 765-2234.

Announcement: *Coho Salmon: Life in the Watershed*

This new six-page fact sheet fills a need expressed by many involved with coho restoration: a summary that describes the relationship between the life history of the fish and the coastal habitats they occupy. The fact sheet is appropriate for landowners and others who can make a difference with coho as well as for outreach staff, including Extension agents, field staff, and watershed volunteers. Individual copies are available at no charge, for a limited time, from Oregon Sea Grant. Two or more copies are 50 cents each, postpaid. Contact Sea Grant Communications, 402A Kerr Admin., OSU, Corvallis, OR 97331. Single copy requests also via e-mail: seagrant@ccmail.orst.edu.

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