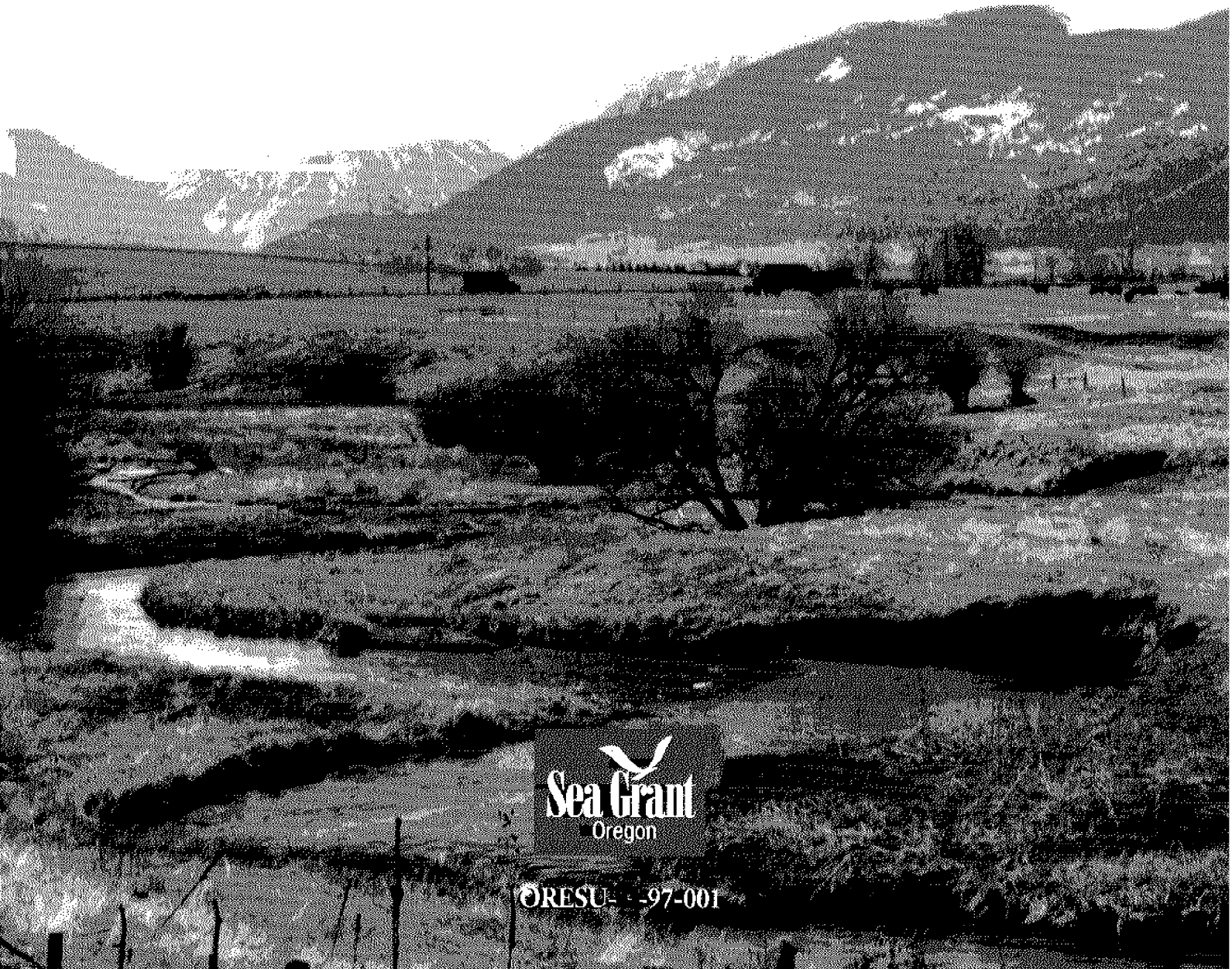


History, Science, the Law, and Watershed Recovery in the Grande Ronde

A Case Study

Angus Duncan



Sea Grant
Oregon

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About the Author

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Credits

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Abbreviations

Following are the abbreviations used in this case study. Some of the terms are represented by more than one abbreviation.

BLM	Bureau of Land Management
Bonneville	Bonneville Power Administration
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
COE	Corps of Engineers
Corps	Army Corps of Engineers
CRFMP	Columbia River Fish Management Plan
DEQ	Oregon Department of Environmental Quality
EDT	ecosystem diagnosis and treatment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Forest Service
GWEB	Governor's Watershed Enhancement Program
HCP	habitat conservation plan
ISG	Independent Scientific Group
NMFS	National Marine Fisheries Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
ODFW	Oregon Department of Fish and Wildlife
OWRD	Oregon Water Resources Department
Power Council	Northwest Power Planning Council
PRC	Pacific Rivers Council
Reclamation	U.S. Bureau of Reclamation
SWCD	Soil and Water Conservation District
SWMG	Strategic Water Management Group
TMDL	total maximum daily load
UGRP	upper Grande Ronde plan
Umatilla	Confederated Tribes of the Umatilla Indian Reservation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

Introduction

The Wallowa Mountains are among those sudden, demanding physical statements found often in Western landscapes and used by nineteenth-century artists from the East to communicate the breadth and pageantry of the land. A traveler today, hurtling through this far northeast corner of Oregon astride the interstate, sees little of this visual drama that so captivated nineteenth-century visitors, and senses less of the layered and textured history of the land. Neither will a passerby appreciate the events unfolding in the Grande Ronde today that place it near the heart of the most urgent ecological question confronting the American West: how to reconcile the social and economic demands human beings impose on the places they live with the biological health of Western watersheds.

One purpose of this paper is to urge the traveler off the highway, down into the middle valley of the Grande Ronde, and into this unfolding story. From La Grande, a college town settled into pine-covered hills at the valley's entrance, the visitor can drive south across a now drained and planted valley floor where in long-ago summers Umatilla and Nez Perce dug camas roots from boggy water meadows that flooded each spring.

The road follows an old settler trail (and earlier still, an Indian trail) that leaves the river at Elgin to climb up and across Cricket Flats, down the Minam Grade into the Minam River canyon, east with the river's flow as it bends around to join with the Wallowa River and together they turn north. The road follows the right bank of the Wallowa to a valley of open slopes flowing down from the north, grasslands where Nez Perce ponies found summer grazing 150 years ago. Long, low, timbered ridges extend up from the south, drained by streams—the Minam, Bear Creek, the Lostine—that rise in snow banks and glacial lakes far back and unseen. And then, at a turn in the road just the far side of the town of Lostine, the ridgelines lift with an abrupt, emergent quality into an alpine setting of high peaks and plummeting canyon walls.

Streams plunge down steep canyons onto Alder Slope and flow together to form the Wallowa River. In late summer, hay lies cut and drying, or raked and awaiting the balers. At the head of Wallowa Lake, swimmers churn the glacial waters and hikers test themselves on the climb up to the lakes basin of the Eagle Cap Wilderness.

The grave site of Old Chief Joseph is on a rise at the other end of the lake. Until recently this was the only ground still occupied by the Nez Perce since the Wallowa band followed Young Joseph and other tribal leaders out of their valley 120 years ago and into the history books, a brave and poignant paradigm of the settling of the West. The history of this place is first of all its natural history, interwoven with the history of the Umatilla and Nez Perce and other local tribes fishing the lake's outlet, hunting elk in the mountains, grazing their Appaloosa herds in the summer meadows, and following the trading routes across to the eastern slope of the Rockies.

Where herds of Indian ponies once grazed on Alder Slope, a latticework of canals now intercepts and diverts streamflows onto pasture and cropland. Drained wetlands and floodplains have been transformed into productive farmland; stream channels have been rerouted by road construction. The valleys of the Grande Ronde are not densely populated, but a hundred years of human occupation has moved water about as if it were living room

"Fish that once crowded Wallowa Valley streams to spawn and die have, within living memory, become almost random events here."

furniture. Livelihoods have been built on those changes, and with them a traditional culture of small towns and hard-working families that shares many values with the tribal society it displaced.

There is another, less visible, latticework—of links between the valleys and their people, and the world outside the mountain walls. The economy of these communities, largely self-sufficient in their earliest years, is now dependent on goods and services traded in and out. Recreation and tourism are displacing timber and cattle as sources of living.

The linkages extend farther now, with the decline of salmon runs in the Columbia Basin. Fish that once crowded Wallowa Valley streams to spawn and die have, within living memory, become almost random events here. Oregon's Grande Ronde and Imnaha Rivers, along with the Salmon and

Clearwater in Idaho and the Tucannon in Washington, are the historical sources of the Snake River salmon now listed as "threatened" or "endangered" under federal law. That listing ties the Wallowa Valley to wheat farms far to the east in Montana and North Dakota, enter-

"The destinies of the fish and the people of the Grande Ronde basin are caught together with events in this larger world . . . that stretches from the Dakotas to Alaska to Japan."

prises that use the slackwater reservoirs of the Columbia to move their products to global markets. It links the valley to the aluminum plants that line the lower Columbia, with their huge appetites for hydroelectric power. It links them to the bright lights and growing populations of the cities of the Interstate 5 corridor—Vancouver, B.C.; Seattle; Tacoma; Portland; Eugene—that consume electric energy and cherish environmental values both, while deferring the choices forced upon them by their demands on the Columbia River.

These linkages extend to the fishing villages of the lower Columbia and the coast, communities as traditional and as stressed by impending changes as those of the Grande Ronde. Finnish and Norwegian fishing families that have laid their nets across the river for three generations are barred from the main channel because the few remaining Snake River adult salmon seeking their natal streams far to the east are spread among the larger numbers of harvestable fish bound for other corners of the Columbia Basin. The web stretches farther still, far out to sea and north to the coastal communities and tribal cultures that wrap around the Gulf of Alaska, pulling fish from the great oceanic churn that mixes Columbian and Canadian and Alaskan stocks for the duration of their ocean stay and on much of their long return.

The destinies of the fish and the people of the Grande Ronde basin are caught together with events in this larger world—both the salmon-defined ecosystem and the river-based economic commons that stretches from the Dakotas to Alaska to Japan. Watershed choices made on Prairie Creek in the Wallowa Valley will reverberate throughout this territory. In turn, the best efforts of the people of the Grande Ronde to restore the health of their streams and upslopes are hostage to choices, successes, and failures of other people throughout this ecosystem.

What follows is a little of the story of the Grande Ronde, but also the story of the communities of fish and people that populate the ecosystem and that must learn to co-inhabit the watershed.

It is written as a record of events and as an account of how change is taking place in Western communities and landscapes. It is not a "how to"

manual on watershed recovery—there are several good ones available already. Rather, its object is to describe how history, people, purposes, and institutions were fitted together, well or badly, in one very important Columbia River watershed. In both its successes and failures, the Grande Ronde has lessons for lawgivers and policymakers, for agency professionals, tribal leaders, and local government officials. Each of them, and the rest of us, needs to understand better how rivers work, how communities work, and how they can work together more successfully. We have to learn about fusing the family histories of people and the life cycle histories of salmon into a world that can be common, not contested, habitat for both.

Can we preserve traditional histories while imposing on them new demands that may seem counterintuitive to the pioneer ethic that taught us to settle and order and subdue the land?

Can we demonstrate Pacific Northwest regional coherence and equity to communities that are carrying the burdens of watershed recovery most directly? Where do the people of the Grande Ronde fit in a Columbia Basinwide salmon recovery strategy? Have they been assigned their proportionate share of authority and responsibility? Do they agree that they have?

How can science function as an intermediary among interests, rationalizing the debate, and not as an advocacy tool or a black box within which, we suspect, other agendas lie hidden?

How can national and state policy goals be reconciled with local values and histories? Can we find models other than irresistible force and immovable object, with their attendant confrontations, back pressures, lawsuits, and delays?

Ultimately this story is about people—ranchers, tribal elders, governors, fish biologists—learning to examine and adjust their values to the evidence and to each other. It is a story that moves forward unevenly, both anchored to and ballasted by history, sometimes checked by misunderstanding and self-interest, then propelled ahead again by professionalism and honesty and good will. The rewards for success are healthier streams and ecosystems, but also healthier, more cohesive communities. The rewards are tribal in the broadest sense of the word: diverse peoples and cultures discovering common purpose, joining together to act on it, and in the process enlarging the circle of community.

The Grande Ronde Watershed: Physical and Historical Context

The Grande Ronde and Imnaha Rivers occupy approximately 5,000 square miles in the far northeast corner of Oregon (figure 1). Both rivers empty into the Snake River's Hells Canyon, which forms the eastern boundary of the watershed. The Grande Ronde is typical of basins in the arid Western United States, with substantial snowpack in upper elevations melting in a spring freshet and then diminishing to summer flow levels sustained by groundwater seepage.

The Blue Mountains bound the drainage to the west and southwest, while the more lofty Wallawas, with peaks close to 10,000 feet, form a central, southeast-to-northwest spine. Three large valleys are spaced between: the Imnaha, the Wallowa, and the Grande Ronde. The last is the largest and most developed, an open bowl of a valley through which, in presettlement times, the middle Grande Ronde River meandered in a wide circle (a "grande ronde") of grasslands, wetlands, and lakes.

The Grande Ronde rushes north out of its upper basin in the Blue Mountains into the middle valley. Catherine Creek, a major tributary rising in the Wallawas to the east, joins the main river halfway through its wide turn around the valley. The river drops down and pushes north to intercept the Wallowa River coming from the east, where it has drained the high up-thrust front of the Wallowa Mountains. The combined waters then flow north through steep canyon country in channels cut through ancient overlays of volcanic basalt flows, to cross the state line between Oregon and Washington and descend to the Snake.

Some 2,900 stream miles in the Grande Ronde are occupied by salmonid species, with something over half accessible to migrating (anadromous) salmon and steelhead. The Grande Ronde in Oregon, the Tucannon in Washington, and the Salmon and Lemhi Rivers in Idaho are the largest headwater repositories of endangered Snake River spring chinook.

The Imnaha River rises in the Eagle Cap Wilderness of the Wallowa Mountains, flows east and then north to the Snake, and drains a watershed of 855 square miles just east of Wallowa Valley. It has 308 miles of anadromous fish streams, but when included in the Grande Ronde Basin Model Watershed, it accounts for nearly a third of the basin's spring chinook and steelhead capacity.

Two Oregon counties—Union and Wallowa—occupy most of these two basins. About 24,000 people live in Union County, half of them in La Grande, 1,900 in Union, and the rest in small towns and on farms and ranches. About 7,000 people live in Wallowa County (down from a 1920 peak of 9,800); Enterprise, the county seat, has a population of about 1,900.

Some 45 percent of Union County and more than 60 percent of Wallowa County are public lands, mostly in U.S. Forest Service ownership. Land use is dominated by traditional resource industries: grazing (44 percent), forests (39 percent), irrigated agriculture (5.5 percent) and nonirrigated agriculture (2.9 percent). Tourism is growing in importance in both counties, with Wallowa Lake and the Eagle Cap Wilderness in particular drawing many new visitors.

Union County is the more urbanized county, with a state university campus, a regional hospital, and government offices. La Grande straddles Interstate 84; Enterprise is an hour's drive to the north and east.

"The tribes retained hunting and fishing rights throughout their historical territories, and therefore an interest in the ecological health of these lands."

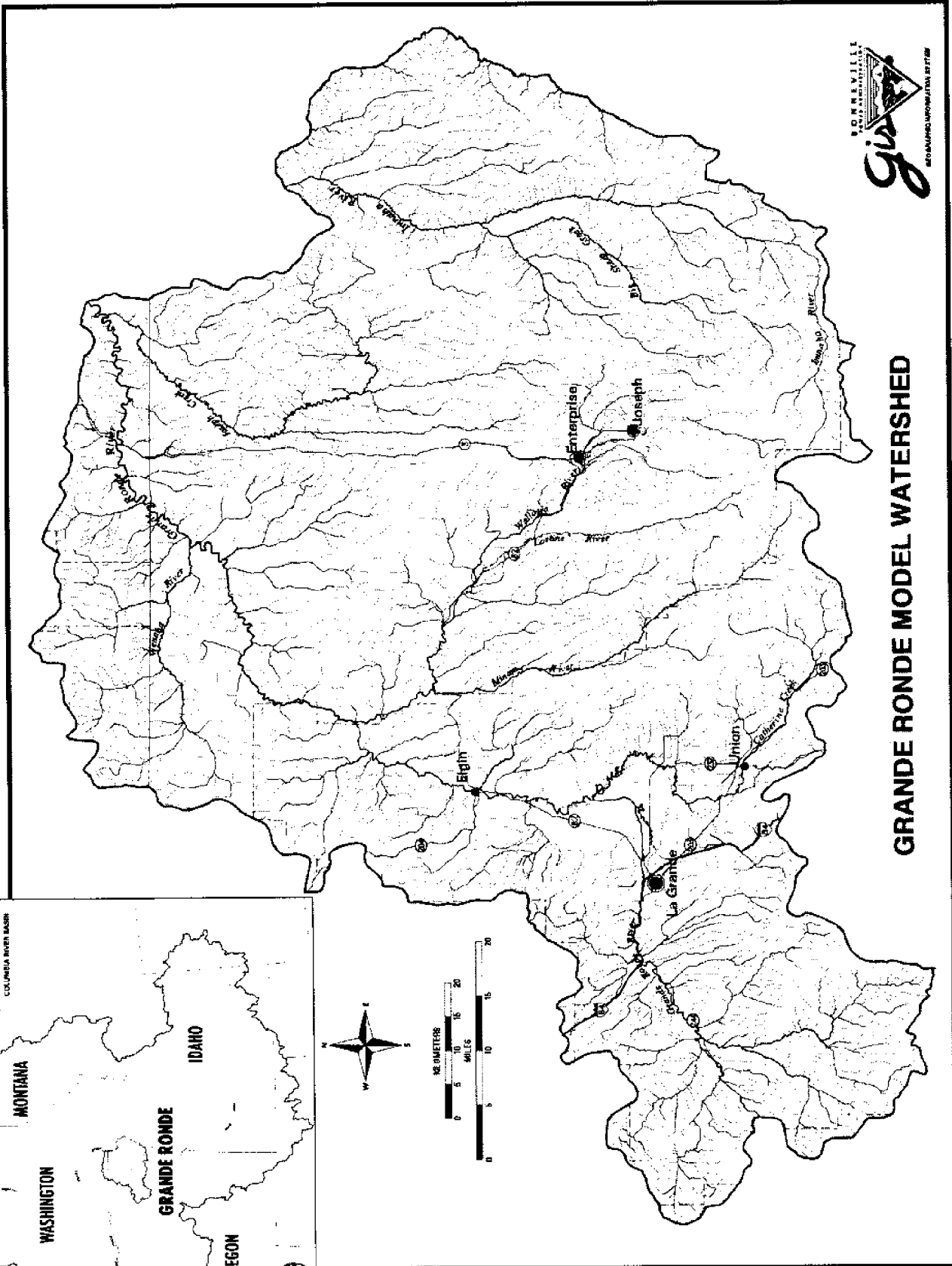
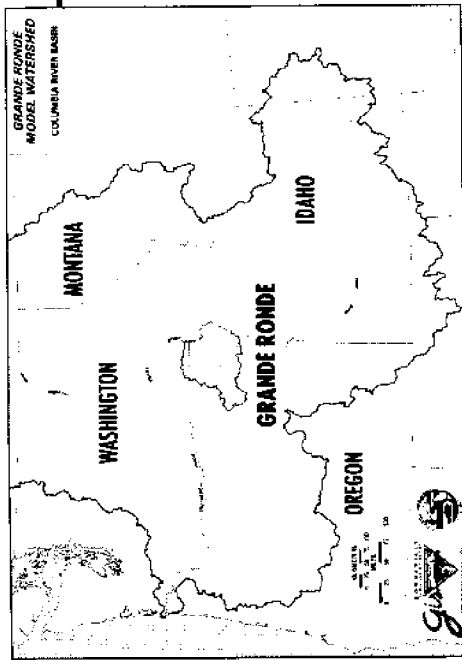


Figure 1.
The Grande
Ronde Model
Watershed.
Source:
Bonneville
Power
Administration.

The tribes of the Umatilla (Cayuse, Walla Walla, and Umatilla) and Nez Perce Reservations share jurisdiction in the upper and lower reaches of the Grande Ronde Valley, respectively. Although much of the land was ceded in the Treaties of 1855 and later, the tribes retained hunting and fishing rights throughout their historical territories, and therefore an interest in the ecological health of these lands.

Overlaid on local institutions are state (Oregon and Washington) and federal law and implementing agencies.¹ The combination of Endangered Species Act listings and extensive federal landholdings results in a pervasive federal influence over local decision making. The state is nearly as omnipresent, regulating nonfederal land use, managing water allocations and fish and wildlife, and administering water-quality rules.

Presettlement

The valleys and canyons of the Grande Ronde were inhabited by Native Americans for thousands of years before the nineteenth-century arrival of Euro-Americans. In recent times the Wallowa (or Joseph) band of the Nez Perce was the only resident tribe, occupying the open river valleys from spring to fall and retreating to the more clement canyons in the north to overwinter. The Umatilla used the upper Grande Ronde for foraging, fishing, and summer residence. Cayuse, Bannock, and other tribes migrated through the area. The Wallowa County-Nez Perce Salmon Recovery Plan acknowledged this tribal legacy: "Trails into the high mountains and deep canyons follow prehistoric pathways. The towns of Imnaha, Joseph, Enterprise, Lostine and Wallowa are located near significant Indian camps. County maps are filled with names such as Chesnimnus, Minam, and Powwatka—words of Native American origin."² The word "wallowa" is Nez Perce, referring to a kind of fish trap employed by the Indians in Wallowa Lake.

Early pioneer descriptions are usually of the middle Grande Ronde Valley, through which most visitors (and a short stretch of the Oregon Trail) passed. Captain Benjamin Bonneville gave an account from his 1834 exploration:

Its sheltered situation embosomed in the mountains renders it good pasturing ground in the winter time; when the elk come down to it in great numbers, driven out of the mountains by the snow. The Indians then resort to it to hunt. They likewise come to it in the summer to dig the camash root, of which it produces immense quantities. When the plant is in blossom, the whole valley is tinted by its blue flowers and looks like the ocean when overcast by a cloud.³

An 1860 homesteader relates that "the creeks and Grande Ronde river were lined with willows and other underbrush and cottonwoods. The upper end of the valley . . . was a vast lake covered with tules and known as Tule Lake . . . a dense luxuriant growth of rye and bunch grass . . . (a) vast ocean of grass."⁴

¹ See Appendix A for a detailed discussion of government agencies and their roles in the Grande Ronde.

² *Wallowa County-Nez Perce Salmon Recovery Plan* (Enterprise, OR: Wallowa County Court; and Lapwai, ID: Nez Perce Tribe, 1993) Appendix H: 1.

³ G. Franzwa, *The Oregon Trail Revisited* (St. Louis: The Patrice Press, 1972) 349.

⁴ *An Illustrated History of Union and Wallowa Counties* (n.p.: Western Historical Publishing Company, 1902) 142.

The Umatilla named the valley Cop-Copi, for the huge, dense, black cottonwoods that lined the river's banks. Tule Lake covered some 20,000 acres, fed by runoff and overflow from Catherine Creek and the Grande Ronde River and draining back into both streams. Nearby Hot Lake was fed from emerging hot springs. The author of a local history observes that "from La Grande across the valley to Cove and Union, much of the distance was in big cattail swamps . . . many swamps and sloughs that were later drained."⁵ Sometime in the early eighteenth century, the local tribes began acquiring horses and thereafter used the valley for grazing their sizable herds. Pioneer stories speak of tracking horses by watching the movement of the tall grass above them.

Mountain regions were populated with ponderosa pine, with understories of Douglas fir, white fir, and lodgepole, interspersed with stands of tamarack. In the upper drainage, a few wide, low-gradient, meadowed valleys are mixed with many steep and narrow canyons.

Abundance of grass varied with water. The rich wetland growth of the middle valley contrasted with dry upland slopes to the south, with Wallowa County steppes that see 16 inches or less of annual rainfall, and with benchland in the northern canyons that are dense and green after spring flooding, then golden in the late, dry, summer months.

Settlement

First Encounters

Exploitation of the natural resources of the basin began with the arrival of Native American peoples. It may be said to have stepped up from subsistence levels as the acquisition of horses widened tribal movements and expanded trade activities between the mountain tribes and their neighbors east and west.

Euro-American explorers traversed the Grande Ronde Valley as early as 1811 (David Thompson). Benjamin De Bonneville, Nathaniel Wyeth, Peter Skene Ogden, David Douglas, and John C. Fremont all have left descriptions of their visits. The Whitmans passed through on their way to Walla Walla in 1836, and Jason Lee headed for the Willamette Valley shortly thereafter. In the 1840s and 1850s, pioneers on the Oregon Trail crossed over from the Powder River basin in the south, then turned west up into the Blue Mountains. (See figure 2 for the proliferation of roads in modern times.)

The Early Fur Trade

Early in the nineteenth century the Hudson's Bay Company, arriving from Canadian possessions in the north, began trading in furs. Soon the company undertook a policy of overtrapping in the Wallowas and other mountains south of the Columbia River, trying to discourage American fur companies from crossing the Rockies. This policy, coupled with the overall economic pressure to strip streams of beaver, caused a collapse in these populations from which they have never recovered. There were ecological consequences in the Grande Ronde and elsewhere. "[Throughout the Columbia Basin] trapping reduced or extirpated most beaver populations, with resulting widespread loss of structural elements, floodplain processes, and vegetative diversity that had developed as a result of centuries of ongoing

⁵ B. Hug, *History of Union County, Oregon* (La Grande, OR: Union County Historical Society, 1961) 82.

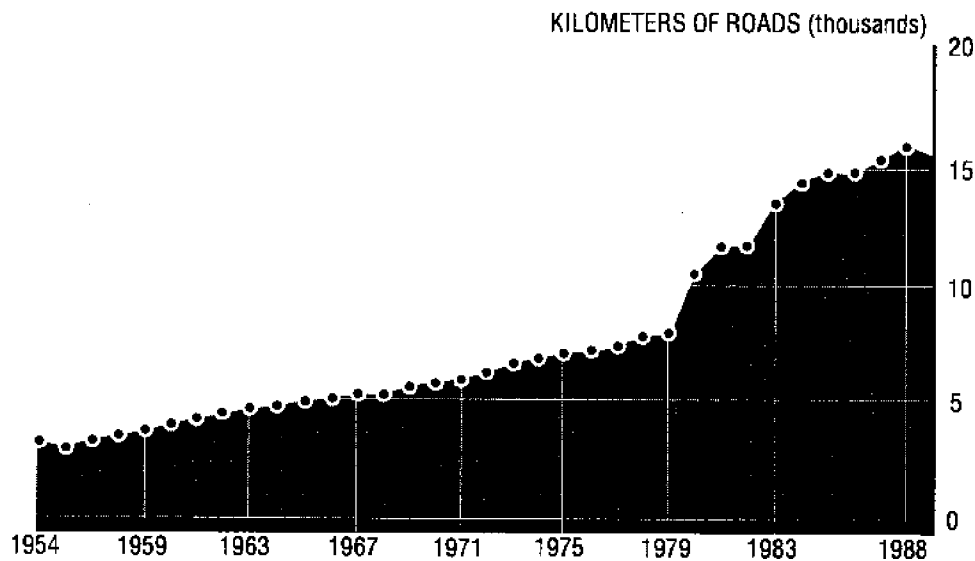


Figure 2. Road mileage (kilometers) on the Wallowa-Whitman National Forest, 1954 to 1990. Adapted from B. McIntosh et al., Management History of Eastside Ecosystems: Changes in Fish Habitat Over 50 Years, 1935 to 1992 (n.p.: U.S. Forest Service, 1994, General Technical Report PNW-GTR-321) 14.

beaver activity.”⁶ Because of their mediating role in the dynamics of streams and wetlands, creating storage and backwaters, and manipulating water levels, beaver were “of particular importance in the more arid regions . . .” of the Columbia Basin.

Homesteading

Permanent settlement in the Grande Ronde commenced in 1860. From west across the Blue Mountains, a committee arrived to reconnoiter. “There were no lands in what is now called Umatilla County worth taking,” their report began. “All the creek bottoms had been taken.”⁸ But in the Grande Ronde they found plentiful land and lush grazing. In 1861, Judge Benjamin Brown and Stephen Coffin founded La Grande, bringing in cattle and horses. Soon they were complaining that the grass had become “less abundant,” while the Nez Perce and Umatilla Indians visiting the valley would bring “vast herds of ponies with them which sometimes trespassed on what the settlers conceived to be their rights.” And “before the dawn of the seventies, the pasturage of the Grande Ronde Valley commenced showing signs of exhaustion.”⁹

The less-accessible Wallowa Valley remained in Nez Perce control until 1870, when settlers pushed over the passes and down the Minam River. In 1872 the first cattle, 300 head, were grazing in Wallowa River bottomlands.

The Umatilla and other area tribes lost possession of their lands in the middle and upper Grande Ronde by signing an 1855 treaty with Territorial Governor Issac Stephens (the tribes retained hunting and fishing rights in their “ceded” lands). The Nez Perce also signed an 1855 treaty, but one of their chiefs, Old Joseph, carefully reserved his band’s rights in the Wallowa

⁶ The Independent Scientific Group [ISG], *Return to the River: Restoration of Salmonid Fishes in the Columbia River Ecosystem* (Portland: Northwest Power Planning Council, 1996) 141.

⁷ National Research Council, Committee on Protection and Management of Pacific Northwest Anadromous Salmonids, *Upstream: Salmon and Society in the Pacific Northwest* (Washington: National Academy Press) 41.

⁸ *An Illustrated History* 138.

⁹ *An Illustrated History* 174.

Valley. Under settlement pressure, amendatory documents were executed in 1863 by other Nez Perce leaders—but not Old Joseph—ceding the Wallowa lands. Tribal leaders challenged the validity of this order in 1873 and nearly succeeded when white settlers were ordered to leave the valley; but the order came under fire and was quickly vacated. The Wallowa Band left the valley when Young Joseph and other Nez Perce leaders embarked on their historic fighting retreat through the Rocky Mountains and nearly to Canada in 1877.¹⁰

Early Water Use and Irrigation Developments

After area tribes were driven from their land, development proceeded apace in both valleys (and somewhat later in the Imnaha). Water was at the center not only of agricultural cultivation, but of nearly every other economic activity of significance. At issue was not only bringing water away from streambeds to fields and mills, but draining or diverting excess amounts—flood control and reclamation—and redistributing it.

In the Grande Ronde as elsewhere, development concentrated first in the rich alluvial bottomlands close to ample supplies of water. As natural grasslands were depleted, plans to drain wetlands and irrigate dry lands quickly emerged.

In 1870 [Fred Nodine] conceived the idea of reclaiming Tule lake . . . which embraced about 2,300 acres . . . covered with water and raising an abundant growth of tules . . . This land . . . was . . . subject to reclamation upon the following terms: The land was to be completely drained and placed under cultivation within twenty years . . . Mr. Nodine had to turn Catherine Creek [the feeder stream], carry it around the eastern side of the lake in a new channel, and finally turn it into one of the [lake's] numerous outlets. . . . To do this he constructed a mammoth canal. . . .¹¹

His newly drained property allowed Mr. Nodine to raise oats, barley, wheat, hay, and 6,000 head of cattle.

In the 1860s, in the area west of Tule Lake, a Cove physician, Dr. Phys, undertook the first excavations for what would become the State Ditch. The initial channel, six feet wide and three feet deep, was constructed to reduce the annual spring flooding that covered additional potential farmland in the center of the valley. Over time, heavy flows deepened the ditch channel, eventually capturing the entire river. Four miles of State Ditch cut off 33 miles of circuitous river channel and flood plain, disconnecting them from their recharge waters and dramatically diminishing the best alluvial fish habitat in the basin.¹²

Additional "ditches" were being dug throughout the valley to turn both natural wetlands and dry uplands into uniformly usable farmland. A new

¹⁰ Efforts by the Nez Perce to return have been continuous since Young Chief Joseph's importunings from his exile to Indian reservation lands near Spokane. At long last there is incipient success, as property for a tribal center is being acquired outside the town of Wallowa. Deep in Joseph Creek Canyon there is ranchland property that will soon pass to the Nez Perce Tribal Government for management as a wildlife refuge.

¹¹ *An Illustrated History* 247

¹² Catherine Creek still flowed into the old Grande Ronde channel, and through it to join the river at the downstream end of the Ditch.

crop, sugar beets, was introduced into the valley in the 1890s. The beets "required large quantities of water but could be planted in wet or boggy areas with results, turning many areas peripheral to the river and Ladd Marsh into agricultural production for the first time. . . . Once into crop production . . . this land was never returned to wetland or frequently flooded status."¹³

In fact the impacts from natural flooding, both destructive and restorative, have been dramatically reduced since settlement. During presettlement times an estimated 72,000 acres in the middle valley were subject to flooding; up to 60 percent of the valley floor might be inundated for as long as five months. In the 1894 flood, 50,000 acres were covered with floodwaters; in the 1949 flooding, only 5,900 acres were inundated.¹⁴

By 1925, some 30,000 acres in Union County were irrigated by controlled diversions of water out of streams and onto fields ("flood-irrigating"). By the 1990s this acreage had doubled, although overall water withdrawals had not materially increased, being offset by shifts to more efficient sprinkler irrigation that now covers two-thirds of the present acreage. Most streams in the two counties that are easily accessible to irrigation withdrawals are overappropriated in low-water summers, where both crops and fish compete for water at the margin. Because surface water supply limits have been reached, reliance on deep aquifer groundwater has increased.

Flow impacts of water withdrawals from streams are partially mitigated by return flows (that is, after losses to percolation, transpiration, and consumption). However, these return flows may carry destructive fertilizer, sediment, and other runoff burdens. Surface runoff is likely to be warmer than the streamflows to which it returns, aggravating the basin's serious stream temperature problems.¹⁵

In Wallowa County in the settlement years,

homesteads soon lined the streams and all other areas near water that seemed capable of supporting agriculture. . . . Most meadows near streams were plowed, some were irrigated and livestock were present most of the years. . . . Soon all of the best . . . pastures were overgrazed. Areas nearest the homesteads [and watercourses] received the hardest use as the animals necessary for food and to provide power and transportation were kept near home. Hogs and plows turned meadows upside down while milk cows, sheep and horses confined to smaller areas . . . ate the grass to the ground. By 1930, most riparian areas had lost the native grasses and most woody vegetation.¹⁶

Pigs were particularly destructive to native vegetation. "Swine . . . were often left to scavenge for themselves and usually chose to turn meadows upside down in their search for roots. Many times farmsteads had areas of 10 or more acres that appeared to be plowed, however this was the work of brood sows and their piglets."¹⁷

"Water was at the center . . . of nearly every other economic activity of significance."

¹³ E. Bishop, "A Century of Farming in the Grande Ronde," *La Grande Observer*, Centennial Edition 21 Oct. 1996: 14-15.

¹⁴ State of Oregon Water Resources Board, Sept. 1960: 54.

¹⁵ Natural Resources Conservation Service and United States Forest Service [NRCS and USFS], "Grande Ronde Cooperative River Basin Study for Union County" (Unpublished, 1996), chapter 4.

¹⁶ *Wallowa County-Nez Perce Salmon Plan*, Appendix J: 2.

¹⁷ A. Isley, *Wallowa County Extension*, from notes for *Testimony for Critical Habitat* (Unpublished, 1993) 3.

Irrigation ditches were dug from the 1870s onward in Wallowa Valley, extending left and right away from the emerging mountain streams. In the early 1900s the dam at Wallowa Lake was constructed, raising the water level to feed additional ditches and incidentally blocking sockeye access to and egress from the lake, entirely destroying the run. In a short time, diversions drew water off from most of the feeder streams that emerged from the steep Wallowa escarpment. By the middle of the twentieth century some 67,000 acres were under irrigated cultivation, although this acreage has since declined.

Leo Beard, whose family homesteaded in the northern canyons, recalls that even on the narrow river benches in Joseph Creek and the other deep canyons to the north, "ditches were built and water was flumed back and forth across the creek to irrigate the bars along the creek. We grew alfalfa and some grain hay for the stock, and raised big gardens. Just put the water to it and you could grow about anything down there."¹⁸

These development patterns are typical of activity throughout the West. "Early settlement in the Columbia River basin was concentrated in alluvial bottomlands along lower-elevation tributary rivers and streams, where arable soils and water were plentiful and transportation was most feasible."¹⁹ Little thought could be spared at the time for the consequences to fish—there were livings to be earned, mouths to feed, and communities to build.

Timber Harvest

Logging in the Grande Ronde began in the 1860s in the cottonwood thickets of the valley floor and on nearby foothills. In 1882 the Oregon Navigation and Railroad Company pushed its line into Union County, and in 1908, over the pass into the Wallowa Valley. Large-scale export of logs and other goods to wider markets became possible. By the early 1900s, intensive upland logging was underway, supported by narrow-gauge rail lines up creeks and splash dams to wash logs down to rail heads.²⁰ Both methods severely damaged the watersheds in which they occurred. "Splash damming and associated log drives are believed to have had devastating effects on all forms of aquatic life, along with causing considerable damage to the stream channel. . . . Railroad grades . . . adjacent to the stream channel or within the flood plain . . . serve as artificial geomorphic controls, constraining the stream channel and truncating flood plain processes and functions."²¹

Timber extraction in the Grande Ronde proceeded in patterns that tracked the rest of the Columbia Basin. Demand and production both surged in the period following World War II. Intensive road building took place in remote areas, particularly from the 1970s onward when road miles in the

¹⁸ *Wallowa County-Nez Perce Salmon Plan*, Appendix G, Letter from Leo Beard, 18 August 1992.

¹⁹ ISG 141. Also, "owing to the early development of flood plain reaches, salmonid habitat in those areas was compromised to varying extents many years ago and measures to protect rivers have tended to focus on much less productive canyon and high mountain segments that . . . were less important habitats for salmonids in general" (ISG 137).

²⁰ E. Bishop, "Timber in the Grande Ronde," *La Grande Observer*, Centennial Edition 21 Oct. 1996: 70-71.

²¹ B. McIntosh et al., *Management History of Eastside Ecosystems: Changes in Fish Habitat Over 50 Years, 1935 to 1992* (n.p.: U.S. Forest Service, 1994, General Technical Report PNW-GTR-321) 12.

basin doubled. Road building adds to sediment loading in streams, as well as simplifying and constraining channels and isolating them from their floodplains.

As private supplies were exhausted, pressure shifted to harvest national forest ridgetops and high valleys.²² (See figure 3.) Old growth ponderosa was depleted, changing the character and ultimately the health of the forests. Insect infestations, disease, and intense fires from fire suppression policies and accumulated fuel loads have characterized forest health in the last two decades. Compacted soils, destruction of streamside and upland vegetation, larger canopy openings from clearcutting—all contribute to earlier snowmelt, faster runoff, and reduced water retention in soils and floodplains.

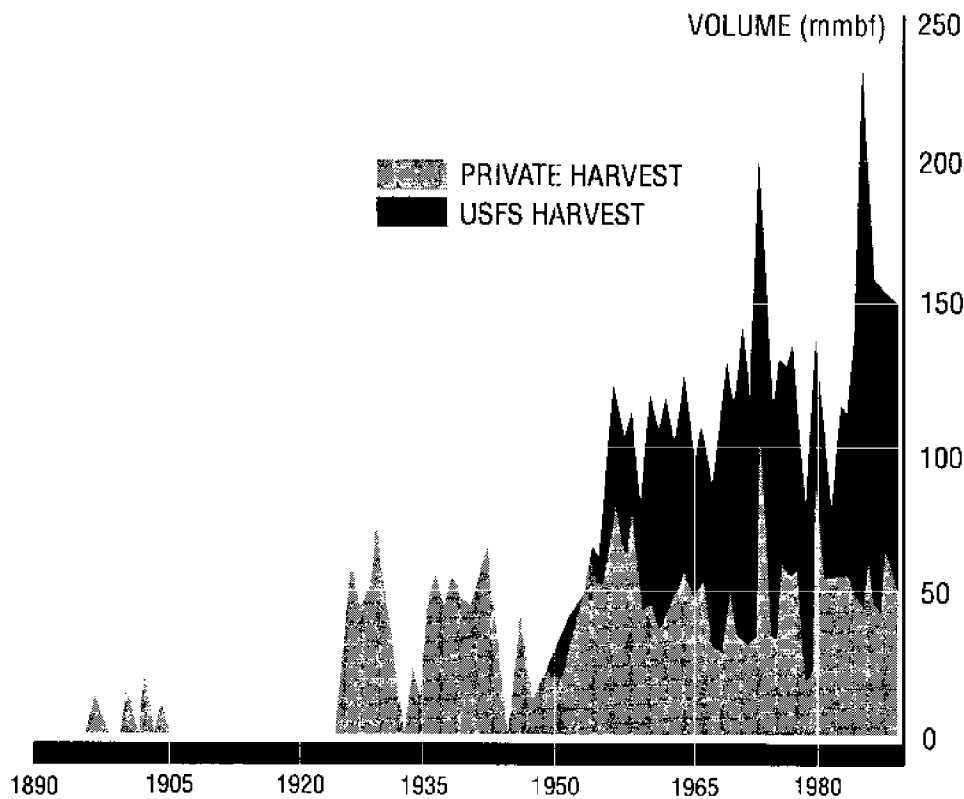


Figure 3. Volume of timber harvested for Union County, Oregon, 1896 to 1990. Adapted from McIntosh et al. 13.

Livestock Grazing

Following early settlement, grazing in the Grande Ronde quickly moved from valley floors to upland meadows and range. By the 1880s there were signs of overgrazing in the upper Grande Ronde. In the early 1900s domestic livestock grazing peaked (in 1906 the Wallowa Forest Reserve recorded 18,700 cattle and 251,000 sheep permitted) and thereafter fell off dramatically, leaving behind exhausted range and damaged meadows and watercourses that have yet to recover (figure 4). In addition to domestic livestock, records speak of several thousand feral horses populating the range, competing for dwindling forage and browse.

Conservation efforts early in the century were offset by the demands of World War I for horses, beef, and pork. Since the 1930s much low-elevation grazing land was seeded to permanent pasture or otherwise protected from

²² McIntosh et al. 12-14.

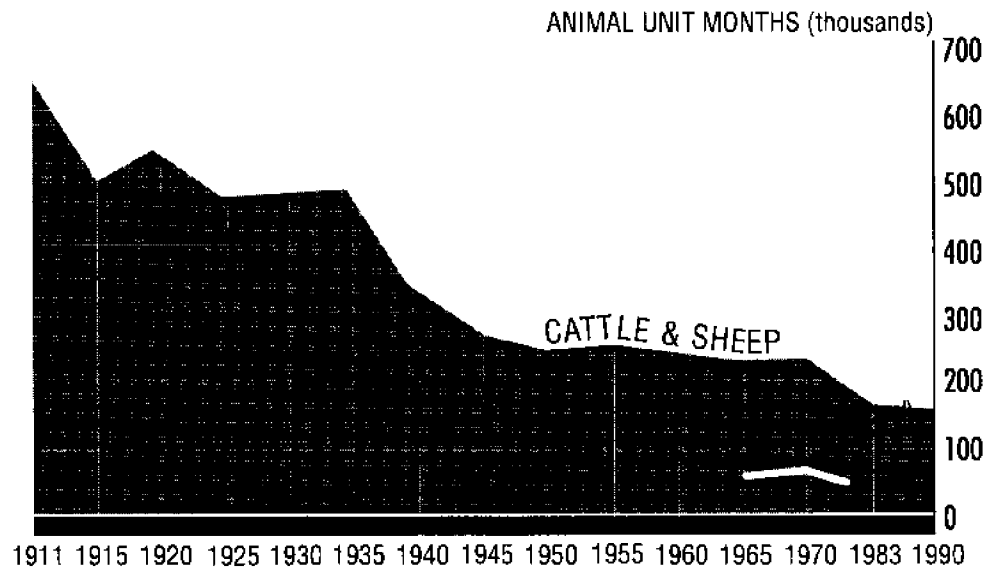


Figure 4. Grazing use (animal unit month) by livestock and elk on the Wallowa-Whitman National Forest, 1911 to 1988. Adapted from McIntosh et al. 12.

the earlier intense consumption. Still, the effects of overgrazing remain severe throughout the basin, and particularly in riparian areas where livestock tend to concentrate for the water and better forage. Even the lower levels of grazing today continue to cause watershed problems in these areas, where they can break down stream banks, denude riparian vegetation and streamside shade, and pollute water.

Mining

Most of the region's intensive mining took place south across the mountains from the Grande Ronde, in Baker and John Day Counties. Mines were worked for copper and gold in the Imnaha and the upper Grande Ronde beginning in the 1870s. Piles of overburden from these mostly abandoned ventures have polluted streams for decades. A 1941 Bureau of Fisheries (now the National Marine Fisheries Service) survey in the area noted, "In a great many instances the river is present in sound only. It was possible . . . to drive a car up the middle of the stream bed. What was left of the river was flowing, out of sight, underneath the rubble."²³

²³ McIntosh et al. 9.

The Science of Watershed Recovery in the Grande Ronde

Four anadromous salmonid species—chinook (spring, summer, and fall runs), coho, steelhead, and sockeye—historically occupied accessible reaches of the drainage, migrating in and out of the basin throughout the spring, summer, and fall. Anadromous lamprey are native to the basin and culturally important to the tribes. Native rainbow, redband, and bull trout are also present in the drainage.

Wildlife species were distributed throughout the basin, among them, elk, deer, antelope, mountain sheep and goats, mountain lions, and many bird species, including wetland birds such as teal, wood ducks, and water ouzels.

Status of Grande Ronde Salmonid Populations

Declines in anadromous fish populations in the Grande Ronde have paralleled conditions within the Columbia Basin as a whole. Harvest impacts on the mainstem Columbia in the late nineteenth century led to the first crisis, addressed by harvest regulations, hatchery construction and operation, and substitution of lesser- for greater-value salmon. A second decline began in the 1920s, as harvest takings began to combine with habitat modifications in the basin's headwaters and with the onset of dam construction in the 1930s. From the 1950s to the 1970s stocks stabilized at low levels; then, coincident with a warming and drying climate oscillation that interacted with existing poor habitat conditions, populations declined precipitously. In 1992, Snake River sockeye, Snake River fall chinook, and Snake River spring/summer chinook were listed under the Endangered Species Act.

In 1956 an estimated 20,000 spring chinook returned to the basin; by the early 1970s the number had dwindled to 8,400 (figure 5). Twenty-one major streams throughout the basin provided spawning and rearing habitat for these fish. Fall chinook occupied the lower reaches of the system, but few specimens or redds have been observed for the last 25 years (figure 6). Historically, the Grande Ronde provided the largest production of coho in the Snake Basin and the furthest inland distribution in the Columbia Basin.²⁴ Since 1986, coho have been considered extinct in the basin (zero counts of coho passing Snake River dams). Sockeye disappeared from the Grande Ronde when the dam at the outlet of Wallowa Lake was raised in 1916, preventing their passage to lake spawning sites. Summer steelhead runs of 15,000 or more may have occurred prior to the construction of the Snake River dams and the low runoff period that began in the 1970s but have declined dramatically since.²⁵

The Oregon Department of Fish and Wildlife (ODFW) conducts redd (nest) counts in the Grande Ronde and Imnaha basins (figures 7 and 8).

²⁴ Pacific Rivers Council, "Cop-Copi: The People and the Ecology of the Grande Ronde" (Unpublished, 1994) 6.

²⁵ Columbia Basin Fish and Wildlife Authority, Grande Ronde River Subbasin Salmon and Steelhead Production Plan (Portland, OR: Columbia Basin Fish and Wildlife Authority, 1990) 99-102. For additional redd count data from 1988 to 1996, data provided in personal communication with Duane Anderson, Pacific States Marine Fisheries Commission, January 1997.

"Sockeye disappeared from the Grande Ronde when the dam at the outlet of Wallowa Lake was raised in 1916, preventing their passage to lake spawning sites."

Figure 5. Spring chinook salmon spawning escapement in the upper Grande Ronde River 1964-1991. Data for 1964-1988 are five-year averages; 1988-1991 is a three-year average. Data from Oregon Department of Fish and Wildlife, La Grande, Oregon 1991, in NRCS and USFS n.p. The figure has been adapted.

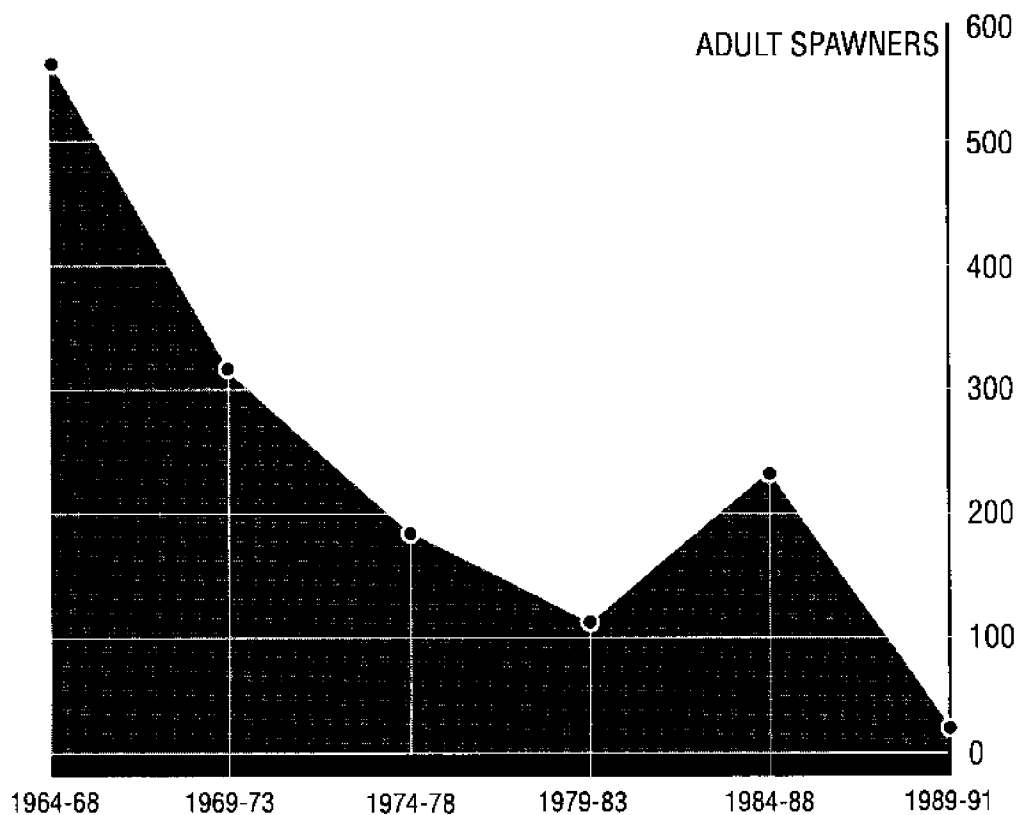
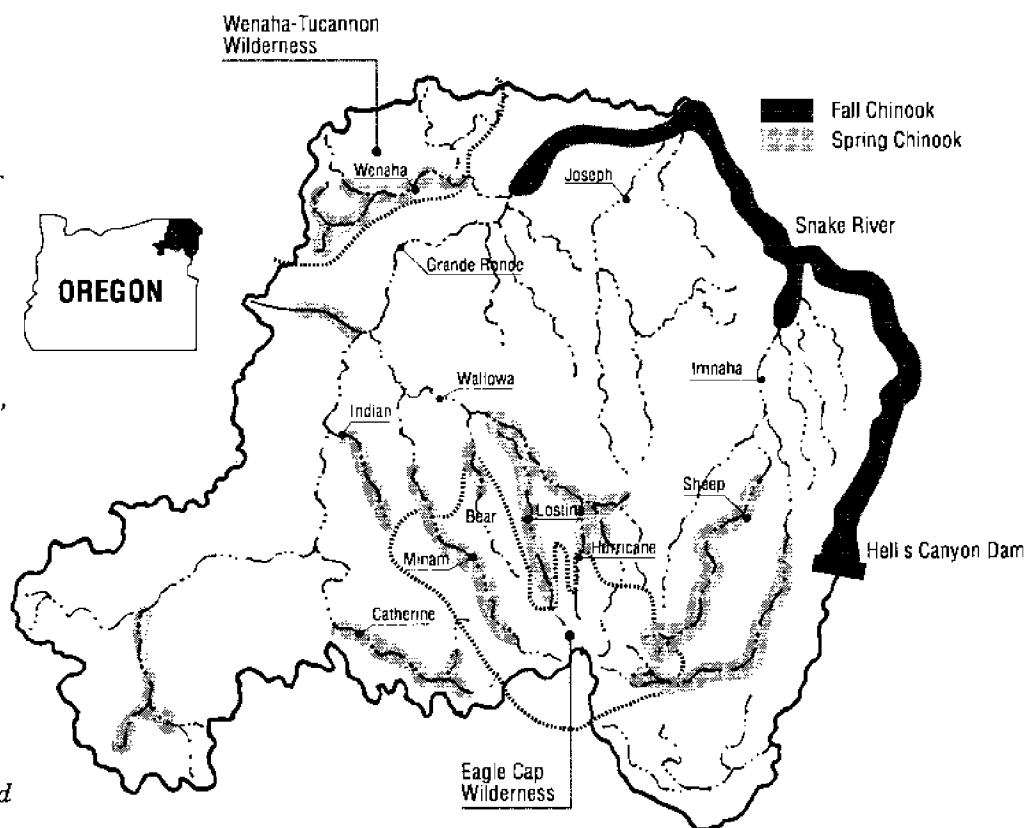


Figure 6. Spawning localities in northeastern Oregon of fall chinook salmon in the free-flowing section of the Snake River below Hell's Canyon dam, and for fall and spring chinook salmon in two of its tributaries, the Grande Ronde and Imnaha. Historically, spring chinook would use the unmarked middle reaches for overwinter rearing. When summer chinook returned, they used the same middle reaches for spawning and rearing. Sockeye spawned in Wallowa Lake. Adapted from ISG 31B.



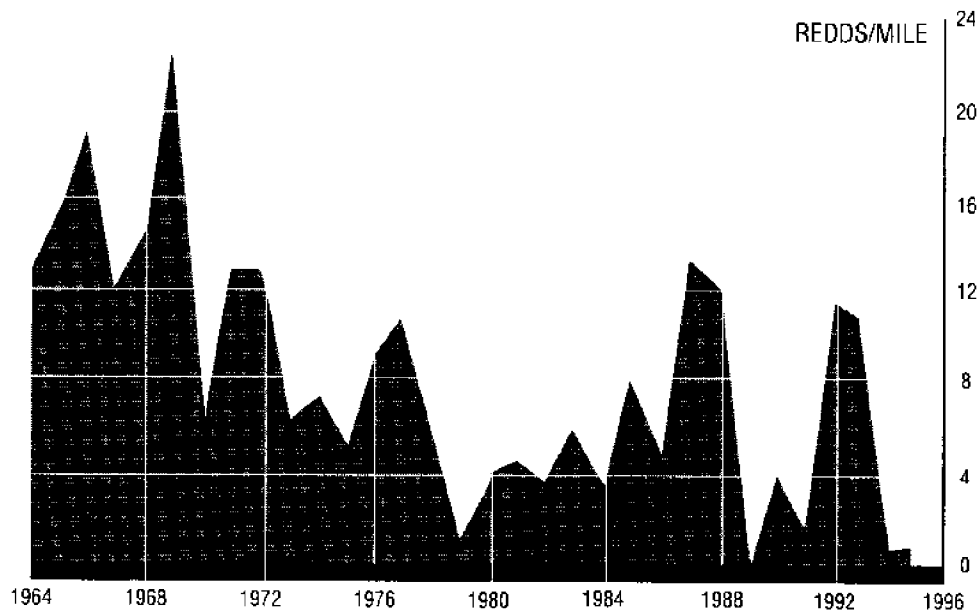


Figure 7. The Grande Ronde River. Spring chinook salmon redd counts in index areas of the Snake River tributaries and the Imnaha and Grande Rivers and their tributaries demonstrate synchronous annual decline of spawners among sites. Adapted from ISG 82B.

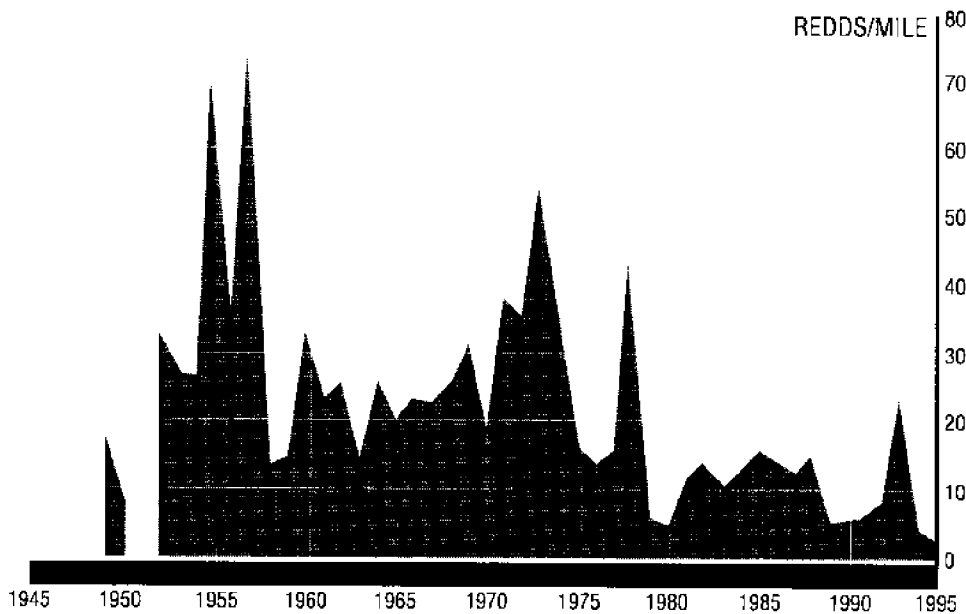


Figure 8. The Imnaha River. Spring chinook salmon redd counts in index areas of the Snake River tributaries and the Imnaha and Grande Rivers and their tributaries demonstrate synchronous annual decline of spawners among sites. Adapted from ISG 82A.

From 1950 to the early 1970s, the upper Grande Ronde showed redd counts consistently between 10 and 20 per stream mile. Thereafter counts dropped off to single digits, with a brief, false recovery in the mid-1980s. The last eight years (to 1996) have averaged 2 redds per mile, and in five of those years, fewer than 1. Similar trends show for all 10 streams surveyed, with the lowest counts in streams most heavily used. Summer steelhead redd counts are also in low single digits and show corresponding curves.²⁶

Fish biologists have proposed scenarios in which simple population sparsity can result in final precipitous declines as spawning partners are simply

²⁶ ODFW data, Duane Anderson, Pacific States Marine Fisheries Commission, correspondence with author, 1997.

unable to locate each other, let alone compete to maintain genetic vigor. The dwindling populations may also suffer genetically from the loss of diversity within the subbasin, simply as a result of fewer fish. The stocks in the Grande Ronde may well be at levels that will test these theories.

Controversial efforts to supplement dwindling wild populations with carefully selected and outplanted hatchery stocks are underway in the basin, with no indications yet of relative success.

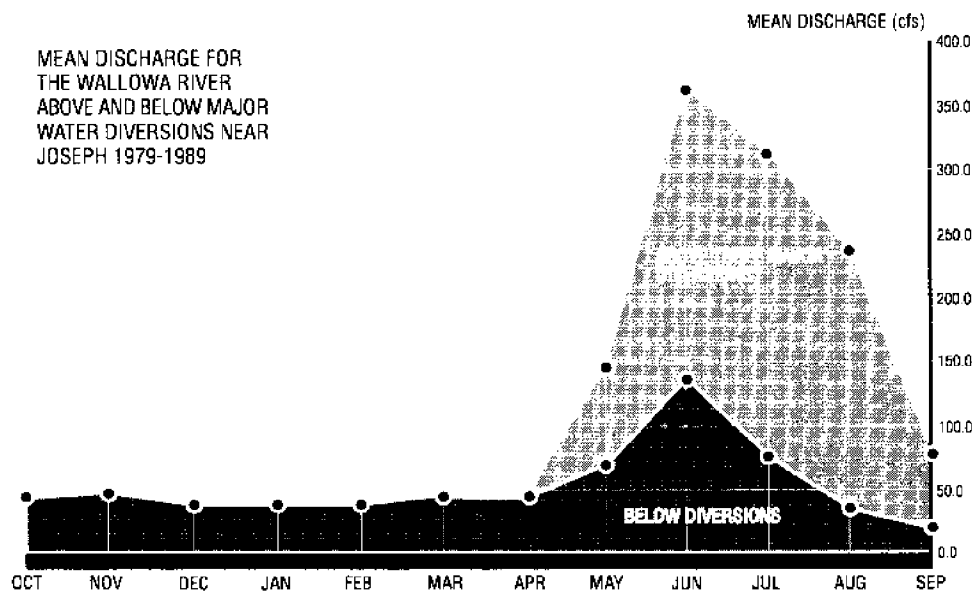
The State of Watershed Health in the Grande Ronde

The effect of settlement, development, and economic use of the Grande Ronde basin has been to substantially degrade watershed conditions from presettlement conditions. The declines have been documented in numerous surveys. These conditions are interactive; for example, high temperatures are a function of low flows, loss of vegetation and woody debris, and loss of pools. Temperature in turn may interact with pollutant loads to support algae growth, which in turn reduces dissolved oxygen required by salmonids and their food web.

Streamflow

The basin has historically low summer flows, but the problem is exacerbated by irrigation withdrawals (figure 9). Many major streams in the basin are overappropriated in low runoff years. Frequently one-half to two-thirds of the summer flow will be withdrawn for irrigation needs. Remaining flows will suffer higher temperatures and in some cases insufficient water to allow adult migration upstream. There is evidence that runoff from the upper Grande Ronde is peaking up to a month earlier than historically because of faster snowmelt, less ground water storage in flood plains, and swifter water movement through cut and straightened channels. The problem may be aggravated by upland timber harvest that exposes snow accumulations to earlier melting. By June, outflow has generally dropped off drastically, reflecting the reduced snowpack and floodplain water retention. The effects of depleted flows are compounded by the onset of the irrigation season.

Figure 9. Effect of three major water diversions on streamflows in the Wallowa River near Joseph (Wallowa subbasin). Sources: USGS data for gauging station no. 13327500 and Oregon Water Resources Department data for gauging station nos. 13319700, 13319000, and 13323500. Adapted from C. Huntington, Stream and Riparian Conditions in the Grande Ronde Basin (Canby, OR: Clearwater Biostudies, 1993) 25.



Temperature

Lestelle and Mobrand note that, "Overall, changes in water temperature between historic and existing conditions appear to have had the greatest contribution in reducing spring chinook productivity."²⁷ Most biologists stipulate summer temperatures below 59°F as optimum, and sustained levels above 68°F as lethal for salmonids.²⁸ Only a few sites at higher elevations consistently meet optimum criteria, while many sites measure summer temperatures at or exceeding 68°F.²⁹ This is especially true in the Grande Ronde Valley and downstream, where the combined loss of streamside shade vegetation and low flows caused by irrigation withdrawals create heat sinks in what should be prime rearing habitat (figure 10). The disconnection between streams and flood plains leads to greatly reduced stream recharge

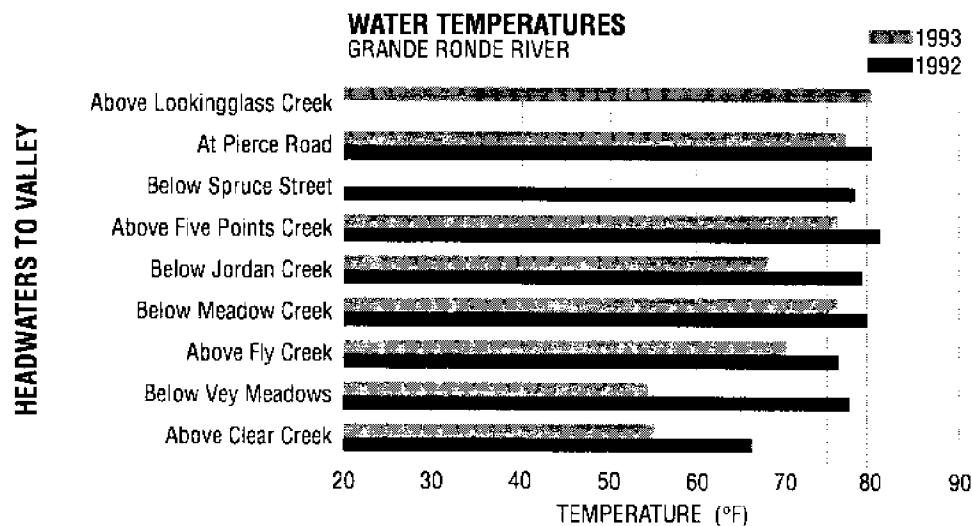


Figure 10. Highest seven-day average maximums for Grande Ronde River in 1992 and 1993 (DEQ 1995). Adapted from NRCS and USFS 4-4.

from cooler groundwater. The Independent Scientific Group (ISG) report notes "lethal or debilitating" temperatures in the Grande Ronde that stress fish and that

have prevented juvenile fish from migrating or redistributing downstream or to tributary branches. Adult fish have been prevented from ascending to suitable spawning areas. Unsuitable temperatures have served to fragment the habitat of tributary basins.³⁰

Equally, lower-than-optimum winter temperatures resulting from the disconnection between streams and moderating groundwater supplies may adversely affect overwintering juvenile fish. Winter temperatures are criti-

²⁷ L. Lestelle and L. Mobrand, *Application of an Ecosystem Analysis Method to the Grande Ronde Watershed* (Vashon, WA: Mobrand Biometrics, 1995) 41.

²⁸ "As water temperature increases beyond about 15°C (59°F), metabolic costs escalate rapidly and available food sources support progressively lower densities of juvenile salmonids" (H. W. Li et al, "Safe Havens: Refuges and Evolutionary Significant Units," *American Fisheries Society Symposium* 17 [1995]. Quoted in ISG 133). Optimum temperature varies with life cycle stage.

²⁹ In 1991 none of the 20 measuring sites in the upper Grande Ronde showed maximum temperatures below 60°F (*Upper Grande Ronde Anadromous Fish Habitat Protection Plan* [U.S. Forest Service, 1992]).

³⁰ ISG 170.

"Survival depends on complex interconnections and feedback loops between the environmental conditions it encounters and its innate ability to respond to them."

cal to the timing of egg hatch and the availability of food for emerging juvenile fish.

It is unclear what influence widening the range of temperature extremes may have on the food web in these streams, but almost certainly there are consequences here as well that affect salmon health.

Stream Structure

Some streams have been channeled, cut down to bedrock in places, and disconnected from floodplains and groundwater. Other channels have been widened, shallowed, silted in, and exposed to heat gain in the absence of riparian vegetation. Banks have been destabilized by vegetation loss and pressure from uncontrolled livestock. Extermination of beaver populations, poor forest health, riparian grazing practices, and salvage of dead and dying trees from streams have reduced streamside vegetation and pools.

Sediment Loading

Roads, stream bank erosion, mine tailings, agricultural erosion, and natural events such as forest fires all add sediment to streams. Excess amounts embed in gravel streambeds, reducing water flow and oxygen supply to salmon eggs. Huntington found levels of fine sediment too high to meet his reference criteria in 47 percent of the channels surveyed.³¹

Other Conditions

The Oregon Department of Environmental Quality (DEQ) classifies the basin as "water quality limited," particularly for temperature and sediment. In some stream reaches the DEQ has documented problems with low dissolved-oxygen levels, excessive pH and ammonia levels, concentrations of coliform bacteria, and excessive algae growth. These conditions result from both point sources (wastewater discharges) and nonpoint sources (urban and agricultural runoff).³²

The Science of Watershed Health

Columbia Basin salmon habitat encompasses steeply falling headwater streams high in the Rockies and Cascades, alluvial floodplains, mainstem Snake and Columbia migration corridors, wetland estuaries at the river's mouth, the plume of mixed fresh and saltwater that extends into the ocean, and an open ocean (pelagic) phase. Altogether it is a complex life cycle exploiting different ecosystems at each stage, each ecosystem as intricate in itself as is the whole.

The survival of a salmon is the consequence of biological and environmental factors that accumulate throughout its life history. To assess these survival factors, we must begin as far back as the creature's genetic inheritance, the health of its mating parents, and the stream conditions into which they have deposited the fertilized egg. From incubation through hatching, rearing, migration out of the watershed and down to the ocean, and finally to the fish's upriver return to mate and reproduce, its survival depends on complex interconnections and feedback loops between the environmental conditions it encounters and its innate ability to respond to them.

³¹ C. Huntington, *Stream and Riparian Conditions in the Grande Ronde Basin* (Canby, OR: Clearwater Biostudies, 1993) 35.

³² NCRS and USFS chapter 4

Most of the external threats to a salmon have incremental effects, not necessarily lethal by themselves. Mortality at dams may come as a consequence of turbine blade injuries, which can destroy the healthiest yearling migrant. But mortality caused by predation, infection from injury sustained against a bypass screen, gas bubble disease, or a combination of these threats is more likely. A fish stressed by high water temperatures may be predisposed to injury or disease. A fish that has exhausted its energy reserves while competing for sparse food supplies during its rearing phase or by propelling itself through the slackwater of a dam reservoir—instead of being carried by a spring flood—will be more vulnerable to predators.

Since spawning and rearing conditions contribute directly to the salmon's ability to negotiate the perils of downstream migration, headwater communities cannot shift all responsibility for salmon mortality onto dams. Habitat is a factor in dam mortality. Equally, the stress to and loss of upstream migrants attempting to circumvent dams will influence the success of spawners to successfully complete redd construction, find mates, and lay and fertilize eggs.

In *Upstream*, the National Research Council (NRC) described the freshwater habitat requirements of salmon as

a stream or lake, the adjacent border of vegetation (riparian zone) that serves as the interface between aquatic and terrestrial ecosystems, and the quality and quantity of water. The water must be clean enough and cool enough to support returning adults, for eggs to hatch, and for young to survive and grow until they migrate to sea. There must be enough water in the rivers at crucial times to make migration possible, to allow fish to escape predators, and to allow fish to find adequate food. Well-aerated streambed gravels are important for spawning. Streamside vegetation provides shade, which keeps the water cool; it provides a buffer against soil erosion, which maintains water quality; it provides living space for various animals that provide food and nutrients for streams; and it provides a source of large woody debris, which plays a key role in the formation of physical habitat and storage of sediment and organic matter and provides habitat complexity in stream channels, thus improving the stream environment for salmon. These requirements for environmental conditions in streams and adjacent riparian zones depend on the condition of the entire watershed in which they occur."³³

The ISG report to the Northwest Power Planning Council (Power Council) reiterates many of the same points:

The tributary rivers [of the Columbia River Basin] flow through mountain valleys where large alluvial flood plains occur . . . within the river continuum from headwaters to mainstem confluence like beads on a string. [These alluvial reaches] are important . . . because they provide critical habitats that are much less available within the constrained channels of many of the canyon reaches [or downstream in the mainstem Snake and Columbia]. . . . Incubation of salmonid eggs and fry occurs within the interstitial spaces of alluvial gravels in the beds of cool, clean streams and rivers Once emergence from gravel is complete, young salmonids [have limited mobility]. . . . [S]uitable habitat and food resources must be available in proximity to spawning areas for successful first-year survival. Moreover, movement may come with high metabolic cost and high risk of mortality, such as exposure to predators, unless

³³ National Research Council 7.

movements are tied closely to patches of predictable, high-quality habitat [affording] low-velocity cover [and] a steady supply of small food particles. . . . Examples of such habitats include quiet-water areas, backwaters, and small spring-fed channels along stream margins, floodplain ponds and sloughs, and alcoves within structural complexes created by woody debris, bank structures and riparian vegetation or aquatic plants. These critical habitats are most abundant and structurally diverse on aggraded floodplain reaches.³⁴

Both reports, and many other analyses, contain extensive documentation of the progressive decline of this spawning, rearing, and migration habitat under pressure from Euro-American settlement and economic use. In the Grande Ronde and elsewhere, beginning in the 1830s with the continental beaver trade, salmon suffered through periods of intensive logging, grazing, and mining; floodplain drainage for farming; water withdrawals for irrigation; dams that shift the spring snowmelt forward to summer for irrigation and into the next winter for power generation; and slackwater pools on the Columbia and Snake that support navigation, moving grains and goods from the northern Great Plains westward to the ocean and across. And of course the direct salmon harvest, in nets and on hooks, nearly eliminated some runs as early as the late nineteenth century, before other impacts could be widely felt.

The NRC and ISG reports both argue that habitat diversity, salmon life history diversity, and survival have an intimate relationship with each other. According to Healey and Prince,

Maintaining a rich diversity of Pacific salmon genotypes and phenotypes depends on maintaining habitat diversity and on maintaining the opportunity for the species to take advantage of that diversity.³⁵

Indeed, that intraspecies diversity is a critical salmon survival strategy (figure 11). Populations (within species) will first occupy the most favorable habitat available, then seek out progressively less favorable niches in which survival and reproduction are achievable (albeit at lower levels of success). These niches may be spatial (for example, moving upstream where temperatures are colder and food supplies—and competition—are sparser), or temporal (such as migration phases that begin earlier or later in the year). These separate populations will, over time, adapt to local conditions in subtle but detectable (for example, with DNA analysis) ways. In the event a local population is diminished or destroyed by a natural event (a mudslide smothering spawning beds, a late snowmelt, or flood), it can be rebuilt by recruitment from the center or the edges. The collection of core and outlying populations is characterized as a “metapopulation.” The outlying populations are no less critical to species survival than is the far larger center, since disaster in any part of the metapopulation is offset by repopulation from the survivors. Furthermore, outlying populations colonizing progressively less favorable habitats may extend the genetic ability of the species to survive if overall environmental conditions deteriorate.

Metapopulation dynamics require, and are based on, the diversity, complexity, and interconnectivity of habitat conditions. Habitat diversity, however, is diversity within limits; that is, within threshold environmental

“Salmon suffered through periods of intensive logging, grazing, and mining; floodplain drainage for farming; water withdrawals for irrigation.”

³⁴ ISG 130-132.

³⁵ M. C. Healey and A. Prince. 1995. “Scales of Variation in Life History Tactics of Pacific Salmon and the Conservation of Phenotype and Genotype.” *American Fisheries Society Symposium* 17. Quoted in ISG 26.

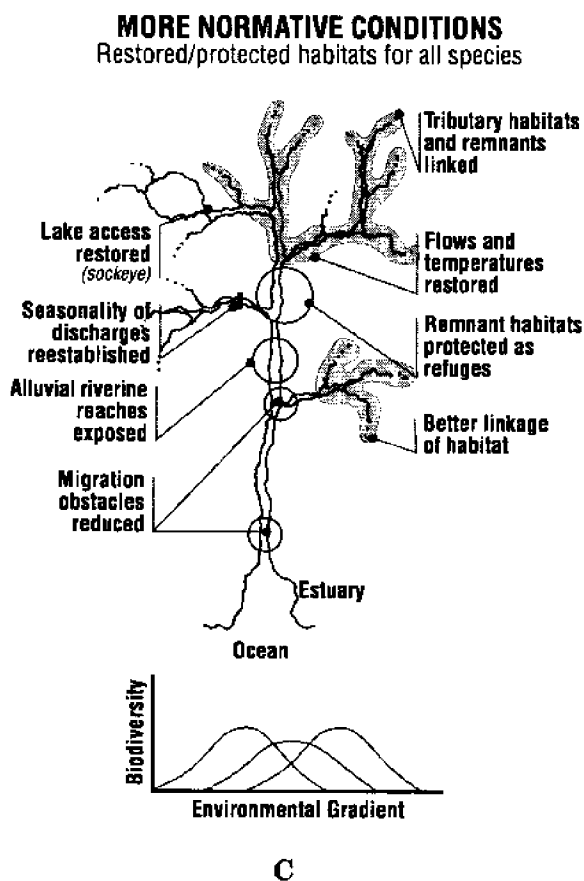
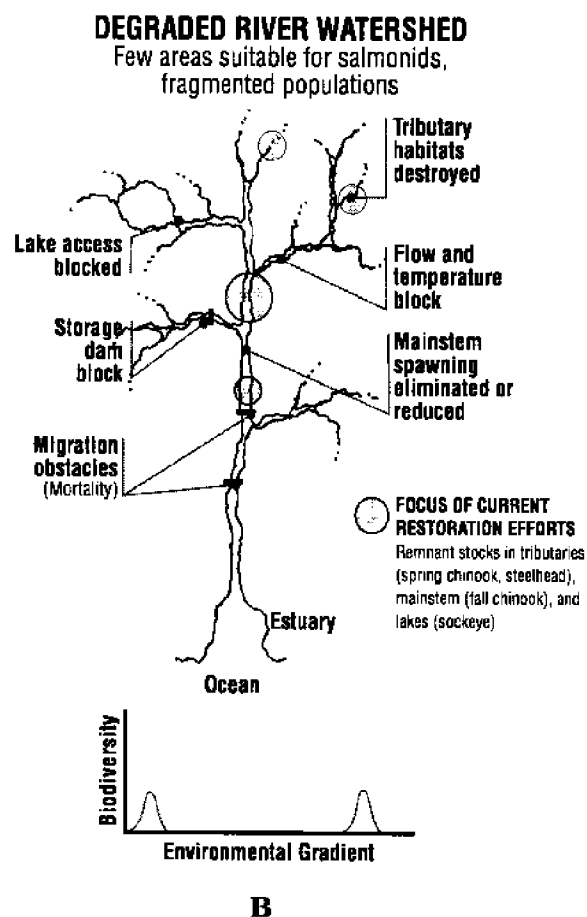
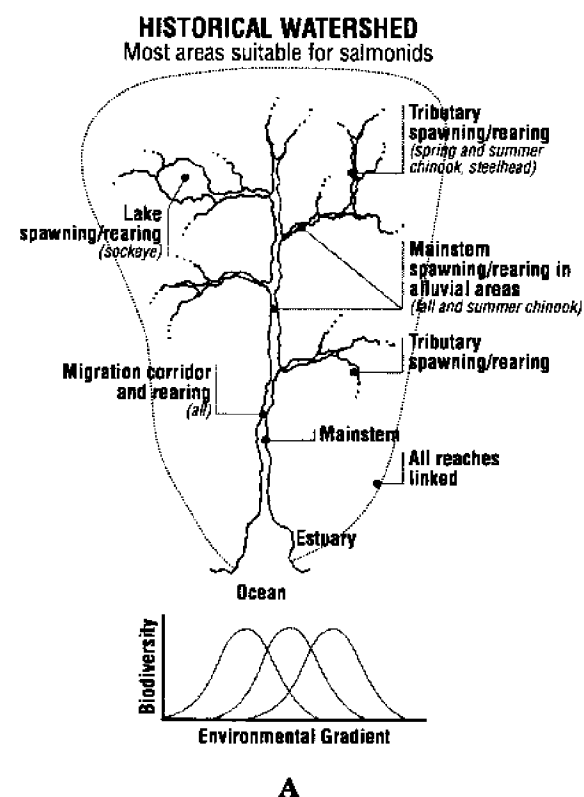


Figure 11. Watershed components and conditions relative to biodiversity for (clockwise from top left) the pristine, or historical, situation (A), the degraded situation characteristic of the present (B), and the situation where a degraded watershed has been moved in the normative direction (C). Adapted from ISG 355A.

conditions of cold water and clean gravel, an intact food web, protective cover, and an open channel to the sea. Complexity and interconnectivity have to do with the variety and complementariness of in-stream, riparian, and upslope environments that interact to harbor the fish, its food supply, and other conditions of survival.

If habitat diversity is reduced, so is life cycle diversity. Survival prospects are diminished. As the ISG report has observed, "Depleted salmon populations cannot rebuild if any habitat that is critical during any of their life stages is seriously compromised."³⁶

In the past, recovery efforts have often focused on restoring the most compromised parts of the watershed, on the theory that these were "limiting conditions," the repair of which would allow fish populations to expand

"We are asked to look at and respond
to watershed conditions 'through the
eyes of salmon.'"

to a level determined by the next limiting condition. This strategy was useful when viewing extreme conditions (absolute passage barriers, for example), but it was essentially a one-dimensional view of a multidimensional problem. By not recognizing the interconnected qualities of habitat, it invited poor use of resources that might have been better applied to other environmental conditions that might be less compromised but that have greater combined potential for supporting salmon life and health.

Later refinements of watershed recovery strategies have directed efforts less at repairing the most severely damaged habitat and more to securing and protecting refugia, or areas that remained largely undamaged and were critical for certain phases in the life cycle, particularly spawning and rearing.³⁷

For the Grande Ronde, Lichatowich, Mobrand, and others have proposed an alternative ecosystem diagnosis and treatment (EDT) approach to watershed analysis that explicitly accounts for interconnections among diverse watershed ecosystem factors, and between those factors and the life history requirements of salmon.³⁸ EDT accumulates both historical and current data on 14 to 17 stream attributes (for example, water temperature) known to be material in the salmon life cycle. The attributes also are arranged on a time scale, since different conditions may be optimum for the salmon at different points in its life cycle (for example, incubation, hatching, rearing, migration). In effect, we are asked to look at and respond to watershed conditions "through the eyes of salmon."³⁹

³⁶ ISG xvii.

³⁷ B. Doppelt, M. Scurlock, C. Frissell and J. Karr, *Entering the Watershed: A New Approach to Save America's River Ecosystems* (Washington: Island Press, 1993).

³⁸ J. Lichatowich et al., "An Approach to the Diagnosis and Treatment of Depleted Pacific Salmon Populations in Pacific Northwest Watersheds," *Fisheries* 20.1 (1995): 10-18. Lestelle and Mobrand are applying this diagnostic tool in the Grande Ronde.

³⁹ L. Mobrand, J. Lichatowich, and L. Lestelle, "Through the Eyes of Salmon" (Unpublished, 1997).

We can then decide what combination of remedial actions will result in maximum overall improvement of survival conditions throughout the head-water phases of the salmon's life history. Because resources are always limited, to stretch resources as far as possible we can rate actions in order of priority. Highest priority can be given to actions that address conditions that violate threshold habitat requirements or that, taken together, will have the greatest impact.

Before a program is agreed upon, the EDT process specifies an additional step, one reflecting an ecosystem view that includes human beings. Community values are solicited, and then community agreement on goals and strategies consistent with the science of watershed recovery. Without a level of community commitment to the findings of watershed science, interventions to repair damaged watersheds are unlikely to be coherent or consistent.

As I demonstrate later in this study, the interaction between watershed science and community values is itself a complex one, with its own unexpected feedback loops. The earlier the linkage is established between human and nonhuman ecosystem needs, and the more thorough the grounding the community gets in watershed science, the more likely are positive action and improvements.

The Model Watershed Process in the Grande Ronde River Basin

In April 1992, Governor Barbara Roberts designated the Grande Ronde as Oregon's Model Watershed program, one of three such programs basinwide. Idaho (upper Salmon River) and Washington (Asotin Creek) also implemented this Power Council recommendation to undertake cooperative "locally-based, bottom-up, voluntary" approaches to habitat restoration on private lands, and coordination of "activities on federal and private lands . . . to achieve comprehensive watershed management . . ." within each subbasin.⁴⁰

Beginnings

The Model Watershed Board, appointed by the Union and Wallowa County governments, met for the first time that summer. Representatives of local economic interests filled the largest numbers of seats, but also represented were the Umatilla and Nez Perce Tribes. John Howard, a Union County commissioner, chaired the board; Ellen Bishop, representing environmental interests, was named vice-chair. It would be an immense task for these men and women to find common ground in a program that needed to both build on and challenge 130 years of status quo to succeed.

The two counties are not without a history of cooperative community activities in the Grande Ronde watershed. Although much of the historical development has been individual, irrigation ditches and flood control works were often cooperative efforts among farmers occupying adjacent properties. In Union County, the community came together in the 1870s to cut the first increment of what became the State Ditch, to open new farmland and reduce seasonal flooding from a sinuous Grande Ronde overflowing onto the flat valley floor each spring.

Union County Flood Control

In modern times flood control was on the community's agenda in 1948-49, and again in 1964, both occasions after destructive events. The Army Corps of Engineers (Corps), the Bureau of Reclamation (Reclamation), and the local Soil and Water Conservation Districts (SWCDs) developed plans for dikes and headwater dams to control flooding and accommodate irrigation diversions. Fish concerns placed the dams on the shelf, but an extensive modern diking system completed in 1975 has not put flooding concerns to rest. Landowners surveyed by the Union County SWCD in 1996 still list upstream storage and levee modification as preferred solutions.⁴¹ The SWCD study keeps headwater dams on the table for discussion, but broadens alternatives to include spacing levees out to a 10-year flood plain, planting riparian vegetation, and allowing natural flooding with rapid drainage.

Wallowa County-Nez Perce Tribe Salmon Habitat Recovery Plan

Wallowa County occupies the far northeast corner of Oregon, but even that distance did not isolate it from the turmoil in westside forests as offi-

⁴⁰ Northwest Power Planning Council Fish and Wildlife Program, *Strategy for Salmon* (1994) 71.

⁴¹ NRCS and USFS 7.2

"The level of local commitment to keeping the initiative in local hands has never been stronger."

cials and communities labored through the consequences of listing the spotted owl under the Endangered Species Act (ESA). In 1992, with the National Marine Fisheries Service (NMFS) proposing to list Snake River salmon stocks, County Commissioner Pat Wortman and Nez Perce representative Si Whitman met to contemplate the daunting future. They agreed that anticipating such listings and organizing to cope with them had potential benefits for both. The Nez Perce sought the return of harvestable salmon to the Snake and its tributaries on their reservation and ceded lands. Wallowa County wanted fish back but wished also to protect the livelihoods of its people, dependent as many were on using the forests, pastures, and streams of this scenic, isolated valley.

From this meeting a process emerged, at first informal, involving landowners, business representatives, county and tribal officials, ODFW biologists, and one environmental representative. State and federal officials provided technical assistance and the data needed to produce, in August 1993, the Wallowa County-Nez Perce Tribe Salmon Habitat Recovery Plan. The plan first acknowledged State of Oregon standards for salmon habitat, then surveyed deficiencies in each stream reach of the Wallowa and Imnaha subbasins. Potential solutions were proposed, including "irrigation conservation measures, adding irrigation impoundments . . . leasing water rights . . . early precommercial thinning [of forests and] selective logging practices . . . creation of natural barriers to large animal use of critical spawning and rearing reaches . . . riparian fencing . . . draw bottom road [closure]."⁴²

The Wallowa County plan has received considerable recognition for its display of initiative and its inclusive review of watershed problems.⁴³ It has been criticized for its emphasis on active intervention by land managers to address watershed problems, particularly with respect to proposals for headwater storage dams and salvage logging and thinning to reduce fuel loads and maintain "optimum tree densities."⁴⁴ Although there are measures to reduce human impacts throughout the report, the plan does not countenance setting aside a stream reach and allowing a natural restoration process to unfold.⁴⁵

The Grande Ronde Model Watershed Experiment

In the five years since the inception of model watersheds in the Columbia Basin, there have been decisions made and projects undertaken, accompanied by an evolution of attitudes (still far from complete), a growing sophistication in handling the technology and tools of watershed management, and slow progress in learning to control and coordinate human inter-

⁴² *Wallowa County-Nez Perce Salmon Plan* 87-96.

⁴³ Northwest Power Planning Council, section 7.6C: 7-35.

⁴⁴ For example, Joseph Creek recommendations suggest that forest managers "Provide optimum tree densities for building and retaining snowpack by planting and preserving trees where they are too thin, and thinning trees to allow precipitation to reach the ground where they are too thick" (*Wallowa County-Nez Perce Salmon Plan* 83).

⁴⁵ Of course, there are already extensive wilderness and wild and scenic areas set aside in Wallowa County. The ISG notes that "headwater reaches are predominantly high gradient within constrained channels and are generally unproductive owing to low concentrations of plant growth nutrients (ISG 353). Typically, the high productivity floodplain spawning and rearing habitat is almost wholly developed and used.

ventions in the watershed. Available data leave unclear whether net progress is being made in the race between degradation and restoration of the watershed. If there has been progress, it remains unclear whether the pace of restoration is sufficient to maintain fish stocks. This inconclusiveness should neither surprise nor shock. The problems in the Grande Ronde have accumulated over 150 years, and even with the best of intent and commitment will take decades to correct.

Finally, irrespective of any progress in a subbasin like the Grande Ronde, salmon stocks there are hostage to choices made at mainstem dams, in harvest operations, and elsewhere in the Columbia Basin.

Monthly or more often for five years now, Model Watershed Board members and technical staff have met to search out a safe path to the future for themselves and their neighbors and reconcile that to a scientifically reliable path to watershed recovery. The combination of apprehension and resolve has produced community dedication and commitment that may waver from time to time but has not yet failed.

Along the way, the process has been punctuated by critical choices, serious threats, defining moments. The level of local commitment to keeping the initiative in local hands has never been stronger. If most of the uncertainties the process began with remain unresolved, there is nevertheless evidence to examine now. In addition, there are working conclusions to be drawn. A selective, roughly chronological tour of significant events in the Grande Ronde over the past five years will suggest some of them.

Prairie Creek

From the mountains just east of Wallowa Lake, Prairie Creek flows around Joseph and along the highway to Enterprise, then through town to join the Wallowa River. The stream, hardly more than a ditch itself now, provides irrigation water to fields and ditches along its short length.

In 1991 the Power Council directed the Bureau of Reclamation to undertake three water conservation projects in the Columbia drainage. In Oregon, Reclamation dusted off a plan to enclose Prairie Creek in pipe, dramatically reducing water loss through seepage, transpiration, and evaporation. The irrigators, in cooperation with the Wallowa County SWCD agreed with the project after assurances they would lose no water, and might gain some, while some savings would also go back into the Wallowa River for salmon.

When the decision was disclosed to the communities of Joseph and Enterprise, it quickly unraveled. Prairie Creek was not just an irrigation ditch, it turned out. It was a stream that wandered through backyards and graced a city park. Seepage along its course fed groundwater levels that supported domestic wells. The biggest complaint, however, was that a watershed decision had been made for the community by a regional agency and a federal one, in consultation with some local water users but not, it turned out, a representative group. City and county officials petitioned the Power Council, politely but firmly, to redirect Reclamation. The stage directions and props for a classic conflict—local control vs. a heavy-handed fiat by state and federal government—were in place.

To the credit of all parties, the conflict was diffused while the commitment was modified and kept. The Power Council and Reclamation backed away from the Prairie Creek project, but on condition that the community come up with comparable water savings and watershed measures, measures that would pass scientific and technical review. The community agreed

and set about organizing the committee that would develop the Wallowa County-Nez Perce Tribal Salmon Plan.

An essential connection was established between expectations of community action on the one hand (coupled with an implicit threat of intervention if no action was forthcoming) and local initiative on the other. Wallowa County understood it was a part—and no longer an invisible, isolated part—of a larger Columbia Basin. It was connected hydrologically, biologically, and politically. It was subject to a set of national policy expectations embodied in the ESA, the Clean Water Act, the Northwest Power Act, and other statutes. The kind of tumultuous change that was turning westside forests inside out was about to break east of the Cascades. Wallowa County could try to deny entry to these forces, or it could seize the initiative. It could turn away outsiders and seek to obstruct change, or it could accept a collaborative model that included both biological imperatives and consideration for valley residents.

The county's choice was not a foregone conclusion. Its inhabitants are independent, many of them from homesteading families, sympathetic to "wise use" public lands policies, distrustful of government agencies, often insistent that federal lands be returned to local control. They are frequently resentful of what they perceive as a distant state government in Salem, 300 miles away, and an I-5 corridor population with its liberal politics, its high-tech industry, and its coffee bars; and that resentment has only grown in recent years as westside, environmentally minded voters have fielded initiatives and filed lawsuits that are seen in the east as targeting rural communities.

At the same time, state policies toward land and water management, fish and wildlife conservation, and watershed health have been inconsistent from governor to governor and from agency to agency. Unresolved contradictions between agencies with development missions and those more oriented to conservation have made consistent state signals to local communities and governments elusive.

In the Grande Ronde, watershed recovery has been shaken by these uncertainties and threats but so far has survived them.

Organizing the Grande Ronde Model Watershed: Board Membership and Staff

At the same time Wallowa County and the Nez Perce were developing their plan, both were cooperating with Union County and the Confederated Tribes of the Umatilla Indian Reservation (the Umatilla) to organize watershed recovery throughout the subbasin. Happily, there were only two tribal groups and two counties involved; other watersheds, such as the John Day, cross many counties and reservation or ceded (treaty) lands.

Following the Grande Ronde's designation as a model watershed, the two county commissions took upon themselves the task of organizing a local watershed policy board. The Model Watershed Board convened in June 1992. Its membership closely resembled that of the Wallowa County group: representatives from the county commissions and tribes, farmers, ranchers, timber interests, and an environmentalist.

The makeup has been criticized as being heavily weighted toward local economic interests, interests that were, after all, responsible over time for the degraded watershed conditions the board proposed to fix. And certainly, the makeup of the Model Watershed Board has produced strategies and projects that rarely threaten individual watershed users and livelihoods. It

was important that some board members be positioned to challenge received wisdom and the status quo (a role that tribal and environmental representation could fulfill).

On the other hand, it would be hard to argue that the makeup was unrepresentative of these communities, which are, after all, still built on extensive economic use of natural resources.⁴⁶ Attempting to impose a state-allocated distribution of board seats (as opposed to the state's ensuring representativeness in distribution) would have been seen as arbitrary at best and manipulative at worst.

In fact the governor's office was openly critical of board makeup. It asked the board to add seats for environmentalists and community activists from La Grande to qualify for funding from the state's new Watershed Health Program. The Grande Ronde resisted. The impasse was finally resolved through creation of an advisory subgroup in Union County that possessed broader representation.⁴⁷ However, the risks of cooperating with the state left a bad taste in local mouths.

These suspicions also were stimulated in the matter of staffing the local watershed effort. The community first looked locally, to the SWCD staff and the Soil Conservation Service (now Natural Resources Conservation Service, or NRCS), but neither group was equipped to take the staffing lead. State of Oregon and Bonneville funding had to be relied on at the outset. Thus, the interim (1991) coordinator was a state employee, paid for and assigned by the Oregon Water Resources Department (OWRD). The board's minimal involvement in the hiring, and the coordinator's clear accountability to Salem, raised local concerns about state preemption of the watershed program.

At its first official meeting in June 1992, the Watershed Board moved to take control of the hiring process. By August it had selected its own staff director, paid by the board with funding directly from the Bonneville Power Administration (Bonneville).

State unhappiness with the board's staff and processes continued over the next two years. The state became increasingly disenchanted with the performance of the board-hired director. While there may have been ample cause for this, state intervention in an area—personnel—that the board felt was its prerogative would have seriously impaired the collaborative effort. State authority to oversee projects for which it provided funding was conceded, but the board was not going to be dictated to in who it hired with nonstate dollars. A personnel dispute, with the appearance of state heavy-handedness, would have colored every other aspect of the relationship.

Wisely the state held its hand, and in 1994 the director resigned to move elsewhere.⁴⁸ Despite rumors, and some incautious words, the threat of state intervention never materialized.

"The kind of tumultuous change that was turning westside forests inside out was about to break east of the Cascades."

⁴⁶ With the exception of Eastern Oregon University in La Grande, the brass foundries and art sales in Joseph, and tourism in both counties, the economies and work forces of the area are substantially engaged in or dependent on timber, farming, and grazing activities. This is less true today, however, than it was 20 years ago.

⁴⁷ The Union County Watershed Management Coalition continues to meet under the aegis of the Model Watershed Board.

⁴⁸ He was succeeded by his assistant, Patty Perry, whose commitment, energy, tact, and understanding have served the board and the watershed with distinction in the three years since.

In membership and staffing issues, the board and the state began to grapple with the delicate questions of who would be in charge of what. How much deference must an outside authority give to a local board? What are the lines of accountability? How much authority can the outside funding agent demand before a local reaction sets up? How can the leverage of state (or federal) standards be effectively applied to influence or guide local efforts without appearing to usurp them? How can local efforts be recruited without allowing watershed health standards to be diluted?

In retrospect the state would have been better advised to largely defer to the community on organizational matters, assuming the local effort was in reasonable good faith. A local board that felt secure in control of its own processes might be a board more open to state participation where the state's role is far clearer: that is, in setting watershed quality goals and evaluating project effectiveness. In the Grande Ronde, the state made its project-related role a more difficult one by trying to shape—from a local perspective, trying to manipulate—local decision making in board composition and personnel matters.

As in Wallowa County, so for the Grande Ronde as a whole: designation as a regional model watershed carried with it risks and rewards. The connection to the Columbia Basin was inescapable for these local board members. They were taking Bonneville funding now, as well as state money. They had considerable leverage, since the region and state had legitimized the board as the lead in a subbasin critical to the recovery of Snake River salmon stocks. At the same time, the board's performance would be highly visible. Ineffectiveness, or worse, intransigent defense of the status quo in a watershed the board itself acknowledged was seriously degraded could bring an avalanche of criticism down on them—could, in fact, jeopardize the local control they sought to preserve.

The four-year record in the Grande Ronde, projects and politics both, has reflected this local-outside dynamic every bit as much as it has local economics and watershed science.

"What should have been a collaborative decision-making model became a cumbersome, hierarchical one."

The Grande Ronde and the Oregon Watershed Health Program

The 1993 Oregon Legislature gave Governor Roberts her watershed health proposal, along with \$10 million to spend in the Grande Ronde and on Oregon's south coast (some \$4 million was ultimately spent in the Grande Ronde). The OWRD was given the lead, and a state director was hired to carry out the state's strategy for watershed assessment and project development. While local councils were expected to play a central role in the program, the state-local relationship was ill-defined. One important feature was that the state would have both a core team of technical experts in Salem and a field team to work in the basin.

In the Grande Ronde it was a rocky relationship from the start. First there was confusion over where to begin: with technical assessments or projects. Although most participants agreed that investing in additional assessment time would produce better-targeted projects, there was pressure—self-applied and from the legislature—to get projects out the door and on the ground. Both parties—the Model Watershed Board and the state—agreed that enough was known about sources of severe mortality (for ex-

ample, passage barriers and unscreened diversions) to justify early projects and gain momentum.⁴⁹ An early action project strategy was adopted. But how should projects be selected? Did the board and the state have the same criteria in mind? If not, whose vote should prevail?

The state generally agreed that local approval should be required—that is, the state should not circumvent the board—but reserved its own authority to subsequently disapprove projects that had passed the board. The core and field teams, which could have been used as technical tools by both the state and local decision makers, became instead gatekeepers for a stacked series of approval gates through which the board had to shepherd its projects. Board- and field team-approved projects would be subject to second-guessing and delays at multiple levels of state approval: the core team, the OWRD leadership, and the governor's Strategic Water Management Group (SWMG). What should have been a collaborative decision-making model became a cumbersome, hierarchical one. Frustration, bruised feelings, and unnecessary "top down-bottom up" procedural arguments ensued.

In the end few if any projects were actually disapproved, although delays and requests for additional information had an equally unwelcome effect on the board. Weak projects that could have been strengthened or washed out in staff consultations in La Grande instead percolated up through the levels of review, becoming sources of disagreement and grist for the skeptics of SWMG.

The dynamics of state government greatly influenced this. On the one hand, the Watershed Health Program was under pressure to spend \$10 million and show results within the two-year window between legislative sessions. On the other, it would be held accountable for money badly spent. There was little time for careful assessments as planned, or for coming to mutually adopted project criteria and a common understanding of their application and meaning. On top of this, SWMG was made up of state agency heads not always in agreement among themselves on what makes a good project, and not always capable of delivering full cooperation from within their agency's rank and file.

To the board, already sensitive to the potential for outside interference and state takeover of their initiative but reliant on state and other outside funding, the slow approval process and perceived second-guessing became a major source of discontent. A model watershed staff director better equipped to resolve disagreements and lubricate frictions might have helped, but this director had no such skills and probably made a bad situation worse.

These problems simmered through the first 12 months of the program, finally coming to a boil when—from the board's perspective—the state changed signals, discarded the early action strategy, and insisted that no projects would be approved without completed assessments of conditions in each Grande Ronde subbasin. The board agreed that these assessments were important but took exception to the unilateral declaration and to a tortuous process that first slowed project approvals, then stopped them up altogether. It required a summit meeting in Portland of local and state policy leaders, facilitated by the Power Council, to resolve at least the immediate

⁴⁹ The Wallowa County-Nez Perce Salmon Plan had inventoried conditions in the lower Grande Ronde. The Grande Ronde Action Plan provided a starting place in the middle and upper valleys. Other data were integrated into these documents including a stream conditions assessment performed by Clearwater Biostudies, a draft of which was made available to the board in 1993.

"State expectations . . . are far less clear than they were becoming in the Grande Ronde when the Watershed Health Program ended."

source of conflict. It was agreed at the meeting that the board would continue to forward projects for state approval on an interim basis. When subbasin assessments were in place, with their statements of problems and indicated solutions, then projects based on these assessments and approved by the state's field team would not be subject to further SWMG review.⁵⁰

This agreement addressed an immediate cause of friction. More importantly, it appeared to promise a more stable basis for state and local collaboration. For while the dispute was growing between La Grande and Salem, the field team was building a solid working relationship with Model Watershed staff, board members, Nez Perce officials, and other partners. There was substantial agreement on a matrix of criteria and a process for rating and ranking projects. The Watershed Health technical experts were being used to assemble the subbasin assessments and plans, as originally intended. The Clearwater Biostudies report, together with the two local planning documents, provided more complete technical detail on watershed conditions and local buy-in on needed actions and priorities. With some abatement of pressure for immediate results, both state and local teams focused on recovery strategies for five critical subbasins within the Grande Ronde. The local staff and board recruited project volunteers from among private landowners in the two counties.

There was again criticism of the Grande Ronde program in the 1995 legislature, from environmentalists and legislators, about apparent lack of on-the-ground progress. The south coast initiative was held up as a success, having committed funds to projects far more aggressively. In fact the Grande Ronde had shifted gears from the early action rush of projects to the more systematic process of subbasin assessments and projects clustered in these critical areas. In 1995 the board deployed over a hundred projects in these critical subbasins, two-thirds of them involving private landowner participation (direct costs or in-kind). It was a product to be proud of, for both the state and the Model Watershed.

It was also the end of the state experiment. The Grande Ronde was allowed to carry over its remaining state funding, which it had obligated but not spent, beyond June 1995. No further state support was guaranteed. The field team would be disbanded just as this working relationship was becoming productive. The new governor, John Kitzhaber, adopted a watershed strategy that still emphasized local councils but spread one-third of the funding in small amounts across the entire state. One state technical representative was left in the Grande Ronde.

Many lessons were learned in the two-year experiment, some of which have carried over into the state's current approach. The value of recruiting local initiative and involving private landowners, thus securing local cooperation and buy-in to the watershed process, even at the expense of pursuing a less-than-technically optimum watershed restoration strategy, is recognized. The ineffectiveness of a predominantly regulatory strategy is also acknowledged, as state regulations that are imposed on communities are often poorly enforced and complied with because of lack of state resources and of local cooperation. The state is more prone to delegate authority to its field personnel to cooperate with local bodies.

⁵⁰ This process worked well in theory, but in practice the state terminated its Watershed Health Program and disbanded the field team before the modified process could be tested.

On the other hand, developing a high degree of common purpose between local citizens and state personnel will be made more difficult to the degree that it relies again on agency field people with multiple lines of reporting and approval, and with agency missions that may conflict both in Salem and in the field. State expectations—for what the local watershed councils will do, what priorities they will adhere to, and what scientific protocols they will operate under—are far less clear than they were becoming in the Grande Ronde when the Watershed Health Program ended.

The state has retained one-half of the collaborative equation. It has proceeded from a heavy-handedness in 1994, to an imperfect but improving model by 1995, to such a light hand in the current approach that only the procedural criterion—that the community set up a local watershed council—remains as a clear state expectation. The new model is not a local-state collaboration but broad state deference to voluntary local initiative. While this might be seen as a reprieve for local citizens who have insisted on the bottom-up model, it will be seen as a failure of local commitment if watershed recovery falters, and will invite state and federal regulatory intervention.

The Grande Ronde and Federal Agencies

In 1993 Senator Mark Hatfield, in floor debate on the U.S. Forest Service (Forest Service) appropriations bill, called for federal agencies to give preferential support to collaborative watershed restoration activities like that in the Grande Ronde Model Watershed. Specifically, he urged federal agencies to coordinate recovery efforts on public and private lands, using a combination of federal, state, and local resources.⁵¹

Six federal agencies are intimately involved in watershed restoration in the Grande Ronde: Bonneville, Reclamation, the Forest Service, NMFS, NRCS, and the Environmental Protection Agency (EPA).

Reclamation, along with the Corps, has had a presence in the Grande Ronde for decades despite the absence of any significant civil works by either agency. Flood control studies and assistance have brought both organizations to the valley in the past. In the 1990s, Reclamation has assisted local community and SWCD officials in water efficiency and watershed activities, providing both funding and technical support.⁵²

Bonneville has provided the largest share of funding, outside of the state's Watershed Health Program, through its support for the Power Council's Fish and Wildlife Program. The Grande Ronde competes, along with tribes and fish and wildlife agencies throughout the Columbia Basin, for approximately \$120 million in direct outlays for fish and wildlife projects. Model Watershed staff and administrative costs are largely covered by Bonneville, in addition to project funding—a total of \$325,000 in fiscal year 1997. To its credit, Bonneville has been a reliable and involved supporter since the inception of the Model Watershed. Its staff has been visible and engaged. It has largely avoided the impulse to second-guess at a project level, while supporting improvement of tools for stream assessment and for monitoring and evaluation. Bonneville has avoided in the Grande Ronde a criticism

⁵¹ *Congressional Record* 27 Oct. 1993.

⁵² Reclamation's Dave Duncan (no relation to the author) was a constant, constructive, and reliable supporter of the Grande Ronde process from the time of his agency's first stumble over Prairie Creek.

"At least one prominent member of the Watershed Board publicly threatened to quit his watershed activities."

suffered elsewhere, of trying to redesign projects developed by fish managers and other technical staff.⁵³

The Forest Service is the principal federal government landowner in the Grande Ronde drainage, managing the Wallowa-Whitman and Umatilla National Forests (the Bureau of Land Management also has small, scattered holdings). Most of the headwater streams that feed the river originate in the high valleys of Wallowa-Whitman Forest. Cooperation with the Forest Service is critical to addressing downstream watershed conditions associated with logging and grazing, as well as to protecting refugia in wilderness areas where high-quality habitat can still be found.

Relations between Forest Service officials at the forest level and the Watershed Board have been dependable and cooperative. The Forest Service supervisor has served on the board since its inception and actively participates. After an uncertain start in 1993-94, technical Forest Service staff now coordinate on a project-specific basis with the board's technical committee (which includes state agency field personnel). As Forest Service funding for habitat restoration has diminished, the impulse to coordinate strategies and secure shared funding has strengthened.

Support from the Region 6 office in Portland has been far less certain. A commendable Forest Service-tribal effort in 1992 to document conditions and propose recovery strategies in the upper Grande Ronde subbasin. The product was a technically sound inventory of degraded conditions in the upper basin, but one that evoked a chorus of criticism from logging interests and others. The plan would have benefited from greater local community review and comment than the technical authors allowed for. The regional forester could have ordered such public review but instead shelved the review draft as being too controversial and filed an alternative, provoking protests from the tribes of the Umatilla Reservation, who had co-authored the first document.

Commitments by the regional forester, John Lowe, to the Model Watershed program in early 1994 led to a state proposal to cost-share some \$445,000 in high-priority Wallowa-Whitman habitat projects and move them off the shelves. But Region 6's funds and attention were both turned to the westside forests and owls. Finally, just a paltry \$40,000 was allocated to the match agreement. The state accepted the offer, only to discover that the money was to be taken out of Wallowa-Whitman Forest's already thin habitat budget, eliminating still other priority projects.⁵⁴

The summer of 1994 also witnessed an intramural conflict between the Forest Service and NMFS that nearly derailed the local watershed process altogether. NMFS had been seeking consultation, under ESA authority, on scheduled timber sales in several eastside forests, including the Wallowa-Whitman. The Forest Service argued that it had provided sufficient consultation. Four environmental groups sought a federal court injunction to compel the Forest Service to comply. The Ninth Circuit Court granted the order,

⁵³ Credit goes particularly to BPA's Marc Shaw, one of the few federal officials from west of the Cascades who was, and still is, a regular and supportive presence at Model Watershed meetings and who has set the tone for BPA's involvement.

⁵⁴ The shell game prompted me to write to the regional forester, John Lowe, taking exception to "Forest Service policies that will expend millions to clean up a train wreck in the west-side forests but can't come up with a penny of new money to prevent one in the Columbia Basin east of the Cascades" (21 July 1994).

which could have shut down large sections of forest to all activities. Ranchers feared they would have to pull their cattle off the range without forage alternatives. Town meetings were held.⁵⁵ At least one prominent member of the Watershed Board publicly threatened to quit his watershed activities, and more were contemplating such moves. In the end, the Forest Service complied with the consultation requirement, but not before local citizens were reinforced in their fears of remote government forces with little concern either for them or for the health of their watershed.

Until recently, NMFS had little contact with the Grande Ronde, despite the watershed's significance as a major subbasin with endangered spring chinook populations. The Model Watershed's Action Plan, issued in May 1994, includes a section called "Government/Agency Interface." The entry under "National Marine Fisheries Service Consultation" is "(To be developed)."

Repeated efforts, first by the Wallowa County Committee and then by the Model Watershed, to draw NMFS attention failed to elicit more than a single, inconsequential visit by a senior regional official in 1993. The Wallowa County Salmon Plan was sent to NMFS' Northwest Region headquarters in Seattle for review but received little attention or response. Local officials were nervous about NMFS attention, especially after the injunction, but also sought recognition and legitimacy for their local process and plans. But NMFS preferred to deal with regional and state officials, and directly with the tribes. Local watershed recovery activities were not on the agency's radar screen.

Finally, in the summer of 1995 a series of meetings among local, state, and federal (NMFS and the U.S. Fish and Wildlife Service [USFWS]) officials opened for discussion a possible watershed-wide habitat conservation plan (HCP) in the Grande Ronde. Such a plan, if implemented, would give private landowners protection against "incidental take"—salmon deaths which would otherwise be violations of the ESA. A multispecies plan could give private landowners such protection for a range of listed species.

NMFS and the USFWS assigned a staff member to work with local parties for a period expected to last 6 to 12 months. The initial scope was limited to the Wallowa River subbasin.

Eighteen months later there was still no working draft of a Wallowa County HCP. Discussions continue, but most apparent motion has been sideways. Local representatives remain unsure how much of their Wallowa County Salmon Plan would be accepted by NMFS and how far-reaching any changes might be. NMFS has offered a framework for an HCP process, but few clues about substantive requirements. Local representatives would like the HCP to include national forest lands in order to protect the local economy against new timber harvest or grazing injunctions and the ratcheting of constraints on the use of federal properties. NMFS is receptive to linking federal management plans to the HCP, but the HCP process is statutorily limited to private property owners and cannot insulate federal agencies from legal accountability for their actions. The county and the Watershed Committee are unreceptive to any plan that involves set-asides to be protected rather than actively managed and available for economic use. Protected

"The county and the Watershed Committee are unreceptive to any plan that involves set-asides to be protected rather than actively managed and available for economic use."

⁵⁵ "Remarks by [Wallowa County] rancher Tom Davis were typical: 'If you play with a rattlesnake, you are guaranteed to get bit,' he said. 'And that's who we're playing with, a rattlesnake—the government'" (Joan Laatz and Richard Cockle, "Eastern Oregon Ranchers Brace for a Fight," *Oregonian* 13 Aug. 1994: A1.)

"Memoranda of understanding will never replace personal trust as a basis for problem solving."

wilderness areas already claim too much of their county, they argue. But wilderness headwaters are only one of the multiple habitats employed by the complex salmon life cycle; and it is often quality habitat in the low-gradient stream and river valley environments occupied by human communities that is scarcest.

The EPA operates in the Grande Ronde directly and through Oregon's DEQ (the DEQ representative now acts as the state's liaison to the Model Watershed). The agency was delegated authority from the EPA for enforcing the federal Clean Water Act in substandard streams in the basin. The EPA establishes total maximum daily loads (TMDLs) for certain pollutants and for excessively high water temperatures and mandates measures to bring streams into compliance with these standards.

While the EPA now has a representative resident in the watershed, board members and staff are generally unclear about the scope and direction of EPA activities (one close observer called it the watershed's "phantom" agency). The projects EPA supports are neither cleared through the Model Watershed Board nor always systematically coordinated with Watershed staff. The EPA shares its water quality data with the Model Watershed and others but does not coordinate data collection strategies or protocols, making systematic watershed monitoring and evaluation more difficult. The agency appears to have several hundred thousand dollars in funded activities in the basin, yet it is largely disengaged from the Model Watershed process. It channels its technical and financial assistance through the state and, often, through the Umatilla tribal staff.

Clearly there are great differences in how these federal agencies relate to the Grande Ronde's Watershed Board and its activities. There are differences within agencies, as well as across agency and jurisdictional boundaries. In an effort to bridge some of these, the Model Watershed staff hosts monthly coordination meetings attended generally by most federal, state, tribal, and private participants. At these gatherings projects and plans can be reviewed, adjustments sought, and supporting actions solicited.

Many agency projects seek to leverage Bonneville funding. Bonneville has stipulated that all such projects will go through the Model Watershed for review, and be subject to board criteria. The board and the other parties are able to use this leverage as another coordinating tool.

But this coordination, a Model Watershed staff member cautioned, is still of resources, timing, and funding. It is not a single, integrated, watershed recovery program. Although the parties involved share a broad vision of achieving a healthy, functional watershed, they do not even share common project selection criteria based on mutually agreed-to science, except when such criteria may be expressed as minimum statutory standards.⁵⁶ Even then, stream temperature levels in the Grande Ronde may be stipulated in law, but they will be achieved only through unified plans and coordinated actions. And arguing that common criteria and science should be subscribed to by all parties begs the question of whose criteria—not an academic question, as we are reminded by outstanding differences over what an HCP should require.

To the extent that the local community, the state, and the federal agencies continue to follow their different drummers, common action and standard-satisfying results will remain elusive.

⁵⁶ Clean Water Act allowable levels of pollutants, for example.

There is another conclusion that should be painfully obvious but bears repeating with respect to both federal and state objectives in the Grande Ronde: The value of physical proximity cannot be overstated. Trying to build a working relationship with this isolated corner of Oregon from Salem or Seattle adds immeasurably to the difficulty. It's hard to get past institutional suspicions and assumptions about ideology and hidden agendas. Especially in small

"There is a strong and mutually supportive relationship between tribal officials and the leaders of Wallowa County."

communities like La Grande and Enterprise, memoranda of understanding will never replace personal trust as a basis for problem solving. And practically, the closer state or federal officials are to the watershed and its communities, the more likely they will be to find ways to cooperate, and to leverage staff and resources. The more local residents feel able to cope with abstractions by dealing with people they know, the more open they will be to solutions they once would have been automatically suspicious of.

Such investing of time and personnel is hard for agencies with statewide or regional responsibilities. But making real progress in a few key areas may offset treading water in many.

Success also may be confounded by the personalities involved. But distance and isolation rarely give people the chance to find out whether they are capable of constructive cooperation.

The Model Watershed and the Tribes: The Nez Perce

Historically the Wallowa band (also known as the Joseph band) of Nez Perce Indians occupied the steep canyons in the northern Grande Ronde basin during winter months, moving to the open country along the Wallowa River in the summer. The Umatilla Indians relied on the upper Grande Ronde subbasin (above present-day La Grande) for sustenance during the spring and summer. There was considerable overlap within the basin, especially in the valley of the middle Grande Ronde. These lands are now considered "ceded" territories under nineteenth-century treaties (still disputed by the Wallowa Nez Perce) on which the tribes retained hunting and fishing rights. Those rights have been construed in federal court as meaningful only if there is game to hunt and fish to harvest. Both tribal groups, together with the Columbia River Inter-Tribal Fish Commission representing all four lower Columbia treaty tribes, regard habitat restoration as essential to their rights.

The Nez Perce joint authorship with Wallowa County of a salmon recovery plan for the lower Grande Ronde, and their participation on the Model Watershed Board and staff, have been discussed above. There is a strong and mutually supportive relationship between tribal officials and the leaders of Wallowa County, one that is curious but gratifying, given the unfortunate history of the Wallowa band's having been displaced from its northeast territory over a hundred years ago. This relationship is built on personal relations, a mutual distrust of outside authority, and an accommodation between the Nez Perce interest in restoring fish runs and the county's fierce defense of its economic resource base. This close relationship allows considerable nonideological problem solving to occur. For example, in 1995 the Nez Perce proposed to Wallowa County that the tribe acquire a 10,000-acre

"Can the fish wait for that slow comfort level to develop? The Umatillas will argue that they cannot."

private ranch in Joseph Creek Canyon, to be restored for fish and wildlife habitat. Such a proposal coming from the state or environmental community would surely have been seen as a threat. But the county supported the tribe, with stipulations. The land would continue to be managed for grazing, although its principal management objective could be for fish and wildlife. A noxious weed control program would be followed. The land would pay "in lieu" taxes to the county. The Nez Perce tribal government agreed to the terms, with the result that for the first time since the Joseph band left the Wallowa Valley to begin its historical series of battles and retreats, these Nez Perce have regained a foothold in their home country. In the process, several miles of vital canyon stream habitat will be restored to high-quality conditions.

Perhaps more important, the working relationship between residents and the tribe was strengthened and deepened. "One of the intangible results of [the Model Watershed] project was enhanced understanding among the members of the Nez Perce Tribe and citizens of Wallowa County," wrote Pat Wortman, Wallowa County Commissioner and a leader in the effort. "The current residents of the county, along with the descendants of the former residents [the Nez Perce], have gained an increased understanding of each others' cultures by working together on this project."⁵⁷

The Model Watershed and the Tribes: The Umatilla

The story of the Confederated Tribes of the Umatilla Indian Reservation and the Grande Ronde Model Watershed is a rockier one.⁵⁸ The Umatilla, along with the Nez Perce, were founding members of the Model Watershed and its board. But they came to the process already feeling burned by the Forest Service's dismissal of the Upper Grande Ronde Plan (UGRP) on which both had collaborated. Now they were expected to join in watershed restoration with the detractors of that plan. Their representative on the board was the staff member who had helped write the UGRP, someone who was able and aggressive in seeking technical fixes and impatient with process. He quickly became frustrated with the pace of the board and its projects. He found the board's willingness to accommodate landowners and their practices inconsistent with the urgent needs of the Grande Ronde, as evidenced by dramatically weakened fish returns to the basin, especially to the upper Grande Ronde. In this impatience he was reflecting a new-found aggressiveness on the part of the Umatilla Tribal Council.

By 1994 Umatilla attendance at board meetings had become sporadic. Board members felt the Umatilla commitment to their process was undependable. There was concern that the tribal government and the EPA were planning projects together without consulting with the board or seeking its cooperation and support. The division became an open one when the Umatilla representative announced at a board meeting that his tribal government had negotiated for a fencing project at Vey Meadows. This property in the upper Grande Ronde had been an important spring chinook spawning and overwintering area, a place of historical importance to the Umatilla Tribe, where fathers brought their sons to learn the ways of salmon. Used for

⁵⁷ P. Wortman, "Wallowa County-Nez Perce Tribe Salmon Habitat Recovery Plan," in W. D. Edge and S. L. Olson-Edge, eds., *Sustaining Rangeland Ecosystems Symposium*, August 29-31, 1994 (Corvallis, OR: Oregon State University Extension Service, 1995) 188.

⁵⁸ The Confederated tribes are the Umatilla, the Cayuse, and the Walla Walla.

many years as ranchland, the Meadows were now severely degraded and suffered from mining and other impacts upstream.

The Watershed Board took no position on the Umatilla proposal, and the Umatilla did not require one. But the project was publicized, and it was rumored that the tribes might next seek to acquire the land. The Vey Meadows ranch owner, uncomfortable with the publicity and growing controversy, and possibly feeling pressure from opponents of the project, withdrew his agreement and the deal fell through. Board members are emphatic that they neither encouraged nor discouraged the transaction, whatever others may have done. The Umatilla are not persuaded that Watershed Board members played no part in the collapse. And Vey Meadows, so important to the Umatilla culturally and biologically, is out of reach of the tribes for the foreseeable future. Not necessarily forever, one astute local resident observed. Sometimes, she continued, patience and benign neglect yield what direct action will not. People can become comfortable over time with ideas that at first appear threatening to their histories and beliefs.

Can the fish wait for that slow comfort level to develop? The Umatillas will argue that they cannot.

Another item on the tribal agenda may test these two propositions. The Umatilla have long held that the State Ditch, which cut off miles of meandering riverbed and floodplain in the Grande Ronde Valley, should be abandoned and the river returned to its old channel. With revegetation and other measures, miles of critical low-gradient habitat could be restored to something like its original configuration and quality.

The tribal proposal is biologically sound. Restoring stream sinuosity and complexity and reconnecting rivers to their floodplains are directions consistent with the best available science. But detaching the river from its floodplain to better control floods and, incidentally, to open thousands of fertile acres to farming was precisely the reason the State Ditch was first dug out in the 1870s and enlarged over the many years since. The conflict between salmon needs and a status quo in which local residents are heavily invested is clear. Local reaction has not been favorable.

Nevertheless, local officials say they have not drawn a line in the sand—or mud—here. The river channel and function are unlikely ever to return to presettlement conditions. But the Watershed Board has communicated its willingness to consider some lesser level of restoration, perhaps reducing State Ditch diversions and restoring usable habitat in the old channel. The SWCD draft “Cooperative River Basin Study” includes a flood control option for the valley that would permit more natural flooding, along with drainage features so farmland is accessible during the growing season.

Will the Umatilla and the community find a more stable basis for cooperative action? From time to time there are efforts by all parties to improve the relationship. Tribal participation in board meetings has resumed and grown more regular in the past year. Yet with the Umatilla’s sense of urgency for action on the one hand and the need to reconcile actions with slowly evolving community views on the other, an amiable and smoothly functioning relationship seems unlikely.

For the Model Watershed to succeed, the Umatilla must play a role that prods and challenges. Congeniality is not the proper test. It will be difficult for the parties to reconcile their differences in the abstract, or on a grand, watershed-wide scale. Progress will come in incremental steps, discouragingly slow for some and frighteningly fast for others. Except in the last resort, good science, civility, and regular communication are the tools best

employed by a challenger of the status quo if challenges are to be constructive and yield the intended result.

Watershed Science in the Grande Ronde

Data on the status of fish stocks and the condition of watershed habitats have been gathered in the Grande Ronde for decades.⁵⁹ Historical changes in river ecosystem conditions have been documented.⁶⁰ Yet because of the complexity and dynamic qualities of such ecosystems, and scientific disagreements over the requirements of sustainable fish habitat, the work of the Model Watershed began without a solid, detailed foundation in data and scientific approach.

Some fish killers—unscreened diversions and passage barriers—were obvious and well-documented. Others were equally obvious—for example, high late-summer water temperatures—but there were gaps in the data and complications in disaggregating causes (flows and shade vegetation) and cures (reduce withdrawals, add upstream storage, and restore flood plain connectivity).

So the Wallowa County committee began by surveying stream reaches for adverse and limiting conditions, referencing state and federal standards for desired habitat conditions,⁶¹ and prescribing site-specific fixes. The Wallowa County-Nez Perce Salmon Plan and the Grande Ronde Model Watershed Operations-Action Plan both served to inventory problems and suggest mitigating actions. They were produced by available agency technical personnel and are well grounded in available data. Suggested remedies are conventional and assume continued active management rather than allowing reserves for natural restorative processes to operate. The adopters did not always choose the safest ground, however; there are prescriptions for exclosure fencing (to separate cows from stream banks and beds), water leasing, and other potentially controversial measures.

The plans are inadequate to the needs of watershed science, however. They are generally silent on how to prioritize actions, and they do not reflect the complex interactions and feedback loops that characterize today's understanding of watershed habitat.

Sustained salmon production [says the ISG] requires a network of complex and interconnected habitats, which are created, altered and maintained by natural physical processes in freshwater, the estuary and the ocean. These diverse and high-quality habitats are crucial for salmon spawning, rearing, migration, maintenance of food webs and predator avoidance.⁶²

In effect, each reach of a watershed performs a critical function at some point in the salmon life cycle (not excepting streams above migration barriers, which may supply flow, nutrients, woody debris, and gravel to actively used areas). Streams with marginal salmon habitat and minimal populations still serve as reserves to produce fish that survive in marginal habitat. In some subbasins, these streams may be the only habitat available in some years and therefore the source from which salmon strays may be recruited to repopulate runs decimated by natural disasters.

⁵⁹ State Water Resources Board, *Grande Ronde River Basin* (Salem, OR: State Water Resources Board, 1960).

⁶⁰ McIntosh et al.

⁶¹ *Wallowa County-Nez Perce Salmon Plan* 9-11.

⁶² ISG xvi.

Three scientific tasks faced the Grande Ronde. First, how could they translate the data they had into a practical strategy for identifying and prioritizing projects? Second, how could they fill in the gaps in stream reach data and then maintain the data base over time to measure results? Third, what more sophisticated scientific model could they adapt to give the more complex view of watershed conditions and dynamics?

Substantial progress has been made in all three areas. To the credit of the participants—local residents, fish managers, and other resource managers—they acknowledged from the beginning that their plans had to be “dynamic [and] designed to change rapidly with new knowledge and changing conditions.”⁶³

In March 1994, following a day-long session in La Grande, board members and agency staff adopted a project-prioritization matrix. It was primitive, but it reflected a strategy that is still largely in place. Both subbasins and projects were prioritized. Highest priority was given to measures that would protect existing high-quality salmonid “biodiversity areas” before treating damaged reaches. Next to be approved would be projects addressing major limiting factors (for example, passage and temperature) and projects that were part of “a comprehensive solution.”⁶⁴ Weightings were given to each cell in the matrix, and “other criteria”—cost, cost-sharing, maintenance requirements, and public support—would be used to rank within cells.

In practice this objective project-selection process has been compromised often, particularly as project windows of opportunity arise that may close if not acted upon. This is especially the case where a private landowner can be recruited to a project which may offer both stream benefits and practical advantages to the landowner (for example, installing a permanent, screened diversion to replace a seasonal, high-maintenance one).

The 1994 matrix has evolved over time to a check list (table 1). Priority is given to projects in focus areas—Catherine Creek and the upper Grande Ronde, Bear Creek, Big Sheep Creek, and others—in which more sophisticated analysis of restoration needs has been completed (figure 12). Greater recognition is given to connecting spawning and rearing areas with migration corridor conditions.

Filling gaps in the data has proceeded more fitfully, but systematically as funding has allowed. In 1993 the Model Watershed contracted with Clearwater Biostudies “(1) to compile and synthesize recent fish habitat data on salmonid streams in the basin, (2) to identify data gaps in the information, and (3) provide a basis for prioritizing near-term restoration activities”⁶⁵

The Clearwater study identified “five habitat parameters common to all available stream survey databases and established reference conditions for each . . . based on the habitat requirements of salmonid fishes.” The parameters were stream shading, bank stability, fine sediment, pool frequency, and woody debris. Each stream reach was then measured against reference standards, and improvements required to achieve the standards were indicated. The report went on to identify priority stream reaches, using biodiversity areas defined by the American Fisheries Society—aquatic eco-

⁶³ Wortman 189. From the foreword to the Wallowa County-Nez Perce Tribe Salmon Habitat Recovery Plan.

⁶⁴ *Grande Ronde Model Watershed Operations-Action Plan* (1994).

⁶⁵ Huntington 12.

Table 1. Restoration project prioritization matrix adopted by the Grande Ronde Model Watershed Board in 1994. Source: Grande Ronde Model Watershed Operations-Action Plan 17.

TREATMENTS	WATERSHEDS			
	Salmon/Bull Trout Biodiversity Area	Salmon/Bull Trout Area	Biodiversity Area	Other Area
Maintains/enhances existing high-quality habitat	1	n/a	n/a	n/a
Addresses major limiting factor including passage as top priority, and part of a comprehensive solution	2	2	3	4
Addresses major limiting factor, but is not part of a comprehensive solution	4	5	6	6
Addresses other limiting factors and part of a comprehensive solution	6	7	8	8
Addresses other limiting factors or is part of a comprehensive solution	8	9	10	10
Project Emphasis Criteria (for ranking within cells on basis of number of criteria met): <ul style="list-style-type: none"> • Low cost, short turnaround, high return • Cost-shared/leverage other resources • Provide nonfish benefits • Low long-term maintenance • Treatment thoroughly developed • Educational/research value • Supported by diverse groups • Available funding • Permits acquired/NMFS consultation/NEPA satisfied 				

systems in healthy conditions, or containing “sensitive” fish stocks at risk of extinction.⁶⁶ Recovery activities within these areas were then ranked from “must address” to “low.”

The Clearwater study reinforced awareness that the scarcity of data guaranteed less-than-optimum project selection and inefficient use of limited funds. It highlighted another of the difficult choices in watershed recovery: spend resources on data collection, delaying intervention to recover the habitat, or get the money out on the ground in physical projects. While there is no easy answer to this dilemma, data gaps become greater handicaps as the most obvious projects are completed and choices become closer calls.

The Model Watershed staff now has available an EDT-based “patient/template” description of environmental attributes in each basin stream reach to indicate the collection of actions needed to close the gap between existing conditions (the “patient”) and those needed to sustain salmon populations (the “template”). (See figure 13 and also p. 24.)

Has this refining of scientific approach in the Grande Ronde realized its intended benefit of improving the effectiveness of projects and use of funds?

⁶⁶ Huntington 71.

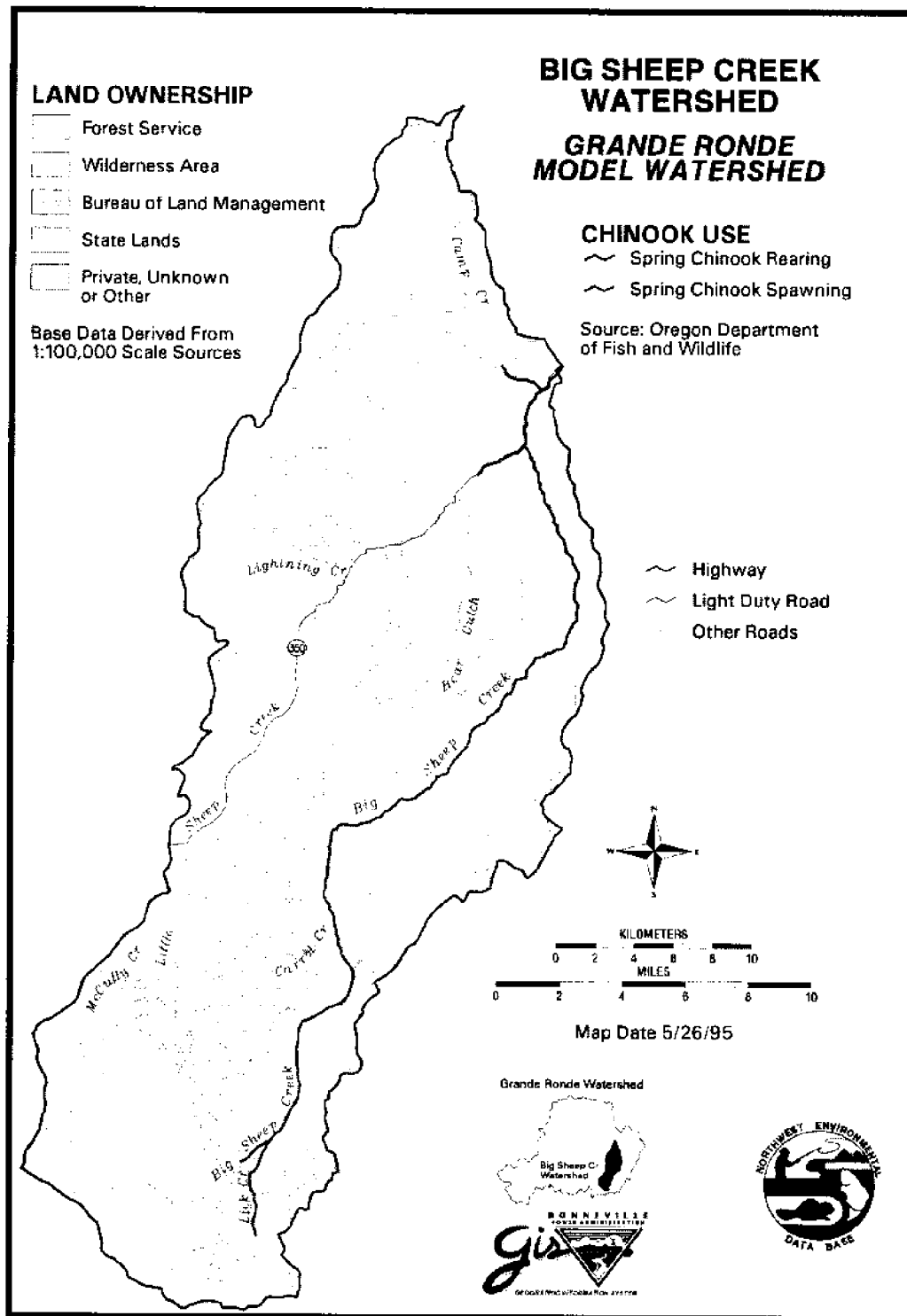


Figure 12. Big Sheep Creek Watershed. Source: Bonneville Power Administration.

The returns are spotty, especially as project selection is still opportunistic to a significant degree: What landowner will provide access? What funding sources are available? Does the project touch a sensitive ideological issue?

At another level, the importance of science at the center of the process is undeniable. Science can serve as a bypass around ideology. If the data say low streamflows and high temperatures during rearing periods undermine productivity (and possibly other efforts to improve spawning habitat up-

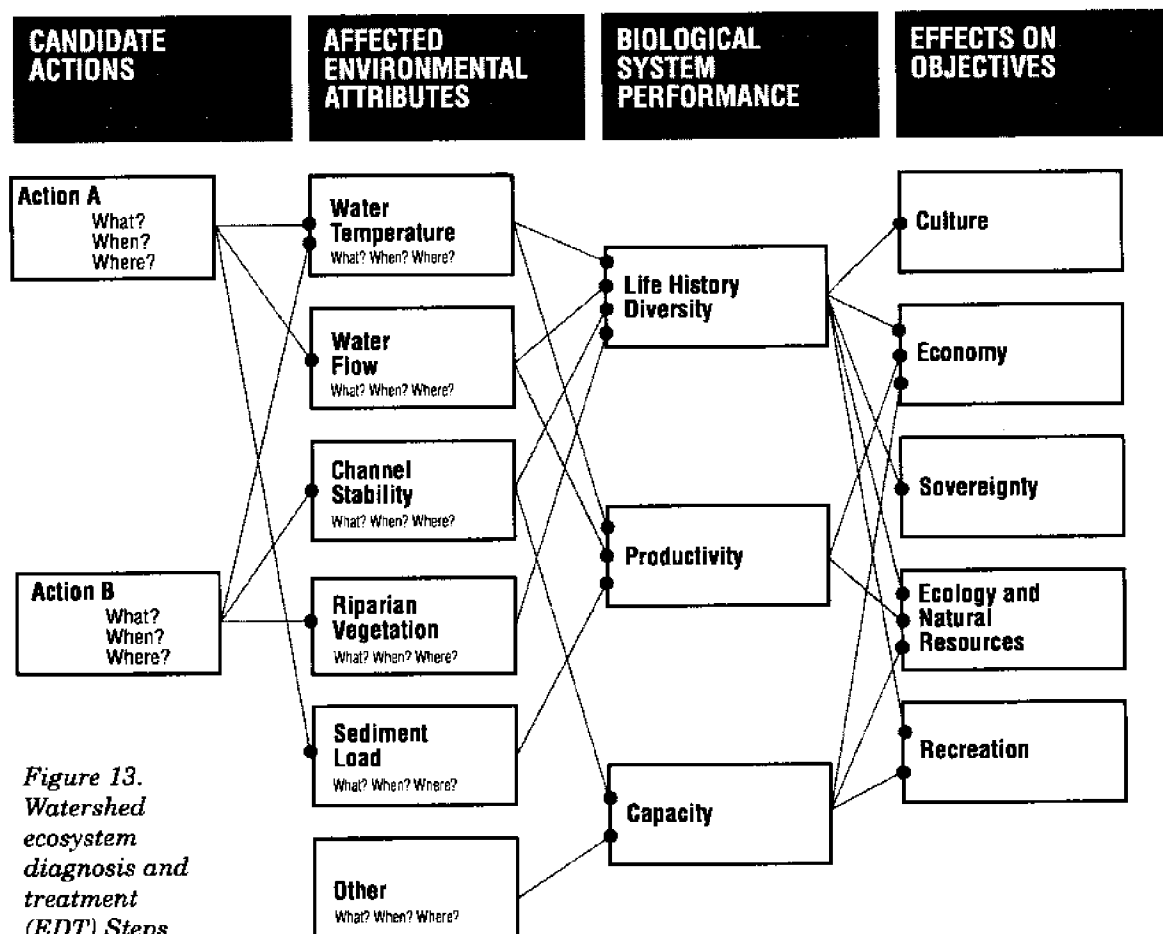


Figure 13.
Watershed
ecosystem
diagnosis and
treatment
(EDT) Steps

stream), residents have less room to evade the obvious solution: provide more, and better quality, flows.

Better understanding of the science is also empowering. As people gain such understanding and are more capable of evaluating data and opinions, they may be more critical of the technical guidance they receive, but they may also be less threatened, reactive, and conservative.

This effect was illustrated in the board's response in October 1996 to an ODFW proposal to dump hatchery salmon carcasses in several basin streams. ODFW sought to replicate the nutrient replenishment in streams historically provided by salmon spawning and dying. ODFW is viewed with suspicion throughout much of eastern Oregon. There are some ranches in the Grande Ronde which refuse entry to its scientists and technicians. The first board reaction reflected this distrust. Did ODFW propose to intentionally pollute basin streams, floating carcasses downstream into people's backyards? Then the questions became more searching. Where would the carcasses come from—inside the basin or out? What was the risk of introducing exotic pathogens? What kind of baseline data collection and monitoring had ODFW prepared? The tone of the discussion was transformed. One board member agreed that introducing the carcasses could restore a measure of food web complexity to the stream. The first objector asked whether ODFW would measure nutrient levels before and after. Would there be reference streams (without carcasses) monitored? Was ODFW prepared to make its case in a public meeting? In the end, the board reserved its approval of the

idea, asking for a public hearing and answers to its questions. The proposal was alive, with a reasonable chance of being considered on its merits. The board did not bog down in ideology, moving instead to critical evaluation and decision making. Science had not only informed the discussion, but had shifted it to a level that would have been difficult to imagine four years earlier.

Summing Up: Unresolved Issues, Forward Strides, Stumbles, Lessons Learned

Few of the signs of progress in the Grande Ronde are objective and measurable. Fish counts are still painfully low. Any gains in the next few years are just as likely to be products of wetter winters and improved ocean conditions as they are of watershed repairs. The same is true for flow and temperature levels and other habitat criteria: it's difficult to measure from a poorly documented and always shifting baseline. Aside from the most elementary sources of mortality, such as unscreened diversions, habitat improvements will need to be measured over the next decade or two before they can be considered conclusive. Monitoring and evaluation of project effects (not just documenting installation and operation) need to be greatly enlarged and sustained over this period.

Unresolved Issues

Managed versus Unmanaged Watersheds

Working through differences over degrees of intervention and active management is unfinished business for scientists, officials, local communities such as those in Wallowa and Union Counties, and the people of the Columbia Basin. The ISG encourages "restoration of natural vegetation and ecological processes that create and maintain fish habitat"⁶⁷ and speaks of reattaching streams to their floodplains. These issues are hardest, of course, where human development is most prevalent and human-salmon competition is most intense—in low-gradient valleys and stream bottoms. Nearly as difficult are riparian grazing and logging activities, which are most economically attractive where they have the greatest effect on stream conditions. Yet the ISG and others also recognize that human influences are unlikely to be eliminated in most areas, and accommodations must be found. Can scientists and the people of the Grande Ronde find a path that side-steps polarizing conceptual differences?⁶⁸

Balance versus Thresholds

A second, and closely related, issue is how to reconcile human management strategies of balance and multiple use with the biological threshold

⁶⁷ ISG 140.

⁶⁸ "The Council anticipates that there will be intervention; otherwise, restoration actions such as removing man-made stream barriers and controlling road erosion would be precluded. But the Council also cautions moderation in devising intervention measures where complex and still poorly understood natural systems are at work. . . . Habitat interventions should seek to restore and employ natural healing mechanisms wherever possible . . ." (Northwest Power Planning Council Fish and Wildlife Program 7-35). Likewise the ISG recommends "that the region move from a strategy of 'fixing' ecosystem damage to one that places greater reliance on re-expression of the natural and biological processes of the Columbia River. . . ." (ISG xxiii). Huntington demonstrates that "roadless catchments [in the Clearwater Basin, Idaho], even those that had intensely burned earlier this century, provided higher quality habitat to more diverse and abundant native fish populations than did nearby heavily 'managed' catchments" (C. Huntington, *Interior Columbia Basin Ecosystem Management Project* [1995], quoted in ISG 139).

"In many ways . . . recovery is less about physical improvements in the watershed and more about people choosing to modify their ideas and behavior."

requirements of species. There is much value to a local commitment to find a balance between withdrawing water from a stream for irrigation and leaving water for salmon, but only if that commitment recognizes that there can be no successful compromise with the temperature or other requirements of the fish at each life cycle stage. Currently, much of the Grande Ronde basin is designated by the state as "water quality limited" for high temperatures and other conditions. Will the community be willing to establish a balance that involves curtailing irrigation withdrawals or that protects streamside shade from grazing damage sufficiently to meet temperature (and other) thresholds?

Private Lands

Land ownership in the Grande Ronde, as in many Western watersheds, is largely public (Forest Service) on the ridgetops and private in the stream bottoms critical to spawning and rearing. Settlers naturally sought life on easier terms first, and settlers needed water. It is precisely their development impulses that built viable human communities beside streams and damaged biological ones in-stream. How can a watershed recovery strategy enlist these same private landowners, respecting their histories while persuading them to modify many of their traditional ideas about using and improving the land? Will landowners be willing to leave water in the stream when the biology requires it, or to allow periodic flooding to reestablish hydrological connections between the stream and its floodplain?

Private Lands and Public Lands

Equally there must be coordinated restoration of a drainage from ridgetop to ridgetop, as Model Watershed Board members are wont to repeat at length. Can the efforts of private landowners and government agencies—regulators and land managers—be integrated into a single watershed strategy and set of project criteria, consistent across the subbasin, so government and private actions are not isolated but instead reinforce and complement each other? Will this cooperation result in setting and meeting standards consistent with threshold biological requirements, or in a least-common-denominator package that falls short?

Bottom Up/Top Down

Who's in charge in a watershed like the Grande Ronde? Should the community determine all recovery strategies and orchestrate activities? Many local people argue that they are the ones most affected by choices made in their backyard, and most knowledgeable about the needs of that environment. Others argue that local control can perpetuate the status quo in which conditions deteriorated. They insist that local authority must be instructed by science and signed off on by higher authority to assure that local, state, regional, and federal watershed activities will be coordinated and that there will be real change. Although the collaborative process in the Grande Ronde represents a middle ground on which interested parties from within and without share control, it is always under pressure from the more adversarial of them. Generally, though, Model Watershed participants have acknowledged as legitimate the interests of agencies and individuals from outside the basin willing to participate constructively.

Some Signs of Success

The gains that can be identified—and equally, the most important unresolved issues—are less physical and more attitudinal. They are in many ways the more important changes that must take place in the watershed, for recovery is less about physical improvements in the watershed and more about people choosing to modify their ideas and behavior. It is about changes in attitude leading to enduring changes in human practices and impacts sufficient to meet the inflexible biological requirements of salmon and other species. In the Grande Ronde there is evidence that these changes are taking place. Less clear is whether the changes will take place fast enough, and will be far-reaching enough, to secure and rebuild dwindling fish stocks.

Some of these gains have been described above: improved agency coordination on projects; growing local confidence in, and application of, scientific method and technical detail; and projects that reinforce each other, focused in identified critical stream reaches. The return of the Nez Perce to Joseph Creek Canyon is a technical and emotional victory for all involved, although the continuation of managed grazing will draw criticism from some.

Perhaps the best evidence for declaring the Grande Ronde experiment an interim success has been the recruitment of private landowners into allowing, and contributing to, projects on their lands. This now goes beyond the Model Watershed Board and landowners already disposed to cooperate. The board, the staff, and the SWCDs are now helping people in subbasins like Indian Creek and Catherine Creek to organize, to meet together regularly, to take seriously the documented problems in their streams, and to set about fixing them. On their initiative, ditch owners drawing from Catherine Creek are contemplating irrigation efficiency improvements and voluntary contributions to in-stream flows. The SWCD will chair one of its Conservation Resource Management Plan processes to address flow and temperature conditions in Catherine Creek and will include representatives from fish agencies, environmental groups, the Umatilla, and irrigators.

It is a point of pride to the Model Watershed that each year's agenda of projects has had substantial landowner participation and contributions.

Mixed Returns

In other respects, the jury is still out on the Grande Ronde. Relations with the environmental community remain uneven: the Model Watershed is cooperative locally with the Grande Ronde Resource Council but distant and testy with state and regional organizations. An environmental representative serves actively on the Watershed Board.⁶⁹ But environmentalists are often categorized into those who are "reasonable" and willing to stay

⁶⁹ The original environmental representative, Ellen Bishop, had been a staff member of the Pacific Rivers Council. She resigned that PRC position in 1994 in response to local unhappiness over the PRC lawsuit limiting harvest and grazing in Wallowa-Whitman National Forest. PRC and the other litigant groups are not welcomed by board members as participants in the Grande Ronde process. Participation by other groups has not been either encouraged or actively discouraged. Outside agencies and environmental organizations have been invited to review and critique the Wallowa County-Nez Perce Salmon Plan and the Grande Ronde Model Watershed Action Plan.

within the Model Watershed process and those who are "unreasonable" and feel free to go around the local process, challenge it, or threaten it indirectly with lawsuits and ballot initiatives. To some extent this describes a local code of conduct: You can work with me, in good faith, inside these lines, or you can see me in court, but you can't have it both ways. But limiting participation from environmental organizations invites criticism from a distance, sometimes constructive, sometimes ill-informed, but potentially damaging with federal and state agency decision makers. The Model Watershed should have the confidence to open the door wider, inviting greater outside participation and risking unfair criticisms to gain access to constructive ones.

The touchy relationship between the Model Watershed and the Umatilla Tribes is partly a consequence of differences over substance and pace of change, but also of Umatilla willingness to challenge the Model Watershed process when it seems to them too slow and averse to risk. It is unclear whether the community and the Umatilla can find the right balance of creative tension and trust or whether the Umatilla will increasingly plot their own course in the Grande Ronde, at arm's length from the Model Watershed.

Relations with state and federal government agencies remain uneven. Project coordination between agencies and the Model Watershed has improved. Where an agency has a local presence, a good working relationship often develops. Differences of personality and operating style, differences in technical approach to the tasks at hand, and the omnipresent contest for control—of process, of a project—can erode the benefits of local presence for a federal or state agency. Policy differences can be magnified by distance and may partially account for the lack of NMFS progress on a Wallowa County HCP.

A consistent source of funding would improve performance. The Model Watershed began with more money—from the state Watershed Health Program—than it could carefully deploy, excessive pressure to get projects out the door, and legislative threats to recover uncommitted funds. Then the state money largely dried up, and the Grande Ronde had to compete for Bonneville funding, not always on a level playing field with the fish agencies that ranked the universe of proposals (and found more merit in their own projects than in those from outside the traditional agencies, such as Model Watershed proposals). Funding to support the Model Watershed staff has stabilized for the time being, but projects must be developed and landowners recruited without assurance that the money will be available. A more consistent base level of project funding would be immeasurably helpful.

Monitoring and evaluation of projects and of cumulative change in watershed conditions remain orphaned to a great extent. The pressure to "do," not just to "study," will always tend to displace baseline data gathering, preproject assessments, and postproject evaluations—and then will penalize the watershed effort for being unable to document improvements. Funding sources need to value these evaluative elements of watershed recovery more highly and to fund them together as a multiyear commitment to selected stream reaches. Absent such commitments, watershed efforts are condemned to wasted resources and needless loss of fish.

Monitoring and evaluation will need to grow more sophisticated, as funders increasingly demand more than just verification that the concrete was poured, the willows were planted, and the logs were laid into the stream. In turn, funders and policymakers must understand what proofs are rea-

sonable. Healthy salmon populations are far off in an uncertain future and dependent on more than just the hospitality of headwater streams. Intermediate levels of evaluation must be supported: changes in physical stream conditions (for example, temperature, sediment loads, and ammonia and nitrate levels) and changes in indicators of biotic health. Tools are needed to disaggregate the effects of watershed projects from variations in background conditions. Efficiency and economy demand coordination among all players in the watershed to accomplish these tasks.

Some of the second-level (physical indicators) evaluation work began in the Grande Ronde in 1996 and continues into 1997, supported by the state. Federal Clean Water Act mandates should increase the demand for this work throughout Western watersheds. Will essential funding and inter-agency coordination appear as well? In this regard, the case for the EPA to better integrate its mission into local watershed efforts seems compelling.

Lessons Learned

Learning in the Grande Ronde is far from complete as the parties involved experience frustration, failure, and success; as new people enter the process; and as watershed science modifies old strategies and devises new ones. Still, we can draw some interim conclusions.

Local Control and Outside Interference

Can the false and destructive choice between local control and outside regulation be avoided? Most of the Model Watershed participants will acknowledge that there are legitimate national and state interests in the Grande Ronde watershed. They will comply with the law of the land even as they may contest its interpretation and application by agency officials. Increasingly, they also understand the mutual dependence that runs from their headwater valleys to the Columbia's mouth, and north to the fishing grounds in the Gulf of Alaska. Board members are sophisticated enough to pose the question, to outside observers, why the Grande Ronde should invest in a healthy watershed only to have the gains mooted by smolt kills at the mainstem Columbia and Snake dams. They have not only grasped the linkages, but can use them to effect.

"Local control" is usually code language. It is sometimes code for an unalloyed defense of the local status quo. More often in the Grande Ronde it has been an expression of apprehension: that people

from outside these northeast Oregon communities, with little knowledge of and less respect for their values and livelihoods, will impose drastic and damaging change. The economic and social fabric of the community will be transformed without its consent, without even the ability to shape and channel the change. The objections to Reclamation's plans for Prairie Creek in 1992 were less substantive and technical than they were fearful of change imposed from without and of loss of local control over the lives of the inhabitants of Joseph and Enterprise.

The best defense being a vigorous offense, that community marshaled its local control arguments to turn back the perceived assault. But Reclamation and the Power Council responded, somewhat disconcertingly, by giv-

"The pressure to "do," not just to "study," will always tend to displace baseline data gathering . . . and then will penalize the watershed effort for being unable to document improvements."

ing way on the particulars but insisting on community-generated alternatives. The community was suddenly both obligated and empowered. The Wallowa County-Nez Perce Salmon Plan is at least a partial consequence.

The critical lesson, which outside agency personnel seem to have to relearn each time, is that a truly collaborative effort depends not on either a heavy regulatory hand or capitulation to local terms and conditions. It depends rather on being clear as to expected results—expectations of law and

"A durable, sustainable recovery has to do with all the machinery and all the biological parts, not excluding people, being captured in a single equation."

policy both—based on standards that can be defended in terms of good watershed science (not the advocacy science issued by hired-gun biologists). Collaboration involves a mutual deference: of locals, to federal and state policy for conservation of watersheds; and of outside officials, to local knowledge, cultural values, history, and traditional livelihoods. Officials can establish firm expectations as to results and timing—indeed, equivocation instead of forthright declaration leads to local suspicions, fears of hidden agendas, and so on. The Watershed Board has functioned best when it has had tough but clear signals to respond to and could find responses that were sufficiently compatible with local values to avoid destructive backfires.⁷⁰

There will always be tensions between the parties, inside and out. There will be unwarranted local resistance to change, insensitive pressuring from without, and miscommunication. Periodic breakdowns will occur. This is about societal change, and the dynamics of such change are often erratic and always untidy. Relationships have to be tended assiduously. Agencies that are clear about expectations and that reduce opportunities for miscommunication by placing their people in the communities, delegating them enough authority to problem solve all but the most sweeping issues, are agencies most likely to be successful.

One Ecosystem

A farmer in Oregon's Powder River drainage, outside Baker (and not part of the Grande Ronde), once argued in a public meeting that the state had no basis for denying his filing to withdraw additional water from his stream. After all, he argued, no salmon were affected; the Powder joins the Snake above Hells Canyon, which blocks all salmon passage. The man could not or would not comprehend that the flows in which salmon migrate past eight Snake and Columbia River dams in June come down from the Powder, and hundreds of other headwater streams, in May.

The Columbia Basin is the sum of all its constituent parts. Harvest rates are linked to dam passage mortality, to headwater habitat, and to flows from the Powder and Payette Rivers.

⁷⁰ Thus it is disappointing to hear Oregon's Governor Kitzhaber describe his watershed strategy as "Give people some authority, funding and technical assistance . . . and then get out of the way." From remarks at the Salmon and Watershed Educational Opportunities Conference at Oregon State University, Corvallis, Oregon, February 12, 1997.

Equally, the people inhabiting the basin ecosystem can no longer live their lives and keep their communities independent of one another, if they ever could. If salmon survival over the dams is a legitimate concern of Wallowa County ranchers—and they assert, with justice, that it is—then Willamette Valley residents may express themselves on Wallowa River temperatures and flow levels. Wenatchee orchardists may comment on Portland's treatment of the Sandy River watershed, from which it draws its water supplies, or of dredging practices in the Columbia River estuary to accommodate ocean-going vessels come to trade.

This sense of a common responsibility and a common fate is critical to the recovery of the Grande Ronde for two reasons. The first is that watershed recovery actions will be taken only by individuals who see equity in allocating the burdens of recovery.

The second, ultimately more important, reason is that such social interdependence mirrors the science of ecosystems and should, over time, fuse with it. Isolated interim fixes do not require this unification—the region has been planting willows and screening irrigation intakes for years now—but a durable, sustainable recovery has to do with all the machinery and all the biological parts, not excluding people, being captured in a single equation.

Control or Collaboration

The greatest barrier to coordination of projects and efficient use of resources is the always present submotif of "Who's in charge?" The local Grande Ronde watershed effort was prompted in the first place by a perceived need to resist outside intervention and thus keep local control over choices affecting the watershed and its communities.

The state's Watershed Health Program arrived with a technical mission and dollars for which it would be accountable to the legislature. But the state program had little notion of how to integrate its needs with a local impulse to control process and events. The result was multiple layers of decision making and an unproductive tug-of-war between the Model Watershed Board and the distant state agency heads (meeting as SWMG). Only toward the end of the two-year experiment did the parties begin fashioning more collaborative decision making—and then the state terminated the Watershed Health Program.

The on-again, off-again relationship between the Umatilla Tribes and the Model Watershed Board is in part a contest over control (and therefore program direction), especially in the upper Grande Ronde. By contrast, the Nez Perce and Wallowa County leaders have developed effective, collaborative decision making in the lower end of the drainage.

The elusive presence of the EPA in the watershed reflects the agency's focus on problems it sees and solutions it controls. The EPA tries to avoid subordinating its technical conclusions to local, nontechnical concerns. Its individual projects may thereby stand up better under technical scrutiny, but the agency has distanced itself from many of the people living in the watershed and has foregone a substantial opportunity to leverage change in community attitudes and practices. The Model Watershed has long sought the central role as clearinghouse for watershed projects in the basin. However, it has wisely not demanded veto authority over tribal, state, or federal projects. And as a practical matter, it sees most proposals anyway, since most seek shared funding from Bonneville resources and Bonneville requires a board sign-off.

The more disciplined the board is about a rigorous technical review of projects, the more confidence outside agencies will have about coordinating through the board. The detailed planning in Bear Creek and elsewhere is the key to reassuring such agencies that coordination will strengthen, not endanger, the technical merit of their projects.

The other side of the collaborative process is outside agencies being clear and precise in stating their goals, standards, and project criteria, while reserving flexibility as to ways and means. Agency prudence in avoiding direct challenges to local authority cannot extend so far that it misleads or confuses the community.

The state's Watershed Health Program had difficulty settling on a strategy, sending mixed and changing signals to the board about the state's expectations. NMFS may have been cautious to a point of counterproductivity in setting out a basis for an HCP in Wallowa County. In both cases, more assertive expectations might well have run into opposition. But confusion, inefficient use of time and energies, and imputing of hidden agendas are scarcely an improvement. Worse, these factors impair the ability of the parties to build a collaborative process based on commonly accepted science and the gradual accretion of trust.

Funding Projects or Investing in Process

Watershed recovery initiatives are always short on patience. The political leadership demands visible, tangible projects—getting the money out onto the ground. Indeed, the worst habitat problems are easy to identify, and the first fixes appear straightforward: remove blockages, screen irrigation diversions, plant streamside willows.

The State of Oregon, the Power Council, the tribes, the Model Watershed Board—all were committed to such an early action strategy in the Grande Ronde.

As opening strategies go, there have been worse ones. Early-action projects are likely to address real problems, although not often the most critical ones. They will be consensus choices, not controversial ones; they will respond to an opportunity as often as to an identified priority need. The connection with careful watershed science and analysis will be uneven. Technically, the strategy is a limited one. Politically, it affords an opportunity to build a collaborative process involving parties who may approach the watershed from very different points of view.

At some early point, however, government agencies (and environmental advocates) will likely face the choice between a watershed process driven by technical criteria—stream reach conditions and objective solutions—or one that trades off some degree of technical merit for political acceptance.

In the Grande Ronde some agencies and environmental organizations have been critical of the somewhat more political model watershed approach. Project selection at times has been suboptimal, with politically acceptable projects chosen over critical but controversial ones. A structural project—for example, riprapping an eroding stream bank—may be selected as much for its benefit to the farmer losing soil as to the stream suffering from sediment accretion. Limited budget dollars may be unavailable for technically superior projects because they have been matched by a landowner for a meritorious but less-critical use. In addition, limited funds may be used for administrative purposes, data collection, or monitoring, and not for physical projects.

Those who defend the Grande Ronde process acknowledge that technical merit is not the exclusive criterion, but rather the first criterion among several. Trade-offs occur. But building acceptance, ownership, confidence, and capability in a local watershed effort, they will argue, is a substantial return for the small investment those trade-offs represent.

Reducing sediment loads in a spawning reach is a real accomplishment, certainly. But permanently changing the agricultural practices that led to the sediment problem addresses the real issue, human behavior—not its symptom, an unhealthy stream.

Building landowner understanding of the science, linking that understanding to a stewardship ethic, and embedding both in a set of commonly held community values should lead to more durable watershed recovery than will any number of hard, on-the-ground projects, absent such changes.

Agencies and others should cultivate a willingness to invest in process where local good faith and openness to good science are present.

The approaches of two federal agencies in the Grande Ronde can be contrasted. Bonneville and the Power Council have been substantial funders of this model watershed. The council established, in its Fish and Wildlife Program, both procedural criteria and “desired future condition” expectations as model watershed goals. The council and Bonneville emphasized being flexible in project selection, involving private landowners, and allocating funds to build capability within the Grande Ronde Model Watershed Board and staff. While conclusive results are distant, the Watershed Board and basin communities have shown significant progress in developing and applying science to their problems. Community and landowner involvement are far greater than what could have been stimulated by outside agencies and regulatory pry bars. Many of the politically controversial actions are still words in a plan, but some of these issues have been engaged. On an interim basis, the Power Council-Bonneville strategy in this basin shows promise.

In contrast, the EPA has an institutional culture built upon rule making and enforcement, a product of years of regulating corporate point-source polluters and investing in cleanup projects. The kind of prodding and prompting that effects community change does not come naturally to such an agency culture. The EPA is a substantial funder of watershed projects in the Grande Ronde, but it has made next to no investment in local process. The EPA's projects may have uniformly high technical qualities, but it's hard to know, since the agency's activities are barely visible. There is little evidence that its activities have materially influenced local land use or agricultural practices.

The EPA has few of the community relationships, outside its work with the Umatilla, that will help to move people from more- to less-damaging practices. As the agency gears up to implement Clean Water Act requirements in this and similar basins, the absence of those relationships will make it more difficult to modify deeply rooted water use practices and historical biases.

Controversial Projects

The watershed council approach has been criticized for giving aid and comfort to those local economic interests least open to change. As one observer has written:

“The EPA is a substantial funder of watershed projects in the Grande Ronde, but it has made next to no investment in local process.”

"Science must also serve as a common currency to which all parties have equal access and in which they have a shared confidence."

Given that many watershed efforts seem to be motivated largely by various parties' interests in pursuing consensus, reducing public conflict over environmental issues, and asserting local control over natural resources, political constraints seem even more significant. . . . [C]learly, no watershed council with a strong interest in protecting the local economy is likely to propose substantial changes in water use. It is much easier for all concerned to focus on . . . installing fish screens, planting trees along riverbanks, and keeping cattle away from riparian areas.⁷¹

That the Grande Ronde Model Watershed prefers projects that are non-controversial and welcomed by landowners should astonish only the naive. Projects that simultaneously benefit these landowners and stream conditions are also unsurprising. Up to a point there is considerable virtue in taking on easy issues first, as veteran negotiators will testify. A process that builds trust and the habits of problem solving is better able to take on tougher issues. Whether it is willing to is the next, essential question.

The Model Watershed has not avoided activities that may generate sparks. The virtues of exclusion fencing to keep grazing out of sensitive riparian areas, to take one example, are disputed in the community and on the Watershed Board, but fencing projects have been approved and implemented.

In the most difficult area of water rights and in-stream flows, the watershed plan acknowledges that the controversial practice of leasing water from landowners should be considered a tool—acknowledges it and has taken a cautious first step toward employing it. In 1995, in a closely divided vote, the board turned down its first voluntary water lease proposal. Early in 1996, a second proposal, at the Dawson ranch on Crow Creek in Wallowa County, was supported. The board is now working with the Oregon Water Trust, which arranged the Dawson lease, about additional opportunities in the Grande Ronde.⁷² In December 1996, the trust was invited to join the Model Watershed process and submit its proposals through the board, qualifying those proposals to compete for Bonneville funding. The Watershed Board and the SWCDs in both counties have supported this collaboration with the Water Trust.⁷³

As a substantial side benefit of the Dawson lease, the local watermaster has stipulated that there be a gauging station installed on Crow Creek. This was to ensure that no other water user would be disadvantaged by the lease, but it will also collect badly needed flow data useful to stream restoration over time.

Depending on one's point of view, one water lease may be a promising first step or a discouragingly small step. If it is to be the former, it will depend on the Watershed Board's willingness to employ more widely tools such as water leasing to restore flow levels. With local support, changes in local practice are more likely to be obtained and to persist than if the state and the EPA rely on Clean Water Act regulatory tools alone. The open question is whether these voluntary acts will be token, or real, substantial, and timely.

⁷¹ Benson 202.

⁷² The Oregon Water Trust is a nonprofit environmental group formed in 1993 to acquire consumptive water rights through purchase, lease, or gift, converting these into in-stream flows, as allowed under Oregon water law.

⁷³ The Grande Ronde now has a second water lease for in-stream flow augmentation.

Logging and Grazing Practices

The Wallowa County Plan has been characterized by some as a “logging and grazing protection plan.” That harsh assessment would be vigorously disputed by its county and tribal drafters. Yet they would just as vigorously agree that logging and cattle will share space with fish and clean streams in their county. They would accomplish this through active management of the land, including such controversial practices as live timber thinning for fire control, managed grazing in riparian meadows, and perhaps additional headwaters storage dams. Unmanaged set-aside areas are inconsistent with this watershed view. It is unclear whether the board’s approach can be reconciled with the watershed science of the ISG report that seeks to restore a level of natural functioning to rivers. Can Wallowa County residents find their way past principled stands for “managed versus unmanaged” watersheds to modified range and logging practices that respect the normative functions of the rivers and adjacent lands?

Science Counts

If logging and grazing are to be reconciled with stream health, the mediating agent will have to be watershed science. Aside from its essential technical contribution, science must also serve as a common currency to which all parties have equal access and in which they have a shared confidence. A rancher who will resist on principle ideological pressures, whether direct or disguised as agency regulations, will find it easier to respond to evidence perceived to be objective and unbiased.

The limitations of this device are obvious. Where the science is inconclusive, or the observer more than ordinarily obtuse, good science will have less impact than it should. Where the science arrives in the hands of an interested party—a Fish and Wildlife biologist, for example—and is inaccessible to others, it may become a provoker of conflict, not a peacemaker.

So the corollary to science counting is that science can also enable and empower. If science is to contribute to solutions, it must enable and empower broadly. Most particularly, it must be usable by those asked to change their habits or practices, so those changes are comprehensible and may be responsibly shaped by the people with the most at risk.

A priesthood of technical experts is often reluctant to share its knowledge, the source of its authority. But only by such sharing will it enlist the informed support of those being asked to embrace change that seems often counterintuitive and at odds with history, and always difficult.

Institutional History Counts

Charles F. Wilkinson writes of the “lords of yesterday”: nineteenth-century laws and programs “that may have been right for [their] time” but require revisiting and revising to accommodate new information and understandings.⁷⁴ Certainly much of the difficulty in aligning state and federal agencies with a shift in direction on watershed management has been the disconnection when these agencies are asked to reconcile historic missions—to support growth and extract wealth from the land—with new watershed conservation goals. The result is often what Jack Ward Thomas, speaking of the Forest Service, has described as “operating under laws that

⁷⁴ C. F. Wilkinson, *Crossing the Next Meridian: Land, Water, and the Future of the West* (Washington: Island Press, 1992) 19.

**"Institutions
change only
because people
change them."**

mesh poorly with effects exacerbated by overlapping responsibilities of several agencies and a wide range of sometimes confusing court decisions."⁷⁵

A former member of the state's Watershed Health team spoke of nine state agencies on SWMG with decades of history moving them in nine separate directions. The Oregon Department of Agriculture continues to press for reservations of new water rights for irrigated farming, and Water Resources continues to process those rights, both complying with prevailing statutory direction that changes only slowly. These policy directions were influenced, but not dramatically altered, by Watershed Health staff—bureaucratic "novices" with temporary assignments—arguing for new watershed values.

Change is percolating through government agencies. The Soil Conservation Service has become the Natural Resources Conservation Service, a new name that reflects a historic altering of course. Younger managers understand their missions differently from retiring ones; in establishing the balance between consumption and conservation they are likely to place the fulcrum differently than their predecessors. But uncertainty and change within results in mixed signals without. Model Watershed Board members, themselves trying to cope with difficult cultural change, have been handicapped by the lack of clarity from, and consistency among, agencies interpreting the law and laying out the basis for cooperative local compliance.

In a real way the fish will have to hang on, if they can, while we complete the process of cultural change in Western resource-based communities and in the legislatures and bureaucracies that regulate the Western economy. New conservation values and new science are driving cultural change in Western institutions and, in turn, will be the beneficiaries of that change.

People Count

Institutions change only because people change them. If the direction of change has the force of history behind it, then in watersheds such as the Grande Ronde, both progress and slippage—that is, the pace of change—are a function of individuals' intervening in history to shape it. The Wallowa County-Nez Perce Salmon Plan is as much a product of the relationship between two men—County Commissioner Pat Wortman and Nez Perce Fisheries Manager Si Whitman—as it is of their respective institutions. Much of the credit for the evolution of the state's field team in the Grande Ronde from foreign body to successful collaborator with the Model Watershed goes to its leader, Lew Wallenmeyer, an ex-Forest Service biologist who built an institutional link on a basis of professional competence and personal trust.

The Model Watershed's first hired director was never able to form a productive relationship with either the board or the array of other agencies with whom the Model Watershed had to do business to succeed. He was replaced in 1994 by his assistant, Patty Perry, who has brought to the work of the Model Watershed a quiet competence, an understanding of her community, and an understated hardheadedness when necessary. The higher degree of intrabasin coordination with federal and state agency people is a product of her perseverance and good humor.

Finally, the Model Watershed Board members and other participants deserve recognition for their sustained commitment to a process that must

⁷⁵ Jack Ward Thomas, "The Ex-Chief's Advice," *Oregonian* 12 Jan. 1997: G5.

have been acutely uncomfortable at times. Their goal—to keep control of their community and culture and destiny—is echoed by many small, resource-based communities across the West. Sometimes this is expressed in challenging and defensive ways to outsiders. In the Grande Ronde, outsiders generally have been welcomed when they have come in good faith, with an open—albeit sometimes challenging—agenda and a commitment to collaborative work.

More important still, most of the board members have shown a capacity to grow in their jobs, to accept new information, and to contemplate decisions that only a few years earlier they would have pronounced unthinkable.

Change can occur as a consequence of forces overwhelming a community from the outside. The history of Euro-American treatment of American Indian tribes is of this first order—a nearly complete, often brutal displacement of preexisting cultures and societies.

The push of history is inexorable, but it does not always need to destroy what it finds in order to build something different. When the push of new events can be married to the pull of traditional values—of stewardship, say, and of communities making local choices locally, albeit informed by the world about them—then change can be the most constructive and least disorienting.

The great question, still and for the foreseeable future unanswered in the Grande Ronde and across the West, is whether such change can occur fast enough for the fish and the watersheds and slow enough for the people.

“Younger managers understand their missions differently from retiring ones.”

Enduring and Changing Values in the Watershed

At the heart of the struggle to restore Pacific Northwest watersheds and recover Pacific Northwest salmon populations is an equation with three variables. The variables are science, law, and institutions that reflect the values, culture, history, livelihoods, and politics of the region.

Our ability to solve this equation is handicapped by our incomplete understanding of the variables, especially technical and scientific knowledge that never seems to settle in one place for long.

The still immature science of watershed ecosystems is evolving at the intersection of hydrology, biology, the technology of industrial engineering, and a recognition—evidenced by collapsing species and unraveling food webs—that something has gone profoundly wrong.

The law, the public policies it reflects, and the institutions established to implement its judgments are changing as the needs and values of communities in the open lands of the West are refined from their pioneer beginnings. For two hundred years Euro-American settlement has relied upon taking what was found and remaking it into something more immediately useful to human beings. We are legatees of that impulse to manipulate and reconstruct, profiting greatly from its many benefits and responsible for repairing the accompanying damage. Our laws and institutions are responding, but slowly, to the signals from science that we have overreached; that we have been sometimes foolish, sometimes overgreedy, more often careless, rarely conscious of consequences.

Institutional change also lags behind changes in understanding the science. People have limits to how much change they can digest and how quickly. Agencies heavily invested in a consumptive economy find it hard to change practices. They interpret incomplete understanding of the science to shore up the status quo. They instinctively protect a lifetime investment in doing things a certain way, a way consistent with a set of inherited values that resists evidence of needed change.

In many ways a traditional stock of knowledge and set of institutions will inhibit the ability to see a problem in a new way. A worker with only a hammer sees a world with only nails. It takes a major intuitive leap for the worker to see a screw and from it to infer a screwdriver. To a rancher, a stream has always been a watering place for cattle; a riparian meadow, summer forage; an income, a livelihood. A regulatory agency may see only a grazed-down meadow beside an overheated stream, and find the basis for a new rule or for enforcement action. To an environmental group whose strategy is to force change through legal pressure, the same meadow may look like nothing so much as a lawsuit waiting to be filed.

Public policy should be about reconciling these different perspectives with the available evidence. Where prevailing values and new science conflict, public policy must find ways to reconcile them, respecting values without holding them immune from the teachings of science.

Easier said than done, of course. Whereas public policy usually assumes an objective, definable reality, our scientific understanding of that reality is usually painfully incomplete. Our perceptions of it may be greatly colored by inherited belief systems. New evidence and new perceptions have to work

"Our laws and institutions are responding, but slowly, to the signals from science that we have overreached; that we have been sometimes foolish, sometimes overgreedy, more often careless, rarely conscious of consequences."

past entrenched preconceptions and values that have grown detached from the evidence. The notion that rainfall would increase with settlement of the West had scant supporting evidence but persisted through decades of drought and failed farms.⁷⁶

As slow as our belief systems are to respond to new evidence, reshaping our institutions to reflect and act on these modified beliefs can be a slower process still. Thus the doctrine of prior appropriation still governs the allocation of Western water rights, serving first those with the earliest appropriation dates but—until the water runs out—accommodating all who wish to register a claim. The system operated efficiently when claims were few; it persists despite the evidence that it can leave streams dry and unable to support riparian and aquatic life. Even as many communities dependent on irrigated farming are coming to accept the evidence and to cautiously test amendments such as dry-year water leasing for in-stream use, the larger institution of Western water law resists efforts at serious reform.

Our forests and grasslands are still governed by laws that sell rights to harvest trees or graze livestock but cannot accept lower bids from those who would leave the trees standing or the grasslands fallow.

A second example of the tenacity of belief systems is that many of our Western resource use and management practices are grounded in the belief that the resources are for all practical purposes inexhaustible. Our original use of them appeared incidental to their abundance, and this perception persists despite evidence to the contrary that has been available since Western beaver populations were all but exterminated in the 1830s.

Early in the present century, belief systems and institutions responded to the accumulating evidence of overuse—declining fish runs and depleted forests—with solutions that relied partly on conservation, but more on engineering to replenish abundance. Fish hatcheries and tree farms were deployed across the landscape. We are now sifting through the evidence of the shortcomings of this strategy.

A third example is that our watershed management institutions have been organized around separate products—fish, timber, soil, water—and their inputs. Where a belief in abundance prevailed, there was no apparent need to examine connections among these resources. Now the science of ecosystems is discovering how management choices (or natural events) in one place can reverberate through natural systems. Building a dam creates a slackwater pool in which warm-water predators can proliferate, consuming juvenile salmon. The biological margin of error is reduced for fish harvest downstream and irrigation withdrawals in the headwaters above. Yet separate agencies and jurisdictions govern the hydropower system, flood

"There is a mismatch between our fragmented management of watersheds and emerging knowledge of interconnected, interdependent ecosystems."

⁷⁶ "It is one of the unexplained phenomena of the West that the rainfall has invariably increased as the country has become settled. [This is linked to] artificial disturbances of atmospheric conditions . . . [the] presence of many tons of steel and iron . . . [the] discharge of heavy artillery . . . [and the] electrical disturbances . . . of telegraph and telephone wires" (*An Illustrated History* 138).

control, salmon harvest, and water use. There is a mismatch between our fragmented management of watersheds and emerging knowledge of interconnected, interdependent ecosystems.

Thus the ISG describes a "Pacific Salmon Harvest Management Paradigm" that directly links "the productive capacity of the habitat" to adult salmon harvest levels offshore and in the river. "Salmon harvest managers need to look at the effects of degradation of the habitat" when setting harvest rates, the ISG argues.⁷⁷ Coastal and inland communities, fishers, and ranchers, all are linked with the fate of the salmon in a common ecosystem.

These lag times between evidence, understanding, and institutional change affect every party involved in Columbia Basin salmon and ecosystem issues. The Bonneville Power Administration has this in common with every lower Columbia River gillnetter and Wallowa County rancher: all are struggling to reconcile traditional belief systems and institutions—highly serviceable ones for many years—with clear evidence that compels them to change but often without a detailed set of instructions on how. In the best of cases, the effort to adjust is a good faith one but difficult for people with so much invested in the status quo. Usually some outside stimulus or pressure—a lawsuit or an Endangered Species filing—is necessary to catalyze change, but how people respond to such pressures, well or badly, determines how rapid and effective and durable the change will be—and how painful.

There is a special poignancy to this passage in the mostly small and traditional communities of basins like the Grande Ronde. People there have at risk not only their livelihoods, but also a way of life wrapped around inherited values and family roots that can go back generations. Change is hard enough without having those values and family histories challenged. When such challenges materialize, as they often do in our bruising political process, resistance to change understandably stiffens. Values long and deeply held have to be examined, and some of them modified, but they cannot be casually discarded. For these communities, change that finds a handhold in a traditional belief structure will be more readily accepted and assimilated.

If we seek more than temporary fixes—for example, trying to chase cattle out of stream bottoms with a new law that will be difficult and contentious to enforce—then we must deal directly with practices, attitudes, and beliefs that have an honorable history. We have to understand the history from

which they emerged—a critical, discriminating understanding, but also a sympathetic one. We have to allow time for beliefs and institutions to catch up with the evidence.

This pace of change may seem glacially slow to many.

"Change that finds a handhold in a traditional belief structure will be more readily accepted and assimilated."

The list of candidate species for Endangered Species status is compelling evidence that change must be accelerated if more creatures and connections are not to be lost beyond recovery.

But for those who choose to live in communities built on traditional values and who are vigilant in defending them, both the degree and the velocity of change are unprecedented and disorienting. The tempo of necessary

⁷⁷ ISG 366.

change cannot be dictated by such communities, but neither can we be indifferent to their values if the objective is lasting change in beliefs and practices, not just isolated successes.

This selective history of change in the Grande Ronde basin is suggestive, if not perfectly representative, of comparable experiences in communities—salmon and human—throughout the Columbia Basin and the American West today. It is also unique to the characteristics of the country and to the personalities and qualities of the people who live in the watershed, people who will have more to do with its life or death than any of the rest of us. The conclusions are sometimes critical, but in the end hopeful precisely because of those people.

Appendix A:

Federal, State, Local, and Tribal Institutions, Treaties, and Laws

Appendix A: Federal, State, Local, and Tribal Institutions, Treaties, and Laws*

Any comprehensive listing of the institutions and laws that address issues of water management and salmonid habitat in the Grande Ronde will be long and not especially illuminating, except in one respect. It will at least be clear from such a list that the conservation and management of the watershed is fragmented in the extreme, that lines of accountability run everywhere and therefore nowhere, and that agency missions to develop and consume the basin's natural resources are far from reconciled with the goal of conserving its biological health. Yet that reconciliation is precisely the task that watershed recovery and watershed councils, such as the council operating in the Grande Ronde, must master. The following is a survey of the more important of these jurisdictions and authorities.

Local Institutions and Laws

The irrigation districts that are associated with large Bureau of Reclamation (Reclamation) and Corps of Engineers (Corps) projects elsewhere in the West are absent in the Grande Ronde. Most irrigation development proceeded on an individual basis or as a collaboration among adjacent landowners.

The most important organizations for irrigators are the Soil and Water Conservation Districts (SWCDs) in each county. The districts are chartered by the state but locally governed and administered by an elected volunteer board of directors. They originated in the 1940s as a means of bringing technical conservation information and aid to local landowners, operating as a bridge between government agencies and the members of the district. Elsewhere in the Columbia Basin, they have taken the lead in addressing watershed conservation issues. In the Grande Ronde, they have both performed their historic mediating role and supported the Model Watershed Board's efforts to recruit landowners to change water use practices and undertake restoration projects.

State land use law mandates that counties adopt land use plans, which are reviewed by the state for consistency with statewide adopted goals. These include both development and conservation goals (especially of farm and forest lands), which counties observe by directing development to lands that it is less crucial to protect. Wallowa County has modified its land use plan to reflect the policies adopted in its Salmon Recovery Plan and then has used its land use regulating authority to implement the Salmon Plan.

Both counties also have adopted ordinances organizing the Grande Ronde Model Watershed Board, establishing its membership and delineating its scope and purposes.

*This essay originally appeared in *A Survey of Columbia River Basin Water Law Institutions and Policies*, ed. by Michael C. Blumm and Brett M. Swift (Portland, OR: Northwest Water Law and Policy Project, 1997). Reprinted with permission from the Northwest Water Law and Policy Project, a project of the Natural Resources Law Institute at Northwestern School of Law of Lewis and Clark College. This report was originally prepared as part of a study for the Western Water Policy Review Advisory Commission. The essay has been edited to conform with the style of the Grande Ronde case study.

State Institutions and Laws

In addition to the state's role in land use planning, the most important state responsibilities in watershed restoration have to do with water law, environmental quality, and targeted watershed health programs.

The Oregon Department of Water Resources administers the state's water allocation laws, which adhere to Western water law principles of prior appropriation and beneficial use. Oregon's code still asserts, with pioneer determination, that the public interest in "augmentation of existing supplies" is principally associated with "maximum economic development thereof for the benefit of the state as a whole."¹

The state records and defends water rights granted to users according to the date of filing; in the Grande Ronde, filings will go well back into the last century. In-stream rights can be acquired for conservation purposes, but most such rights necessarily have recent priority dates, useless in dry years. There is authorization for conserved water to be sold or donated as an in-stream right with the original priority date or for water to be leased for such purposes. These authorities have seen little use because there is little incentive for a landowner to surrender this valuable property. Some leasing activity is occurring—including that in the Grande Ronde—but cautiously and with little benefit to fish or habitat so far.

At least new water rights east of the Cascades are now limited in areas where weak fish stocks are present. In a controversial 1994 change in regulation, an applicant for a new withdrawal right has to show that weak fish stocks will not be adversely affected by the withdrawal.²

In addition, tribal claims on water are beginning to be adjudicated. These claims, which may be for both consumptive and in-stream (fish and wildlife) purposes, date from treaty signings and so would predate nearly all other water rights if they were validated.

The Oregon Department of Environmental Quality administers the federal Clean Water Act under agreement with the U.S. Environmental Protection Agency (EPA). Since many streams in the Grande Ronde and other state river basins are "water quality limited,"³ there is a legal obligation on landowners and local and state officials to correct the problems as they are identified. Under prevailing court interpretations, water *quality* problems may also be water *quantity* problems under Section 303(d) of the Clean Water Act, potentially putting water quality and water rights laws in conflict.

For the past several years, Oregon has targeted several programs at improving watersheds (including the Watershed Health Program initiated by Governor Roberts in 1992). The Watershed Enhancement Program was undertaken in 1987 and administered by the Governor's Watershed Enhancement Board (GWEB), which was composed of 11 state and federal officials. The program administered limited funds for education and projects and also was intended to improve coordination among the conflicting missions and policies of the agencies involved.

In 1993 the legislature established the Watershed Health Program, to be directed by still another interagency group—the Strategic Water Man-

¹ ORS S. 536.310(2) 1995.

² The change responded to a recommendation in the 1993 Fish and Wildlife Program of the Northwest Power Council.

³ DEQ lists 870 stream segments in 91 Oregon subbasins that fail to meet the water quality standards of S 303d, Clean Water Act.

agement Group (SWMG)—which included many of the same state agency heads and others. The legislature also encouraged the formation of local watershed councils, appropriated \$10 million for improvement projects, and gave funding priority to two target areas: the southern Oregon coast and the Grande Ronde. This was in partial response to a recommendation of the Northwest Power Council's (Power Council) Fish and Wildlife Program that model watersheds be designated in the lower three states of the Columbia Basin, with special attention and resources to be delivered thereto.

The Watershed Health Program derived also from the report of a 1992 public-private working group that proposed an array of "watershed management tools," including investing in water conservation, allocating some of the saved water to in-stream uses, imposing a public interest test on transfers, and requiring better measurement of consumed water and better enforcement to benefit in-stream flows.⁴ Few of these flow-related tools have seen extensive service yet because emphasis has shifted to stream and streamside projects that are less controversial and more easily welcomed by landowners.

In 1995 the legislature abolished SWMG, shifted the Watershed Health Program to GWEB control, omitted most of the water management tools from the new law, and simplified the mission to support of local watershed councils in developing their own programs and in complying with other applicable federal and state laws.

Late in 1996, under pressure from a citizen ballot initiative that would have prohibited grazing near any water-quality-limited stream, Oregon Governor Kitzhaber negotiated a "Healthy Streams Partnership" agreement among agricultural interests and some environmentalists that would increase state aid to needy watersheds and carry the threat of stepped-up enforcement of clean water laws. State and timber industry funding appear likely. Skeptics—including both environmentalists and the National Marine Fisheries Service (NMFS)—have questioned whether the governor has found the right (collaborative) mix of clear state expectations and voluntary local activism. A too-slack state role can be as crippling as one that is overly prescriptive. The absence of SWMG's water management tools also may slow progress. If the state defers to local councils without explicit state standards for stream health outcomes (other than federally mandated water quality standards), local performance may be quite uneven. The potential for conflict between local and state officials, arising out of misjudgments about intent and objectives, is high.

This is particularly so because the missions and tools of other state resource agencies, governed by principles of multiple use, are still directed to both economic development and resource conservation and lack a reconciling set of priorities that can be applied within a watershed. Can water rights continue to be issued while biologically based flow requirements in specific streams remain unclear?⁵ Should the first task of the Oregon Department of Forestry be to protect the integrity of watersheds or to encourage logging in them (consistent with prevailing state law, but not necessarily with emerging watershed science)?

⁴ R. Benson, "A Watershed Issue: The Role of Streamflow Protection in Northwest River Basin Management," *Environmental Law* 26.1 (1996): 175-224.

⁵ In 1996 the Oregon Department of Agriculture proposed to reserve substantial additional water withdrawal rights for agricultural use in eastern Oregon.

Other state agencies with significant roles in watershed conservation include Agriculture, Land Conservation and Development (land use), Fish and Wildlife, and the Oregon Soil and Water Conservation Commission. Interestingly, Fish and Wildlife has been a somewhat peripheral player in local landowner-oriented watershed efforts. It is often seen as a fish advocate rather than a cooperative participant—an executor of the Endangered Species Act (ESA) and Oregon's sensitive species law and wild fish policies. Some landowners bar the agency's staff from their lands.

The Northwest Power Planning Council

The Power Council includes representatives named by the governors of Idaho, Montana, Oregon, and Washington. It is an interstate compact mandated by Congress to "assure the Pacific Northwest of an adequate, efficient, economical and reliable power supply" while promoting energy conservation and renewable technologies and "protecting, mitigating and enhancing fish and wildlife resources."⁶ The Power Council's Fish and Wildlife Program of 1992 proposed the idea of model watersheds in Idaho, Oregon, and Washington (and later, Montana), a recommendation acted upon by those jurisdictions. The Power Council's plan also proposed measurable standards for watershed health and asked the states and other parties with habitat responsibilities to adopt and implement them. However, the Power Council can in most cases only recommend and exercise critical oversight, without any power to compel compliance. Congress carefully delegated substantial responsibility and little authority to the body.

The Power Council does have considerable say over the disposition of the fish budget of the Bonneville Power Administration (Bonneville). These are funds allocated to fish and wildlife projects in mitigation for the effects of the construction and operation of the federal hydropower system on the Columbia River and its tributaries (figure A.1).

Federal Institutions and Laws

The principal federal agencies and laws involved in water management and watershed recovery in the Grande Ronde are NMFS and the U.S. Fish and Wildlife Service (USFWS) (the ESA); the Environmental Protection Agency (EPA) (the Clean Water Act); and the federal land management agencies, the U.S. Forest Service (Forest Service), and the Bureau of Land Management (BLM).

In the Columbia Basin, the regional federal river managers are also involved: Bonneville, Reclamation, and the Corps.

NMFS implements the ESA with respect to anadromous fish; and USFWS implements it with respect to resident fish and wildlife. Salmon, steelhead, and bull trout are listed or potentially listed species within the Grande Ronde. Actions which could result in direct or indirect harm ("taking") to listed species are subject to consultation with one of these agencies, although different rules apply to federal and nonfederal lands. Grande Ronde communities are affected either way, dependent as they are on the federal lands that occupy about half the basin. Both agencies can negotiate habitat conservation plans (HCP) with private landowners that will protect the latter from takings penalties or other impacts, in return for voluntarily implementing the terms of the HCP. NMFS also administers the Mitchell Act,

⁶ Section 2, The Northwest Electric Power Planning and Conservation Act of 1980, 16 U.S.C. SS 839-839h (1994).

GRANDE RONDE BASIN

BPA SPONSORED FISH PROJECTS AS OF 1997

Projects

Habitat Projects

Research Projects

Other Watershed Projects

Preliminary Mapped

Land Purchase for

Net Percu Tribe

Land Management

Forest Service

Wilderness Area

National Recreation Area

Bureau of Land Management

Indian Reservation Lands

State Lands

Private, Unknown

or Other

Base Data Derived From

1:100,000 Scale Sources

Map Date 5/27/97

Map Date 5/27/97

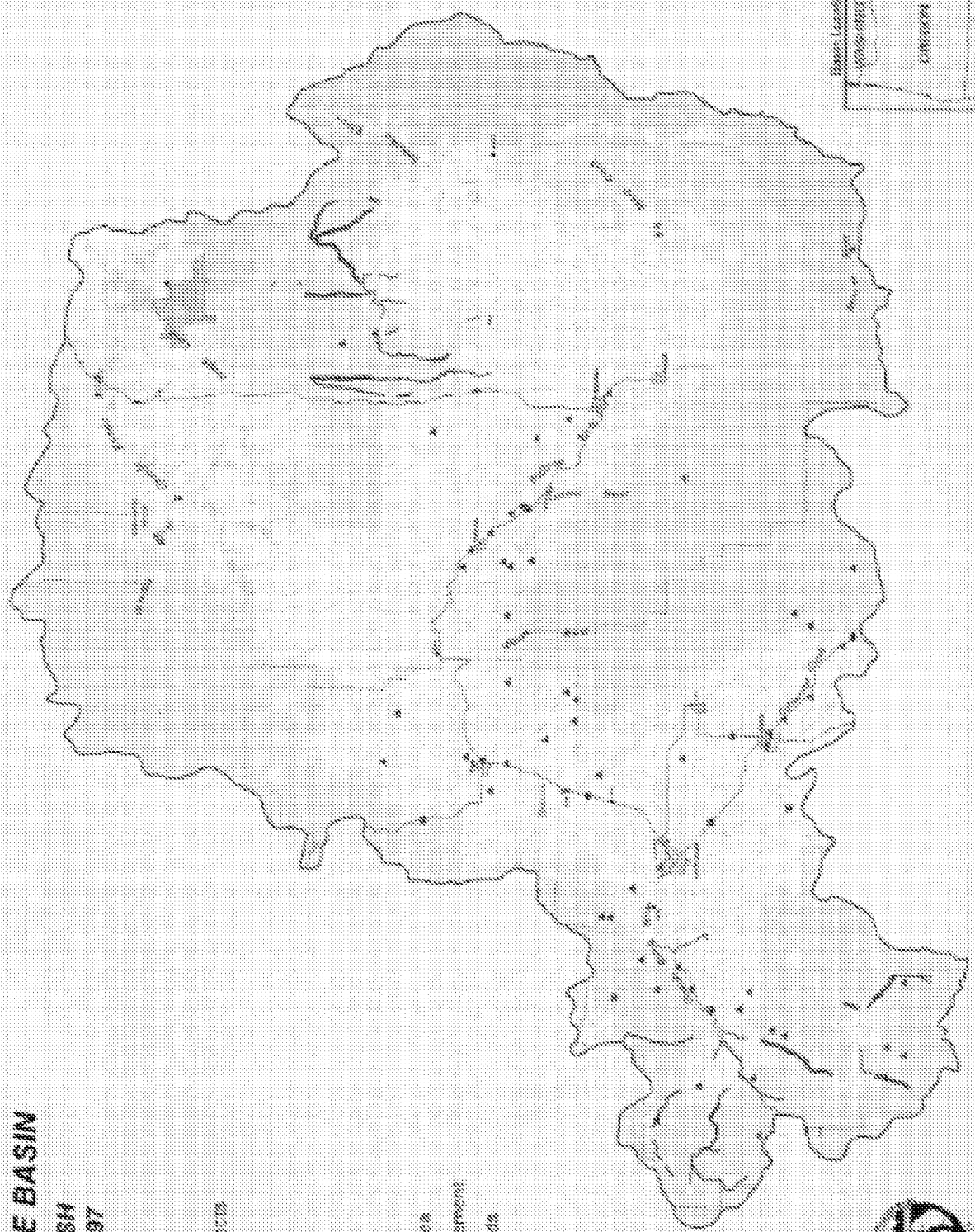
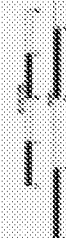
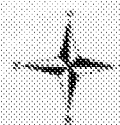


Figure A.1. BPA sponsored fish projects in the Grande Ronde basin as of 1997.
Source: Bonneville Power Administration.

which supports hatchery operations in the Columbia Basin, and some water diversion screening projects.

The EPA administers the Clean Water Act, acting largely through the state (as described above). The EPA also directly funds watershed monitoring, evaluation, and restoration projects. From 1992 to 1995 it had committed approximately \$1.5 million to projects in the Grande Ronde, principally through the state and the Confederated Tribes of the Umatilla Indian Reservation. It provides assistance to the state in designating water-quality-limited stream reaches, establishing total maximum daily loads (TMDLs) of identified pollutants for these streams, and adopting measures to bring the streams into compliance with Clean Water Act standards.⁷

The Forest Service and, to a lesser extent, BLM manage federal lands in the Grande Ronde. The principal tool of the Forest Service is the forest plan adopted for each separate forest (the plan must be consistent with other applicable federal law, including the Environmental Protection Act and the ESA). For the last ten years, east side national forests such as Wallowa-Whitman have been managed in the shadow of ESA implementation west of the Cascades. Anticipating ESA challenges on the east side, the Forest Service has developed and superimposed new tools on the forest plans. The PACFISH strategy applies to anadromous fish-occupied federal lands in the Pacific Northwest and Alaska. It seeks to set watershed standards and practices derived specifically from the ecosystem needs of anadromous fish. Because its habitat standards are often stiffer than those in adopted forest plans, it is controversial in the Grande Ronde and elsewhere, and its effects and effectiveness are unclear.

In their Oregon and Washington lands east of the Cascades, the Forest Service and BLM propose to overlay on or substitute for PACFISH an effort with the cumbersome name of the Interior Columbia Basin Ecosystem Management Project. The intent is to manage lands for ecological sustainability broadly construed (as opposed to managing for economic production or for sustaining one species). Jurisdictional and administrative boundaries will be overridden by ecosystem requirements (a goal which makes more puzzling the exclusion of that part of the Columbia River drainage west of the Cascades). "Ecosystem management" will provide "a framework in which scientific information will be used to objectively evaluate resource trade-off decisions."⁸ To its credit, the project acknowledges the obstacles—political, historical, and bureaucratic—that a linkage to ecosystem science will face. In particular it will have to find its point of integration with the local communities that occupy and use the watersheds, acquiring a community perspective without losing its ecosystem focus.

The river management agencies—Bonneville, Reclamation, and the Corps—are linked to headwater management and watershed restoration in more oblique ways. Efforts to rebuild weak anadromous runs have made their demands on the Columbia River hydropower system. All three agencies have obligations under the Northwest Power Act (as well as the ESA) to mitigate and enhance fish and wildlife species, particularly the anadromous

⁷ Setting TMDLs and bringing the Grande Ronde and other streams into compliance is a central commitment of Governor Kitzhaber's Healthy Streams Partnership initiative.

⁸ U.S. Forest Service and U.S. Bureau of Land Management, *Background and Purpose of the Eastside EIS, Interior Columbia Basin Ecosystem Management Project* (Washington: GPO, 1994).

stocks that pass their dams. Agency leaders perceive that investments in watershed recovery may prove less expensive to hydropower operations than modifying the operations of their projects, reconstructing (or breaching) them, or shifting flows back from winter peaks for power demand to spring and summer flows for fish. Reclamation must also address the impacts to river flows of withdrawals from irrigation projects it owns and operates.

All three also have obligations to respond to the Power Council's Fish and Wildlife Program, which has specific directions to each in its Program.⁹

Bonneville includes in annual budget obligations around \$120 million for funding council-approved projects throughout the basin, including habitat projects.¹⁰ The Grande Ronde continues to rely on this source for meeting a significant share of its administrative and project costs. Bonneville funding also goes to support the Independent Scientific Group (now the Independent Scientific Advisory Board) and other investigations into the science of fish survival and watershed health.

The Natural Resources Conservation Service (NRCS)—formerly the Soil Conservation Service—has played an important supporting role in the Grande Ronde. With its recent name change, the NRCS mission was broadened to something approaching an ecosystem restoration role. Its responsibilities were extended beyond soil and water conservation for agricultural purposes, to conservation of biological resources and their interactions. Restoration of salmon habitat through landowner-based projects is giving the agency its first stiff test in caring for both farmers and fish. In the Grande Ronde, NRCS has provided, and funded, much of the design and engineering work for projects located on private lands. NRCS staff have played pivotal roles in the model watershed programs in Idaho and Washington as well. Nationwide, the agency administers an \$18 million budget for watershed conservation.

Other federal agencies that have lesser parts to play in a watershed like the Grande Ronde include the federal Energy Regulatory Commission, which licenses nonfederal dams and stipulates mitigation measures—including habitat project funding—for dam impacts on fish, and the U.S. Geological and Biological Surveys.

Tribal Institutions and Laws

Relations among sovereign tribal governments, the states, and the federal government are based on written treaties, on the federal trust obligations to the tribes, and on a body of court decisions construing this body of rights and obligations. The tribes are sovereign nations that interact with the federal government and the states on a sovereign-to-sovereign basis. The tribes also work voluntarily and cooperatively with local governments and others institutions in the region.

Tribal rights in the Grande Ronde are driven by treaties signed in 1855 and 1863, under considerable duress, by the Umatilla Tribes (Umatilla, Walla Walla and Cayuse) and the Nez Perce. While there is considerable question whether the Nez Perce leaders who signed away the Wallowa Valley pos-

⁹ Thus when Reclamation was directed to develop experimental water efficiency projects in Washington, Oregon, and Idaho, it selected the Prairie Creek project in the Wallowa Valley.

¹⁰ In fiscal year 1997, the Grande Ronde received from the Bonneville Power Administration \$305,000 for administration and \$1,127,000 for watershed projects. Funding is likely to be lower in fiscal year 1998.

sessed the authority to do so, there is no question that tribal hunting and fishing rights in "usual and accustomed" places were reserved in the lands that were surrendered. Thus the Umatilla assert such rights in the upper and middle Grande Ronde; and the Nez Perce in the lower Grande Ronde and the Wallowa Valley. Federal courts have taken the position that such rights would be meaningless without game to hunt and fish to catch, so there is a treaty obligation on the United States and the State of Oregon to manage the use and conservation of the Grande Ronde watershed to assure conditions compatible with a meaningful right. It's not perfectly clear how the tribes could exercise their rights in their direct relationships with the Model Watershed and local communities. Activities in the Grande Ronde, however, are so intertwined with state and federal authorities, programs and funds that levers are available for the tribes to work as and when they are required.

The treaty tribes of the lower Columbia, including the Umatilla, Cayuse, Walla Walla, and Nez Perce, are organized into the Columbia River Inter-Tribal Fish Commission for purposes of managing harvest and influencing the river policies of other government agencies. They also participate with other fish managers—federal, state, and tribal—in the Columbia River Fish and Wildlife Authority, which recommends policy positions and project funding allocations to the Power Council and Bonneville. Through the Authority, the tribes helped to develop the Columbia Basin System Planning Production Plan, which addresses hatchery operations and habitat conditions in the Columbia Basin. The System Plan includes 31 subbasin plans. Such a plan for the Grande Ronde was adopted in 1990, setting out production and escapement goals for the subbasin for each indigenous stock, and strategies for achieving them.

The tribes are by treaty comanagers of fish harvests along with the states and the federal government. In the Grande Ronde, harvest is governed by the terms of the *United States v. Oregon* federal court proceeding. After tribal ceremonial and subsistence harvest is taken, any remaining fish available for harvest are divided equally between the tribes and nontribal fishers. As a practical matter, the tribes have foregone any harvest due to the extremely weak condition of the stocks.

Appendix B:

The Law of the Columbia River

Appendix B: The Law of the Columbia River*

TREATIES AND FEDERAL RECOGNITION OF TRIBES	
1855 treaties, executive orders, and other instruments with Columbia Basin tribes	<ul style="list-style-type: none"> ◆ Established reservations throughout the Columbia River Basin ◆ Reserved water to fulfill purposes of reservations, including support of fisheries; some treaties and executive orders guaranteed certain rights both on and off reservation, including the right to fish at usual and accustomed places; subsequent litigation of Stevens Treaty assured tribes half of salmon harvest. ◆ Recognized tribes as sovereigns: tribes have management authority over all natural resources located within reservation boundaries. ◆ Several tribes are party to the Columbia River Fish Management Plan that supervises in-river harvest of salmon in the Columbia River system.
1964 U.S./Canada Columbia River Treaty	<ul style="list-style-type: none"> ◆ Coordinates U.S./Canadian mainstream dam operations for flood control and hydropower purposes by managing water storage and releases ◆ Implemented by COE, BPA, BC Hydro
1985 U.S./Canada Pacific Salmon Treaty	<ul style="list-style-type: none"> ◆ Allocates harvest of five Pacific salmon species between the U.S. and Canada; goal of the treaty is to ensure each country benefits commensurate to the amount of fish spawned and reared in their rivers and streams. ◆ Established bilateral management forum; created the Pacific Salmon Commission to make harvest allocation decisions
Army Corps of Engineers	<ul style="list-style-type: none"> ◆ Operates nineteen major federal dams in the Columbia River Basin for flood control, hydropower, navigation, and other authorized purposes ◆ Conducts other river management activities (dredging, regulation of structures) ◆ Issues dredge and fill permits under the Clean Water Act in rivers and wetlands ◆ Required to act consistently with the Northwest Power Act and takes the Power Council's fish and wildlife program "into account at each relevant stage of decisionmaking processes to the fullest extent practicable"

*Source: Michael C. Blumm and Brett M. Swift, eds., *A Survey of Columbia River Basin Water Law Institutions and Policies* (Portland, OR: Northwest Water Law and Policy Project, 1997), n.p. Reprinted with permission from the Northwest Water Law and Policy Project, a project of the Natural Resources Law Institute at Northwestern School of Law of Lewis and Clark College. This report was originally prepared as part of a study for the Western Water Policy Review Advisory Commission. It has been reformatted for this publication.

Bureau of Reclamation	<ul style="list-style-type: none"> ◆ Operates nine major dams and reservoirs in the Columbia River Basin, primarily for irrigation purposes ◆ Operates numerous projects for secondary purposes, including hydropower, municipal and industrial use, and recreation ◆ Enters into contracts with irrigation districts and other users for the delivery of project water ◆ Required to act consistently with the Northwest Power Act and takes the Power Council's fish and wildlife program "into account at each relevant stage of decisionmaking processes to the fullest extent practicable"
Federal Energy Regulatory Commission	<ul style="list-style-type: none"> ◆ Created to carry out the provisions of the Federal Power Act ◆ Regulates the construction and operation of nonfederal hydroelectric projects in the basin ◆ Issues and conditions original and new licenses for nonfederal hydroelectric projects ◆ Required to act consistently with the Northwest Power Act and takes the Power Council's fish and wildlife program "into account at each relevant stage of decisionmaking processes to the fullest extent practicable"
Bonneville Power Administration	<ul style="list-style-type: none"> ◆ Markets and distributes excess power produced from federal hydroelectric projects on the Columbia River and its tributaries ◆ Required to act consistently with the Northwest Power Act and takes the Power Council's fish and wildlife program "into account at each relevant stage of decisionmaking processes to the fullest extent practicable" ◆ Funds the protection, mitigation, and enhancement of fish and wildlife resources affected by the Federal Columbia River Power System
Forest Service	<ul style="list-style-type: none"> ◆ Authorizes and monitors timber harvest, grazing, mining, recreation, and other activities that occur on all national forest lands and some wilderness areas and wild and scenic river corridors in the Columbia River Basin ◆ Has limited water management authority, but does monitor and assert federal reserved rights and other water rights obtained pursuant to state law, and regulates access to national forest lands for water project purposes ◆ Has recently developed and implemented the Northwest Forest Plan, PACFISH, and INFISH; planning documents specific to the basin that address fish and wildlife concerns
Bureau of Land Management	<ul style="list-style-type: none"> ◆ Authorizes and monitors timber harvest, grazing, mining, recreation, and other activities that occur on all federal "public lands" and certain wilderness areas and wild and scenic river corridors in the Columbia River Basin ◆ Has limited water management authority, but does monitor and assert federal reserved rights and other water rights obtained pursuant to state law, and regulates access to BLM-managed lands for water project purposes ◆ Has recently developed and implemented the Northwest Forest Plan and PACFISH; planning documents specific to the basin that address fish and wildlife concerns

National Marine Fisheries Service	<ul style="list-style-type: none"> ◆ Administers the Endangered Species Act (ESA) for anadromous fish; ESA responsibilities include listing species as threatened or endangered, designating critical habitat, developing recovery plans, consulting with federal agencies, and regulating the take of federally listed species. ◆ Develops fishery management plans that set ocean harvest regimes ◆ Administers the Columbia River Fisheries Development Program ◆ Is a party to the Columbia River Fish Management Plan (CRFMP); members of the CRFMP supervise the in-river harvest of salmon in the Columbia River system.
Fish and Wildlife Service	<ul style="list-style-type: none"> ◆ Administers the ESA for nonanadromous fish and other species: lists species as endangered or threatened, designates critical habitat, develops recovery plans, consults with federal agencies, and regulates the take of federally listed species ◆ Manages federal lands designated as national wildlife refuges
Environmental Protection Agency	<ul style="list-style-type: none"> ◆ Oversees implementation of Clean Water Act: wetlands regulation and state water quality programs (point and nonpoint source programs) ◆ Administers national pollution discharge elimination system in states where delegation has not taken place (Idaho)
Northwest Power Planning Council	<ul style="list-style-type: none"> ◆ Interstate compact agency created by 1980 Northwest Power Act ◆ Develops regional plans for power production and fish and wildlife protection ◆ COE, BOR, FERC, and BPA must take the Power Council's fish and wildlife program "into account at each relevant stage of decision-making processes to the fullest extent practicable"
REGIONAL LAW	
Northwest Power Planning Council	<ul style="list-style-type: none"> ◆ Interstate compact agency created by 1980 Northwest Power Act ◆ Develops regional plans for power production and fish and wildlife protection ◆ COE, BOR, FERC, and BPA must take the Power Council's fish and wildlife program "into account at each relevant stage of decisionmaking processes to the fullest extent practicable"

STATE LAW

Idaho Montana Oregon Washington	<ul style="list-style-type: none"> ◆ Allocate and distribute water within state boundaries; issue water rights and establish state rules governing the use, sale, and transfer of water rights ◆ Implement various provisions of the federal Clean Water Act, including the establishment of state water quality standards, identifying water-quality-limited water bodies, and administering point (except Idaho) and nonpoint source water-quality programs ◆ Regulate forest, agricultural, and mining activities and practices on state and private lands ◆ Administer the rules and licensing procedures applicable to fishing and hunting activities within state boundaries and prescribe management practices for state-owned fish hatcheries
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