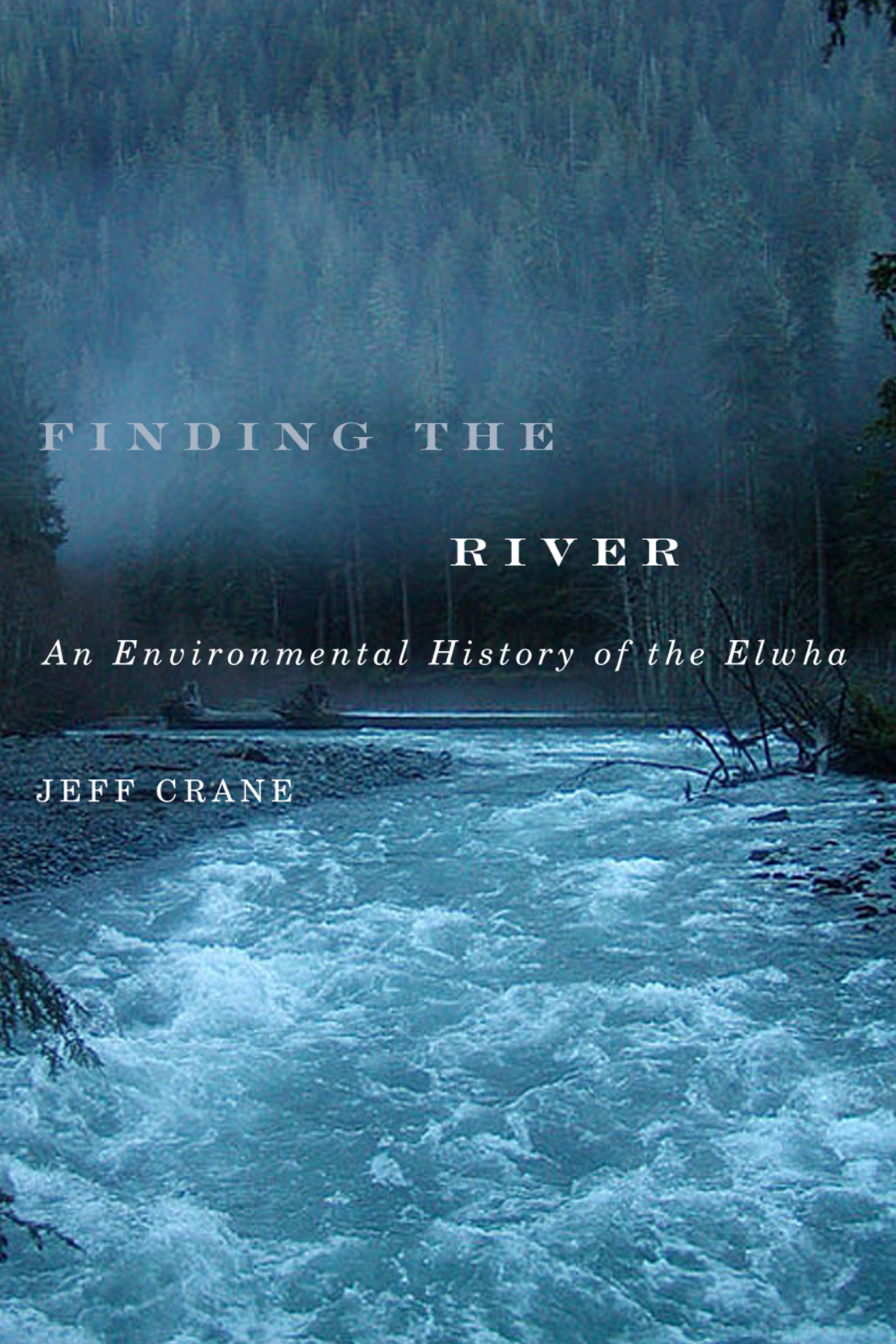
FINDING THE
RIVER
An Environmental History of the Elwha
JEFF CRANE

Chapter 4

Meaning Runs Through It

RECONVERTING THE ELWHA FROM INDUSTRIAL RIVER TO SALMON RIVER

> *If the wild salmon can no longer survive here, one might ask, where can they?*
>
> Bruce Brown[1]

"*Torpedo the Dams*, Full Speed Ahead," declared the flyer announcing a party to celebrate the impending demolition of the two dams on the Elwha River, located on the Olympic Peninsula of Washington State, about six miles west of Port Angeles. River restoration advocates had won a startling victory in 1992 by convincing Congress to pass legislation to restore the Elwha River, including removal of both the Elwha and Glines Canyon Dams if necessary. This was the first time federal legislation had been passed for the removal of dams to restore a river and its fisheries. However, while the activists had won groundbreaking legislation and complete victory seemed imminent, the battle would drag on longer than activists could anticipate, despite ushering in a new environmental era of dam removal and river restoration.

The story behind the Elwha River activists' success is one of cooperation and creativity resulting in a broad coalition of unlikely allies. The fact that these dams were still standing nearly 20 years later reveals the continuing tension between economic development and salmon restoration in the Pacific Northwest.

While numerous environmental debates dominated the headlines in the Pacific Northwest in the 1980s and 1990s, one of the most important and heated was that over the extinction of salmon and

steelhead populations and the likely future decline of runs throughout the region. The movement to restore the Elwha River and its salmon represented a remarkable environmental and political effort, which seemingly reached fruition with the passage of the Elwha Restoration Act in 1992. An examination of the Elwha restoration effort demonstrates shifts in environmental values in America and the Pacific Northwest. Of more interest is how the Elwha River was reevaluated in the modern era for nonindustrial uses, and the remarkable strategy of consensus employed to craft and pass a bill calling for restoration of the river and its fisheries.

Bruce Brown's *Mountain in the Clouds*,[2] a book exploring the history and collapse of salmon fisheries on the Olympic Peninsula, with a strong focus on the Elwha River and the episode between Darwin and Aldwell and their attempted solution, helped build support for the idea of river and fisheries restoration in the region. After his book was published, Brown even suggested in a keynote address that dam removal should be considered as an option. The idea of river restoration through dam removal began to gain traction quickly. A letter from the National Parks Conservation Association to Olympic National Park Superintendent Robert F. Chandler in March 1985 suggested the park service purchase the two dams so that they could be removed at a later date. The letter also criticized the construction of the Elwha Dam and the hatchery solution as a key factor in the destruction of Northwest salmon fisheries.[3]

It was clear that the status quo on the Elwha River could not be sustained much longer. A proposal by the administration of Olympic National Park in March 1985 for reintroduction of anadromous fish called for strong measures and private money to initiate a serious effort to restore salmon above the dams in two phases. In the opening paragraph of the report, the loss of both salmon and access to excellent habitat was emphasized, as it would be time and time again in future activist media efforts. Also, the report made the point that there was more at stake than just salmon, or the lack thereof. Because the river was one very important thread in a complex mountain watershed ecosystem, the loss of salmon above

the dams created significant impacts throughout that watershed. Spawned out and decomposing salmon contributed nutrients to the river and its tributary streams and also fertilized the soil surrounding the waterways. The lack of those fish made the river, streams, and soil less fertile and less productive. This was clearly an expanding and much more ecological way of thinking about the impact of the dams on the environment, beyond just salmon survival. Moreover, the loss of salmon had negative impacts on the numerous species that depended on the fish, such as raccoons, otters, bears, ravens, and others.[4]

The Olympic National Park administration then fired the proverbial shot across the bow, foreshadowing or paving the way for arguments for dam removal, by stating that mitigation would be necessary to lower mortality rates of *downstream* migrating smolts as part of a plan to reintroduce salmon *above* the dams. The long years of ignored protest over the health of the river's fisheries were quickly drawing to a close. The report emphasized the importance of the mitigation measures and the consequences of failure. "Certain procedural changes in operation of the dams may reduce this mortality [of downstream migrating smolts]; however, if these do not reduce it to acceptable levels, additional measures will be necessary."[5]

The report then laid out the steps necessary for mitigating the Elwha fisheries. Some of these steps included: modification of the spillway on the west bank of the Elwha Dam by removing rock outcroppings and resurfacing, elimination of use of the east bank spillway during the period of downstream smolt migration, and a reduction of water flow through the west spillway during the same period. The park also insisted that both dams modify turbine operations and water release at critical times in order to reduce mortality of juvenile salmon. This was intended to protect young fish migrating downstream from above the dams, through their turbines, and then down to the Strait of Juan de Fuca. Clearly, an important shift was underway and gaining momentum. Apparently, the days of status quo acceptance of a deteriorated river and poor

management of downstream water flow by the dam owners were over. The report also addressed the issue of upstream fish passage by demanding construction at the Elwha Dam of a weir for adult salmon, a short ladder, fish trap, cableway, and hopper. In addition, a fish truck loading area, truck ramps for fish release in both reservoirs, the purchase and maintenance of two trucks for the above reason, and annual funds of $30,000 to operate the facilities would also be required. The park also set a strict timetable for implementation of these improvements, emphasizing that these were "minimum measures" that would have to be expanded as necessary.[6]

REIMAGINING THE RIVER

As interest in upstream fisheries restoration, and even dam removal, gained momentum, Rick Rutz of Olympic Park Associates analyzed the possibilities of dam removal. According to political scientist Virginia Egan, "Rick Rutz began to research the feasibility of the dam removal option. Several activists in this period relate how Rutz first developed the language for an intervention and 'shopped it around' to various Seattle offices of key environmental organizations."[7] This apparently worked, because on May 15, 1986, four conservation groups—Seattle Audubon Society, Friends of the Earth, Olympic Park Associates, and the Sierra Club—also joined the groups seeking to block relicensing of the dams. Another factor in the involvement of these environmental groups was the recent passage of the Electric Consumers Protection Act (ECPA) in 1986. Mandating that environmental issues be given weight during the review of a request for dam relicensing, the legislation effectively strengthened the hand of environmentalist groups, brought more interest groups into the escalating Elwha restoration movement, and increased the likelihood that dam removal could happen. According to Egan, the environmental groups were interested in testing the ECPA, and the Elwha case seemed a perfect candidate.[8]

While there was some talk of dam removal, few Elwha advocates saw that as a real possibility. The FERC (Federal Energy Regulatory Commission) had never refused a license (thus damning a dam

to removal) for environmental reasons and had proven strongly resistant to considering environmental issues in the relicensing process in general. Therefore, the focus was on using the relicensing process to force a real consideration of the salmon issue and push for extensive mitigation of the dam's impact on the fish. Although the environmental groups were granted intervenor status in relicensing, they demanded dam removal from the beginning. In the mid- to late 1980s, theirs was a minority and marginal position.

The Joint Fish & Wildlife Agencies (JFWA) and the Elwha Relicensing Steering Committee (ERSC) were organized by salmon advocates to facilitate negotiation and gain as much as possible from the FERC and dam owners Crown Zellerbach and James River Corporation. Ironically, and consistent with its history of powerlessness since 1914, the Washington Department of Fisheries, because of Darwin's earlier agreement, could not oppose relicensing the dam. They were, however, allowed to sit in on the meetings. The JFWA coordinated research on restoration, mitigation, and the feasibility and logistics of dam removal, and reviewed material and findings in order to present a consistent message and united front in the release of public information. This group also provided a forum for resolving disagreements and conflicts among the member groups.[9]

The ERSC was dedicated to the distribution and exchange of information and ideas for advocates of Elwha restoration. Meeting for the first time on October 1, 1985, the group also sought the active participation of both Crown Zellerbach and the Lower Elwha Klallam. The group continued to expand with invitations to and increasing participation by Conservation Intervenors, including those demanding dam removal. Notes Virginia Egan, "Toward the end of the FERC relicensing proceedings, as they were beginning to conclude that mitigation measures would be cost-effective for the company, representatives of JRC [James River Corporation] and Daishowa America[10] also attended."[11] (Daishowa had become owner of the Port Angeles pulp mill by this time.)

This process of coordination, cooperation, and open communication would prove critical in the efforts to restore the

Elwha. The crafting of a consensus solution reflected the mastery of those three strategies and culminated in the remarkable legislation of 1992.

Before evaluating the success of the consensus effort, it is necessary to understand the unique qualities of the Elwha. While there are many dammed rivers in the Pacific Northwest and the nation, few have generated the vociferous support expressed for Elwha restoration. The beauty of the river, its location within a national park, and the dramatic loss of a bountiful salmon fishery were all factors contributing to support of the dams' removal. Moreover, unlike the Columbia River or Snake River dams, the Elwha River dams were reasonable targets for removal and river restoration. The watersheds of many other rivers like the Snake and the Columbia have been seriously degraded under the pressure of agriculture, logging, and other resource extraction activities along with urban and suburban development. By contrast, the Elwha River's watershed is little changed since the pre-dam era. Approximately 84 percent of the watershed exists within the Olympic National Park and most of it is old-growth forest, providing abundant and healthy salmon-spawning habitat. Furthermore, the dams were of little economic significance, providing partial power for only one Port Angeles pulp mill. Strong arguments can be made for the restoration of many rivers, but the ecological health of the Elwha River watershed as well as the economic insignificance of the two dams provided a realistic scenario for dam removal and river restoration.

OF SALMON PAST AND FUTURE

The Lower Elwha Klallam tribe has lived for centuries on the banks of the Elwha River and sought to regain access to a healthy and productive river. The demise of the river occurred within two generations; fisheries manager and tribal member Rachel Kowalski recalls her grandmother speaking of the river teeming with fish. And as Kowalski states: "It's not just a matter of dollars and cents for us . . . the loss is ever present."[12] Their involvement was important for several reasons. The tribe had already challenged the relicensing of

the dams on the Elwha. They were also economically and culturally dependent on the river and stood to benefit from a decision to restore the salmon runs. Additionally, the Indians of the Northwest were guaranteed the right to access and harvest fish in the treaties of the mid-19th century, as clarified by the Boldt decision of 1974, which required that salmon harvests be split evenly between Indian and non-Indian commercial fishermen. Underlying the discussion of restoring the salmon to the Elwha was the knowledge that the Lower Elwha Klallam had lost their traditional access to the salmon fisheries and that legal action was a possible outcome of this violation of treaty rights.[13]

The possibility of litigation provided the Lower Elwha Klallam and other river restoration activists with strong leverage in their efforts to restore the river, and this potential outcome fueled efforts to remove the dams through other means. Like many Northwest Indian tribes, they suffer from high unemployment rates along with other economic problems, and see a restored Elwha River as a means to strengthen their local economy and reinforce important cultural traditions centered around the river and its fish. "The tribe has long struggled to advance its concerns regarding the subject," wrote the tribal council to Washington Governor Booth Gardner in 1989. "At issue is a devastating loss of income resulting from the destruction of the river fishery . . . The disruption of natural river flow has resulted in a loss of a valuable beach area and associated uses including shellfish harvesting."[14] Restoring what had been the very heart of the community for untold years would of course be both powerful and poignant. But pragmatic arguments were the key to getting the dams removed. A Klallam study indicated that a restored Elwha River could bring as much as $150 million to the tribe over a period of fifty years.[15]

Writers and activists pursuing river restoration celebrated the inherent aesthetic and productive characteristics of the Elwha. They generally portrayed the river as pristine, bountiful, and magnificent. A *Seattle Times* editorial advocating removal of the dams declared "that the dams decimated the Elwha's rare five-species salmon runs,

including legendary giant kings that exceeded 100 pounds."[16] The emphasis throughout pro-restoration editorials, brochures, and letters was on the size and abundance of the salmon runs as well as the weight of individual chinook salmon. Indeed, the size and weight of chinooks became a focus of restoration rhetoric. "Flowing out of the heart of pristine Olympic National Park, the Elwha River once sustained all five species of Pacific salmon.[17] Giant chinook salmon weighing more than 100 pounds once spawned in the Elwha . . . two hydroelectric dams were constructed on the river, destroying its once prolific anadromous fish runs."[18] An article on the Elwha River restoration in a Friends of the Earth bulletin reinforced this narrative of abundance lost, referring to the Washington State Department of Fisheries estimates of 8,000 chinook a year and a quarter million pinks every other year, noting, "So many pink salmon used to jam into the Elwha that they once lifted a canoe right out of the water—or so the story goes."[19]

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This anecdotal reference to canoes being lifted out of the water resembles other archetypal stories of people crossing rivers on the backs of spawning salmon and spooked horses having to be backed across streams and rivers packed with salmon. These popular stories colorfully recall the abundance of the salmon runs and the awe they inspired in early observers; use of these anecdotes also reflects powerful nostalgic longings. Accordingly, Don Hannula of the *Seattle Times* described the historical Elwha chinook in reverent tones: "They came in spring—the biggest breed of salmon this state has known—and began their steep, grueling journey up 65 miles of river rushing from the majestic Olympic Mountains. These were the fabled giant Kings of the Elwha—salmon that tipped the scales at more than 100 pounds."[20] This prose served as the introduction to an editorial supporting Elwha restoration, and imbued the reader with a grandiose, romantic interpretation of the value of the Elwha River and its salmon. While it is tempting to believe that humans have always viewed nature in such a way, the viewpoint stems in fact from cultural changes over the last century and a half. The language used here to describe nature and ascribe to it particular aesthetic values can be traced to the American preservationist tradition and earlier to the romantics. The early preservationist period in American history radically changed and continues to influence the way many Americans view, talk about, understand, and, finally, use nature. It is difficult to understand the values and emotions driving the Elwha restoration movement without examining the culture of environmental preservationism, at least in a limited way.

The shadow of Sierra sage John Muir stretches long over this preservationist impulse. Muir argued that nature contained value besides that of the economic interests of man, and special places deserve to be set aside not only for reasons of biological health but for aesthetic and particularly spiritual reasons as well. Seeking to protect his beloved Yosemite Valley, Muir wrote:

> *It seems strange that visitors to Yosemite should be so little influenced by its novel grandeur, as if their eyes were bandaged*

> *and their ears stopped. Most of those I saw yesterday were looking down as if wholly unconscious of anything going on about them, while the sublime rocks were trembling with the tones of the mighty chanting congregation of waters gathered from all the mountains round about, making music that might draw angels out of heaven. Yet respectable-looking, even wise-looking people were fixing bits of worms on bent pieces of wire to catch trout. Sport they called it. Should church-goers try to pass the time fishing in baptismal fonts while dull sermons were being preached, the so-called sport might not be so bad; but to play in the Yosemite temple, seeking pleasure in the pain of fishes struggling for their lives, while God himself is preaching his sublimest water and stone sermons!*[21]

Clearly for Muir, as with the many preservationists who have followed him, including the environmentalists pursuing restoration of the Elwha River, nature holds an intrinsic worth, a value beyond its practical and economic usefulness to humans. While transcendentalists such as Ralph Waldo Emerson and Henry David Thoreau spoke of nature in the same language of wilderness romanticism and primitivism, it was largely through the efforts and writings of Muir that this interpretation of nature gained a wider acceptance in American culture gradually over the early 20th century.[22] Indeed, perceiving spiritual values in nature has gained greater acceptance among Americans. A 1995 sociological study of Americans' attitudes towards nature showed that Americans of different religious faiths shared an awe, reverence, and respect for nature, even finding that agnostics used the metaphor of "God's Creation," to support their environmental values.[23]

For many Americans, spiritual values are implicit in nature, particularly in places that trigger feelings of the sublime like Yosemite and the Grand Canyon. The spiritual aspect of nature represents a central impulse for preserving some natural places. Furthermore, the preservationist impulse once found in only a small segment of the American population now constitutes an integral element of

contemporary environmentalism. To limit our understanding of the effort to restore the Elwha River and its fisheries to the legal motions and negotiations is supremely reductive. Any analysis that refuses to examine the whole complex weave of ideas, values, and emotions tied to nature—and particularly nature at its most magnificent, beautiful, and even monumental—is overly materialistic and in the end, useless.

The language employed by those seeking restoration of the Elwha and its fisheries echoes the rhetoric established by Muir and other early preservationists. Letters written to Washington State Governor Booth Gardner supporting the removal of the dams in 1989 and 1990 also described the Elwha River in terms similar to those used in editorials and environmental brochures. One writer declared: "We need to restore the wonderful salmon runs that existed before these dams were built and to begin to repair the damage they have caused to this magnificent area of the Olympic National Park."[24] Another letter stated, "What is gained is a natural free-flowing Giant with return of its tremendous anadromous fish production."[25] The phrase "a legendary run of huge salmon,"[26] repeated often with slight variations, best clarifies the perceived monumental character of an undammed Elwha as expressed by environmentalists.

MONUMENTAL FISH

Preservationist attitudes are important in understanding the effort to restore the Elwha River, but other elements were in play as well. The description of the Elwha River and its salmon echoes a theme historian Alfred Runte refers to as "monumentalism." Runte argues in *National Parks: The American Experience*[27] that the urge to create parks and monuments arose in part from a strong sense of American cultural inadequacy resulting from the violent separation from Europe and its cultural legacies entailed by the American Revolution. By emphasizing the wonders of nature such as Niagara Falls, and later places like Yellowstone and the Yosemite Valley, Americans could replace the lost cultural monuments of Europe with natural monuments already available on their own magnificent continent. Indeed, for many preservationists, the wonders of nature constituted

a higher value than that of European art and architecture. John Muir wrote, in reference to the Merced Valley, "The whole landscape showed design, like man's noblest sculptures. How wonderful the power of its beauty!"[28] Americans at the turn of the 19th century viewed nature as a romantic landscape that filled a cultural niche missing for citizens of a young nation. Monumental landscapes, waterfalls, mountains, and geysers served as a replacement for the lost and longed-for European heritage of ancient cathedrals, castles, and ruins. Furthermore, these monumental places also suggested the golden future awaiting the young republic. Besides all of these reasons for setting aside and protecting monumental nature, the turmoil of the late 19th century, when the creation of national parks and monuments began, contributed to the effort to iconize certain majestic places such as Yellowstone and Yosemite. The idea was that these places also served to unify Americans as one people. This was a powerful impulse in the wake of Reconstruction's failure, the Populist movement and the labor-capital conflicts of the 1880s and 1890s.

Monumentalism engendered a tendency to set aside lands not based on their resource values or ecological significance but, rather, for their beauty as reflected in a monumental way: towering granite cliffs, cascading waterfalls, awe-inspiring glaciers. Historian Roderick Nash articulates a similar idea when he talks about the role of wilderness in defining America in *Wilderness and the American Mind*, arguing, "In the early nineteenth century American nationalists began to understand that it was in the *wildness* of its nature that their country was unmatched."[29] As Nash explains it, Americans felt that while other countries might enjoy and celebrate a limited, tame form of nature, only Americans could brag of owning and conquering a "wild continent." The idea of wild nature being central to American identity went beyond physical challenges and abundance. According to Nash, "If as many suspected, wilderness was the medium through which God spoke most clearly, then America had a distinct moral advantage over Europe, where centuries of civilization had deposited a layer of artificiality over His works. The same logic worked to

convince Americans that because of the aesthetic and inspirational qualities of wilderness they were destined for artistic and literary excellence."[30]

While arguments supporting restoration of the Elwha River stressed the significance of the ecosystem and the chance to restore a potentially complete and healthy biotic community—an increasing rarity in these days of ecosystem fragmentation—their language reflected the American tradition of monumentalism as well. It might even be that the efforts to restore nature, in this case the salmon runs of the Elwha, are driven by a nostalgia for an imagined better American past. Restoring monumental nature may be a fundamentally conservative act (in both senses of the word) insofar as it restores nature of a certain kind—in this case, an abundant fishery. Arguably, monumentalism is the cornerstone of American exceptionalism and a powerful impulse indeed. Regardless, leaders of the restoration movement realized that arguments for restoration of the river had to appeal to more than aesthetic nationalism and ecological preservation if they hoped to achieve a consensus of support for dam removal in a rural community. They needed to make sense ecologically, economically, and, finally and most problematically, politically.

BUILDING SUPPORT FOR DAM REMOVAL

While river restoration activists believed there were many good reasons for removal of the dams and restoration of the river, the political and cultural context of America and the Pacific Northwest in the 1980s necessitated a pragmatic approach, an approach that focused on building popular support for dam removal by pointing out the numerous benefits of river restoration, primarily with a focus on the potential economic benefits. The "wise use" movement of the 1980s articulated an anti-government and anti-environmental position in the West. The Reagan administration had not only abandoned and condemned the moderate environmental stewardship of earlier Republican administrations but had also moved to undermine environmental laws and agencies responsible

for the environment. In the Pacific Northwest, and particularly the heavily affected Olympic Peninsula, many residents were in an uproar over the spotted owl and restrictions on harvesting of old growth timber to protect owl habitat, resulting in severe economic impacts for many logging-dependent communities. At the same time, there was a broader recognition in the region of a worsening crisis of salmon and steelhead extinction and decline, with dams perceived as the primary culprits.

In a milieu of resistance to environmentalism and concern over loss of jobs to owls and salmon, the environmental groups escalated their opposition to the relicensing process and moved toward a legislative solution in the process. In March 1988, Olympic Park Associates, the Seattle Audubon Society, Friends of the Earth, and the Sierra Club filed a petition for the FERC to declare that it did not have jurisdiction over the Glines Canyon Dam relicensing. They also demanded that the FERC immediately "phase the proceedings." The environmental groups argued in this petition that the Federal Power Act of 1920 along with further legislation in 1935 banned dams in national parks and prevented the FERC from providing licenses for such projects. James River Corporation had argued that because part of the project (the Elwha Dam, power lines, and other related equipment) was on non-park land, the FERC had the authority to issue a license even though the Glines Canyon Dam resided within the park boundaries. The environmental groups' response to this was caustic. "Even if true, the relevance of this is difficult to discern. The statute makes no such convoluted distinction and such a construction should not be forced upon the statute without especially good reasons. Here, there are good reasons why James River's reading should not prevail."[31] The environmental groups referred to precedents in earlier cases where the FERC had declared its inability to license on national park lands.

The whole licensing process allowed the intervenors to develop more scientific material and understanding of the impact of the dams and the potential for restoration. It also enabled the groups to sort out competing and conflicting interests and organize the most

effective way to move forward. Moreover, during this process it became clear to James River and Daishowa America that the costs of mitigation would be prohibitive, so they began supporting dam removal. How to best achieve this goal and overcome an intransigent FERC became the overriding question, with lawsuits seeming the best answer.[32]

In late 1990, the intervenors shifted to a new strategy. While pursuing a legal strategy before the Ninth Circuit Court would likely bring success, it wasn't certain that the court would find in favor of removal of both dams, or not split jurisdiction of the FERC over the dams between the Elwha Dam and the Glines Canyon Dam. Advocates were concerned that they could get only a partial victory. Both James River and Daishowa were concerned enough that they lobbied hard for legislation mandating dam removal. This would obviate the need for FERC cooperation while swiftly cutting the Elwha knot. Unfortunately, the FERC refused to join the removal advocates in supporting legislation, even though its own Environmental Impact Statement (EIS) research was indicating that dam removal would be necessary.[33]

Congressman John Dingell, Chairman of the Subcommittee on Oversight and Investigations to the Committee of Energy and Commerce, was a critical player in building support for this legislation and making sure it saw the light of day; without his support, the bill would never have left committee. In a 1989 letter to Democratic Congressman Al Swift of Washington's Second Congressional District, Dingell indicated that he had met with several people from the Northwest on the Elwha issue, including representatives of the Lower Elwha Tribal Council. While agreeing that the Elwha fisheries had been poorly managed for too long, he also stated that it would be impossible for him to support legislation for restoration without "a great deal more information and understanding of the impacts and consequences."[34] He had therefore asked the General Accounting Office (GAO) to study the issue and legal ramifications. "I have also written to the Secretary of the Interior and the Federal Energy Regulatory Commission (FERC). Enclosed are copies of both

letters. You may want to release them."[35] Dingell clearly sought to bring public attention to this legislation, possibly indicating that he supported further exploration of this issue if not actively endorsing the legislation.

In the letter to the comptroller general of the GAO, Charles A. Bowsher, dated the same day as the above-mentioned letter to Congressman Swift, Dingell employed activist language for restoration. In his letter, Dingell refers to the dams providing power for only one mill and being owned by one company, a key point cited often and early by restoration advocates. He also incorporates the language of "Nature Lost" so central to activists' efforts and discourse. Dingell made the common reference to all five species of Pacific salmon, and the fame of the run in terms of quantity and quality of fish. He also argued that restoration would improve the ecosystem of the Olympic National Park and Washington State anadromous fisheries.[36]

It would have been difficult for an environmental group brochure or letter from an activist to state the case much more clearly or cogently than this. In so doing, Dingell reinforced the central arguments of restoration advocates. However, and maybe more interestingly, they had clearly crafted an effective rhetoric of pragmatism and opportunity that was evocative, easily repeated and explained, and poignant. Activists employed clear, precise, and powerful rhetoric with significant impact early in their efforts.

In pursuit of the necessary information, Dingell instructed Bowsher to perform a number of tasks within 90 to 120 days. Among these tasks was the need to address legal issues regarding dam removal, a history of the dams and the river fisheries, the impact of the dams on the Lower Elwha Klallam, the impact on employment, and who would be responsible for restoration of the fishery. He also directed the GAO to determine the jurisdictional status of the FERC regarding the Elwha dams and also whether the commission could force dam owners to mitigate for damage to fisheries.[37]

Dingell's letter to Secretary of the Interior Manuel Lujan, Jr. and FERC Chairman Martha Hesse displayed a discernible edge.

Notifying them of his role in the proceeding legislation, Dingell wrote that he was concerned about the safety of the dams and their impact on the fishery. Stated worries as to who would pay for restoration were followed by a strong indictment of FERC behavior. "Foot-dragging, finger pointing, and unreasonable delay seem to prevail in this matter, while efforts toward sound and reasonable solutions seem to be eluding everyone."[38]

After bringing up the issue of jurisdiction, questioning the National Park Service's contention that the FERC lacked jurisdiction over the dams, and inquiring into the issues involved in ordering the removal of a dam, he also requested that the commission provide a detailed and comprehensive history of the dams' licensing, environmental, and safety issues. Toward the end of the letter, Dingell's rhetoric grew sharper again, like a prosecuting attorney hitting a defendant with a series of tough questions. "What actions has FERC taken under the law to restore and mitigate fishery losses from these dams? Why has FERC never apparently re-opened the licenses to deal with the fish and wildlife issues? What are FERC's plans concerning fish and wildlife under the Federal Power Act?" Dingell was clearly pushing FERC to take the ECPA seriously, reminding the commission that it was now required by federal law to also consider environmental issues when reviewing the relicensing of a dam. He continued in his attacking vein, specifically questioning the actions of the dam owners in earlier years. "What are the responsibilities of the licensee, including prior licensees or owners, for dam safety and fishery losses? In this regard, please identify the original licensees and explain how the present owners succeeded to them under the law. Also, are the dams operated for the 'sole purpose of providing electric power to Dauhowa [sic] of America's pulp and paper mill?' Is that consistent with the requirements of the Act?"[39] Not only was Dingell trying to amass information, he was asking what had been done or not done to allow the situation to reach such a point.

The potential burdens of a long relicensing process, intertwined with a series of judicial rulings likely to require extensive mitigation measures, compelled Daishowa America to show more interest in a

legislative solution to the Elwha salmon crisis. The concerns of the company were numerous; first among them was the desire to keep electricity costs low. One of the central reasons for buying the Port Angeles mill in the first place was the availability of cheap power (significantly lower than market costs) produced by the two dams on the Elwha, providing 40 percent of the mill's power needs. In addition to protecting its low power costs, the company also wanted compensation for investments in the dams since 1986, to avoid having to pay for mitigation requirements (estimated at $64 million at that time), and protection from any liability associated with future damage to Elwha River watershed habitat and salmon. The company had numerous incentives to take a seat at the legislative table.[40]

Daishowa was in a strong position to protect its interests and achieve the above-mentioned goals through legislation because of its prominent position in the locally depressed Port Angeles and timber economies. Nobody wanted to cost the local economy the 400 jobs at the Port Angeles plant, or to suffer the political blowback of a plant shutdown. So, all efforts were made to create legislation that would protect Daishowa and the local jobs.[41]

JOBS AND SALMON

While it is obvious that political opposition created by anticipated job losses could have stopped the restoration effort dead in its tracks, Virginia Egan makes the critical point that the earlier vociferous and ugly conflict over logging restrictions to protect spotted owl habitat informed the concern of restoration activists for protecting local mill jobs.[42] It is hard to overstate the impact of the spotted owl controversy in the Pacific Northwest. Loggers and their supporters construed the habitat and logging restrictions as the impositions of an oppressive federal government dictated to by activists more concerned with birds than the health of logging communities. Clearly, if jobs were threatened by efforts to restore rather than preserve salmon, the rhetoric and conflict would likely spin out of control. More generous actions could stave off a discourse of "environment/fish versus jobs/livelihood" or even the coarser rhetoric of outsider environmentalists

and urbanites pushing their agenda onto hardworking rural folk. That was the kind of rhetoric that had been common in the spotted owl debate and is often responsible for stasis in environmental issues.

Supporters of river restoration recognized the need to depict the restoration of the Elwha River and its salmon as a rational and economically desirable decision. While the evidence clearly supported this position, it was necessary to devise a support strategy built on reducing economic dislocations arising from dam removal. The linchpin in this effort was the "creative solution" offered by environmental activists and supported by Congressman Al Swift. One of the most vexing problems facing restoration advocates was the issue of the lumber mill powered partially by electricity from the Elwha dams, and the potential loss of jobs. While blocking relicensing seemed a promising and straightforward strategy, it also would amount to a federal "taking" and could result in a series of lawsuits delaying the removal of the dams. Elwha restoration activists sought to forge a legislative solution based on consensus instead of employing lawsuits and depending on the FERC relicensing process. Broad community support might lead to a quicker and more popular solution to the problem presented by the dams.[43]

The "creative solution" became the key to this process. This was an initiative by the restoration advocates and Congressman Swift's office, which sought to find replacement sources for the power that would be lost with the dams' removal, thereby preventing the closing of the Daishowa mill and the corresponding loss of jobs. The replacement of power at no additional cost to Daishowa left the company with no justifiable opposition to the removal of the two aging dams. Jim Baker, then the assistant Northwest representative for Friends of the Earth, argued it was important to achieve a win-win solution that would benefit all the parties concerned with the Elwha River, its salmon, and hydroelectric production. The fact that the Bonneville Power Administration (BPA) could provide replacement power at the mill and the increasing pressure brought on and by the FERC to evaluate the environmental impacts of the dams improved the chances for favorable negotiation toward a solution that would

lead to the removal of the dams, with protection and benefit for the parties involved.[44]

The determination of restoration advocates to pursue consensus through the "creative solution" was reinforced by the fact that the above position was articulated after the General Accounting Office had released a legal opinion consistent with advocates' positions that the FERC could not relicense the Glines Canyon Dam, and had the authority to order removal of both dams.[45]

Those who had always depended on the river played an ongoing and persistent role; the Lower Elwha Klallam were essential to the overall success of the restoration efforts. They steadfastly insisted on dam removal at all costs. As part of their overall political strategy, the tribe agreed among themselves to give up other goals where necessary while sticking fast to dam removal. For instance, they had hoped to gain access to traditional lands on Ediz Hook for the creation of a cultural center as well as for seasonal homes, as had been their practice earlier in the century before they were displaced. However, Port Angeles, as part of its negotiations in this process, insisted on renewing its lease on the Hook, asserting that the city had plans to develop the land. The Elwha Klallam also gave up on the hope for a massive infusion of federal money for housing, as Senator Slade Gorton slashed that request from $20 million to $4 million.[46]

Along with the local Native population, Congressman Al Swift played a crucial role in the effort, particularly in building consensus for dam removal. Swift kept the support of the local community uppermost in his mind as he worked for restoration of the river. From beginning to end, he realized and fought for Port Angeles issues such as water purity, jobs, and the economy. Staff notes of a meeting in December 1991 between Al Swift and Port Angeles Mayor Jeff Palmerance stress the economic benefits that would accrue from the Elwha Restoration Act. They emphasized the importance of preserving economic security while removing the dams.[47] These notes also pointed out that water purity would be assured and restoration would lead to increases in salmon and steelhead, improving the local tourism economy. What started with a river and fish was turning

into a complex plan benefitting multiple sections of Port Angeles and Elwha River regional society.[48]

When the Department of the Interior confidently announced that the FERC would not relicense and the Interior would take ownership of the Glines Canyon Dam and possibly the Elwha Dam, it was clear to members of Swift's staff that this could lead to serious economic consequences for the local community, and they chose not to follow this course.[49] Cooperation between restoration advocates and Congressman Swift provided the necessary nudge toward consensus. The owners of the Daishowa mill hesitated to allow BPA energy audits of the mill's energy efficiency and use, a necessary step in the creative solution. Environmentalists were quick to let Swift know of the mill owners' obstructionist behavior.

> *You have frequently stated to us, to the companies, to the other intervenors, and to the public that litigation over the Elwha River dams should be avoided. We agree. In the hopes of providing a basis for convening negotiations among all the principal parties, we have taken this initiative of communicating to you and to BPA our findings on energy conservation at the Daishowa mill. We respectfully urge your office to take whatever steps are feasible to persuade the principals to convene negotiations at the earliest possible date—certainly before FERC actions or other events force any party to resort to litigation over the dams.*[50]

Broad support for this effort, the real threat of legitimate legal action, FERC intervention, and pressure applied by Congressman Al Swift all convinced the mill owners to cooperate with efforts to build consensus for dam removal through application of the creative solution.

FROM RESTORING SALMON TO PUBLIC WORKS

Activists focused on achieving consensus on dam removal. Besides the creative solution, they stressed the fishery production capabilities of the river, and how that could result in dollars not only for commercial fishermen, including Indians, but also, for the local economy through increased sport fishing and tourism. They, like the

Lower Elwha Klallam, relied increasingly upon economic arguments for dam removal; supporters of restoration stressed the economic contributions from dam removal and sediment removal jobs to the local Port Angeles economy.

In a struggling economy depressed by cutbacks in logging, the promise of money and jobs was an effective way to cultivate local support. "At least half of the removal cost would be pumped into the Olympic Peninsula economy in the form of wages to workers doing river restoration," stated a 1994 Department of the Interior report supporting restoration.[51] In releasing this report, Assistant Interior Secretary George Frampton Jr. pointed out the benefits of Elwha restoration for "preserving and creating jobs."[52] Specifically, the restoration would provide "$90.4 million in gross income to workers in Clallam County . . . National Park Service spokesman Joan Anzelmo said she had been involved in discussions at which the total number of jobs over the 20-year life of the project was estimated at about 1,500, with a maximum of 400 to 500 jobs at any one time."[53] Letters to the editor identified the economic benefits that could be gained from a restored Elwha River: "Restored salmon runs will generate millions of dollars of new revenue every year for sport, commercial and tribal fishing. Businesses on the Olympic Peninsula will experience large increases of tourism dollars from visitors who come to see firsthand the restoration in progress. And dam removal will also restore an attractive, free-flowing river segment, providing increased opportunities for the growing whitewater boating industry."[54]

A *Seattle Times* editorial combined the aesthetic and wilderness ideal with an economic argument, encapsulating all the values now inherent in the anticipated Elwha River, a river flowing with multiple meanings. "Restoration of salmon runs would provide an economic boost by increasing tourism for the Olympic Peninsula. A free-flowing, 70-mile [actually, closer to 42] stretch winding through Olympic National Park would make the Elwha one of the country's great wilderness rivers."[55] The Elwha River was clearly again being asked to do a lot. The same editorial also clarified another aspect

of the pragmatic strategy. In response to worries that removing Elwha dams would stimulate a widespread call for further dam removal on the Snake and Columbia Rivers, the editorial stated, "Restoration of the Elwha would set no precedent for the Columbia River and its tributaries. Hydroelectric dams on the Columbia are an essential part of the economy. The Elwha Dams pump out a piddling amount of cheap power at a heavy environmental price."[56] The editorial asserted an important point that became ubiquitous in the Elwha River restoration efforts: that the Elwha would set no precedent for dam removal on the Snake and Columbia Rivers. As the editorialist pointed out, the electricity pumped by the dams on the Columbia and Snake Rivers, not to mention reclamation projects supporting agriculture and inland navigation, implied much more significant economic costs should dams on those rivers be removed. Additionally, the Elwha River watershed is a fairly small ecosystem and, as already mentioned, remains relatively intact, healthy, and protected in a way that the Columbia and Snake rivers are not.[57]

In addition to all the other arguments for the exceptional nature of the Elwha River dams and the benefits of their removal, Olympic National Park Superintendent David Morris stated succinctly and pragmatically what made the Elwha River restoration project more promising than other projects: the fact that the "removal of the Elwha Dams would provide, 'the biggest bang for our bucks.'"[58] While other issues such as environmental health and ecosystem restoration played a key role in generating restoration support, the linchpin of success was supporters' ability to prove the project would make sense economically. The issue of potential job loss was dealt with in one fell swoop—not only would jobs not be lost, they would be created by this restoration effort.

Since the 1980s' debates over the spotted owl in the Pacific Northwest, a general dichotomy had emerged in the media and public rhetoric asserting that an urban, liberal environmental movement, with values based on recreation and aesthetics, was impinging on rural, resource extraction-based economies against the will of local blue-collar residents.[59] Just as the Lower Elwha Klallam Indians

portrayed the benefits of a restored Elwha River in largely economic terms, many Port Angeles letters relied on utilitarian and resource-related arguments in favoring restoration. This is not to argue that Port Angeles residents ignored or were unaware of the aesthetic values inherent in a restored Elwha. Rather, restoration advocates in the Port Angeles area were probably more aware of economic issues and local attitudes, and they constructed their arguments for restoration with these issues in mind. They sought to build consensus around a theme of economic improvement. While this can be chalked up to strategy, it is also worth noting that as members of the community, they had to think more carefully of the impacts on friends and neighbors. Many Port Angeles residents offered strong and detailed arguments elucidating the economic benefits of dam removal. "Plans to renovate and to expand the mill need not be shelved due to dam removal. Modernization and conservation can turn the mill into a showcase of production and energy efficiency. Predictions of mill-closure related job loss can be offset by the labor requirements of the dam removal and canyon rehabilitation projects."[60]

Those supporting the restoration of the Elwha and its salmon represented a broad and varied constituency, but they shared some common beliefs and goals. Primarily, they believed that intact ecosystems are an integral part of a healthy nature; removing the Elwha River dams reflected an effort to restore a river ecosystem to wholeness. Secondly, they acknowledged that science and technology had failed to artificially propagate salmon runs and remake nature into a productive factory of biological commodities. Management of resources is essential, but must be predicated on the protection and conservation of healthy habitat. Moreover, it is necessary to restore and protect nature in such a way that ecosystems can operate successfully on their own and be sustainable. The removal of the Elwha dams and restoration of the river and its fisheries would be the culmination of a remarkable strategy and implementation of a new environmental management model. However, passage of the legislation was one step. Implementation would provide another set of difficult challenges.

RESISTANCE AND LOCAL GOVERNANCE

Despite the direction the 1992 Elwha Restoration Act seemed to be taking dam removal efforts, unforeseen events marked the start of a long and drawn-out journey toward any real action. The political support evidenced in the legislation's passage crumbled quickly after Republican victories in the 1994 congressional elections. According to the *Tacoma News Tribune*, "With budget-cutting Republicans taking over Congress, a $200 million plan to restore salmon runs by tearing down two Olympic Peninsula dams is probably dead, two members of Washington's delegation say."[61] Democratic Congressman Norm Dicks reversed his already tentative support of dam removal, and Republican Senator Slade Gorton, remarking to Dicks "Welcome to the party," embraced the Republican moment and continued his opposition to the removal of the dams.[62] Gorton, who originally voted for the Elwha Restoration Act, reversed his tentative support for dam removal prior to the 1994 congressional elections. The position of Senator Gorton was key to the future of the Elwha River because of his seniority in the Washington congressional delegation and his position on the U.S. Senate Appropriations Committee, controlling government spending.[63]

Even as Gorton stalled and proposed funding for fisheries enhancement rather than appropriating funds for the dam purchases and removal, local resistance to dam removal emerged. Following the release of the second environmental impact statement (EIS) in the summer of 1995, some local residents questioned the exclusive focus on dam removal and agitated for reopening discussion of other options such as mitigation measures short of tearing out the dams. While there had been numerous opportunities to comment and debate on the proposals presented from 1989 to 1994, these opponents, probably encouraged by the conservative turn in the nation and Congress at the time, as well as the rhetoric of Senator Slade Gorton, threw themselves into public meetings for the implementation of the EIS draft in the summer of 1995, and both sides debated the future of the river, dams, and salmon.[64]

The group leading the opposition, Rescue Elwha Area Lakes (REAL), spearheaded by area resident Marv Chastain, was shocked and angered that something as radical as dam removal was actually being considered—and close to implementation in their own neighborhood. According to Chastain, "I thought that the idea of destroying two lakes and dams that produced power was too ridiculous to contemplate. But as time went by, I began to realize it *was* being contemplated and it probably was going to happen."[65] The group began organizing around early 1994. At a January 25, 1994, gathering held at Aggie's Restaurant in Port Angeles, approximately 120 people attended an informational meeting aimed at stopping dam removal. Organized by United We Stand America and Chastain, the attendees first watched a movie produced by REAL, laying out their criticisms of the restoration plan. In one of the more familiar arguments, the film argued that the lakes hosted an abundant and diverse wildlife population (including trumpeter swans) and should be preserved as ecosystems for their value. The film also stated the Secretary of the Interior had said on multiple occasions that he was eager to press the plunger and blow up the dams, that removing the dams would necessitate the purchase of power from other, more expensive sources, and that silt from the restoration would destroy what salmon did remain in the lower river.[66]

In addition to the impact of downstream silt, the film raised the oft-stated concern of dam removal opponents that unsightly and smelly mudflats would be exposed, reducing property values and creating an unappealing aesthetic. This particular concern has been proven false in numerous cases where raised, such as dam removals in Maine and Wisconsin, but they could not know that in 1994, before dam removals began happening on a regular basis. Concerns over the diminishment of water quality and damage to local wells were articulated in the film, as was Marv Chastain's consistent refrain that there is plenty of spawning gravel in the lower river, a patently false claim. Finally, the film advocated fish ladders and expressed concern over what the real costs of this project would be.[67]

The post-film discussion was animated and ranged from reasonable concerns to the paranoid. For example, sensible points were made and questions asked regarding the impact of sediments downstream, the costs of restoration, and whether 100-pound salmon would actually return to the Elwha. Paranoia kicked in with assertions that the government really wanted to shut down the local mills, that the Olympic National Park was using this to expand, and that "a very powerful group of people in this country merely want to trash the Olympic Peninsula."[68] The references to park expansion and land grabs reflect ongoing tensions over the recent restrictions of logging public lands to protect the spotted owl, as well as even older local debates over park boundaries and resource access and use dating back to the late 19th century.[69]

REAL was able to gain the interest or support of approximately 300 people and donations amounting to around $3,000, which then was used to hire a consultant to analyze the government reports produced during the research, planning, and implementation process. In the end, REAL responded in the traditional way—recommending preserving the status quo with techno-optimistic solutions such as screens, fish ladders, trap and haul programs, and such. No matter that the research for the restoration had ruled these options out as ineffective, nor that these "solutions" were failing on rivers throughout the Pacific Northwest; the focus was on keeping the dams right where they were.

In what some might see as a postmodern move, REAL argued that the second nature of the Elwha River dams and reservoirs should be protected from a return to first nature (or third nature?) because of the natural values embodied in the harnessed Elwha River. Moving away from the shock of the idea that dams might actually be removed, taking away precious electrical power, REAL argued that new wetlands and reservoirs had been created by the dams and species dependent on these, such as lake and rainbow trout and migrating waterfowl, would be damaged by dam removal. The rest of REAL's arguments against the proposed dam removal were

based on several issues: questions over whether restoration would actually work; a belief that the downstream habitat was a good one for chinook salmon—although fisheries biologists had substantively explained why it was bad habitat (not enough cobble, too warm, flow problems, etc.); and a belief that the city might need the power produced by the dams in case of an emergency—although the power generated by the dams was barely enough to run the Port Angeles hospital. The "in-case-of-emergency" argument echoed those of the Inland Empire Waterways Association that the lower Snake River dams should be built in case the Cold War turned into a hot war.[70]

With this vocal, conservative, minority opposition, Slade Gorton seemingly had his proof that locals opposed dam removal. More than happy to construe the Elwha dam removals as the urban, liberal elite imposing their will on poor, benighted, under-represented, less-urbane types (an argument that plays well in rural Washington State) who "work for a living," Gorton tapped into or manipulated some of the ongoing local animosities against federal power and Pugetopolis recreationalists. This also helped fuel ongoing anger from the earlier spotted owl controversy that created so much division on the Olympic Peninsula. Clearly the local community, the average Port Angeles folk, would never really support something as radical and unjustified as the removal of two perfectly good dams. Demanding a community-based plan for the Elwha (thereby trying to pit the locals against the outsider environmentalists) that he assumed would substantiate his assertions, Gorton unwittingly opened the door to the next stage of the Elwha restoration process. The Elwha Citizens Advisory Committee would demonstrate that the restoration plan had greater support than Gorton assumed and would likewise defy simplistic categorizations of environmental efforts as urban-based policies imposed against the will of rural residents.[71]

PORT ANGELES WEIGHS IN

Despite these political setbacks, advocates of restoration pushed forward with their plans. Those seeking restoration, including environmentalists, the Lower Elwha Klallam, and federal agencies

such as the National Park Service and U.S. Fish and Wildlife Service, continued their efforts to restore the river, creating a plan for restoration in 1994 and an implementation plan published in April 1996. Both plans strongly urged complete removal of both dams, removal of accumulated sediments, replanting of indigenous plants in the old reservoir beds, and moderately aggressive salmon restocking programs. However, most of the funds to accomplish this would have to be appropriated by Congress, and Senator Slade Gorton blocked every attempt to earmark funds for this effort.

The Clinton administration lent its support to the effort in 1996, probably for legitimate environmental reasons as well as to improve relations with environmentalists angered by his signing of the salvage logging rider. Gorton sustained his opposition to the Elwha Restoration plan, saying that President Clinton was "proposing that we sacrifice Hanford jobs in the Tri-cities but spend millions of dollars to tear down dams on the Peninsula."[72] This seeming non sequitur reflected Gorton's efforts to perpetuate the idea of job losses associated with environmental policies and projects, and to always align the Elwha River efforts with the Columbia and Snake rivers. Job loss was not an issue in the case of the Elwha River plan. Certainly Hanford had nothing to do with the Elwha.

Democratic Senator Patty Murray strongly favored river restoration and was joined by Republican Representative Rick White, who suggested taking money from Columbia River salmon efforts to use for Elwha restoration. In 1996, support for dam removal became more pronounced, with Interior Secretary Bruce Babbitt stepping up his efforts to have the dams removed and Olympic National Park Superintendent David Morris calling for their removal as well.[73] Bruce Babbitt made a trip to the Elwha River in 1997, seeking to reinvigorate the issue but also enunciating a more cautious approach than in 1994, mindful of the need to win Senator Gorton to the cause again. Cautious due to the firestorm he had earlier ignited with ranchers, farmers, and industrial interests in the West with calls for dam removals, Babbitt repeatedly stated that the destruction of the Elwha dams would provide no precedent

for other dam removals.[74] The considerable power and influence of Gorton in resolving the Elwha restoration battle was demonstrated by his effectively blocking funding for several years, as well as by the words of Babbitt in 1997: "The bottom line is that Senator Gorton is a guy who would be likely to have the final say on this issue."[75]

While evaluating the actions of politicians is central to understanding the progress of efforts to restore the Elwha River, it is equally important to consider an interesting development in the Port Angeles community. The Elwha Citizen's Advisory Committee, a group assembled in Port Angeles to offer formal advice on the Elwha issue, announced its support of river restoration, although it called for a 13-year restoration timeline rather than rapid dam demolition and restoration. The decision of this committee to support river restoration through dam removal represents the success of the consensus effort pursued by restoration activists, and demonstrates the degree to which Slade Gorton's political maneuvering violated the popular will. At this point, Gorton and other opponents' tired but still-effective accusations of urban environmentalists attacking rural communities for questionable goals proved untrue, for this committee was not some gathering of wild-eyed Port Angeles "tree-huggers." Rather, it represented the more traditional and conservative elements of the community. One member, Jerry Newlin, was president of NTI Engineering and Surveying Company as well as president of the Clallam County Economic Development Council. Bart Phillips was executive director of the Clallam County Economic Development Council and spokesperson for the group. Clearly, the economic interests of Port Angeles were well-represented on this committee.[76]

Although originally opposed to dam removal, they ultimately arrived at a consensus advising dam removal over an extended time period. Through a process of education and inviting people concerned about the Elwha issue to speak up via debates and public meetings, the group decided dam removal made the most sense for the Port Angeles community. The support of the advisory committee demonstrated not only the effectiveness of the consensus strategy but also the pragmatism of the dam removal and river restoration

plans. Furthermore, the creation of legislation for river restoration and the support for this project illustrates a remarkable process of democracy and compromise in action.

ECOLOGICAL DEMOCRACY IN ACTION

The committee's report, "The Elwha River and Our Community's Future," was released on April 30, 1996, and must have shocked Slade Gorton, while offering general relief to restoration advocates. Gorton's probable assumption, based on his career rhetoric that rural Washingtonians would automatically oppose environmentalism generally and dam removal specifically, was shattered by the report's endorsement of dam removal and fisheries restoration. But this was not a simple endorsement for immediate removal of both dams as proposed and imagined by the National Park Service. This was a more complex proposal that the committee members believed was more realistic than the Park Service plan, a position that has since been validated.

Noting the importance of the salmon culturally, economically, and ecologically for the broader Elwha River ecosystem, the authors supported restoration but believed that financing would prove problematic. Hence they proposed an extended, sequential, and somewhat complex model of restoration and dam removal that protected the numerous interests of the community, would be successful over the long-term, and most importantly, was also more economically pragmatic. Arguing that the "case for dam removal is compelling," the committee also made the now notably prescient case that financing the removals would be problematic. "The climate in Congress clearly does not favor such an extreme and expensive idea. For Congress, there may be some willingness in the future to consider removal subject to adequate funding. This would be more plausible if the Elwha Restoration Fund is successful . . . "[77]

Because they believed federal funding was highly unlikely, the committee members proposed an Elwha Restoration Fund financed by park dollars, revenue from power generated by the dams once they were owned by the park, federal appropriations, and state money.

Financing the restoration in such a way would allow for steady, slow progress but would also build momentum and show the commitment of the community to restoration. This was not the clean, immediate solution favored by restoration activists but it did reflect the opinion of the community and also demonstrated both caution and optimism regarding the realities and benefits of Elwha restoration.

Political scientist William R. Lowry explains the complexity and nuance of the committee's proposal in *Dam Politics: Restoring America's Rivers*. He argues that the proposal was "appealing" because the committee wanted to reduce the initial cost to the federal government and minimize the effect on the Port Angeles economy. It also recognized that immediate removal of both dams would likely damage the Elwha River's native salmon stock. While noting that hatcheries could be employed to supplement the fish population and reduce losses, the proposal also argued for active dredging of sediments to hasten the process and reduce in-river turbidity.[78]

Regardless of this flowering of ecological democracy in Port Angeles, the heated nature of environmental debate, the fear of the ramifications of successful river restoration by opponents, and the determined opposition of one senator all undermined the committee's 1996 restoration plan for the Elwha River and blocked the democratic will of the Port Angeles community.

WILL THE DAMS COME TUMBLING DOWN?

For a time, the senator seemed to be swayed by the tide of popular support for the restoration, switching positions again in 1998, perhaps temporarily convinced by the endorsement of the Elwha Citizens Advisory Committee for dam removal. In early 1998, President Clinton announced that $86 million would be appropriated in the 1999 budget for removal of the lower dam and partial restoration. Furthermore, President Clinton stated that he would seek $13 million the following year to remove the Glines Canyon Dam. Meanwhile, Senator Gorton attempted to use support of Elwha restoration as a way to prevent dam removals on other rivers, stating that his support

for removal of the Elwha River Dam would be contingent on two major stipulations. One was that 12 years pass before the removal of the Glines Canyon Dam, in order to ascertain the effectiveness of removal and restoration on the lower river—a seemingly reasonable request. However, postponing removal of the upper dam would only perpetuate continuing problems regarding lack of gravel recruitment and suitable spawning habitat for salmon—something that any fisheries biologist or anyone minimally educated on river ecosystems understands. Without concurrent removal of the Glines Canyon Dam, the restoration effort would be of limited effectiveness. His second stipulation was that the Elwha River dams could not be removed without a guarantee that Columbia and Snake River dams would not be removed, revealing his larger concern. While Gorton finally seemed to consider the local community's mandate, his tentative and qualified support for Elwha Dam removal was merely part of a larger strategy of blocking other, larger environmental programs, and preventing the precedent of dam removal for salmon.

Debate over breaching dams on the lower Snake River in the late 1990s convinced Gorton to switch positions on the Elwha yet a third time. Environmentalists, predicting the demise of inland steelhead and salmon stocks, demanded the breaching of four lower Snake River dams, and agriculturalists, industrialists, politicians, and others quickly organized an effort to block them. The debate over the dams on the lower Snake was integral to Elwha restoration because Gorton was able employ his position on the Appropriations Committee. Funding leverage for the Elwha River restoration would require surrender on the current debate over Snake River dams and prevent any such demands for removal of Columbia River dams in the future.

This strategy reveals the tendency of conservative politicians and industry to see environmentalists as one bloc or movement, rather than recognizing the local character and legitimacy of specific efforts, such as the one on the Elwha. This type of thinking necessitates a victory-at-all-costs mindset, with the presumption in this case that

any defeat would lead to the demolition of many more dams. It typifies the strong conservative response to many dam removal efforts.

Formalizing his strategy, Gorton did indeed introduce legislation in the spring of 1998 requiring that funding of Elwha restoration be contingent on a pledge that no dams would be removed from the Snake or Columbia Rivers in the future. He used the removal of the Elwha River dams—regardless of the decision of the local community and the actions of Congress—as leverage to ensure the continued survival of dams on the Columbia and Snake Rivers. This legislation ultimately failed, but inflamed the debate over dams on the lower Snake River and delayed funding for the Elwha River dam removals and for necessary research and planning for several years. What Senator Gorton accomplished was to create a level of inaction that has prevented Elwha restoration for almost two decades following the passage of the Elwha Restoration Act.[79]

Several arguments were made for restoring the Elwha and its salmon runs. However, the primary approach enabling an effective coalition of support for restoration was the argument that removing the dams made sense economically as well as ecologically. The political maneuvering by Gorton that blocked removal of the dams and restoration of the river had little to do with the process that resulted in the passage of the 1992 legislation. Continued delay in river restoration has been the unfortunate by-product of the debate over breaching other, larger dams and an unwillingness to take bold steps to restore salmon runs. But the dams have been removed and the river and fisheries restoration has begun. This reflects a quiet nationwide effort to remove hundreds of ecologically damaging and economically useless or marginal dams to restore aquatic ecosystems.

The efforts to remove the Elwha dams reflected the increasing strength, complexity, and creativity of the American environmental movement in the late 20th century. Similarly, these efforts also denote at least a temporary high-water mark as environmentalists took on seemingly sacrosanct targets—dams—as powerful symbols and tools of industry and development. The campaign to remove the

Elwha dams incorporated environmental and economic arguments, a creative solution, and determination to build consensus in support of restoration. The overall goal of the dam removal effort was the reconstruction of a functional and productive ecosystem, reflecting a broader trend nationally and an increasing sophistication of American environmentalism. While the effort to remove dams is important insofar as it demonstrates the strength and sophistication of the environmental movement, both regionally and nationally, what is of particular importance is the effort at ecological restoration. In the late stages of industrial capitalism, Americans are positioned to evaluate the economic benefits of dams versus their environmental impacts, specifically analyzing particular dams on rivers and watersheds across the nation. The result, as intended with the Elwha effort, attempts redress, removing dams that provide little economic benefit yet perpetuate intensive ecological damage. Possibly the most important lesson of the Elwha River restoration effort is that 150 years after the beginning of industrial capitalism in America, it is possible to address environmental deterioration in an intelligent and cooperative manner. "Torpedo the dams, Full speed ahead" may have been a cry of victory that failed to anticipate resistance to change. But it captured the spirit of an effort to find the proper balance between economic development and environmental health.

Conclusion

Find the River

RESTORATION AND THE NEW ELWHA RIVER

The river glideth at his own sweet will
from "Composed upon Westminster Bridge,
September 3, 1802"
William Wordsworth

This book landed on bookshelves mere months after the dams were removed. Even as the Elwha's story found readers, and the author checked the book's rank on Amazon, the first salmon began nosing their way past the old dam sites into an expansive river ecosystem of salmon possibilities.[1] We are left wondering what is the importance of the Elwha River and its restoration?

First, from a historical perspective, following the story of this river and its short period of development and industrial use allows for an examination of attitudes regarding nature in American society in general, and the Pacific Northwest specifically. By studying the history of the river, it becomes clear that American ideas about nature have changed radically over time, reflecting dramatic and sometimes unthinking economic growth, the emergence of important and popular ideas about ecology, the role of a healthy nature in human society, and the necessity to restore ecosystems where at least practical and necessary. The second part of the question's answer springs from the issue of restoration.

My job would be easy if I could say that the efforts to restore the Elwha River and its fisheries led to the dams being promptly razed and the fish runs at least partially restored, allowing me to argue that this very action had initiated the beginning of an active era of

dam removal and habitat restoration across the nation. Of course, reality and history are often too complicated for an elegant narrative getting us from there to here.

In the current era of environmental crisis, with an increasing emphasis on ecological restoration, the Elwha River restoration effort played a key role in opening a discourse on dam removal in American society. Hundreds of dams around the country have been removed, including major projects such as the Quaker Neck Dam on the Neuse River in North Carolina, and dams on Bear Creek in Oregon, Mad River in California, and various sites in Wisconsin, with consistently successful fishery restoration. The fish return every time, and in healthy to astounding numbers, proving the legitimacy of dam removal as a restoration strategy.

When the discussion of dam removal on the Elwha began in the mid-1980s, removal was perceived as a radical and unprecedented move. Moreover, it seemingly required a unique and powerful set of circumstances, as presented in the Elwha case, to even contemplate the removal of functioning dams. Yet, by the late 1990s, as a furious debate raged over the future of dams on the lower Snake River, activists were pushing hard to remove numerous other dams around the nation. By tilting their lances at these watermills and providing a model of challenge and strategy for taking on dam companies and the FERC, the Elwha restoration activists helped usher in a new era of dam removal and river and fisheries restoration. The revolutionary change in discourse—demanding dam removal for fish restoration on the Elwha River with accompanying legislation—proved the success of such activism and helped launch efforts nationwide to remove dams to restore fisheries.

A remarkable momentum has developed in the years since the early 1990s. There has been a large-scale and highly successful effort to remove small dams throughout the country and even some large dams in various regions. According to the environmental organization American Rivers, at least 465 dams have been removed with approximately 100 more slated for removal or under serious consideration. This is not a large percentage in a nation with about

The Elwha Dam in 2011. Courtesy of Jeff Crane

75,000 dams, but it does represent a fundamental shift in thinking and ecological priorities.[2]

Better understanding the role of the Elwha fight in the current era, and its role in American environmentalism, as well as grasping a fundamental shift in environmental activism and American attitudes about development and nature, necessitates a look east towards a river running the opposite direction of the Elwha.

HOW A RIVER IN MAINE CONNECTS TO THE ELWHA

Today kayakers and canoeists travel the flow of the Kennebec River in Maine, past the old mill site on the southern bank in Augusta. Below them shad, striped bass, herring, and alewives all migrate upstream to the next dam in the river. Five-foot-long short-nose sturgeon break the surface of the water then plummet back. Fishermen revel in the great runs surging up to Waterville and beyond.

It hasn't always been like this. What brought this river back to life was in great part due to the removal of Edwards Dam—an action made possible by a change in federal laws regulating pollution and the uses of nature, a group of committed activists who could envision a restored Kennebec, and a remarkable process of negotiation and

compromise at the local and state level to put it all together. The fishery restoration project on the Kennebec is a stunning success—to this date, environmentalists' strongest evidence of the efficacy of dam removal for fisheries restoration. Two years following the removal of Edwards Dam, over 1,000 juvenile American shad were collected upstream of the dam site, and many of these appear to have originated from wild stocks migrating upstream.[3]

Both the FERC decision not to relicense Edwards Dam and the actual removal of the dam generated increased cries for dam removal and general euphoria on the part of river restoration activists. Upon the removal of the Edwards Dam, Peter Rafle, then director of communications for Trout Unlimited, declared, "We are going through a process of re-evaluating how we value rivers. Obviously, in the developmental stage of this country rivers were primarily a means of transportation and a source of power for industrial development. They still serve those purposes, but I think less so, and we are learning anew to appreciate the other things rivers can offer."[4] Margaret Bowman, director of American Rivers, stated, "It is a very important symbol; it symbolizes how reasonable and practical dam removal can be for river restoration."[5]

The active removal of the pieces of infrastructure that power the industrial economy (many of them from the beginning days of that very economy, like the Edwards Dam, built in 1837) is a powerful and symbolic act. Such acts of ecological restoration show the development of the American environmental movement and suggest a process by which philosophy and environmental action are joined in recognizing that an ethical consideration of the rights of nature as well as the desires of humans sometimes necessitates dismantling that which Americans had so proudly built many years before.

THE FIGHT TO RESTORE THE KENNEBEC

In the middle of the 20th century, the Kennebec River was simply too polluted to consider restoring a healthy fishery in the river. The Clean Water Act of 1972 helped bring the river slowly back to life, as did the ending of log drives on the Kennebec in the mid-1970s. These

two developments, the result of decades of environmental efforts, brought some semblance of ecological health back to the Kennebec. As the river slowly recovered, residents of the valley began imagining a free-flowing river with the Edwards Dam removed. Efforts to make the river "swimmable and fishable" between 1972 and 1990 cost the state of Maine over $100 million for water treatment facilities; by 1990 the river was believed to be 95 percent cleaner than it had been in 1972.[6] While the river still suffered from some pollution problems, it increasingly resembled a healthy river ecosystem, leaving an old dam in Augusta as the final challenge to restoring the river and its fish populations.

The cleanup of the river water was a critical first step in the restoration of the river itself. Advocates and government representatives took the second critical step by boldly proposing the removal of the Edwards Dam to complete the restoration of the lower portion of the river and its fish. The Edwards Dam battle was similar to that of the Elwha in many ways. Environmental groups worked together on a focused strategy and recruited the assistance of fisheries experts in state and federal government. Furthermore, they sought to craft a solution that gained the support of the wider community. While the residents of the Kennebec River Valley were more divided over this dam removal than were residents of the Olympic Peninsula, a clever and pragmatic solution in the Kennebec Valley helped build the necessary support. As with the Elwha, activists found ways to offset the economic losses from removing the Edwards Dam. Unlike the Elwha case, however, negotiations broke down in Maine. Activists and the state of Maine finally chose opposing the relicensing of the Edwards Dam by the FERC over crafting a legislative solution. Their strategy, while seemingly less democratic, would in fact in the end be more effective than the consensus strategy adopted for the Elwha River effort.[7]

Fisheries biologists had already been working for years to bring healthy fish populations back to the Kennebec River. In fact, when a flood breached the Edwards Dam in 1974, Thomas Squiers, a fish biologist in the Maine Department of Marine Resources, approached

the governor and asked him to block efforts to repair the dam so fish could gain access to upstream habitat. Too far ahead of the cultural shift regarding dams and fisheries, his request fell on deaf ears.[8]

In 1985 fish biologists again embarked on a plan for fish restoration on the Kennebec. "The Strategic Plan for the Restoration of Shad and Alewives to the Kennebec River above Augusta" sought to increase alewife production to 6 million a year above Augusta and also to "achieve an annual production of 725,000 American shad above Augusta."[9] In order to better facilitate this plan, the Maine Department of Marine Resources crafted cooperative agreements with dam owners on the Kennebec River. All the dam owners signed agreements except Edwards Manufacturing Company, the owner of Edwards Dam. The agreements called for owners to provide funding for a fish trap, truck, and release program for the alewives and shad to help them get around the dams. By providing funding for this program, the Kennebec Hydro Developers Group (KHDG) would be allowed to delay the implementation of fish passage facilities at their dams.[10] The refusal of Edwards Manufacturing Company to join this project presented a problem for fisheries restoration efforts because the Edwards Dam was the most damaging in the Kennebec River ecosystem. This refusal to cooperate probably reflected Edwards Manufacturing Company's assumption that the government would continue to support economic interests over ecological concerns, as it had for the previous century and a half.

However, efforts to restore fisheries gained enough momentum to compel the owners of the dam to begin construction of a $200,000 fish passage facility in the 1980s. At that point, supporters of fish restoration were not talking about dam removal, but were specifically pointing out the possible economic value of a healthy Kennebec River fishery. In supporting the fish passage facility, Representative Donald V. Carter argued that a healthy sport fishing industry could help the local economy, and that Maine needed to use its clean air and open spaces to improve life for its residents. While the proposed fish collection, sorting, and passage facility reflected growing interest in fisheries restoration on the Kennebec, it also represented the

continuation of the old, traditional reliance on technological fixes before the era of dam removal began.[11]

When, in 1989, a coalition of sportsmen's groups and environmentalists declared their intention to pursue removal of the Edwards Dam, many perceived this goal as quixotic, although activists believed that removal of the dam would be the most effective way to restore the fisheries.[12] Very few others spoke of dam removal in 1989, although the Elwha River activists were aggressively pursuing a similar goal far to the west in Washington State. The idea of removing hydroelectricity-producing dams for fish restoration was thought to be simply preposterous. The head of the Natural Resources Council and the publisher of *Maine Sportsman* both agreed that dam removal would be the best solution for the river ecosystem, yet also asserted that gaining control of the dam through the FERC process and then removing it would be "a long shot."[13] But the river restoration advocates moved forward on their plan. At the center of the restoration effort, the Maine Natural Resources Council and the Kennebec Chapter of Trout Unlimited formed the Kennebec Coalition and made a long-term financial commitment to the campaign. Support from the Atlantic Salmon Federation and from American Rivers was also key to the early development of the coalition and its campaign.[14] The Kennebec Coalition hoped to block relicensing of the dam when the license came up for renewal in 1993. They moved quickly to put together the legal muscle necessary to file objections with the FERC, to conduct extensive research to accurately depict the ecological and economic impacts of the dam on the river and the community, and to conduct a public education campaign to build grass-roots support.[15]

While advocates of dam removal made their intentions clear, Edwards Manufacturing Company, the owners of the dam, notified the FERC that they intended to spend $30 million to increase the dam's generating capacity from 3,500 kilowatts to 18,000 kilowatts. They also stated that they intended to install a "state-of-the-art fish passageway."[16]

Fish passage technologies had been tried in the past with little success. For example, a fish pump installed in the dam in 1988 had proved of little value, and in late 1989 the Department of Marine Fisheries publicly criticized the Edwards Manufacturing Company for allowing the destruction of thousands of downstream migrating alewives in the dam's turbines.[17] Blaine Harden, a reporter for the *Washington Post* and author of *A River Lost: The Life and Death of the Columbia River*, described the dam and its impact on the river and Augusta in passionate prose: "The dam cheats both fish and electricity consumers while funneling the bulk of its benefits into the pocket of a company that employs just four people. It does not control floods. It irrigates no fields. Its turbines produce one-tenth of 1 percent of Maine's power needs, which is sold at three times the going rate for electricity in the state. And the dam halts upstream passage for nine species of migrating fish. Even Mark Isaacson, a vice president for the company that owns Edwards, conceded . . . that 'it is hard to make a public-policy argument in favor of this dam.'"[18] A dam of little value degraded a river to provide an insignificant amount of expensive electricity and profit for one small company. A decision that may have made economic sense in the Market Revolution at heart of the 19th century now clearly made no sense in the late 20th century post-industrial economy of Augusta.

In 1990, Maine Governor John McKernan supported the removal of Edwards Dam even while the Edwards Manufacturing Company participated in concurrent negotiations with the City of Augusta and the Maine state government in an effort to preserve its dam. *Kennebec Journal* reporter Ken Brack characterized the Edwards Manufacturing Company as a "wily adversary" whom many believed was playing the state government against the City of Augusta in an effort to preserve the dam. Governor McKernan raised the stakes by threatening to use eminent domain to condemn and remove the dam. Passage of a bill giving the Atlantic Sea Run Commission authority to remove the dam would give the state negotiating power with the dam owner. Ron Kreisman, who was counsel for the Maine

Natural Resources Council and a key player in the efforts to remove the dam, criticized the Edwards Manufacturing Company's tactics when he said, "We have always felt they want to drag out the licensing process as long as possible and are not serious about a new project." The willingness of the Edwards Manufacturing Company to use numerous ploys in the face of restoration efforts necessitated an increasingly interventionist and aggressive approach by river restorationists and the state.[19]

Meanwhile the City of Augusta was working out a deal to become a co-licensee with Edwards. In turn, for helping the Edwards Manufacturing Company obtain its new hydroelectric license, the City of Augusta would gain a portion of the electricity sales, which could have amounted to between $40,000 and $80,000 a year for the city coffers. Furthermore, as part of the plan, Augusta would have the option of buying the dam in 1998. Central to this agreement were the proposals by the company to improve the dam, greatly increase hydroelectric generation, and install improved fish passage facilities. Clearly, the Edwards Manufacturing Company believed that accepting the city as a partner was the key to preserving the dam and their profits. They were also willing to move from their long-term intransigence on fishery issues and improve fish passage in the interest of keeping the dam in place.[20]

During these negotiations, fisheries biologist Thomas Squiers accurately predicted that removal of the dam would increase aeration of the river and would improve the river for striped bass populations.[21] The national environmental group American Rivers announced their support for McKernan's plan in March, 1990. They supported the state's use of eminent domain to condemn and acquire the dam and predicted that intervention in the FERC relicensing process would only extend the process unnecessarily, an accurate prediction of the effort that would eventually stretch out over another nine years.[22] Dam removal advocates turned to the FERC arena after Edwards petitioned to relicense the dam in 1990 and Governor McKernan broke off negotiations with the company, asking the commission to deny the relicensing petition. The governor believed that Edwards

was no longer negotiating in good faith over the future of the dam and river.[23] From that point on, the effort to restore the river and remove the Edwards Dam focused on the relicensing process.

In their public education campaigns, the Kennebec Coalition and Maine state government strategically chose to emphasize the positive goal of river restoration rather than the negative goal of dam removal. Research provided an important foundation for this process, as the coalition had to demonstrate the historical fish numbers and varieties on the river to make a compelling case regarding the ecological impacts of the dam and the possibilities of restoration. While they worked to produce high-quality, well-researched reports for the FERC, Kennebec Coalition activists also produced sizable crowds at public hearings on the relicensing. "We turned out large numbers of people, primarily from the Kennebec Chapter of Trout Unlimited coordinating them, enabling them to speak articulately . . . we . . . worked very hard to coach a lot of the people, asking them to be respectful, to be patient, to talk from their heart."[24]

The release of the FERC's draft Environmental Impact Statement (EIS) in 1991, calling for the construction of fish passage facilities, a solution that had failed so often in the past, energized the coalition to step up its efforts. The Kennebec Coalition responded by hiring consultants and working more closely with federal agencies to craft stronger technical arguments supporting removal of the dam. The coalition also used consultants to counter arguments raised by defenders of the dam, including assertions that dam removal would be costly, cause riverbank erosion, and increase downstream flooding.[25]

Like the Elwha River restoration advocates, the Kennebec Coalition stressed the particular qualities of the dam and the river that justified dam removal. Like the Elwha and Glines Canyon Dams, the Edwards Dam was relatively insignificant as a power producer, providing only 3.5 megawatts of power. The dam was old and relatively unstable, having been breached as recently as 1974 and many other times in its history. Furthermore, the dam blocked critical upstream habitat and miles of rivers and creeks that could contribute

to fisheries production, as did the Elwha and Glines Canyon Dams. Therefore fisheries advocates were able to make both economic and environmental arguments for removal of the Edwards Dam. Like Elwha advocates, they argued that the economic benefits of a restored fishery would outweigh the benefits of a dam that produced little power but created insurmountable ecological problems. It was clear as well that the economic benefits of a restored fishery would be more widely distributed than the profits from the dam, which went only to the owners of the Edwards Manufacturing Company.

Edwards opposed dam removal for obvious reasons; they wanted to continue reaping the profits rendered from the high electric rates garnered through a contract signed during the 1970s oil embargo. Reasonably enough, they also feared being forced to pay for the removal of the dam. In an economy where businessmen and women rarely pay for the externalities of their business, the owners of the dam were unwilling to consider the prospect that they bore responsibility for damage to the environment or could be forced to pay for the destruction wrought by the dam on the river and its fisheries.

As co-owners, the Augusta city government supported the company's desire to keep the dam, deriving profits and tax revenue from its operation. And there were other property concerns that prompted the city government to support Edwards. According to interim City Manager Dave Jowdry, "Are there riparian rights for landowners in the 17 miles above the dam? Many of these people—residents of Augusta, Sidney, Vassalboro, Winslow, and Waterville—purchased riverfront property and may have the expectation that there will be water in the river. That may not be part of FERC's deliberation, but we should be sensitive to the concern."[26] Faced with a landmark proposal to remove a dam, the city government chose to support a continuing business interest and practice caution.

As events progressed, the owners of the Edwards Dam eagerly cast themselves as victims of organized environmentalists bent on the widespread removal of dams nationwide. As Mark Isaacson of Edwards Manufacturing Company opined, "They are very interested

in establishing a precedent for dam removal . . . the dams they really want to remove are not on the Kennebec but in the Pacific Northwest and they thought we'd be a good place to begin. We're a small, private company with four employees."[27] While this statement portrayed the dam owners as victims, a status the original dam builders would have hesitated to claim with their visions of glory and wealth, Isaacson was accurate in his estimation of an emerging national dam removal effort with the Elwha dams in the Pacific Northwest preceding the Kennebec efforts. However, his assertions of a vast environmental conspiracy were broadly overstated. The Kennebec restoration effort was an organic movement conceptualized, organized, and completed by members of the local community who sought to improve the river and their own quality of life.

Perhaps the Edwards Manufacturing Company earned its status as an antagonist to the maturing environmental movement since the company had earlier demonstrated little interest in restoring the Kennebec's fisheries. Now that more dramatic solutions were on the table, Edwards Manufacturing was willing to cast itself in the role of victim.

CRAFTING A SOLUTION AND A REVOLUTIONARY FERC DECISION

Gubernatorial candidate Angus King included support for removal of Edwards Dam in his 1994 campaign, and sustained that support after his election. According to Evan Richert, Maine's state director of planning and point man for the state's efforts to remove the dam, the state worked in close communication with the Kennebec Coalition. "We talked a lot with them and the federal agencies, so we knew what they were doing and ended up focusing on the economic arguments . . . "[28] The state made it clear that it generally supported hydropower, in fact advocated hydropower, but sought to intelligently evaluate each dam and its economic benefits and ecological impacts on a case-by-case basis. Edwards Dam no longer made economic sense, while it had never made ecological sense. As

Richert cogently points out, "The cost–benefit just wasn't there to keep the dam. It was going to be different in other situations and we look at them differently in different situations."[29]

According to Richert, the state produced reports for the FERC filing process even as the Kennebec Coalition filed their own extensive sets of documents. When the Edwards Manufacturing Company decided to throw in the towel, they approached the state rather than negotiate with the Kennebec Coalition.[30] The state negotiated with Edwards and the City of Augusta. While Augusta was forced to go along because of Edwards' decision to give up fighting the FERC decision, they were reluctant to give up the economic perks of their relationship with Edwards without a fight. The timely arrival of Bill Bridgeo as Augusta's new city manager contributed positively to the transition and the city government's acceptance of the future demise of Edwards Dam. His vision for a dynamic downtown development plan partially funded by state money contributed to the willingness of Augusta city government to support the removal of the dam.

Negotiation was only one aspect of the Maine state government's strategy for dam removal. Officials worked actively to promote the dam removal, address concerns, and educate the public in general. There were many concerns: fear of industrial contaminants in soil backed up behind the dam, potential downstream flooding, a reduction in riverside home values, and the elimination of river access for communities that had built piers and docks for the lake. While some of these were reasonable fears, concerns were increased because opponents of dam removal crafted dire predictions of such negative consequences. Thus, these concerns needed to be addressed to create public support for dam removal.

The decision by the FERC to not relicense the dam came as a shock to many. FERC chairman James J. Hoecker explained the decision saying, "Today's order requiring the removal of the Edwards Dam reflects a balanced view of environmental as well as social and economic considerations."[31] Peter J. Howe of the *Boston Globe* announced the FERC decision by writing, "For the first time in U.S. history, federal power regulators refused to extend the operating

license for a hydroelectric dam yesterday, ordering that a structure that stretches 900 feet across Maine's Kennebec River be ripped out so that sturgeon, bass, salmon, and smelt can reach their spawning grounds."[32] The battle over the dam's future culminated with a 2–1 vote by the Commission to not extend the license again and to order the dam's razing.[33] Media accounts of the order focused on a shift in resource policy, many overstating the case while comparing rivers of electric power production versus productive rivers of fish.[34]

Fish restoration advocates reacted to the FERC announcement with exultation. Evan Richert said, "This is a big win for the environment and the economy. It is also a terrific example of how federal officials listened to the evidence and struck the right balance in their decision."[35] Stephen Brooke added that "the facts brought FERC to the same place where all the rest of us have been for a long time . . . [the] time has come to remove the Edwards Dam so that abundant fish populations can again return to this magnificent river."[36] The dam owners were somewhat more glum in their response. Isaacson criticized the FERC decision as bad policy and questioned the FERC's authority to deny the license and require removal of the dam.[37] Businessmen and members of the hydropower industry worried that this step might set a precedent for the removal of more dams in the interests of ecological restoration.[38] Certainly a successful river restoration effort through dam removal would provide sustenance to an environmental movement increasingly interested in targeting dams nationwide in an effort to reestablish rivers and fisheries.

DANGEROUS DAM PRECEDENT

While the national newspapers and magazines focused on the FERC decision and the unprecedented nature of the order as well as the possible nationwide ramifications, the removal of the dam was far from a *fait accompli.* The Edwards Manufacturing Company, with support from the hydropower industry, mounted a legal challenge to the FERC decision. In their appeal, they requested that the FERC vacate the decision and announced that they would challenge

the decision in federal circuit court and possibly demand federal compensation for the taking of their property.[39] The Edwards Dam owners and City of Augusta filed a re-hearing request in an effort to have the FERC decision overturned.[40] Joining them in this request were "the National Hydropower Association, the City of Tacoma, Washington (which receives a portion of its power from a dammed river in the Olympic Mountains), and the Edison Electric Institute, a national organization representing more than 75 percent of the national electricity generators and an almost equal percentage of the nation's consumers."[41] The other parties to the appeal feared the precedent that decommissioning Edwards Dam might set, and the increased concern regarding environmental issues expressed by the FERC in relicensing procedures since 1986. Further, these groups as well as the owners of Edwards Dam were concerned that the owners of dams failing the relicensing process would be saddled with the cost of removing their own dams.[42]

Additional challenges came from other quarters. Four conservative Republican members of the Senate Energy and Natural Resources Committee challenged the FERC decision. Senator Larry Craig of Idaho (undoubtedly concerned over ramifications of the decision for dams on the lower Snake River and a consistent opponent of environmental causes), Senator Frank Murkowski of Alaska, Oklahoma Senator Don Nickles, and Representative Jon Kyl from Arizona informed the FERC that they were disappointed at its failure to provide a requested stay of implementation of the FERC decision for the dam owners.[43] Ironically, if the Kennebec River Coalition had sought a legislative solution, these legislators would have been well-positioned to block dam removal, just as former Senator Slade Gorton blocked removal of the Elwha River dams. However, due to the decision to challenge the dam through the FERC relicensing process, these opponents could only voice their concerns while the process moved forward.

A great deal of distance remained between dam owners, the City of Augusta, and those seeking restoration of the Kennebec River and its fisheries. The final removal of the Edwards Dam was more than

the simple enactment of orders from the federal government. The crafting of a solution that allowed for benefits all around precluded what might have become a nasty court battle over the future of a dam, a river, and fish.[44]

The Kennebec Coalition and state government patched together a solution in an effort to avoid a lengthy series of court cases. Director of State Planning Evan Richert announced the state's interest in helping create a solution as soon as the FERC decision was announced. "We want to work with the owners and find ways for them to meet their obligations. The governor has a genuine concern that we don't pile costs on the dam owners. We intend to treat them fairly and with respect in trying to reach an expeditious solution. If that's not possible, we'll defend the decision in court."[45] Dave Cheever, a *Kennebec Journal* reporter during the negotiations, noted that it was this plan that finally resolved the issue and cleared the way for dam removal. His interpretation is, however, a little less rosy than that of others. He asserts that the city council and Edwards Manufacturing were given little choice in the matter insofar that this deal was going to happen regardless of their consent.[46]

The solution crafted was a complex one, but it, like the consensus crafted on the Elwha River, offered something for everyone and expedited the process of removing the dam and restoring the fisheries. In an unprecedented move, Governor Angus King appeared before the city council and gave a presentation on the plan for dam removal. The formal agreement between the city, the state, and the dam owners was signed on May 8, 1998. This solution protected the city and the dam owners from legal liability during the dam removal process, made the state responsible for acquisition of the dam with money provided by Bath Iron Works, and required Edwards Manufacturing to pay approximately $250,000 to the city for the last royalty payment to the city, taxes for the year, and a portion of the sale of materials salvaged and sold from the site. The agreement also provided some opportunities for downtown economic revitalization with funds from the state available for development and planning.[47]

The linchpin for this complex financial arrangement arose from a deal struck with Bath Iron Works, a shipyard located in Bath, Maine, alongside the lower Kennebec River. Bath has produced ships for hundreds of years, and Bath Iron Works still builds ships and provides jobs in the region. Bath Iron Works needed to improve its facilities along the river and as a result brought needed money into the dam removal effort. The Iron Works' desire to expand and flatten their shipbuilding yards threatened 13 acres of wetlands that were prime habitat for sturgeon and other species. Facing the need to provide mitigation for this habitat destruction, the company offered to contribute money to the Edwards Dam removal efforts. The $2.5 million provided by Bath Iron Works was key to the final resolution of negotiations and the removal of Edwards Dam.[48]

ENVIRONMENTAL BENEFITS OF DAM REMOVAL

Since the removal of the Edwards Dam, most of the fish have returned to the Kennebec, and the river now more closely resembles an organic and dynamic ecosystem rather than an industrial waste ditch. The water quality has improved dramatically with increased water flows and a corresponding higher oxygenation of the water. Insect counts have doubled and tripled with a wider variety of aquatic insect species in the collections, a reliable indicator of higher water quality. The striped bass fishery has improved dramatically on the river, and the fish, along with shad and alewives, quickly moved upstream to the dam in Waterville. Studies of the river above Augusta demonstrated additional spawning in the newly accessible areas as well as general increases in numbers of several other fish species. Two million alewives traveled upstream immediately. Newspaper articles and personal stories have celebrated the resurgence of fish upriver above Augusta, over 160 years since the building of the dam. In fact, it is common to see five-foot-long sturgeon breaching the river's surface from downtown Augusta. This is certainly a success story and offers an alternative to the declensionist narratives that more typically describe the stories of human destruction of nature.

The restored river and fisheries provide a powerful precedent for those supporting dam removals in other parts of the country.[49]

AND THE DAMS COME TUMBLING DOWN

The story of the successful restoration of the Kennebec River, although exceptional at the time, is now indicative of a wider movement, as environmentalists and government agencies nationwide seek to reevaluate dams and river use in a context that includes not only economic issues but also measures the value of ecosystems. In fact, small dams are being removed and fish populations restored in many locations throughout the country. The success of this experiment and others like it will determine the future of still more dams and rivers across the country.

On the Kennebec River itself, the success of the Edwards Dam project led activists and biologists to cast their eyes toward the Fort Halifax Dam just 17 miles upstream on the Sebasticook River, a tributary to the Kennebec. After a tough fight, the owners of that dam agreed to remove it, and in the summer of 2008, 9 years after the Edwards Dam fell, this one went as well. Now, the fish travel upstream to yet another dam. The falling dams on the Kennebec and its tributaries are emblematic of the national process, heightened and strengthened by the Edwards Dam fight. Each time a dam is removed with environmental benefits and, hopefully, economic benefits as well, the momentum piles up behind another dam somewhere in the nation. What will the future Kennebec River watershed look like? Will the resurgence of fish lead to a resurgence of the economy or will those issues remain more ambiguous?

In fact, the Augusta downtown economy has not recovered in the way that restoration advocates and the city manager anticipated it would. Home values along the river have increased, however, and there has been some increase in revenue from tourism, fishing, boating, and other recreational activities. While it is reductionist and short-sighed to be cornered into making economic arguments for removing dams, other unanticipated economic benefits do arise.

For example, the town of Benton, along the Sebasticook River, north of the former Fort Halifax Dam site, saw its first alewife run in approximately 160 years, a run that may be the largest in the United States. Citizens of the town, under the supervision of a newly appointed alewife warden, harvested 350,000 alewives for an influx of $15,000 to town coffers.

Dam removals have nearly all resulted in rapid and notable ecological restoration. For example, the Quaker Neck Dam was removed from the Neuse River in North Carolina in 1997–98, and two other dams upstream were removed, including one blown up by the Marine Corps. At one time, the Neuse River had produced more striped bass and American shad than any other river in North Carolina, a state that has always been a top producer of these popular commercial and game species. The construction of the Quaker Neck Dam in 1952 inflicted severe damage on this fishery. The catch of 700,000 pounds of American shad prior to the construction of this dam stands in strong contrast to the mere 25,000 pounds caught in 1996. Efforts to improve estuary ecosystems led to the plan to restore the river. Specifically, the Albemarle and Pamlico sounds of North Carolina were impoverished by the Quaker Neck and other dams on the Neuse River. Dam removal would allow for the spawning of anadromous species, which included not only striped bass and American shad but also sturgeon, herring, and alewives, enriching both the rivers and the estuary.[50]

The solution was relatively simple, as in the case of the Elwha and Kennebec rivers—remove a dam. Then, remove more. In many cases, dam removal, enabling natural processes to function again, leads to quick and impressive improvements in the river ecosystem. The result has been a resurgence of the striped bass and American shad runs on the Neuse as they work their way into several hundred miles of stream habitat blocked by the dams. Beyond that, and unexpectedly, there has been an increase in amount and size of the popular flat-head catfish, as they aggressively feed on the spawning fish now available after removal of the dams. Elizabeth Grossman, the author of *Watershed: The Undamming of America*, explains how

the removal of one minor dam can radically open up and transform an entire river ecosystem, writing "with the obstacle of Quaker Neck removed, 75 more miles of the mainstem and 925 more miles of streams that feed into the Neuse are now available to fish." Federal agencies, the dam owners, and local groups worked cooperatively to remove the dams and restore fisheries in a way which created little conflict and which has resulted in an improved fishery. The science was clear that the dam removal would unequivocally improve the river and fisheries, and the owners of the Quaker Neck Dam were willing to cooperate, making this a relatively straightforward process. Now, the Milburnie Dam in Raleigh is the primary obstacle to spawning fish on the Neuse River and there is increasing pressure for its removal. An owner of a store that rents canoes and sells bait on the Neuse River said, "I like it with the [Quaker Neck] dam gone. There's more bigger fish, a lot more variety, and people aren't afraid to eat 'em."[51]

The Waterworks Dam on the Baraboo River in Wisconsin was also removed in the late 1990s. The removal of this dam created dramatic improvements in water quality along with improved fisheries.[52] In fact, Wisconsin environmentalists have made great strides removing dams for environmental reasons, primarily restoration of native fisheries. According to Grossman, over 60 dams have been removed over the last 40 years on such rivers as the "Milwaukee and Manitowoc Rivers in eastern Wisconsin, the Kickapoo and Yahara Rivers and Turtle Creek in the south, the Flambeau River in northern Wisconsin and the Willow River, a tributary of the St. Croix in western Wisconsin."[53]

The success of river restoration efforts has enabled leading groups like American Rivers and Trout Unlimited to hail these efforts, as the fisheries consistently return quickly after the removal of dams. While it seems obvious that fish will return to previously blocked rivers (and the evidence so far supports this assumption), opponents of dam removal consistently deny the potential success of future projects even as the list of successful removals and restorations continues to grow. As an article in *Bioscience* points out, migratory species have

returned and increased their numbers after dam removals on Bear Creek in Oregon, Mad River in California, and Clearwater River in Idaho. Furthermore, dam removal has allowed non-migratory species like smallmouth bass to extend their range and displace introduced species like carp in streams in the northern Midwest.[54] On the West Bend River in Wisconsin, dam removal resurrected the river and created a thriving bass fishery. The old reservoir, predicted by opponents to become an eyesore and mud pit (similar to predictions made by the opponents of Edwards Dam removal), has actually been transformed into a park. The removal of three dams from Butte Creek in northern California allowed a non-existent salmon fishery to rebound to a run of approximately 20,000.[55]

In Maine, inspired no doubt by the success on the Kennebec River and other restoration efforts, activists, government representatives, and business and community leaders put together a remarkable and arguably unprecedented effort to restore the Penobscot River. As with the Kennebec River, dams built on the Penobscot during the late 19th and early 20th centuries had destroyed once-famous and profligate runs of Atlantic salmon, striped bass, shad, herring and other species, reducing the quality of the overall river ecosystem. Also like the Kennebec River, two dams are to be removed entirely and another one partially modified for upstream fish passage, in order to restore the fisheries of this once great river. This restoration, funded with a combination of federal and private funds, will open up approximately 1,000 miles of river and tributary spawning habitat.[56]

The effort to restore the Penobscot bears some similarities to the process on the Elwha River. A coalition of environmental groups, the Penobscot Indians, government agencies, and the owners of the dams forged a compromise that will benefit everyone involved. An editorial from the *Kennebec Journal* praised the proposed restoration:

> *It is, it seems, often much easier for humans to destroy than it is to create. For generations, the Penobscot River fed both the Indian tribe that took its name from the river and the landscape of forest and ocean that surrounded it. That connection was severed*

with the advent of industry and hydropower. To many, the riches that resulted were worth it. But to the river and those who loved it, it was not. So now, a growing and determined group has set out to bring life back to the Penobscot. John Muir once said of his beloved western forests that 'God has cared for these trees, saved them from drought, disease, avalanches and a thousand tempests and floods. But he cannot save them from fools.' You could call those who destroyed the Penobscot 'fools' but it would be fools as well who would now decree that all industry on the river must stop to make up for that damage. Instead, with wisdom, these river restorers have found a way to balance both nature's needs and the demands of our economy.

We—and the river—are in their debt.[57]

This editorial, penned in a community that has already seen the benefit of dam removal, articulates a position rarely heard in the mainstream in this region, or even the nation, a short 20 years earlier. Adopting a nuanced position addressing the shifting uses of the river, based on the requirements of the human community, the editorial writer makes the point that restoration of nature is a fundamental human activity. This echoes the argument made by famed entomologist and environmentalist E.O. Wilson that the 21st century has to be the century of restoration. Furthermore, this editorial argues, as have activists on the Elwha River, Klamath River, and others, that a better balance should be struck between nature and industry; that the excesses of industrial growth can be addressed and corrected to create a more sustainable natural economy. In so doing, activists are showing the way to constructing a land ethic while restoring nature.

A project that compares in scope and ambition with the Penobscot River restoration is the Northwest's proposed Klamath River restoration. The first dam was built in 1918 and eventually four dams on the river helped destroy one of the largest salmon runs on the Pacific Coast. This long, winding river enters the Pacific on the coast of northern California and then extends into the desert of

eastern Oregon. Historically, Klamath, Yurok, Karuk, and Hoopa Indians depended on the fish of this river for subsistence. But, as was the case everywhere, they were forced onto small reservations (some of the tribes were actually eliminated and lost federal recognition) and the land opened up for settlement, logging, and agriculture—particularly problematic for the uses of the Klamath River today, in the desert of southeastern Oregon. Four dams, multiple constituencies, and declining salmon runs (with two species listed as endangered) led to an explosive situation in the summer of 2001, when drought threatened farmers dependent on irrigation from the Klamath River in southeastern Oregon. Since that time, after a massive salmon die-off in 2002 because of the draining of water for farming, and amidst protests, face-offs, and threats of violence, the various stakeholders in the basin—many of them economically, politically, and ideologically opposed to each other—hammered out a compromise agreement to restore the salmon fishery. There is a great deal of healthy habitat in this watershed, so the potential for recovery of salmon populations is strong.

The Klamath River is not the only watershed in Oregon undergoing restoration. A dam dating from the same era as the Elwha Dam, the Marmot Dam on the Sandy River was removed in 2007 in an effort to restore the river and its salmon and steelhead fisheries. Owned by Portland General Electric (PGE), the dam was built in 1913 and like the Elwha, blocked salmon and steelhead from migrating upstream. While the company is upgrading its other hydropower generating facilities for improved production and compliance with fish protection requirements, the executives decided that upgrading this dam would have been too expensive and removal was a better option. The accompanying dam on the Little Sandy River has been removed, as well as a wooden flume running from that dam to the former Marmot Dam reservoir. PGE also donated 1,500 acres of land from the project to the Western Rivers Conservancy.[58]

On the Rogue River in Oregon, another dam fell to make way for salmon. In the summer of 2009 work commenced to remove the Savage Rapids Dam near Grants Pass. Built in 1921 for irrigation

purposes alone, the removal of the 39-foot-high and 500-foot-wide dam represents one of the larger projects up to this point. Poor fish-passage facilities and the general plight of salmon on the Rogue River prompted the national environmental group Water Watch to block a water rights permit request by the Grants Pass Irrigation District (the owners of the dam) in 1991. Years of debate and lawsuits and the listing of the Rogue River coho salmon as an endangered species culminated in a negotiated agreement to remove the dam, which will open up another 500 miles of spawning habitat to salmon and steelhead. Fisheries biologists believe that this action will add over 100,000 salmon a year to the river's population.[59]

On the other side of the continent, one of the great industrial states has aggressively stepped up its removal of aging and obsolete dams. Pennsylvanians have removed over 100 dams, with many more slated for removal. Some date back to the 17th and early 18th centuries and provided power for sawmills, grain mills, and textile mills, representing an important component in the early industrial economy. Abandoned for many decades, their impact on fisheries was largely irrelevant for a long time because the rivers and streams were so filled with industrial and sewage pollutants that they were biological deserts. Like on the Kennebec River, the Clean Water Act led to cleaner water and a resurgence of riparian biota, prompting the question of what would happen if the dams were removed? Activists and fisheries biologists envisioned a further restoration of the river and stream ecosystems, with the return of fish like the American shad. Now, creeks and rivers like the Pennypack, Darby, Brandywine, and the Schuykill more closely resemble their historical selves as shad are surging upstream into healthier, accessible habitats. The hope is that eel and striped bass will soon follow.[60]

THE LAND ETHIC AND DAM REMOVAL

To situate dams properly in their cultural and economic context, it is important to understand the social and economic displacements as well as the environmental damage created by dams. American environmentalists, fisheries experts, and communities are evaluating

dams in a more complete way, weighing the costs, and removing the dams that create more damage than good. Removing dams is *not* eliminating productivity or eradicating human use of the river. Nor is it harming the capitalist economic system or laying unfair burdens on rural communities. Nor is it really restoring a river to its "natural" pre-industrial state. Rather, it is a matter of choosing to work intelligently with natural systems to allow them to function under fewer overt restraints and controls—in the process, providing a new but also a reconstructed ecosystem replete with a whole different set of functions, values, uses, costs, and economic benefits. And, it is judging the changed system to be desirable, more beneficial, sustainable, and finally, in the sense that Aldo Leopold meant when he wrote of the need for a land ethic, a system that is more ethical in that the value of nature and other organisms are recognized alongside human needs. The restoration of rivers and fisheries through dam removal is an effort to enact Leopold's land ethic.

Some might argue that the Elwha River restoration effort indicates the weakness of environmentalism in America. The fact that it has taken approximately 20 years to get to dam removal after passage of the Elwha Restoration Act prompts that very question. Add to that 20 years the many decades of effort prior to the passage of the legislation, and the question gains even more weight. It is essential to remember that removing large dams for environmental restoration represented a major step in environmental action, a large shift in thinking about the proper uses of nature, and to many represented an attack on industry in America. Resistance and discomfort were to be expected. Consider also that the Elwha dams, unlike the low-head dams that have been removed in the intervening years since 1992, are high-head. Their removal moves the river restoration movement forward significantly because of their size and the potential for high profile, successful fisheries restoration. More to the point, the oppositional role of Senator Slade Gorton, particularly once he folded the Elwha River restoration effort into the ugly fight over the lower Snake River dams, can hardly be overstated. He held almost all the cards, and was willing to ignore not only the legislation but

also the advice of the local community via the Port Angeles Advisory Committee, to prevent such an important and precedent-setting move as these dam removals represent. It is important to note that the opposition has been overcome. And while it has taken longer than many had anticipated (except the Port Angeles Advisory Committee), the very lag period that is regretted by many Elwha advocates makes the Elwha River restoration even more powerful and important. The "bottom is out of the tub" as President Lincoln once ruefully commented.

Over the last 20 years, hundreds of dams have come down with generally positive results. More fish have returned, the water is better aerated and there is very little of the decline in property value and the ugly, muddy banks that were predictions of dam removal opponents in other places like Maine and Wisconsin. Fisheries biologists, activists, politicians, and all stripes of Americans are learning of dam removals and seeing the benefits of those efforts.

Now that the dams are removed, advocates and opponents will watch with interest to see how quickly the Elwha River returns to a productive salmon fishery. When the trickles and then stronger runs of salmon and steelhead arrive, the Elwha will provide yet another example of how dam removal in some cases is a reasonable and successful strategy for restoring ecosystems and economies.

A PROPER UNDERSTANDING OF DAM REMOVAL AND RIVER RESTORATION

Richard White's *The Organic Machine* was one of a raft of books on the Columbia River that were published in a short period in the mid- and late 1990s. This study provides a history and analysis of the Columbia River and its place in American society. White argues that the current Columbia River is one that is made and remade by numerous human activities: commercial and sport fishing, irrigation, pulp mills, hatcheries, aluminum production, dams, hydroelectricity, and so forth. All are necessary endeavors that have created a new kind of river, an Emersonian "organic machine" that is both natural and produces labor for our use and benefit. While noting the problems

Pool and riffles on the Elwha. Courtesy of Jeff Crane

with treating a major river as a machine, a mere collection of parts, his broader point is that this is the river we must live with now; that it can never be the "natural" river it was before, returned to a perceived simpler time of salmon abundance and river health. That may well be—this river commands a complex and large constituency that for the most part sees it as more important for its industrial purposes than for its fish production.

In "Salmon," the final chapter of *The Organic Machine*, White seems to take special pleasure in denouncing some environmentalists. "To call for a return to nature is posturing. It is a religious ritual in which the recantation of our sins and a pledge to sin no more promises to restore purity. Some people believe sins go away. History does not go away."[61] The arrogance of this statement, in its massive disregard for the complexity and intelligence of the environmental community, is reminiscent of some of my students who brush off environmentalists as "tree-huggers." White posits the most extreme position regarding restoration of the Columbia River and its fish, then denigrates it further by referring to these calls as "posturing,"

comparing these views to religious excess. This was 1995. The calls for dam removals had begun, early on with the Elwha legislation in 1992 and then with increasing demands for removal of dams on the lower Snake River. Any desire to remove Columbia River dams at that point were limited either by an acceptance of reality or by the acknowledged difficulty of removing the lower Snake River dams first. As White worked on this book, he must have felt that he was catching this misguided movement in its early stages—and setting it straight.

In point of fact, if you are willing to set aside the Columbia River for a moment and consider the growing and remarkably successful river restoration movement, he has been proven quite shortsighted. The Elwha River is easy to set up in counterpoise to the Columbia. The Elwha is economically insignificant, produces little power that is easily replaceable, blocks a river that is embedded in relatively pristine habitat, and does not have a complex mix of constituents with a vested interest in keeping the two dams in place. These are legitimate points to make, but it is important to think historically. As White points out, "History does not go away." The fact of the matter is that when these removals were called for on the Elwha, such propositions were unprecedented and considered extreme measures—proposals that responsible adults like the owners of the mill and the dams could safely ignore as the shrieks and cries (or the religious recantations of sins) of extreme environmentalists.

Not only is the deed done, but it turns out that the path to restoration has been and will continue to be a complex one, using machinery, science, technical reports, experts, and natural methods in serious and informed efforts to "return the river to nature." These are not drum circle aficionados and Earth First! radicals rappelling the faces of dams. In fact, those seeking to return the Elwha to nature are respected fisheries and wildlife biologists of high stature in their field, tribal leaders, businessmen, and numerous members of federal, state, and local agencies. The plans to restore the river and its habitat, fisheries, shellfish, and wildlife are multi-dimensional, reflecting decades of experience, research, and debates.

What does this have to do with White's organic machine? First, the term as he uses it is applicable to not only the Columbia but to any dammed river performing labor for humans. The Columbia seems untouchable because of its centrality to the region's economy and the cheap, "clean" hydroelectricity its dams, particularly the Grand Coulee, provide for a multi-state region. The sanctity of those dams seems even more untouchable when one considers the need to perpetuate and increase the use of hydroelectricity in order to reduce pollutants that drive global warming. To push the point a bit more, it might be that the sacrifice of the Columbia makes it possible to preserve the salmon in rivers where the dams are insignificant or where proposed dams would be of little value in terms of hydroelectric production. Regardless, as White should understand, and undoubtedly does, it is reckless to accept a dam as a permanent feature of a river or a society. History may not go away but dams clearly do.

SOME IMPLICATIONS OF ELWHA RESTORATION

The Elwha dams have been torn down and time's passage has provided an opportunity for Elwha advocates to carefully plan the restoration process and studies that will be conducted to evaluate the return of the salmon and the growing health of the watershed ecosystem.[62]

Assuming success over the long-term, these studies will not only provide data that support other dam removal efforts across the nation, but also provide information on how to improve the restoration process to make it more ecologically productive and successful. If this is the case, then the delays in Elwha restoration may strengthen the environmental restoration movement. In fact, the Elwha River dams, their removal long delayed, may still prove to be the important transition in the environmental and river restoration movements that many assumed they would be back in the 1990s. These were the first high-head dam removals for environmental purposes in the United States. It is also the most costly river and fisheries restoration to this point, with a combined current estimated

cost of approximately $300 million. Much of the expense arises from the need for extreme mitigation measures. Many dam removal projects (all low-head dams to date) have required little in terms of preparation and mitigation, in some cases a backhoe tearing a trench in the dam or cofferdam has represented the peak of the effort. On the Elwha, the cost of actual dam removal is a minority of the overall project price. Because the National Park Service decided to allow for natural erosion of stored sediment behind the dams, the necessary new water treatment plants plus flood protection and septic tank replacement downstream drive costs higher. While the Olympic National Park had held out the promise of jobs in restoration work as a strategy for building community support, it was decided that active sediment removal was too expensive and environmentally damaging. So for a few years the river will flush out high levels of sediment, and then begin to return to normal. Completion of such a complex and expensive restoration project, particularly if the salmon return in strong numbers, will provide a model and momentum for even larger and more complex river restoration projects. Dams that now seem untouchable may come under fire as salmon advocates demonstrate the legitimacy of restoration while applying the force of law and treaties in defense of salmon and Indian rights.[63]

When the legislation was passed in 1992 calling for restoration of the Elwha River and its fisheries, there was exultation and anticipation of the physical event of dam removal and salmon returns. A great deal of excitement also stemmed from the achievement of an unprecedented act, and the speedy timelines for dam removals. The reality of partisan politics and obstruction delayed the dam removals and changed the significance of dam removal on the Elwha River. However, it is possible that the delays have allowed for the development of a better restoration model, one that will best serve native Elwha stock and generate new knowledge and understanding of the process of river restoration that can be applied to other, similar projects.

UNDERSTANDING THE RIVER

The dams were not simply removed to allow fish to move upstream; the process of restoration is much more complicated than merely removing a barrier. The mountains of sediment behind the dams and the varying health of the native salmon stock preclude a casual restoration of this type, such as was done successfully on the Kennebec River in Maine. Restoring the fish to the river necessitates a complex, well-orchestrated system of recolonization, hatchery use, and introduction of fish to the river at different stages of life. It also requires placing fish at various spots in the river, both to maximize restoration and to avoid high mortality rates due to turbidity from the mountains of sediment flushed downstream.

To better understand the effectiveness of restoration, resource managers and scientists representing multiple agencies, as well as the Lower Elwha Klallam, organized and implemented a careful program of study to effectively evaluate and catalog the ecosystem prior to dam removal. This establishes a baseline for future studies and for understanding the consequences of dam removal. A series of conferences have been conducted to organize these studies and establish cooperation and consistency between researchers.[64]

The baseline studies are complex and rigorous and reveal a scientific zeal and sophistication about the potential physical results and scientific knowledge accruing from dam removal that could not have been foreseen when the legislation was originally passed. One might assume a great deal of excitement and interest on the part of the fisheries biologists in particular because their work is now not in service of continued mitigation, technological optimism, and other half-measures meant to sustain economic development over salmon health, but rather part of a real solution to the salmon crisis—representing a profound next step for fishery professionals and environmentalists alike.

In one article discussing the biological impacts of dam removal on salmon and their responses, the authors described the work done to evaluate woody debris in the lower Elwha. In their inventory, snags and logjams were identified, measured, tagged, and mapped with

GPS. Specific information regarding width, length, type of tree, and orientation of the logjams and snags was collected and recorded.[65]

In order to effectively ascertain and evaluate existing salmonid populations, a number of methodologies were employed. Spawning ground surveys of the mainstem and side channels were conducted by foot and boat to locate and catalog active salmon redds. Locations were recorded via GPS and further details such as water depth and velocity, the size of gravel and cobble in the redd, the distance to woody debris, the type of habitat, and the distances to stream banks and pools was collected as well.[66]

In addition to this painstaking and thorough methodology, an innovative snorkel study, one of the longest on the North American continent, was conducted. Twenty-one fisheries biologists participated in the 42-mile long survey, the approximate length of the river. Biologists from the National Park Service, United States Geological Survey, Lower Elwha Klallam tribe, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, Peninsula College, and the Wild Salmon Center snorkeled the river. Conducted over a few days in August 2007, the swimmers recorded populations of bull and rainbow trout above the dams, and rainbow and bull trout as well as pink and chinook salmon in the lower Elwha.[67]

RETURN OF THE RIVER

Salmon and their access to the river certainly dominate most people's thinking about the Elwha, but there are other, significant ecological issues that are not as obvious. With the interruption of sediment transport, the ecological impacts of the dams moved beyond the destruction of the salmon runs. For example, the loss of gravel and cobble from the river forced Port Angeles to spend millions of dollars over the years hauling rock to replenish and stabilize Ediz Hook. Where there used to be a wide estuary at the mouth of the Elwha, rich with clam beds critical to the Elwha economy, the beaches are almost entirely gone. The dams stopped the replenishing of the beaches and estuary. The blocking of sediment flow, resulting

in "sediment starvation," has also caused the expansion of kelp beds and a reduction in eelgrass, with impacts on various species of fish, including salmon. Additionally, the coarsening of the beaches has damaged some species of clams and the Dungeness crab population.

Now that the dams are gone, at least 18 million cubic meters of sediment formerly blocked by the dams are again flowing downstream, restoring the regular sediment transport of the Elwha River. It is anticipated that in the first five years after dam removal, 2 to 2.5 million cubic meters of sand and gravel and as much as 5 million cubic meters of sand silt will be transported down the lower Elwha River. Scientists are strongly interested in studying and understanding the processes by which the Elwha will restore its own hydrology and river geology, as well as the impacts on the nearshore environments discussed above. Extensive studies are already planned in order to better understand these changes. While dam removal is causing habitat change and improvement of the Elwha River ecosystem, other work needs to happen to make this restoration as complete as possible. Shoreline revetments, a dike separating estuaries from the Strait of Juan de Fuca, and a 3,300-meter bulkhead have all effectively armored the beach and limit the ability of sediment to restore the original beach conditions in the area just east of the river mouth. This is a reminder that dam removal is just one step, albeit a major step, in the complete restoration of the Elwha River ecosystem.[68]

RETURN OF THE SALMON

Understanding and implementing the return of salmon to the Elwha necessitates an understanding of the current state of the fisheries on the river and the difficulties the fish will face in colonizing the opened river. Removing the dams was the first step in a long, complex process. Variability in surviving genetic stock, weather, sediment flow and river turbidity, as well as the ability of fish to migrate to different parts of the river ecosystem to spawn, are just some of the factors that fisheries biologists have to consider in reestablishing salmon runs throughout the entire Elwha River watershed.

It was believed that pink salmon had gone extinct on the river but apparently a few colonized the river or a small remnant population escaped notice; there is now a very small pink population. These salmon tend to spawn in large numbers, have high stray rates, and also maintain short residencies in their natal streams. Therefore, they should colonize the Elwha watershed fairly quickly. All salmon species have a certain percentage that stray from their home streams to new streams, with pinks having a stray rate as high as 34 percent in bad conditions. Colonization can occur quite quickly. In Alaska, streams exposed by retreating glaciers have been colonized by multiple salmon populations in mere decades. Faster natural colonization of one to five years has occurred on streams where culverts have been removed or fish ladders installed.[69] Pinks utilize a broad range of habitat, including flood plain channels. Also, their spawning period in summer and early fall is a time of lower water flow and they are therefore less likely to face the high turbidity than other salmon species will. Pink salmon, like chum, are not particularly good at overcoming barriers, so their spatial reach will be limited and they will remain in the lower parts of the Elwha. Because they spawn every two years and in very large numbers, they have the potential to produce a strong population quickly and may very well be the first sign of restoration success on the Elwha.

Like the pink, there is a small chum salmon population extant in the Elwha. They are the least able of Pacific Northwest salmonids to overcome physical barriers, and therefore have an even more limited range than the pink salmon. Moreover, their spawning period in late autumn and winter is a period of higher water flow, which will mean more turbidity in the first few years of restoration, resulting in a higher mortality rate for chum salmon in that early stage.

Elwha River sockeye salmon present some interesting questions. The historical Elwha sockeye spawned on the shores of Lake Sutherland, which is connected to the Elwha by Indian Creek. Cut off completely from traditional spawning grounds, a small remnant population has barely managed to continue in the lower river. These

could be remnants but are more likely strays. What is known is that with the dams down, the sockeye will colonize the lake. A resident kokanee salmon population in the lake may have originated from the original sockeye but that isn't known for certain. Non-native kokanee from Lake Whatcom were planted in Lake Sutherland from 1934 to 1964 but genetic tests show distinct subpopulations of native and non-native versions of this fish.[70]

Coho and chinook salmon seem to offer the most potential for large-scale recolonization of salmon. The chinook are the most magnificent of Pacific salmon in terms of their size and strength. Because of hatchery efforts over the 20th century, the river still hosts a small reproducing population, although there are questions whether the spring chinook, which produced the biggest kings, still exist.[71] These powerful fish are expected to do well in the restoration. Their size and strength, evolutionary adaptations to barriers in the river, allow them to overcome more obstacles than other salmon species. There were questions as to their ability to pass some significant barriers in the river—notably, Rica Canyon and Grand Canyon. In 1984, summer steelhead were fitted with tags and released above Glines Canyon Dam. The steelhead passed the canyons and proceeded far up the mainstem of the river, demonstrating beyond question the capacity of chinook to colonize the river far into the mountains. The Elwha kings also utilize floodplains for juvenile and adult life stages. Swimming, jumping, driving relentlessly upward and onward into the heart of the Olympics, they will occupy and colonize more mainstem and tributary miles than the other salmon species.[72]

Another important salmon on the river that has not garnered as much attention as the chinook is the coho, otherwise known as silver salmon. A historically strong species and important food source, the coho is valued generally because of the high quality of its flesh. The Lower Elwha Klallam director of river restoration, Robert Elofson, spoke in enthusiastic terms about the coho, anticipating that the recovery of this fish on the Elwha would be a real marker of success, and an exciting event. They are expected to be relatively successful

because of larger numbers already existing in the lower river, and will likely take advantage of floodplains and tributaries such as Hayes, Lillian, Lost, and Goldie creeks. Steelhead trout will likely colonize such areas as well. Some problems are anticipated with stream turbidity; coho salmon and steelhead spawn in spring and winter and are likely to experience heavier loads of sediment before the river stabilizes. [73]

The restoration plan for the river prioritizes preserving existing native Elwha salmon while seeking a balance between production goals and creating as natural a restoration process as possible. In reality, this means a complex and "adaptive" restoration program that will make adjustments based on proven successes and failures. Because of the fear of damage to existing salmon stocks due to high turbidity of sediments washing downstream, particularly in the first five years of the restoration process, multiple hatcheries are preserving eggs and milt from native stock and will supplement the runs with hatchery planting on the river. Also, windows will be created for native spawning salmon, stopping dam destruction to limit sediment flow and turbidity that might hurt those fish. The construction of woody debris sites ahead of dam removal, along with plans for the reforestation of flood plains, the removal or alteration of dikes, and the acquisition of floodplains will enhance the Elwha River ecosystem and contribute to the success of the restoration project.[74]

While fishery biologists want to allow as much natural recolonization as possible, the pressure to show strong results in a 25- to 30-year timeframe and the worry about damage to existing salmon stocks mean that hatcheries will be used in a substantive manner. Under the current plan, sockeye salmon will not be planted in Lake Sutherland. Rather, the kokanee that exist there are expected to adapt an anadromous pattern and become sockeye. If that doesn't occur, it is expected that sockeye strays from other runs will colonize the river. The use of hatcheries for other fish will be done in a way that emphasizes variability within the species and watershed. They will be planted by truck, helicopter, and backpack, and the fish planted will

reflect multiple stages within a juvenile smolt's lifespan. Hatcheries are no longer a panacea, a scientific, technological replacement for rivers. Rather, they serve a role within a broader, complex plan for bringing the salmon river back to life.[75]

It will likely be several years before it is clear what salmon have colonized the river successfully and which species have not. There will be variability in this success based on the species and spawning period, but other factors such as heavy rains, incidents of high turbidity, etc. may also have impacts. Once the flow of sediment has stabilized over the first decade after dam removal, the restoration of the salmon should move forward in a fairly straightforward manner. They will find their way up the Elwha and make it a fully functioning salmon river once again.[76]

As the salmon colonize the rivers, and fisheries employees plant parr (pre-smolt juvenile salmon) and smolt across the Elwha watershed, it is hard not to wonder at what kinds of numbers will return. The predictions for salmon population growth seem quite optimistic. Within 25 years, it is expected that the Elwha will produce 6,000 chinook, 12,000 coho, 40,000 chum, and approximately 250,000 pinks. If these numbers are accomplished by both human and salmon action, then the Elwha River will begin to resemble its historical self. This will be a monumental achievement of society finding its way back to a healthier relationship with nature and a healthy, salmon-rich Elwha River.

THE ELWHA IN THE GLOBAL WARMING ERA

Over the 20 years from the Elwha River Restoration Act in 1992 to the present, perception of the environmental importance of the Elwha River changed. The passage of time as well as the current and predicted impacts of climate change have re-elevated the importance of the Elwha River restoration in what will certainly become a desperate struggle to preserve as many Pacific Northwest salmon as possible over the next 50 years. With the numbers of salmon expected to populate the river, the meaning of the Elwha is shifting again as the river becomes central to the fight to preserve salmon.

An examination of the impact of global warming on Pacific Northwest salmon is horrifying and disheartening in the most objective sense. Equally nerve-wracking is the dominance of techno-optimistic solutions and a complete absence of discussions of conservation and sacrifice in Americans' discourse on this most fundamental issue. The impacts of global warming are manifold and ripple out across the greater salmon bio-region in numerous, complex, and not easily understood ways. A restored Elwha River with increasing runs of salmon, even as climate change impacts regional salmon populations, will make the Elwha a critical ecosystem in the broader efforts to protect and preserve salmon.

Salmon derive a wide range of benefits from their river habitats. Depending on species and size, they use small streams, large rivers, estuaries, and lakes for spawning, migration, and habitat. The optimal size of cobble and force of current flow for redds varies by species; generally, bigger fish can build their nests in bigger cobble and within heavier river flow. Besides spending varying amounts of time in natal streams, rivers, lakes, and estuaries before migrating to the ocean, different species also spawn at varying times of the year. These variations allow for full use of riparian ecosystems for salmon reproduction.

By multiplying this general variability, which exists within one river watershed, by all the various subspecies found in thousands of rivers and streams of the Pacific Northwest, one can envision a tableau of remarkable complexity based on millennia of evolution and adaptation. Global warming will wash away the foundations of this remarkable structure, creating instability and chaos for Pacific Northwest salmon for the next century, at least.

Climate change has already forced powerful ecological change with significant impacts on Northwest salmon. For example, snowpack in the Washington Cascades has been reduced by 30 to 60 percent in some areas—this after a regional temperature increase of 1.5 degrees Fahrenheit since 1920.[77] Rain is replacing snow in many cases during the winter, further lessening snowpack and altering stream hydrology. A recent study by the Climate Impacts Group

estimates that by 2080 there will be no dominant snow basins left in the North Cascades of Washington State, which means none in Oregon or northern California either, and only 10 transient snow basins remaining in the North Cascades.[78] What will be the impact of climate change on Pacific Northwest salmon? Specific predictions are difficult and limited research has been conducted in this area. But there are general impacts that can be understood and explained in at least a limited fashion.

Taking a general approach, the warming of water is the fundamental problem, but in myriad ways. As noted, temperatures in the Northwest have increased 1.5 degrees Fahrenheit since 1920, slightly more than the global temperature increase. An average of multiple models of climate change estimates conservatively that temperatures will increase by at least 1.7 to 5 degrees Fahrenheit by 2080; the temperature rise could be dramatically higher. In fact, up to this point, actual temperatures and impacts have been increasing more quickly than earlier models predicted. Warmer water has several direct impacts on salmonids. These types of fish, which include salmon, steelhead, and trout, thrive in water temperatures ranging from 54 to 65 degrees Fahrenheit. Stress increases at temperatures over 65 degrees, disease increases dramatically at 69 to 71 degrees, and mortality occurs at 73 to 75 degrees, depending on the species. Specifically, temperatures of 73 to 75 degrees lead to massive fish kills.

In addition to weakened immune systems, disease, and death caused directly by temperature increase, there are other impacts to salmon that are not subtle but also not easily observed. For example, as thermal barriers increase, spawning salmon enter stretches of river and stream that are too warm as they move up to their natal sites. Upon hitting these thermal barriers, salmon stop their movement to wait for the water to cool. Based on current models, those thermal barriers will increase and last for longer stretches of time. Thermal barriers in August, a key spawning period for many salmon species, are predicted to last 10 to 12 weeks on important salmon rivers like the Yakima, Columbia, Snake, and Tucannon, and the Lake

Washington Ship Canal. If the thermal barriers are still present when spawning begins, the salmon that are blocked begin seeking out redd sites on the downstream side of the barrier. The result is that these salmon will not return to their natal sites and a great deal of salmon habitat will go unused, diminishing both the salmon runs and the river ecosystem. For example, salmon on the Snake River blocked by downstream thermal barriers will be unable to use the thousands of square miles of relatively healthy habitat in Idaho and Oregon on federal lands, wilderness areas, and wild and scenic areas. Moreover, the salmon seeking new sites due to warm water will displace other salmon redds, both of their own and other species, destabilizing the whole system. The overall result is the reduction of salmon numbers on a particular river, multiplied hundreds or thousands of times across the region.

Another major impact of climate change is the dramatic alteration of the hydrology of salmon waters. Increased rain precipitation is replacing snow precipitation, turning snow-dominant basins into transient basins and transient basins into rain-dominant basins. Historically, glaciers have provided a steady supply of icy, clean water to salmon rivers and streams; those glacial tributaries to streams and rivers are quickly diminishing and disappearing, further disrupting the hydrology and water temperatures of regional rivers and streams. In the North Cascades, glaciers have lost 25 to 45 percent of their volume since 1985. Many glaciers have disappeared completely, or have "gone extinct" to borrow from Mark Carey's article on the treatment of glaciers as endangered species. Olympic Mountain glaciers are in widespread, rapid retreat. The Hoh Glacier has retreated 450 meters since 1990; Blue Glacier, 270 meters; and Humes Glacier, approximately 120 meters. The loss of water from glaciers compounds the problems arising from shifts in precipitation patterns—less winter snow and more winter rain, and earlier snowmelts.[79]

Consequently, a series of dramatic and overlapping changes will damage Northwest salmon runs. Over thousands of years salmon have evolved to a pattern of hydrological events that will now

undergo rapid and dramatic transformation. For example, the smolts of many salmon species use the spring snowmelt and the full, fast-moving streams to be flushed quickly to the ocean as their physiology shifts from freshwater to saltwater. This set of events depends on a heavy winter snowpack. The diminishment of the snowpack threatens to unravel this complex system. The lack or reduction of spring snowmelt will reduce the stream flow, smolts will take longer to get to the ocean, and some will be stranded and killed in smaller streams. Also, the slower migration will increase their vulnerability to predators such as bass (an introduced species in the Northwest) that will thrive and expand their range as water temperatures increase. For smolts that don't migrate immediately, the reduced snowpack and lower streams in spring will mean lower waters over the course of the year, reducing the amount of available habitat, again rendering them more vulnerable to predators. Spawning salmon will face not only thermal barriers but also streams and rivers with lower water levels, or even dried-up waterways. This will make the spawning journey and reproductive process difficult or impossible, depending on local conditions.

One may be tempted to take refuge from these frightening predictions by reflecting on the abundance of healthy upstream habitat in the Pacific Northwest. Protected forests and habitat in the North Cascades and Olympic Peninsula of Washington, the coastal range of Oregon, and national forests and wilderness areas in Idaho seemingly must provide some balance to the problems presented above. However, studies indicate that these protected areas will not preserve healthy salmon habitat. One study modeling climate change and its impact on chinook salmon in the Snohomish River basin on the western slope of the Cascade Mountains of Washington, projected a 20 to 40 percent decline in spawning numbers throughout the basin. The healthy, high mountain habitat would be particularly hard-hit by the variations in rainfall, snowfall and snowmelt patterns.[80] Another study of tributary creeks to the Middle Fork of the Salmon River in Idaho which are located in healthy, protected habitat, reinforces the prediction of losses from global warming.

Warmer water temperatures slow the transition from parr to smolt, reduce predator avoidance, and limit growth. Also, lower water levels reduce habitat, thereby increasing competition for food while diminishing places for the smolts to hide to avoid predators.[81] The authors predict an approximate 50 percent juvenile mortality rate in this watershed. It is safe to say that other watersheds in western Oregon, Washington, Northern California, and British Columbia will experience similar reductions of salmon populations.[82]

The critical point is that these fish already spawn and survive as smolts in relatively healthy watersheds. These studies argue, based on multiple projection models, that even highly protected wilderness and national park lands, ecosystems so healthy that little can be done to improve them, will suffer under the impact of climate change. Hence, damaged and exploited habitat must be restored in order to mitigate the losses in healthy habitat. The impact of climate change on the overall region necessitates an even greater commitment to the reconstruction of nature, in order to give salmon the highest odds possible at all stages of their journeys as smolts and spawning adults.[83]

Pacific Northwest salmon advocates recognize that the nature of the debate over salmon has shifted with the multiple threats produced by climate change. First, the argument is no longer economics versus environment. Seemingly, this conflict pits environmental issues against each other. One problem for salmon advocates is that hydroelectric dams provide power without contributing greenhouse gases to the environment. This creates the conundrum of pitting two environmental issues against each other: clean energy or salmon? The lack of a functional land ethic in America allows for solutions aimed at human convenience to gain precedence over seemingly "idealistic" and "unrealistic" efforts to preserve and restore salmon. Second, techno-optimistic solutions and ideas continue to dominate the national discourse on climate change. The effort to preserve and restore salmon necessitates a consistent refrain that sacrifice, conservation, and other steps can preclude the necessity for dams or nuclear power plants. Essentially, the opportunity exists for salmon

advocates to complicate the debate from one of "What can be done most easily to fix this pressing problem?" to one of examining the ethical system guiding Americans' interaction with and uses of nature. A continuous and intelligent discussion of the need to preserve and restore salmon as part of a solution to global warming will help make the discourse more intelligent and mature, and in the end, more successful.

It may be necessary to make strategic moves to restore and preserve salmon, while recognizing that some clean energy sources such as the dams on the Columbia River are probably off-limits. Waterways like the Elwha and the Rogue and Klamath rivers of Oregon and California become important in this respect. In the case of the Elwha, with a sharp decline from the glacier fields to the Strait of Juan de Fuca, a distance of only 45 miles, the river offers a pristine ecosystem and clean water for salmon and steelhead; while glaciers retreat on the Olympic Peninsula and elsewhere, a respectable reserve of ice and snowpack remains in this range. The opportunity exists to restore population numbers from today's approximately 5,000 salmon to tens of thousands within a decade or two, while also expanding the diversity of the river's salmon, in imitation of its historical productivity and biodiversity. The removal of the dams on the Elwha provides compensatory salmon habitat for areas that may become unsuitable because of global warming, or for rivers where dams must remain because they provide credible amounts of hydroelectricity. Salmon advocates would do well to develop a strategy that requires mitigation of small rivers with dams as part of any package to develop an already sacrificed river, or as part of any relicensing process for a seemingly sacrosanct hydroelectric dam. Restoration advocates on smaller rivers throughout the region need to argue for the importance of these rivers in offsetting the impacts of global warming, giving a new urgency to their efforts that is not contrived but very real. The days of monumental rhetoric, aesthetics, and continued dependence on techno-optimistic solutions are coming to an end. Where possible, rivers have to be restored as completely as possible if salmon are going to survive their next peril.

Salmon advocates are pushing a fight-on-all-fronts strategy, which offers an opportunity to propose a natural reconstruction argument. By attempting to help salmon in numerous ways and places, a healthy process of habitat and ecosystem linkage is taking place. In so doing, they make the case for other benefits besides salmon; for example, the recent call by marine biologists for better salmon efforts to benefit diminishing orca populations. Not only does this advance the discourse, it also helps generate more support and broaden the constituency for rivers and salmon. Making the case that salmon preservation and restoration benefits multiple species strengthens advocates' efforts.

Extending that point, salmon advocates need to link widespread, complex ecosystem improvements, with salmon as the linchpin, to economic benefits. The case needs to be driven home that an ethical system which includes a healthy relationship with nature can also provide jobs and sustainable economic growth. For example, restoration of salmon streams provides indirect jobs through tourism, sport and commercial fishing, and of course, restoration work itself.[84]

Another strategy is promoting salmon efforts as a jobs and stimulus package. Replanting tree corridors along rivers; building pumping stations and laying pipe for warm-water and low-water events; restoring estuaries in the lowlands of the coastal region; removing culverts and dams; rebuilding stream and river ecosystems—all provide jobs and benefit local economies. Moreover, building an educational component into these jobs, like the Civilian Conservation Corps (CCC) did with their restoration projects,[85] will not only recruit workers to these efforts but also help educate the broader public. Demonstration projects of stream restoration and returning salmon runs, like the demonstration projects of the CCC, could go a long way toward educating and building support as well as providing tangible evidence of the benefits of using the land ethic to reconstruct Americans' relationship with nature.

This all leads to the most important point—one that needs to be centered in the dialogue about salmon and climate change, and which is largely missing at this point: the still-imperative need to construct

a new narrative about our relationship with nature that emphasizes the land ethic. Seventy years after Aldo Leopold's articulation of the land ethic, Americans still fall drastically short of that idea. The broad-based, fight-on-all-fronts strategy needs to be built around the argument of a re-envisioning of the relationship between human society and nature, with the centerpiece of that relationship being the land ethic.

The efforts to create salmon strongholds in Canada, the U.S., and Russia reflect many of the strategies stated above, and if achievable, offer a comprehensive approach to salmon preservation and restoration. The proposed Pacific Salmon Stronghold Conservation Act (2009) in the United States sought to set aside and protect the salmon ecosystems that are currently healthy and contain diverse populations. Although this bill failed to gain enough support to move forward, this approach holds great future promise. Canada is a little further down this path with the creation of its first salmon stronghold on the Harrison River of British Columbia. The importance of healthy national park ecosystems in the Pacific Northwest, with an increasing emphasis on habitat and species preservation over time, attains greater importance in the discussion of necessary steps for protecting salmon in the face of climate change. For example, the Hoh River, draining the western and rainforest side of the Olympic Mountains, is a very healthy ecosystem from its headwaters in Hoh Glacier to the point that it leaves the park. The river still hosts strong salmon and steelhead runs and a local partnership managed to set aside 7,000 acres of protected river habitat, stretching from the Pacific Ocean to the park boundary. This model of government and local action, focused on stronghold creation, holds a great deal of promise for salmon conservation in the face of climate change's devastating impacts. The other benefit is that these strongholds will extend and improve habitat for elk, bear, marbled murrelets, and numerous other species.[86]

The restored Elwha River could be a cornerstone and model in this effort to create and extend a land ethic while reconstructing nature. Or, the Elwha could serve another, less positive purpose. If,

in fact, Americans fail to construct a better ethical system for our relationship with nature, refusing to make major moves to stop and reverse global warming and protect Northwest salmon stocks, then rivers like the Elwha, Klamath, Snohomish, and Rogue could well serve as ark rivers—uniquely healthy rivers that can preserve enough salmon stock to reintroduce species across the region when and if we get on the other side of the global warming crisis.

The history of the Elwha River from the early 19th century to the present shows an ever-changing relationship between human communities and the river, as well as corresponding changes in use. As society and its needs changed, the meaning of the Elwha River changed as well. Once the ecological and cultural heart of the Lower Elwha Klallam Indian community and a prodigious producer of magnificent salmon, the river was transformed and degraded by the construction of one dam, then another. A new industrial river was created in order to "spawn," sustain, and expand a thriving, industrial metropolis on the Olympic Peninsula.

By making the Elwha River an industrial river, the local boosters, capitalists, and leaders elided the river's original meaning. Their river use and practices, as well as the limitations of state conservationists' power, exacerbated the river's deterioration, inflicting great damage on downstream salmon in addition to the destruction of upstream salmon. Their destruction of the Elwha River as a salmon river, culturally and functionally, did not go uncontested. Local voices insisted that the Elwha remain at least partially a salmon river. Their continuing use of the lower river, their critiques of dam owners, and the pressure they placed on the Washington State Department of Fisheries swelled—until the 1970s and 1980s, when a major challenge arose and discussion over the river's meaning and therefore its uses changed once again. Not satisfied with this limited organic machine, fish biologists, environmentalists, and the Lower Elwha Klallam launched a fight to resurrect the Elwha to some version of its original health and productivity and restore the Elwha's meaning as a salmon river.

Insistence on recreating the Elwha as a salmon river—together with persistent, effective organizing and consensus building; a regional Northwest salmon crisis; and growing national environmental consciousness—led to the passage of the Elwha Restoration Act in 1992. Since then, the restoration and recreation of this river has been hindered by political gamesmanship and lack of appropriations. Now that the dams are gone, the salmon will again find the river and begin swimming upstream. In the end, the salmon themselves will find the Elwha River and its watershed and begin the last stage of restoring it to a salmon river once again.

Even as the salmon reclaim creeks, estuaries, and the upper river itself, the meaning of the Elwha will likely begin to shift again, as climate change looms. At one time, the Elwha River was poised to become a landmark in American history and in American environmentalism. While the Elwha removals will remain important as the largest dams removed for fisheries restoration in American history, and, hopefully, for the successes of the restoration, the more important new meaning of the Elwha may derive from the impending climate crisis. Healthy river ecosystems like the Elwha will become exponentially more important if and when salmon stocks collapse throughout the region. They will serve as ark rivers as temperatures rise. The Elwha will invariably suffer like other rivers, but the relative pristine nature of its watershed and the variety of salmon on the river may enable it to preserve enough salmon for a day when temperatures decrease and salmon reintroduction can begin again on damaged rivers. It is hard to imagine a river having such significance and bearing such a burden, but the Elwha River has always been important to the communities living on and near its shores. As the salmon nose their way into the deep pools and thrash through the riffles, I look forward to seeing this both new and old Elwha become a salmon river once again.

Notes

INTRODUCTION

1. Steelhead trout and salmon are similar species with a couple of important differences. The key similarity is that steelhead and salmon both spend time in the ocean and travel upstream to spawn and reproduce. For the sake of simplicity, in this book I will use salmon inclusively for salmon and steelhead. Chapter 1 will cover some of their differences and similarities.

CHAPTER 1

1. My late father was a lifelong conservative and lover of nature. When I showed him the dam I had spent so much time studying (the Elwha Dam), he immediately recognized the crux of the problem, that so small and limited a dam could do so much damage. While the statement he made may sound presumptuous, that was not his style. He was just surprised by how small and antiquated the dam appeared and recognized how seemingly easy it would be to fix an environmental problem on this particular river.

2. Stewart T. Schultz, *The Northwest Coast: A Natural History* (Portland, OR: Timber Press, 1990), 13–15; Rowland W. Tabor, *Geology of Olympic National Park* (Seattle, WA: Pacific Northwest National Parks & Forests Association, 1987), 28–36; Bates McKee, *Cascadia: The Geologic Evolution of the Pacific Northwest* (New York: McGraw-Hill Book Company, 1972), 48–65, 154–72.

3. Salmon are genetically predisposed for colonization. A small percentage of salmon from each spawning group migrate to other streams. When the Olympic Mountains were a raw mound of rock and mud, with the streams beginning to cut their way through the sandstone and basalt, stray salmon from other rivers found streams such as the Elwha and colonized it.

4. Tabor, *Geology of Olympic National Park*, 41–44, 85–87; Tim McNulty, *Olympic National Park: A Natural History Guide* (New York: Houghton Mifflin Company, 1996), 57–58; Robert L. Wood, *Olympic Mountains Trail Guide: National Park and National Forest* (Seattle, WA: The Mountaineers, 1984), 8–9.

5. Wood, *Olympic Mountains Trail Guide*, 38; National Park Service, *The Elwha Report: Restoration of the Elwha River Ecosystem & Native Anadromous Fisheries* (Denver, CO: National Park Service, September 1993), introduction.

6. McNulty, *A Natural History Guide*, 91.

7. Tabor, *Geology of Olympic National Park*, 86–87; National Park Service, *The Elwha Report*, introduction; Jerry F. Franklin and C. T. Dyrness, *Natural Vegetation of Oregon and Washington* (Corvallis, OR: Oregon State University Press, 1988), 94–95; Wood, 40–44.

8. Smolting is a process in which the fry begin to physically change in preparation for their entry into a saltwater habitat. At this point they are referred to as smolts.

9. Turbidity refers to the amount of suspended sediments in the water.