The quarterly publication of River Network Volume 5, Number 4/Winter 1995

River Voices

# Dam Fights of the 1990s: Removals

## Removing dams is a realistic goal that is gaining momentum in river restoration

by Rita Haberman

River conservation, indeed much of the history of the American environmental movement, has been largely defined by dams. Large dams, and epic dam fights—Hetch Hetchy, Grand Canyon, Glen Canyon, Tellico, and the Stanislaus—to name a few. Watershed battles and defining moments for our country and culture.

Thousands of fights against dam construction, winning and losing, large and small, led the environmental movement for decades and a few large dam fights continued into the early 1990s (Auburn, Animas-La Plata, Great Whale). The results are grim. More than 68,000 large dams (two stories or higher) and some two million small dams choke the rivers of America. Approximately 600,000 miles of what had been free-flowing rivers now lie stagnant behind dams.[1]

Although proposals for new dams still loom—touted under the benefits of clean energy, flood control, water supply and even recreation—in many regions of the country the tables are beginning to turn with regard to how our nation views dams.

Photo: Asahel Curtis, Washington State Historical Society

*A young woman shows a steelhead caught in 1907, before the Elwha Dam was built.*

**"HISTORICALLY, QUESTIONS ABOUT DAMS HAVE BEEN LIMITED TO WHERE OR WHETHER TO BUILD THEM IN THE FIRST PLACE... IT IS TIME TO CHANGE THE TERMS OF THE DEBATE. IT IS TIME TO ASK WHETHER OR NOT EXISTING DAMS SHOULD BE ALLOWED TO REMAIN."**

The Oregon Natural Resources Council eloquently described the changing perceptions of dams in a recent report, "Historically, questions about dams have been limited to where or whether to build them in the first place. Given what we now know, it is time to change the terms of the debate. It is time to ask whether or not existing dams should be allowed to remain."[2]

Now many river conservationists are doing just that, focusing their energies on dam removals as an essential and practical river restoration strategy. A few of these efforts have received significant national press, such as the hydroelectric dams on the Elwha River in Olympic National Park and on the Kennebec River in Maine, but there are many more dam removal efforts across the country. We learned of hundreds of documented dam removals and more in the process. For example, the National Park Service has removed more than 100 dams on rivers and streams affecting our national parks, and in just the last three years the Wisconsin Department of Natural Resources (DNR) has been involved in the removal of 15 dams from Wisconsin's rivers and streams.

Our intent is to share with you some of these stories and to encourage you and your organization to consider—or perhaps more likely to reconsider—dam removals as a potentially viable restoration strategy for your river.

### Opportunities

The timing is right. A combination of several social, environmental and economic factors are responsible for helping to reframe the debate about dams. Hydropower dam relicensings, public safety concerns, severely declining

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# River Voices



*River Voices* is a forum for information exchange among grassroots, regional and state river groups across the country. River Network welcomes your comments and suggestions.



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## River Network is a national nonprofit organization dedicated to helping people save rivers.

We support river conservationists in America at the grassroots, state and regional levels; help them build effective organizations; and through the **River Network Partnership** link them together in a national movement to protect and restore America's rivers and watersheds.

River Network runs the following four programs:

**River Clearinghouse** provides river activists with information and referrals on technical river resource and nonprofit organizational issues;

**River Leadership Program** develops new leadership and strengthens existing state and regional river advocacy organizations, and provides a link for local and state groups on national legislation;

**River Wealth Program** builds the capacity of river organizations to support themselves financially;

**Riverlands Conservancy** brings critical riverlands into public ownership, thereby empowering the public to oversee management and protection.

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# From the President


© photo by Linda Kliewer

In the summer of '89, I visited the Volga River in Russia with a team of environmental professionals. Huge hydropower dams had cut off most of the river from the majestic Caspian Sea sturgeon. Russian fisheries biologists asked me again and again for examples of dams that had been successfully removed.

Today we would have some inspiring examples for them. The time is past when dam removal was just a romantic Monkey Wrench Gang fantasy. Today it's a pragmatic alternative for dam owners—utilities, paper companies, municipalities, irrigation districts—and for FERC itself. Legal liability, operating costs, renovation costs, mitigation responsibilities and market changes can make dam removal the most practical alternative. A new era began, perhaps, this last December 14 when FERC ruled that it had authority to order dam removals (see page 9).

As you will read in this issue, dam removal is a matter, not only of economics and environmental impact, but also of politics. Communities can be very attached to the concrete monuments that convert unruly rivers into docile reservoirs. The Kettle River case study illuminates the cure for this "edifice complex"—a revisioning of the virgin river, what it was and what it can be again. Dams and reservoirs have become so much a part of the landscape that we forget the beauty and richness that lie buried beneath them.

**"THE TIME IS PAST WHEN DAM REMOVAL WAS JUST A ROMANTIC MONKEY WRENCH GANG FANTASY."**

I'd also like to share some River Network news. I'm delighted to announce that Kevin Coyle has officially joined River Network's staff. Kevin is one of the most experienced river conservationists in the country. After many years with the National Park Service, he joined American Rivers, Inc. where he worked as conservation director and ultimately president. He will remain in the Washington, D.C. area as River Network's vice president and director of partnership services. This will give us a better "reach" to the eastern states. Kevin wants to work with you, to help your organization achieve its full potential in conserving a river or watershed.

We want more of you—many more—to sign on as Partners of River Network. As a Partner, you have first call on our services: fundraising help, access to volunteer experts, information on any topic, referrals to other organizations who have dealt with the problem you are grappling with. We envision the Partnership as a national network of river and watershed protection activists, supporting each other, drawing on the services of River Network, and working together for national goals. We invite you to complete the form on page 22 and sign on as a Partner!

Sincerely,

Phillip Wallin
President

—*continued from cover*—
fisheries, a growing demand for free-flowing river recreation opportunities, tighter purse strings on public works projects, and alternative technologies are some of the primary levers for dam removals.

One big opportunity to re-evaluate the existence of dams is the fact that more than 300 hydropower dam licenses across the country are currently up or will soon be up for renewal. Most of these projects were given original 50-year licenses back in the 1940s. Now that 50 years or so have gone by, those same projects must be relicensed, but under much closer scrutiny.

The Federal Energy Regulatory Commission (FERC) is now required to review hydro projects for adverse impacts on recreation, fish, wildlife and other river values, and to consider the recommendations of other federal agencies such as the National Park Service, the U.S. Fish and Wildlife Service, as well as those of state agencies. River advocates can intervene and participate in the process too. In most cases the licenses will be renewed with new operation requirements to minimize environmental impacts, but some relicensing processes will lead to dam removals (refer to article on page 7).

## Why Removals?

Safety ratings for dams nationwide are frightening. In the National Dams Inventory, 32% of the dams have a "high" or "significant" downstream hazard potential, and the majority of these dams do not have an emergency action plan in the event of failure or negligent operation. The importance of public safety related to dams will only become more pressing as dams continue to age and deteriorate.

Thousands of small dams were built in the early 1900s and have been gradually deteriorating under the pressures of water and time. Today, many are severely degraded and pose a public safety hazard. For example, in Wisconsin there are about 3,500 dams, many of which were built during the 19th century to power grist mills or to provide flood waters for logging operations. Almost all of these century-old dams were built of timber and rock. Even though most have been rebuilt with concrete, the Wisconsin DNR estimates that at least half of the state's deteriorating dams will need repairs costing upward of $100,000 each during the next 10 years.[3] The situation is similar on Minnesota rivers and streams blocked by more than 1,000 dams.[4]

The indisputable connection between the dismal condition of our nation's fisheries and dams is another powerful argument for reassessing whether some dams should continue to exist. Perhaps nowhere is it more prevalent than in the Pacific Northwest on the heavily dammed Columbia and Snake Rivers, where 95% of the juvenile salmon fall victim to dam turbines and the slackwater pools that the dams impound.

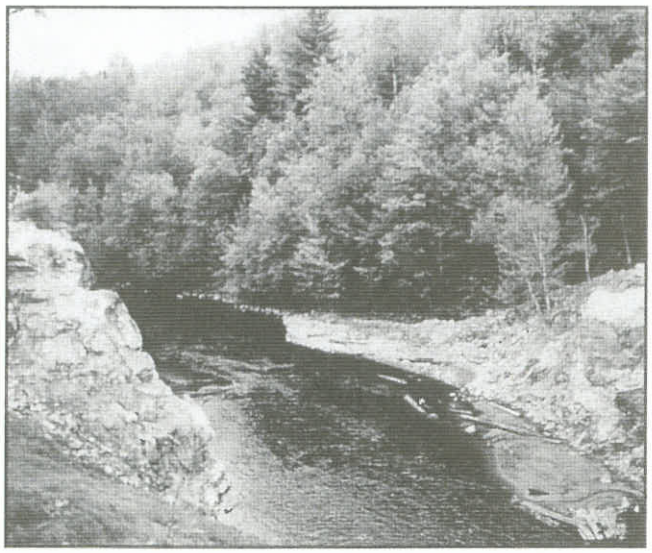
Anadromous fish of the Atlantic have also been hit hard. Blocked by more than 900 dams on New England rivers, Atlantic salmon populations have been reduced to less than 1% of their historic levels.[5] The socioeconomic values of commercial and sport fishing industries and Native American tribal treaty fishing rights are gaining more attention as anadromous fisheries continue to decline.

But it's not just anadromous fish that have been impacted by dams, so too have freshwater fish populations. One example is the successful restoration of fisheries on a reach of the Milwaukee River in Wisconsin. After being dammed for almost 70 years, the degraded Milwaukee provided habitat for a large exotic carp population, not much else. After Woolen Mills Dam was removed in 1988, water quality improved greatly and native gamefish species now flourish.

The growing demand for recreation on free-flowing rivers is another reason to take a closer look at whether many dams should exist. Rafters, kayakers, canoeists, fishers and other river enthusiasts are putting ever-increasing pressure on our limited, free-flowing rivers. The Welch Dam on the Cannon River was removed in 1994 and the Sandstone Dam on the Kettle River is coming down in large part to meet the growing demand for river recreation near Minneapolis/St Paul.

Another example is the many kayakers, canoeists and fishers who flocked to the free-flowing Merrimack River after the 90-year-old Sewalls Falls Dam near Concord, New Hampshire partially blew out in 1984.

Photo: Wisconsin DNR



***The Wisconsin DNR removed Prairie Dells Dam in 1991 from the Prairie River to rehabilitate and improve trout fisheries.***

These Merrimack River recreationists, attracted to their newly restored gentle rapids and glassy pools, provided the core of a diverse coalition that defeated a proposal to rebuild the hydropower dam in 1986.

Dams are often a wasteful use of public money. Payment for dam maintenance and removal often falls on public agencies because they either own the dams to begin with, or private dam owners do not have the funds to pay for repairs or removal. In many cases the results of economic analyses heavily favor removal. For example, Woolen Mills Dam in the Milwaukee River in Wisconsin would have cost $3.3 million to repair or $500,000 to remove. Sandstone Dam on the Kettle River in Minnesota would have cost $400,000 to repair or $200,000 to remove. Savage Rapids Dam on the Rogue River in Oregon will cost $17 to 24 million to repair or $11 million to remove and install irrigation pumps.

Dam repair costs are not just a one-time event. Ongoing maintenance, repeated dredging of filled-in reservoirs and the prospect of necessary removal in the future should also be included in economic analyses.

Finally, one of the most pressing and obvious arguments for considering dam removals is the obsolescence of many of the dams built over the last century. Thousands of grain mills and the dams used to power them are no longer needed. Often the power supplied by old, inefficient hydropower plants has been replaced by more efficient sources, but the old dams remain. More efficient irrigation practices and alternative non-structural flood control are other changes making many dams obsolete. Although many dams once served a valuable societal function, many are no longer necessary and do nothing but diminish ecological, aesthetic, and recreational river resources.

## Expect Opposition

Despite the economic, safety, and ecological benefits of dam removal, they usually don't come tumbling down without some opposition. The public's emotional attachment, historical significance, perceptions of decreasing "lakefront" property values, private financial greed, and inadequate technologies are among the biggest obstacles to setting rivers free.

Many communities across the U.S. regard their local dams as a permanent and appropriate part of their landscape. To many people, dams are beloved landmarks and have historic value. Many residents have never seen their river free-flowing. According to dam safety engineer Richard Knitter of the Wisconsin DNR, who has led efforts to remove more than 30 dams in the last two decades, local resistance is usually high. Many of the small dams in Wisconsin rivers were the cornerstones of young Wisconsin towns and cities.

Photo: National Park Service

*The Bluebird Dam stood 200' long by 56' high for 80 years in Rocky Mountain National Park. In 1982 it was declared structurally unsound. Shown here, 95% demolished.*

Another frequent obstacle to dam removal is perceived decreases in "lakefront" property values. For example, "lakefront" property owners behind Salling Dam on the AuSable River in Michigan made a big fuss over potential property value losses associated with dam removal. The Michigan DNR researched local property values and found that AuSable River frontage was at least equal to, if not more valuable than, "lake" or reservoir frontage. "Lakefront" property owners behind Manitowoc Rapids Dam on the Manitowoc River in Wisconsin raised a formidable dissenting voice at the prospect of losing their reservoir, even though the decrepit dam was a major public safety hazard. The dam was removed in 1990, and residents now enjoy improved water quality and the restoration of 40 miles of excellent fisheries habitat.

Dam-created lakefront property owners are also frequently concerned about the "big, ugly mud flat" that will supposedly be left after a pond is drained. In reality, drained reservoirs rapidly revegetate.

Reservoir property owners are just one set of private interests who want rivers to remain dammed. Private hydropower developers will almost certainly put up a strong fight to keep their dams. They enjoy millions of dollars in profits annually by using public ▶

| Primary Dam Purpose | | |
|---|---|---|
| | No. of Dams | |
| Recreation | 23,185 | 31.3% |
| Fire & Farm Ponds | 12,557 | 17.0% |
| Flood Control | 10,801 | 14.6% |
| Irrigation | 10,176 | 13.7% |
| Water Supply | 7,226 | 9.8% |
| Tailings & Other | 5,967 | 8.1% |
| Hydroelectric | 2,166 | 2.9% |
| Undetermined | 1,732 | 2.3% |
| Navigation | 243 | 0.3% |
| Total | 74,053 | |

Source: National Inventory of Dams 1993-94

waterways and pay virtually nothing for their use. Private irrigation districts also enjoy inexpensive or free use of public rivers.

Practical hurdles remain as well. Dam removal is still a relatively new business with many technological unknowns. Small-scale dams are relatively easy to remove, but large dams are more difficult. Regardless of dam size, sediment management is a critical issue in dam removals. Two big questions are: how much has accumulated behind the dam and how clean is it? If sediment is released uncontrolled, it can degrade habitat downstream. If there is a lot, it can even raise the riverbed and water levels downstream. If the trapped sediment is contaminated with heavy metals, removal costs can increase substantially.

Lack of funds may pose the biggest obstacle of all. Even though benefit-cost analyses frequently lean heavily in favor of dam removals, responsible parties, both public and private, often lack the funds to follow through. The Elwha River is a prime example, where the "proposed action" from the draft environmental impact statement is to remove two dams, but getting the $147 to $203 million in necessary funding is unlikely given the recent changes in Congress. The financial situation for state agencies is also usually sparse, with a few notable exceptions in Wisconsin and Minnesota. The Hydropower Reform Coalition is working on establishing innovative removal and decommissioning funds.

## How to Begin

Each potential dam removal case is unique with its own historical, economic, political, and ecological issues. Regardless of the particulars, if you are interested in getting a dam removed from your river, you may want to start with some of the following steps.

Contact your state dam safety official. The Association of State Dam Safety Officials maintains a list and River Network has a copy. Check safety records and ranking of the dam. Research dam ownership and liability issues.

Contact other government agencies responsible for river resource management. Find out what other dam removals have already occurred in your state. Look into cost-sharing programs to assist in removals. Ask fisheries biologists to help you document the negative impacts the dam has on fisheries resources. Inquire about the possibility of an agency purchasing land around the dam site as a park.

Research the economics of the dam. This is an absolutely essential step. How much does it cost to maintain and repair the dam? Who pays? What economic values (if any) does the dam currently provide? What economic benefits could be realized if the dam were removed?

Research the historical state of the river before the dam. Visit your local and state historical societies. Get some old photos. Help your community visualize the free-flowing river resource it once had and can restore.

Collect information about other dam removal efforts. River Network can help you link up with other river groups. Other success stories may help convince your community of the benefits of dam removals.

Find some allies to work with. Fishing and boating organizations are obvious first calls, but chambers of commerce and offices of tourism may also be interested and supportive.

Removing dams is still a relatively new strategy in river conservation. Almost every case is viewed as precedent setting in some way. In his article, "Freeing the Kennebec River," Ted Williams described the hydropower dam relicensing process of Edwards Dam as "a case study of how Americans have looked on their rivers in the past and how they perceive them today....The dam's removal would mark a profound shift in America's philosophy about river management and river ownership."[6] He also insightfully says, "The notion that a dam doesn't *belong* just because it is *there* is revolutionary; yet it's catching on here and there." So take a closer look at the dams on your favorite river. It may just be time for them to come down.

## Endnotes

1 Statistics from American Rivers, Inc. Washington, DC.

2 *15 Damnable Dams* by Oregon Natural Resources Council, Portland, OR.

3 "Flowing Free" by Matt Keefer, *The Milwaukee Journal*, June 10, 1990, p 27.

4 "Dam Yanking," *The Minnesota Volunteer*, March - April 1994.

5 RESTORE: The North Woods, Wild Atlantic Salmon: An Endangered Species, Concord, MA.

6 "Freeing the Kennebec," *Audubon* Sept/Oct 1993, p 36-42.

*Rita Haberman became the director of River Network's River Clearinghouse program and editor of River Voices in 1990.*

# Hydroelectric Relicensing

## How relicensing can affect dam removals

by Rich Bowers and Margaret Bowman

Most of the privately owned dams in the United States were built 50 to 150 years ago, during this country's Industrial Revolution. At that time they were technological and engineering marvels, built to run industries or to generate electricity. They were sold to the public as a clean, renewable resource which would power the future of society.

However, time and information can change perceptions. Today, the American public better recognizes the cost of degraded rivers, depleted fisheries, and the value of a healthy river system. They are also beginning to understand that among all development threats to natural rivers, hydropower dams rank at the very top.

For all of the impacts of the hydropower dams have on our nation's natural resources, commercial fisheries and recreation industries, they generate a relatively small amount of power, just 13% of the nation's energy generating capacity. Almost all privately owned dams are under the jurisdiction of the Federal Energy Regulatory Commission (FERC) and represent just over 50% of this hydro capacity, or 7% of the national power generation.

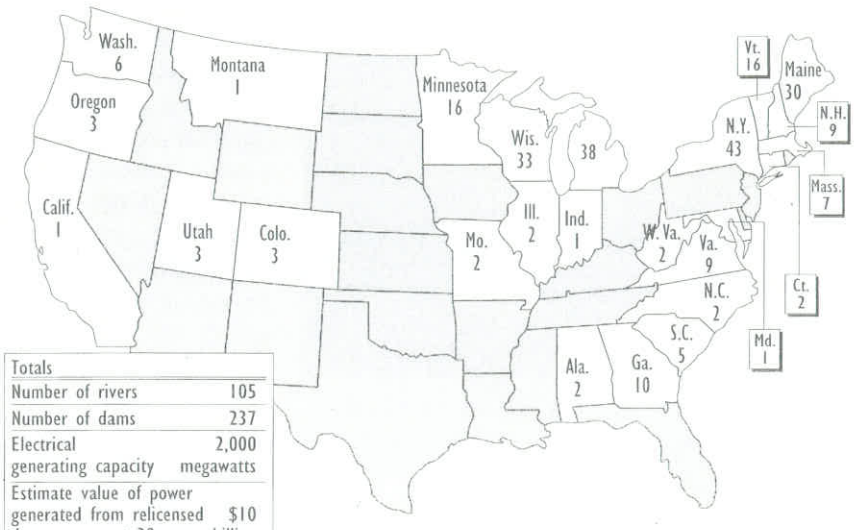
Many of these dams have licenses which are about to expire, and their owners are seeking new operating licenses, or "relicensing" (2,148 as of August 1994). It is FERC's responsibility to issue licenses and determine conditions for periods of 30 to 50 years. These licenses typically stipulate how the dams are operated, what minimum water flow levels are necessary and, in some cases, how watershed lands are managed.

### What is Relicensing?

When a hydropower dam license expires, the dam owner must renew it through a complex, administrative process known as relicensing. FERC reviews each application individually through a process that typically takes a minimum of five years to complete (but can take much longer—the Glines Canyon (WA) relicensing began in 1975 and is not yet final). Then federal and state resource management agencies must evaluate and develop recommendations for each facility. The public can intervene and participate in the process, but participation is lengthy and demands a high degree of legal and technical expertise.

Until 1993, relicensing was a relatively infrequent procedure which received little, if any, public attention. Then in 1993, 160 licenses affecting 237 dams on 105 rivers expired (see above). These "Class of '93" licenses—representing more than 10% of all FERC-licensed developments—are linked to a 1943 court decision which extended FERC jurisdiction to all rivers used to float timber to market. The resulting 50-year licenses placed on dams throughout the country expired in 1993, launching an unprecedented wave of relicensing that will continue with licenses expiring on another 259 dams between 1994 and 2010.

### Hydropower dams due for FERC relicensing in 1993




| Totals | |
|---|---|
| Number of rivers | 105 |
| Number of dams | 237 |
| Electrical generating capacity | 2,000 megawatts |
| Estimate value of power generated from relicensed dams over next 30 years: | $10 billion |

Sources: American Rivers, Federal Energy Regulatory Commission

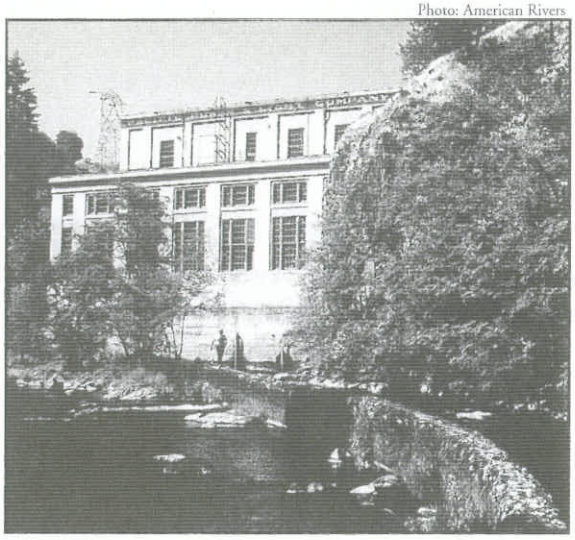
NOTE: There were no dams up for relicensing in 1993 in Hawaii or Alaska

### Opportunity to Restore Rivers

When a dam is relicensed, river interests acquire an opportunity to seek newer, safer, more efficient, and more environmentally and recreationally compatible dams. Through this process, river interests have a real opportunity to apply current scientific knowledge and public values to hydropower dams for the next 30 to 50 years. Given the length of these licenses, this is a once-in-a-lifetime opportunity.

Relicensing provides a good arena for river restoration for several reasons: First, relicensing is an established legal process with opportunities for public input. Second, balance between energy production and environmental considerations by FERC is federally mandated under the Federal Power Act. Third, many of these dams dewater entire sections of rivers for corporate profit, which presents river interests with a strong image to take to the public. ▶

Photo: American Rivers



*The Condit Dam on the White Salmon River in WA has blocked salmon migration for 80 years, but it is now up for relicensing.*

Fourth, increased public involvement in relicensing has created a forum for negotiation, and this has often provided the incentive needed for utilities to address issues they might otherwise avoid.

Hydropower relicensing offers a unique opportunity to address an ongoing cause of ecosystem degradation, trigger broad ecosystem restoration on rivers, and establish environmentally sensitive guidelines for future dam operations.

However, while some dams can be improved in the areas of resource protection, safety and energy conservation (some dams can dramatically increase production by upgrading archaic equipment), others are so destructive or dangerous that they must be removed.

## Dam Removal—the Ultimate in River Restoration

Dam removal is the ultimate river restoration effort, but one which has been used infrequently in the past. The current relicensing process provides many more dams to study for removal, including many old, unsafe, and/or totally inefficient dams.

During the last year, nature and changing economics have combined to offer even greater opportunities to address dam removal through relicensing. In June 1994, FERC approved a settlement between state and federal agencies and the Consumers Power Company regarding 11 hydro projects on Michigan's AuSable, Manistee, and Muskegon Rivers.

Environmental and recreational benefits from this settlement are valued at $45 million over the 40-year life of the new licenses. Included in this settlement was $750,000 for the removal of the Stronach Dam on Michigan's Pine River. This dam had stopped operation in 1952. Also, this settlement commits the utility to establishing a fund for the long-term maintenance or future removal of all dams included in the agreement. Also in June, FERC announced that it would consider dam removal as one alternative to relicensing Edwards Dam on Maine's Kennebec River. FERC's study will be included as part of a draft Environmental Impact Statement (EIS) which addresses relicensing of 11 projects on this river.

Edwards Dam has been involved in year-long settlement talks between the Edwards Manufacturing Company, the city of Augusta, and conservation interests. Negotiations started over the limited use of fish passage, and had grown to cover removal of the dam, but in the end resulted in an impasse.

The degradation of anadromous fish and river habitat is legendary on the Columbia River. The White Salmon River is a National Wild and Scenic tributary, and, except for one dam (Condit) is free-flowing from its headwaters to its confluence. Removal of this marginally profitable dam (8.89 Megawatt) would improve historical fish runs, open the possibility of extending Wild and Scenic protection, and provide an extended recreational run on this popular whitewater river. In 1993, FERC determined that a full EIS must be completed for this river. More importantly, FERC has determined that dam removal should be studied as an alternative to relicensing. Their upcoming draft EIS will examine both complete removal and partial removal (a lower portion of the dam would remain to trap sediment). A third alternative to build a new upstream diversion if the dam is removed, proposed by PacifiCorp Electric Operations, will not be addressed.

The Vermont Agency of Natural Resources has been working to have a small (6 Megawatt) dam on the Clyde River removed in order to improve salmon restoration. In May 1994, nature helped out by providing higher-than-normal spring runoff which blew-out the end of the Newport No. 11 dam.While the state sought to avoid repairs and remove the dam, FERC decided in September to order repairs to prevent erosion. The issue is still unresolved, as the Environmental Protection Agency has halted repairs until environmental issues are resolved. In addition, it may be difficult to obtain Clean Water Act Section 404 "dredge and fill" permits, further delaying repairs.

Perhaps nature will have the final say—as the Vermont winter has ended this year's construction season. Regardless of the final decision, it looks like natural flows for the Clyde this spring.

River interests have long argued that small hydro dams were only profitable because of a quirk in the law (the Public Utility Regulatory Policies Act of 1978) which often requires utilities to buy electricity from hydro dams whether they need the power or

not, and often at rates far in excess of alternative power.

Now, however, these dams are facing the possibility of increased competition. Pushed by industrial customers who want cheaper power, and by new energy grid management and distribution abilities, utilities will be seeking lower overhead, larger market share and more economical sources of energy. This means that small, marginally economical dams could be abandoned in large numbers.

This potential scenario has both the hydro industry and FERC taking a second look at relicensing, and has presented river restoration advocates and others with a tangible and pressing reason to address this issue today.

In response to these new situations, FERC formally requested (September 15, 1993) public comment on whether the Commission has authority to order alternatives to a new license (including removal) in the relicensing process. A determination is expected in late December 1994 (see sidebar). In the interim, FERC has added "reopener" sections to licenses, reserving authority at some point to order future removal of dams.

Incredible as it may seem, while private hydro dams are under the jurisdiction of the FERC, and this agency determines license conditions and is federally mandated to balance both power and non-power use of the river, FERC is unsure of its ability to call for the removal of dams. In other words, FERC has no plan for what happens when dams are unwanted, uneconomical, unsafe or too environmentally damaging to continue.

The hydroelectric industry is the only energy industry without such a plan. Mining and timber production, as well as industrial developments (such as nuclear power plants and solid-waste landfills) must plan, financially and otherwise, for the full life of the activity—including retirement of the facility after its useful life. Common sense dictates that the ability to safely terminate an activity at the end of its useful life should be an integral part of the plan. Through relicensing, river interests are seeking to correct this situation by having FERC adopt a "cradle to grave" plan for dams. The hydro industry is opposed to this idea.

## Who Pays?

At the center of the debate is who must pay for dam removal. Environmentalists argue that industry, which has profited from the use of a public resource for many decades, should foot the bill.

Industry, on the other hand, has argued that FERC only has authority to "takeover" the dam or issue a non-power license. Furthermore, that any takeover must be by mutual agreement, and, to protect the applicant's investment, takeover must include adequate compensation. Any other reservation of authority, even FERC reopeners "presents a licensee with substantial uncertainty regarding the feasibility of continued operation of a project" (National Hydropower Association comments on FERC public inquiry).

In some cases, applicants have taken this argument to its extreme consequences. Last year, Central Maine Power decided that the Moxie Storage Project (on a tributary of the Kennebec) was no longer profitable, and decided not to seek a new license. The dam is in poor condition and needs in excess of $200,000 for repairs to meet FERC safety standards.

To avoid responsibility and the possibility of dam removal, the company sold the dam to a local community inhabited by less than 50 year round residents. Now river interests and agencies, including FERC, are wondering who pays for dam safety, maintenance and insurance costs, and environmental and recreational protection?


### FERC Rules it has Authority to Order Dam Removals

**Washington, D.C.—The Federal Energy Regulatory Commission (FERC) announced that it has the authority to order dam owners to decommission or remove a dam during a hydropower relicensing application.**

**This announcement, released on December 14, 1994, could affect 1,800 privately owned hydropower dams across the country. Conservationists have long argued that FERC has the authority to order the immediate removal of dams.**

**FERC, however, failed to ensure adequate financial planning for future dam retirement by refusing to establish a national decommission fund or dam-specific retirement funds. FERC also ruled that it would address cumulative environmental impacts of hydro dams through individual relicensings and not through watershed analysis.**

*For more information, contact Hydropower Reform Coalition (see page 10.)*

Nowhere has the question of who pays been more evident than on the relicensing of the Glines Canyon and the unlicensed Elwha Dams in Washington State, where the public, represented by the Department of the Interior (DOI), is facing an estimated cost of $307 million to remove these dams. Without a retirement plan, dam operators (originally Crown Zellerbach ▶

—*continued from page 9*—

Corporation and now James River Paper) have no responsibility for removal. Historically, dam removal falls to the state agency, or in this case, the DOI. Under either scenario, the public pays.

As Secretary of the Interior Bruce Babbitt recently discovered, (commenting to Trout Unlimited about the Elwha river dams), dam removal becomes even more expensive when development supporters and politicians argue against lost jobs, lost power, increased rates, and increased emissions from coal-fired plants.

## Alternatives to Dam Removal

Again however, time and increased information is changing our perceptions. In some cases, removal may be inappropriate or even more damaging to the river than the dam itself. Often considered a "cheap solution" (the cost of several sticks of dynamite), removal can become very costly when looking at further damage from construction, sediment contamination, wetland reduction, and permanent changes in river and lake levels.

Through relicensing, river interests are seeking, where appropriate, alternatives to removal to restore rivers (referred to as decommissioning). This includes all actions taken to retire a dam and cease its use to generate electricity or mechanical energy, such as breeching the dam, spillage of all water over the dam, or just removal of generating facilities.

## Future of Dam Removal

By their nature, all dams will eventually become obsolete for hydro purposes. Dams trap sediment that will eventually fill up an impoundment. Even if dams are not facing immediate removal, good "cradle to grave" planning dictates that funds should be available for future removal or another retirement alternative. In this way, we can guarantee that the public is not stuck with the bill at other dam sites.

River interests are seeking to have eventual removal addressed in each new license, and included in all settlements.

In the past year, conservation and recreation involvement in relicensing has resulted in strong settlements which address dam removal or alternatives, and river restoration measures.

In the past year, conservation and recreation involvement in relicensing has resulted in strong settlements which address dam removal or alternatives, and river restoration measures.

The recent Deerfield settlement on eight dams operated by New England Power on the border of Vermont and Massachusetts, contains provisions to study future decommissioning, as well as funds to remove dams if necessary. The Consumers Power Company settlement in Michigan contains similar funds for 11 projects on three rivers. A soon to be signed agreement with the City of Watertown, on New York's Black River, will also provide funds for decommissioning. Depending on future negotiations with other applicants and the results of an EIS for the entire river, the Watertown funds may provide a base for the possible decommissioning of eight separate projects.

*Rich Bowers is conservation director for the American Whitewater Affiliation, and Margaret Bowman is director of hydropower for American Rivers, Inc. Both AWA and American Rivers are national members of the Hydropower Reform Coalition.*

## Hydropower Reform Coalition

### Tapping Into a Ready-Made Partnership

Relicensing of hydropower dams provides one additional benefit to the issue of dam removal—it provides an already established partnership of conservation and recreational participants, the Hydropower Reform Coalition (HRC). Through relicensing, HRC has gained recognition and experience in dealing with FERC, agencies, the hydropower industry, and in furthering grassroots participation in this process. In all, the Coalition has involved more than 60 organizations in relicensing.

Besides planning for dam removal or long-term dam maintenance, HRC also seeks: improved in-stream flows; restoration of flows to de-watered reaches of river; fish passage facilities where necessary; better public access to rivers; protection of riparian habitat; environmental restoration and mitigation trust funds; and river-wide planning and cumulative analysis.

National Steering Committee members of this Coalition include American Rivers, American Whitewater Affiliation, Appalachian Mountain Club, Conservation Law Foundation, Izaak Walton League of America, Michigan Hydro Relicensing Coalition, Natural Heritage Institute, New England FLOW, New York Rivers United, Trout Unlimited, and the Sierra Club Legal Defense Fund.

For more information on relicensing, or on how to join the HRC, contact Margaret Bowman, coalition coordinator, at (202) 547-6900, or Rich Bowers, AWA, at (301) 589-9453.

# Restoring Florida's Ocklawaha River by Removing Rodman Dam

## The 30-year battle may soon come to an end

by Rita Haberman and Gary Appelson

The Ocklawaha River, the largest tributary of the St. Johns River, once flowed freely for some 87 miles through north central Florida. It was one of Florida's most biologically diverse river ecosystems, providing habitat for numerous species of water birds, more than 100 species of fish, the endangered manatee and Florida panther, black bears and others. The river has been drastically altered, though, since 1964 when the U.S. Army Corps of Engineers began its ill-conceived Cross Florida Barge Canal (CFBC), designed to transport barges from the Gulf to the Atlantic. Only one-third of the senseless, multi-million dollar project was ever completed as planned, but Rodman Dam remains intact, blocking the Ocklawaha. Now the 30-year-long citizen effort, led primarily by Florida Defenders of the Environment (FDE), is preparing for what it hopes will be its last battle to free the Ocklawaha.

The history of the CFBC and its Rodman Dam is a classic example of a project that never should have begun and now refuses to die. The Corps completed Rodman Dam in 1968, and in the process devastated the Ocklawaha. The dam and reservoir deforested 9,000 acres of hardwood bottomland forest and flooded 16 miles of river under a six-foot deep reservoir.

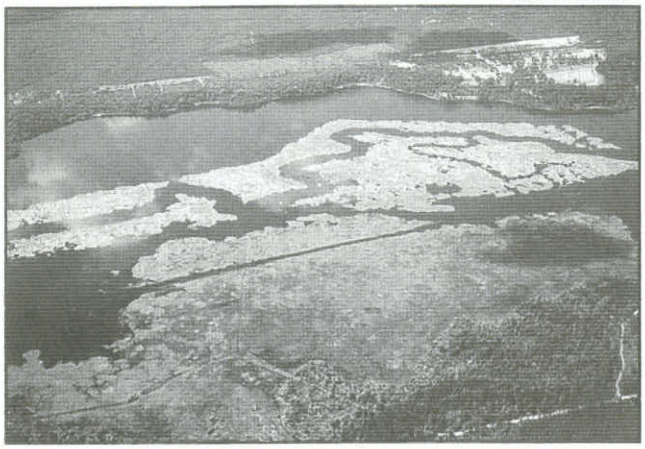
The Corps continued building other locks, dams and canals of the CFBC until 1971 when environmental organizations, opposed to the destruction of the Ocklawaha River and its floodplain forest, succeeded in obtaining an injunction against further construction. Shortly afterwards, President Nixon signed an executive order halting construction of the CFBC.

It took almost two more decades, however, for Congress to officially deauthorize the project. The biggest obstacle to deauthorization was one Florida Congressional Representative who prevented a vote in the U.S. House, even though deauthorization passed twice in the U.S. Senate and Florida's Governor and Cabinet also supported deauthorization.

In 1977 President Carter called for a $2.5 million study of the alternatives for restoring the Ocklawaha; and in 1978, the U.S. Departments of the Army, Agriculture and the Interior, the Council on Environmental Quality, and the Environmental Protection Agency called for restoration of the river. The Florida Governor and Cabinet concurred.

Finally, in 1990 Congress deauthorized the CFBC, making removal of Rodman Dam and the long overdue restoration of the damaged reach of the Ocklawaha possible. The next essential step to restoring the Ocklawaha was to win project approval and appropriations in the Florida State Legislature. Through intensive lobbying and public education, FDE and other environmental groups geared up for the 1993 Legislative session by successfully getting endorsements for restoration from Florida's Governor and Cabinet (again), Florida Game and Fresh Water Fish Commission, Florida Department of Community Affairs, Florida Department of Environmental Regulations, more than 40 of Florida's most respected ecologists, and virtually all of Florida's major newspapers.

Photo: Ken Sourbeer



*Ocklawaha River showing original channel outline after inundation by Rodman Dam.*

Despite all the past studies and endorsements supporting restoration, the 1993 State Legislature opted for yet another study—this time a two-year, $1 million study. State Senator Kirkpatrick of Gainesville proposed and successfully pulled off this delay as the chair of the subcommittee that controls funding for state resource agencies. Kirkpatrick, an avid bass fisherman, represents the district where Rodman Dam is located. Many believed that agency heads feared their budgets would be jeopardized if they opposed Kirkpatrick.

History seems to be repeating itself. Just as one powerful politician blocked deauthorization (and essentially restoration) efforts in Congress for most of 20 years, it now seems to be occurring in the State Legislature. Once again a project that benefits a few is being promoted at the expense of a natural resource that benefits many.

In December 1994, the St. Johns River Water Management District, the agency charged with protecting the water resources of the St. Johns River basin, released the scientific component of its study. As predicted, it reinforces the case that the Ocklawaha can be restored easily and safely. FDE is using this recent information to build an even stronger case for restoring the Ocklawaha to take to the 1995 State Legislature.

*continued on page 21*▶

## The Importance of
# Environmental Assessments for Proposed Dam Removals

by John R. Shuman, 

"The environmental impacts of existing dams on river ecosystems have been studied far more extensively than have the impacts of removing dams."

Dams have long been viewed more or less permanent fixtures on rivers, with only periodic maintenance required. Viewpoints are beginning to change, however, as some dams have been removed and others are proposed for removal. Both the federal and state governments are involved in assessing the safety and fate of thousands of dams, with the Federal Energy Regulatory Commission now facing decisions on more than 200 dam relicensings.

## The Effects of Dams—the Good and the Bad

The environmental impacts of existing dams on river ecosystems have been studied far more extensively than have the impacts of removing dams. Among the better known ecological changes generally occurring from the damming of rivers are: alterations in temperature and flow regimes in the river downstream from the dam, obvious loss of flowing water habitat (river) and replacement with standing water (reservoir) habitat in the impounded region, interruption of animal movements longitudinally along the river course, alteration of the fish community in the region of the river now inundated and perhaps upstream from the reservoir as well, interruption of genetic exchange among populations inhabiting the river course, reduction in the delivery of river nutrients to downstream sections of the river because of entrapment by the reservoir, and the loss of the floodplain habitat and lateral connectivity between the river and adjacent upland habitats.

While it is obvious that the ecological integrity of the riverine system is compromised by damming, there are benefits realized from the presence of a dam and reservoir. These benefits are often human oriented, including hydroelectric production, domestic water supply, flood control, recreational opportunities, navigation, and industrial and irrigation water supply. Fish and wildlife sometimes benefit as well, including often larger numbers of fish and birds in the reservoir than in the former river, and greater habitat diversity as well. However, more recent ecological research indicates that the increase in habitat types not natural to the river system can have negative impacts to the flora and fauna endemic to the riverine habitats.

## Why Dams are Removed

Since the average age of dams in this country is 40 years, many dams are in need of safety rehabilitation. Very often, the costs for rehabilitation are excessive for the 90% of the dams owned by private owners or municipalities. Dam removal in these instances is often the only economically viable alternative. Most of the dams that have been purposefully removed (i.e., not including dam failures) in this country have been removed because they were too costly to rehabilitate. Examples of these include Salling Dam in Michigan and Woolen Mills Dam in Wisconsin.

In the last few years, there has been a concerted effort by environmentalists and others to recommend dam removal based solely on the environmental impacts of a dam on the river ecosystem. To date, most proposed removals have focused on dams having significant impacts on anadromous fish migrations.

Decisions are now becoming necessary regarding the fate of a large number of dams in this country which are in need of rehabilitation or relicensing or which are deemed to be environmentally damaging. Assessment of the various dam retention, rehabilitation, modification and dam removal alternatives is both complex and frequently controversial. Nevertheless, it is also clear that dam removal is a reasonable, and in many cases, viable alternative in assessments regarding the fate of dams.

## What the Past Has Taught Us

The dam removals reported in the published and gray literature probably represent a minority of the total number of dams intentionally breached or removed. Information gathered from federal and state agencies suggests that there probably have been hundreds of dams intentionally breached or removed in this country, but the vast majority of them have been small in size.

But what about the environmental effects of removing dams, especially those on larger rivers?

It is clear from a review of past dam removals that it may be environmentally unwise to simply open up or breach a dam and allow "nature" to restore the river ecosystem. Several of the past and currently proposed dam removals discussed in the literature are instructive in understanding the environmental consequences and considerations for assessing dam removal as an alternative for the fate of dams.

*Fort Edward Dam*—The Fort Edward Dam on the Hudson River was removed in 1973. This removal provides some lessons regarding dam removal and the need for comprehensive pre-removal environmental assessment studies. Fort Edward Dam was a 9.1 m high and 180 m long rock and timber crib dam built in 1817 which was near collapse at the time of removal. The owner, Niagara Mohawk Power Corporation, had received an amendment to their license from the Federal Power Commission (now FERC), which authorized them to remove the dam. One year after removal, the Corps of Engineers documented blockage of the downstream Champlain Canal which connects the Hudson River with Lake Champlain. Other areas of the Hudson River were also obstructed by woody debris and sediment moved downstream after removal of the dam. It was estimated that 336,000 $m^3$ of sediment had moved downstream in one year after removal of the dam, and that 765,000 $m^3$ remained in the floodplain above the dam after the first year of removal. Prior to removal of the dam, polychlorinated biphenyls (PCB's) were discharged into the Hudson River just upstream (ca. 6 km) from the dam. Water levels in the Hudson River above the dam dropped 4.6 m after dam removal, and downstream PCB transport has been monitored since the Fort Edward Dam was removed.

Photo: Wisconsin DNR

*Woolen Mills Dam demolition on the Milwaukee River in 1988. Prior to removal, the Wisconsin DNR developed a feasibility and implementation plan as well as a 10-year restoration plan.*

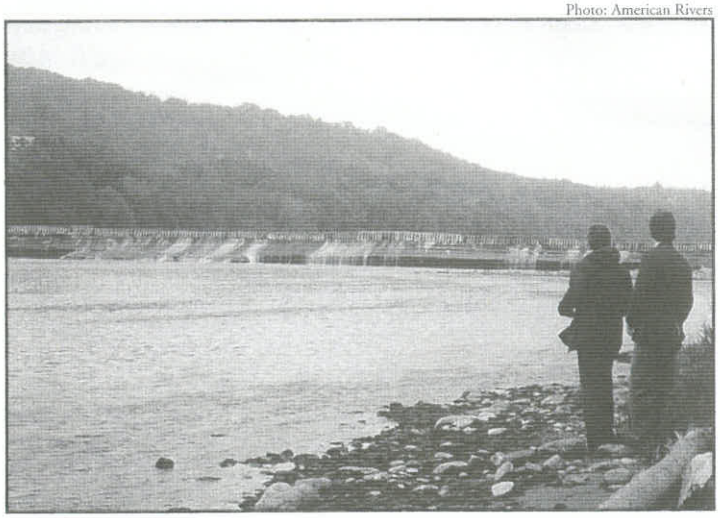
While completed over 20 years ago, the Fort Edward Dam removal provides cogent evidence why comprehensive and holistic environmental assessments must be completed before a dam is removed. The State of New York appropriated $5 million for cleanup of the downstream materials eroded following removal of the Fort Edward Dam. The 1977 Federal Power Commission hearing ruling on this dam removal found that pre-removal studies must assess the presence and potential movement of sediments and other materials both in the vicinity of the dam and upstream in the reservoir. The judge also found that pre-removal studies must be more precise and unambiguous in order to determine whether a dam removal should be authorized.

*Newaygo Dam*—Sediment movement was also observed following the 1969 removal of the Newaygo Dam on the Muskegon River, Michigan. Removal of this dam resulted in the release of impounded sediment which immediately started migrating through the river channel as a sediment wave. It was estimated that about 40% of the original volume of impounded sediment was washed downstream immediately after removal of the dam.

*Woolen Mills Dam*—Woolen Mills Dam on the Milwaukee River in West Bend, Wisconsin was removed in 1988. This dam was 4.3 m high and impounded 27 ha. In 1979, the Wisconsin Department of Natural Resources (WDNR) ordered the City of West Bend to either repair or remove the dam to resolve issues of public safety. In 1986, the City asked the WDNR to develop a feasibility and implementation plan for dam removal and a 10-year plan for stream restoration in the impounded area following removal. After review of these plans, the City chose the dam removal alternative based on economic, social, and environmental considerations. Following dam removal, most of the sediment within the 2.4 km of formerly impounded river channel was scoured out within six months. The river bottom substrate now is composed of mostly gravel and rubble.

Fish habitat restoration was an important component of the Woolen Mills dam removal feasibility and implementation plan. Following dam removal, the entire riparian zone was disked, dragged and planted with barnyard grass and smartweed to protect ▶

Photo: American Rivers



*Edwards Dam on the Kennebec River in Maine. Sediment management is a major issue of concern in the proposed removal of this dam built in 1837.*

*—continued from page 13—*exposed soils from erosion. River channel reconstruction and excavation and river bank improvement were completed to increase pool depths for fish habitat improvement. A floodplain analysis was completed to determine the potential for flooding problems due to the reconstructed river channel. Silver maple and swamp white oak transplants were planted along the river banks to provide canopy cover. Other fish habitat improvements have been made since dam removal which have resulted in improvements in the smallmouth bass fishery. Anglers are catching adult smallmouth bass, and young-of-the-year smallmouth bass have been observed in the restored river.

*Salling Dam*—Another dam removal which provides insight into consequences and environmental assessment needs for dam removal is the Salling Dam removal on the AuSable—River near Grayling, Michigan. This 5.2 m high dam impounded approximately 22 ha along 3.2 km of the AuSable River, and functioned for hydroelectric generation until 1952. The Salling Dam was inspected in 1980 and found to be structurally unsafe. In 1988, the private owners of the dam were ordered to repair or remove the dam. Since the owners could not afford to repair the dam, they entered into a consent agreement with the Michigan Department of Natural Resources which allowed the Department to remove the dam and restore the river to its free flowing state.

Prior to removing the Salling Dam, written procedures were developed to accomplish the drawdown of the impoundment in a safe manner while minimizing impacts. The nature and extent of accumulated sediments was investigated. No contaminated sediments were found, and the accumulated sediments in the impoundment were generally less than 1 m thick and consisted of flocculent (loose) organics in the downstream two-thirds of the impoundment and sand in the upper third. Drawdown procedures required periodic monitoring of water quality, with stipulations that the drawdown should cease whenever water quality was unacceptably deteriorated. A 61 m long, 4.6 m wide, and 1.8 m deep sediment trap was constructed on the upstream side of the temporary drawdown sheet-pile structure to trap sand sediments during the drawdown. Exposed floodplain soils were stabilized by reseeding with annual rye grass to minimize erosion. All disturbed areas were covered with topsoil, seeded and mulched.

The Salling Dam removal, completed in 1992, caused significant local controversy. The controversy centered on the possible reduction in property values, whether property ownership would extend down to the river's edge after the drawdown, altered or reduced recreational opportunities, sediment transport to downstream areas, and flooding potential without the dam. Most complaints after the drawdown related to the flocculent organic sediments transported downstream during the drawdown.

*Columbia Falls Dam*—The removal of the Columbia Falls Dam on the Pleasant River in Maine was unique in its ultimate purpose. The Columbia Falls Dam was part of the Pleasant River Hydro Project, which was fraught with problems including cost overruns, equipment failure, and dry years. The dam was removed in 1989 by Bangor Pacific Hydro Associates as mitigation for improvements to their West Enfield hydroelectric facility on the Penobscot River in Maine. This type of mitigation was unique because it involved dam removal as mitigation for environmental impacts in another river basin. The U.S. Fish and Wildlife Service (FWS) was initially opposed to this mitigation for the proposed West Enfield modifications because it was "out-of-kind" and "out-of-basin". The mitigation plan was ultimately accepted by the FWS in 1988. The dam removal was successfully completed, and Atlantic salmon now have access to Pleasant River, one of Maine's seven wild salmon rivers.

## Assessing Proposed Dam Removals—What You Need to Know Before You Decide

These reviews of past dam removals, as well as others less well documented in the literature, have pointed out several common environmental considerations regarding the potential removal of dams. These considerations can be divided into two categories:

(1) physical and chemical issues, and (2) biological and ecological issues. A synopsis of these issues follows:

*Physical and Chemical Issues*:

- sediment transport to downstream areas of the river following dam removal
- release of toxic substances from the sediments following dam removal
- degraded water quality during the dam removal
- changes to river channel morphology before and after dam removal
- recontouring of the floodplain after dam removal to assure floodplain function
- trapping of sediments by the dam during impoundment
- revegetation to prevent soil erosion following the drawdown for dam removal

*Biological and Ecological Issues*:

- blockage of upstream and downstream movement of fish and other aquatic animals by the dam
- replacement of flowing fish habitat with standing water fish habitat by impoundment
- loss of floodplain forest wetlands due to impoundment
- impacts to threatened and endangered species, both positive and negative
- changes in bird communities by impoundment due to increased habitat diversity
- fragmented wildlife corridors because of the presence of the reservoir
- reduction in sediment and nutrient supply to the river below the dam
- alteration in the flooding pattern (loss of flood pulse) below the dam

The dam removals discussed here and in the literature attest to the potential problems related to sediment transport, particularly the Fort Edward Dam removal in which toxics and sediments were transported downstream. It should be noted that while sediment transport invariably occurs following dam removal, its severity is determined by the volume of sediments impounded by the dam and by the dam removal procedure utilized.

Significant efforts are being expanded for the proposed Elwha and Glines Canyon Dam removals in Washington and the proposed Rodman Dam removal in Florida to predict, through modeling, the extent of sediment transport following dam removal and the methods for drawdown at dam removal which would minimize it.

## Assessment of the Proposed Rodman Dam Removal

Biological and ecological issues are also important when comparing dam removal with other alternatives regarding the fate of a dam. In an assessment of the fate of Rodman Dam, a 6,800 foot long dam impounding 9,000 acres of the Ocklawaha River in Florida, dam removal and reservoir retention alternatives were assessed in the following 20 studies.

*Physical and Chemical Studies*

- river transect surveying
- bathymetric and sediment thickness mapping
- sediment properties and erodibility characteristics
- sediment transport
- sediment resuspension due to wind
- sediment characteristics, toxics and seedbank analysis
- floodplain characteristics
- sediment loading to the river below the dam
- hydraulic and hydrologic evaluations
- surface water quality analysis
- impacts on the surficial and Floridan aquifers from drawdowns

*Biological and Ecological Studies*

- southern tesselated darter and bluenose shiner studies (threatened/endangered species)
- migratory fish analysis - effects of the dam
- fish populations analysis - reservoir and river populations
- aquatic plant management in the reservoir
- floodplain forest succession following permanent drawdown
- threatened and endangered species analysis
- bird populations analysis
- habitats analysis

This proposed dam removal has been extremely controversial in Florida, and the size of the dam and reservoir necessitates a rather extensive environmental assessment of the alternatives. Assessments for smaller dams and impoundments could certainly be completed at substantially less cost (estimated here at over $800,000) and time. However, it is important to be comprehensive in the understanding of the alternatives and their implications, so that the correct removal precautions and mitigations are taken beforehand.

Dam removal is sometimes portrayed as a very simple process, whereby all that needs to be done is to open up the dam and let nature heal itself. While sediment transport problems frequently occur after dam removals, several past and proposed dam removals have utilized sediment transport modeling and sediment trap and hydraulic routing approaches to both assess and minimize sediment transport before the dam is removed.

A comprehensive environmental assessment of dam removal and reservoir retention alternatives is necessary to overcome both the often simplistic view of dam removal and to establish a more complete understanding of both river restoration and reservoir retention alternatives so that the best environmental decision is made.

*Dr. Shuman is a supervisory environmetnal scientist with the St. John's River Water Management District. He directed the environmental assessment of dam removal and reservoir retention alternatives for Rodman Dam on the Ocklawaha River.*

*If you have questions or information to share on past or proposed dam removals, he can be reached at St. Johns River Water Management District, P.O. Box 1429, Palatka, FL 32178-1429, (904) 329-4341.*

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# Freeing the Kettle River

## Public involvement was key to success in Minnesota

by Rita Haberman

Like thousands of dams that block rivers across the United States, Sandstone Dam on the Kettle River in Minnesota is a dam that has outlived its usefulness. For almost 90 years the impoundment behind the Sandstone Dam has concealed a six-foot waterfall, powerful rapids and other natural features of the Kettle, but soon the once quick Kettle River will again be free.

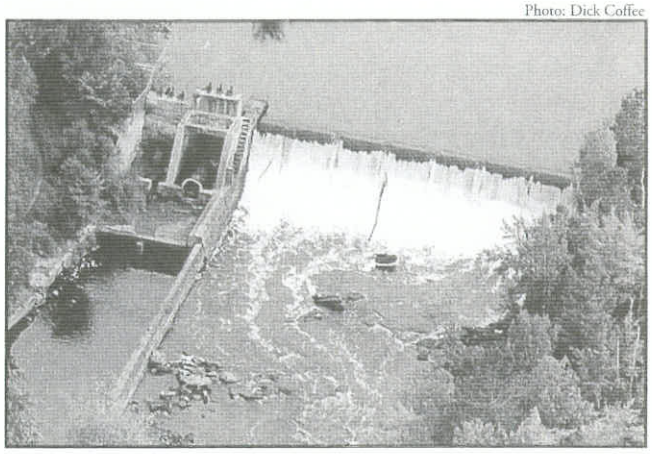
The original purpose of Sandstone Dam, built in 1908, was to supply power for a local quarry. A few years later the quarry industry closed down, but the dam continued to operate as a source of electricity for the Sandstone area. The hydropower dam stayed in operation until 1963 when Minnesota Power and Light, owners of the dam since 1923, shut down the dam because it was no longer economically feasible to operate. In 1967 the power company "gifted" the dam to the Minnesota Department of Natural Resources (DNR), along with 200 acres of surrounding undeveloped land, now part of Banning State Park. With that gift, the state assumed liability for the aging dam constructed of sandstone, concrete, steel, and timbers.

In the 1980s the DNR conducted extensive research on the dam and found that it would never be an economically feasible source of energy and estimated that removing the dam would cost half as much as repairing it—approximately $200,000 versus $400,000. A lack of interest and a lack of funding, however, has kept the dam sitting idle for most of the last three decades. The situation changed though, in 1992, when the state of Minnesota approved bonding money to deal with some of its most hazardous, deteriorating, old dams. With a solid source of funding, the Minnesota DNR took a hard look at the Sandstone Dam and cited a long list of reasons why it should be removed: to eliminate a safety hazard; to reduce taxpayer liability; to restore the free-flowing, natural condition of the Kettle, Minnesota's first state Wild and Scenic River; to improve fishing opportunities on the Kettle; and to improve non-motorized water-based recreation activities.

The Kettle is one of Minnesota's most popular canoeing rivers. The Sandstone Dam, fortunately, is the only impoundment on the Kettle, but it inundates the river's best stretch of whitewater in Banning State Park. Just three miles upstream from the dam, also in the park, is Banning Rapids, one of its finest stretches of whitewater. Removing the dam would restore a superb whitewater run and boost recreational tourism in Sandstone and its surrounding towns.

Even with a strong case for removing the dam, it took a lot of work to convince the people of Sandstone that it was a good idea. Patricia Arndt, manager of the project with the Minnesota DNR, orchestrated the successful public involvement effort. "It was an evolutionary process to win the support of the local community," explains Arndt. When the DNR first proposed dam removal as an option, many of the 2,000 residents of Sandstone were opposed to it. Less than two years later, when local and state press were invited to document the first day of dam demolition, local and state leaders were present on the banks of the Kettle to show their support for restoring the river.

Photo: Dick Coffee



*Aerial view of Sandstone Dam on Kettle River as it looked before drawdown and demolition.*

The Sandstone Dam story offers a collection of strategies for other river advocates interested in dam removals. One of the first things Arndt did was pull together an Integrated Resource Management Team of DNR specialists to research all aspects of the dam removal. Dam removals cut across many disciplines, and the team of specialists provided a readily available source of technical expertise. Arndt also organized an ad hoc committee of representatives from the community. "We asked the 'movers and shakers' of the community to get involved, ask questions, air concerns and share information with the people they represented. As we won the support of committee members, locals followed," says Arndt.

A couple members of the ad hoc local committee have been extremely helpful in winning public support for removing the dam. One is a local freelance journalist, Dianne Carlson, who wrote a series of several in-depth, firsthand feature stories about the Kettle River Dam Project that have appeared in Sandstone's local newspaper, *The Pine County Courier*. Carlson has written several good articles, some in easily understandable, question-answer format to address some of the most common concerns. Another key ad hoc

committee member is Randy Gordon, the manager of Banning State Park. "Along with being a strong and articulate advocate for restoring the river, Gordon was a critical link to the city because of his involvement with the Sandstone Chamber of Commerce. The city trusted Randy and his judgment, and that trust transferred over to the DNR," explains Arndt.

The old cliché, "a picture is worth a thousand words," rang true in the case of the Sandstone Dam. The DNR hired a Minneapolis-based consulting firm, MacroMedia, to develop computer images of the pre- and post-dam removal conditions. The DNR included these computer images with many of the their public education efforts to help people visualize the restoration. According to Arndt, "Computer imaging was a relatively inexpensive investment (a few thousand dollars) that went a long way to build the credibility of the DNR and to assure the community that the DNR had indeed thoroughly researched the impacts."

Another strategy the DNR used was public information meetings. They hosted two open houses where they set up several information stations. The DNR invited everyone, including a vocal "save the dam" contingent. With their computer models and several technical specialists on-site to answer questions, the DNR informed hundreds of local residents about the project.

Upon first learning of the DNR's plans to remove the dam, many local residents were upset. They felt that Sandstone would lose a piece of its cultural history. After all, only a handful of residents witnessed the river free-flowing. With the quality computer images and some historical photos, Arndt and others helped people realize that removing the dam was an opportunity to restore the natural history of Sandstone and that the past 90 years with the dam is only a short period in the big picture. To commemorate the dam and its historical significance to the city of Sandstone, the DNR is salvaging an original turbine from the dam and will display it along with an interpretive marker at the Kettle River Environmental Education Center near the original dam site. Some of the native sandstone from the dam will also be salvaged and used in a variety of projects throughout the city.

In July 1994, the dam project team got the green light from the assistant commissioner of the Minnesota DNR to proceed with the removal process. One month later the dam demolition contractors opened the gates of the dam to drawdown water behind it. The "day of (w)reckoning," as Arndt put it, was November 30, 1994, when the Commissioner of the DNR, Rod Sando, dropped the wrecking ball on the dam, as a historical first step in restoring the river. Demolition is scheduled to be completed by March 1995. Following completion, the DNR, the city of Sandstone and other Kettle River enthusiasts are planning a big celebration, "The Grand Opening of the Kettle River."

## DAM DAMAGE

# 8 of the Ways Dams Kill Fish

**1 Warmed Waters**
Dams slow rivers. Slow rivers are warmer rivers. Fish are sensitive to water temperature. Combined with irrigation diversions and logging along streams, dams are leading contributors to water temperature problems.

**2 Dam Delays**
Slow water slows fish. Salmon are born in freshwater, migrate to the ocean, and then return to their stream of origin to spawn. Once their transformation from freshwater to saltwater fish begins, salmon need to get to the ocean. If they are delayed, they die. Young fish also have trouble navigating through slack water behind dams.

**3 Deadly Diversions**
Many irrigation diversions are not "screened." Instead of flowing downstream, fish follow currents created by irrigation diversions and end up as fertilizer in farmers' fields. On many streams, irrigation also uses too much water, leaving little or none for fish.

**4 Sliced Smolts**
Smolts face their greatest threat passing turbines that produce power. To "get around" turbines, fish are loaded on trucks or barges and sent downstream. But barging causes stress, crowding and disease hurts fish homing instincts.

**5 Predator Promotion**
Dams create premier habitat for fish and wildlife that prey on salmon. Principal among them are squaw fish. Warm reservoir water increases squaw fish metabolism. Plus, if young salmon are not killed passing turbines, they often are injured or stunned, making them easy prey for mergansers, herons, seagulls and other predators.

**6 Passage Predicament**
Dams block rivers. Upstream migrating fish can use "ladders" to get past them. But even the best ladders cause delays, crowding and stress. Often there are no ladders, or they are poorly designed and don't work.

**7 Silted Spawning Grounds**
Dams hold back silt, literally drowning spawning habitat in dirt. Habitat not buried with silt is covered with water too deep for spawning.

**8 Grabbed Gravel**
Gravel and debris are the foundation of our fish runs. Without adequate downstream flows of gravel, downed logs and the like (which dams prevent), downstream salmon habitat gradually washes away. If there is little habitat, there will be few fish, no matter how many we save from anglers, predators and dams.

Reprinted with permission from the Oregon Natural Resources Council *15 Dammable Dams* (see page 20)

# Restoring the Wild Rogue River

## Water law is the lever to remove Savage Rapids Dam

by Brad McLane and Rita Haberman

The Rogue River in southeastern Oregon is one of the original eight rivers protected by the National Wild & Scenic Rivers Act of 1968. With its wonderful whitewater, exceptional weather and abundant wildlife, the Lower Rogue is one of the most sought after river trips in the West. Although the Upper Rogue isn't quite as popular with river recreationists, it is with fish. Each year thousands of Rogue River fall and spring chinook, coho, and winter and summer steelhead attempt to migrate through the Upper Rogue, but many of them are injured or killed at Savage Rapids Dam. For the past several years river and fish advocates, led primarily by WaterWatch of Oregon (WaterWatch), have built a strong case for removing the dam. It's a case based on economics, viable alternatives, and a win-win solution.

Savage Rapids Dam was built in 1921 to divert water for irrigation. The Grants Pass Irrigation District (GPID), the owner of the dam, was originally formed to irrigate about 18,000 acres. Since then GPID's irrigation area has shrunk to 7,000 acres, and so too has its right to water. In 1981, the Oregon Water Resources Commission (OWRC) told GPID it was entitled to only half the water it was using. Compounding GPID's problems, for its 73-year history the dam has been devastating to anadromous fish populations.

While Savage Rapids Dam has been touted for removal for years, the catalyst that spurred serious considerations to remove it was, ironically, a 1987 GPID request to OWRC for more water. WaterWatch objected to GPID's request on the grounds that it violated Oregon's water allocation and fish passage laws. As a condition of temporarily granting GPID more water, WaterWatch negotiated an OWRC decision requiring GPID to study the fish passage problem and strategies for improving its irrigation efficiency (its current efficiency rating is only 18%).

About seven years later, the results of these studies all pointed to the same solution: remove the dam. A U.S. Bureau of Reclamation study estimated that it would cost $17 to $22 million to repair the dam and its failing fish ladders or $11 million to remove the dam and replace it with pumps. A U.S. Fish & Wildlife Service study estimated that removing the dam would allow the Rogue to produce an additional 116,000 adult anadromous fish annually. Of these, 90,000 would be harvested by sport and commercial fishing efforts—at an estimated monetary value of $5 million—with 26,000 escaping to spawn.

In addition, the results of a GPID survey indicated that 70% of its customers were unwilling to pay higher rates to save the dam. Faced with these results, the GPID Board voted unanimously in January 1994 to remove it. They were, however, reluctant to accept the necessity of its demise. As a GPID Board member explained: "everyone who lives near the dam would rather it stay, but the future of the district means it has to go."

After making their decision to remove the dam, GPID returned to OWRC with their request for more water. In October 1994 OWRC granted a five-year extension of GPID's long-sought water permit, but with two contingencies: 1) GPID must continue to seek greater water efficiency measures, and 2) GPID must exercise "due diligence" in working to remove Savage Rapids Dam by the year 2001. With the decision to remove the dam supported and strengthened by OWRC, freeing the Rogue had become a realistic possibility.

A great deal of the progress to date can be attributed to WaterWatch's basic strategy of utilizing a solid understanding of water law as a negotiating lever, and then proceeding to seek a win:win solution. WaterWatch's Jeff Curtis explains how an understanding of water law was the key to establishing WaterWatch as a force to be reckoned with and in getting GPID and OWRC to the negotiating table. WaterWatch—always quietly armed with the option of suing the GPID for violating Oregon's water laws—has subsequently worked hard to avoid polarization of the issues. WaterWatch has encouraged rational consensus-building and careful analysis of the problems and potential solutions. With the economics so strongly in favor of dam removal, WaterWatch's Bob Hunter explains: "We were just sitting back and waiting for them to see the writing on the wall."

As clear as its case may be, the dam-removal campaign has had to face some organized opposition. Calling themselves the Committee to Save Savage Rapids Dam, this group has used a variety of tactics: they have garnered the support of a state senator and state representative who are working on a bill to stop the dam removal plan; filed a lawsuit against WaterWatch, Oregon Natural Resources Council and the Sierra Club (which was recently dismissed as unfounded); campaigned successfully to elect three new pro-dam GPID board members (of a total five people on the board); and claim to have a petition with more than 10,000 signatures to save the dam.

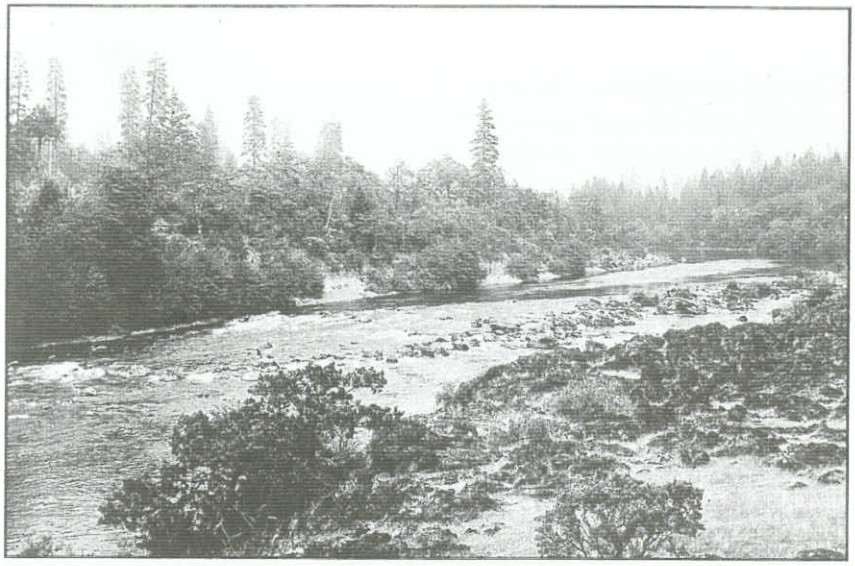
Partly in response to the efforts of pro-dam contingents, WaterWatch has also worked to build grassroots support. As Curtis explains: "You really need more than just good lawyers. You need grassroots support in order to remove a dam." WaterWatch's initial efforts at building public support focused on education and mobilization of dam ▶

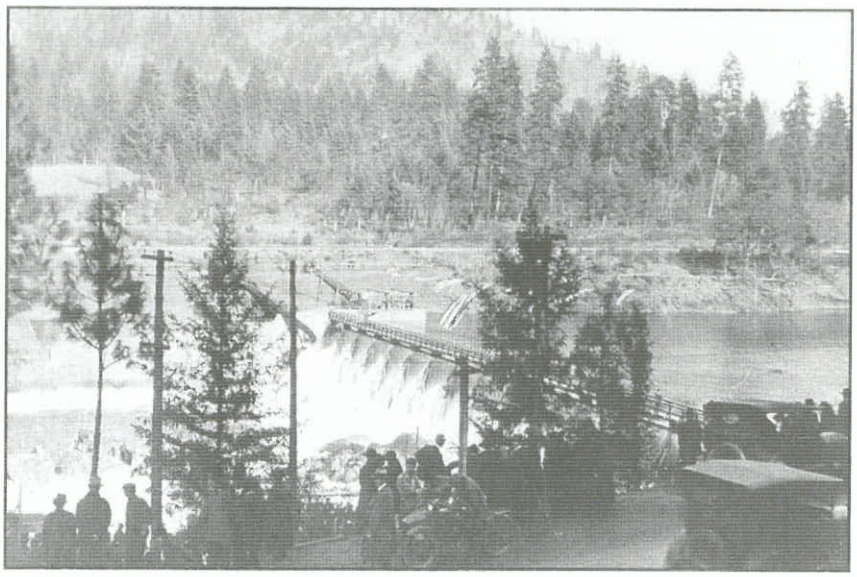
removal supporters in the surrounding communities.

In December 1993 WaterWatch placed a one-page announcement in the Grants Pass newspaper. Its caption read: "Save the Rogue River Salmon, Save Grants Pass Irrigation District, Take Out Savage Rapids Dam." The ad proceeded to argue the merits of the dam removal case with ease, clarity, and simplicity. It highlighted the dam's dilapidated condition, its violation of federal and state safety requirements and fish passage standards, the relative costs of repair and removal, and the fact that GPID is legally responsible for a dam that it can no longer afford to maintain.

WaterWatch's effectiveness at building local grassroots support is demonstrated by the number of people speaking at an OWRC public hearing in October 1994. About 50 dam removal supporters showed. Of these, 36 testified in favor of removing the dam, while only six testified in favor of keeping it. Also, with $11 million required to tear down the dam and replace it with pumps, WaterWatch has worked to build grassroots support on the regional level. One strategy has been to tap into the Save Our Wild Salmon Coalition, which represents over forty conservation and salmon fisheries organizations.

The campaign to remove Savage Rapids Dam is a unique case, yet some useful parallels can be drawn to help other groups working on similar issues. The campaign's success can be attributed to focusing on a win-win solution and supporting it through grassroots organizing efforts, negotiating skills, and the results of credible research. In addition, WaterWatch's Bob Hunter stresses the importance of a good understanding of water law, and advises other groups working on similar issues to learn how their state and federal water allocation systems operate, adding: "What you might find are some things that are not being done correctly, which might give you a legal foothold to go in and create some change."





***The Rogue River pre-dam (top). The 1921 dedication ceremony for Savage Rapids Dam (bottom).*** Photos courtesy of Josephine County Historical Society

As successful as the campaign has been thus far, the elusive prize—a free-flowing Rogue—is not yet certain. A free-flowing Rogue will be restored only if there is enough grassroots support and Congress allocates the necessary funds.

For more information on Savage Rapids Dam and how you can help, contact: WaterWatch of Oregon, 921 SW Morrison, Suite 438, Portland, OR 97205, (503) 295-4039.

*Brad McLane is an intern with River Network.*

# References and Resources:

## Organizations working on dam removals and written and on-line resources

### ORGANIZATIONS

#### Hydropower Reform Coalition

HRC includes over a dozen national, regional and local organizations working to achieve conservation and recreation improvements at hydropower facilities throughout the United States. HRC has a great deal of experience and technical expertise in dealing with FERC, agencies, hydropower industries and grassroots participation in the process. For more information on relicensing or how to join HRC. Contact: Margaret Bowman, Coalition Coordinator, at American Rivers (202) 547-6900 or Rich Bowers, at American Whitewater Affiliation at (301) 589-9453.

#### National Park Service's Rivers, Trails and Conservation Assistance Program

Recreational Technical Assistance in Hydropower Licensing
The RTCA provides resource and planning expertise to help public agencies and citizens. One of the ways RTCA encourages recreational opportunities and natural resource protection is by providing technical assistance (planning coordiation, conflict resolution, information gathering and distribution and others) during the licensing and relicensing of hydropower projects. Contact: Tracy Miller, National Park Service, P.O. Box 37127, Washington, DC 20013, (202) 343-5490.

#### Association of State Dam Safety Officials

The purpose of ASDSO is to provide a forum for exchange of information, foster interstate cooperation, provide information and assistance to state dam safety programs, provide representation of state issues before Congress and federal agencies, and improve efficiency and effectiveness of state dam safety programs. ASDSO maintains a database of dam safety officials, a library of resources, and hosts annual conferences and technical conferences on dam removal. Contact: ASDSO, 450 Old Vine, Second Floor, Lexington, KY 40507, (606) 247-5140.

### REFERENCE TOOLS

**National Inventory of Dams 1993-94**

The national database of more than 74,000 dams compiled by state and federal agencies (U.S. Army Corps, FERC, Bureau of Reclamation, U.S. Soil Conservation Service and others) in coordination with the Federal Emergency Managment Agency. Includes information about purpose, risk, ownership, emergency action plans, date built, etc. Information is available on CD-ROM and the package includes a summary booklet of highlights. Contact: FEMA's National Dam Safety Program, Federal Emergency Management Agency, 500 C Street, SW, Washington, DC 20472.

**National Park Service's Inventory of Dams**

The National Park Service (NPS) maintains a database of all NPS and non-NPS dams that affect park maintenance, operations or safety. Includes information about more than 100 dam removals. NPS has adopted policy that non-essential dams should be removed and the impoundment area restored if economically and environmentally warranted. Contact: Charles Karpowicz, NPS, Code 610, Engineering and Safety Service, P.O. Box 37127, Washington, D.C., 20012-7127. (River Network has 1994 information).

**EcoNet's Dams Conference** (env. dams)

One of the many on-line EcoNet conferences. Opportunity to learn about other dam campaigns, share your information, or request assistance. Contact: Institute for Global Communications, EcoNet, 18 DeBoom Street, San Francisco, CA 94107, (415) 546-1794.

*Rivers at Risk: The Concerned Citizen's Guide to Hydropower* by John D. Echeverria, Pope Barrow and Richard Roos-Collins for American Rivers, 1989. Excellent reference on FERC licensing and relicensing and how to participate effectively in the process. Available from Island Press for $17.95 at (800) 828-1302.

*Lifelines: The Case for River Conservation* by Tim Palmer, 1994. Includes two chapters specifically about dams, providing insights on numerous campaigns, studies, and agency policies. Available from Island Press for $17.95 at (800) 828-1302.

*Down by the River: The Impacts of Federal Water Projects and Policies on Biological Diversity* by Constance Elizabeth Hunt, 1988. Begins with background on river management and dam impacts, then focuses on implications for several major river systems in the U.S. Published by Island Press $22.95.

*15 Damnable Dams* by Oregon Natural Resources Council. 1994. Contact: ONRC, 522 SW Fifth Ave., Suite 1050, Portland, OR 97204, (503) 223-9001. Available for a nominal price to river advocacy groups.

Grooms, Steve. 1994. "Undoing the Dams," *The Flyfisher.* Summer 1994:27-29.

Williams, Ted. 1993. "Freeing the Kennebec River," *Audubon.* September-October 1993:36-42.

*Wild Atlantic Salmon: An Endangered Species—A Proposal for the Restoration of Wild Atlantic Salmon to New England Rivers.* 1993. RESTORE: The North Woods, PO Box 440, Concord, MA 01742, (508) 287-0320.

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Pawloski, James and Leon Cook. 1992. "Salling Dam Drawdown and Removal." *Proceedings of the Association of State Dam Safety Officials, Ninth National Conference.*

*Draft Environmental Impact Statement Elwha River Ecosystem Restoration,* Olympic National Park, Washington. October 1994. Contact: National Park Service, Denver Service Center, 12795 W Alameda Parkway, P.O. Box 25287, Denver, CO 80225-0287.

*Environmental Studies Concerning Four Alternatives for Rodman Reservoir and the Lower Ocklawha River.* Prepared for the Florida Department of Environmental Protection by St. Johns River Water Management District. December 15, 1994. For more information contact Florida DEP at (904) 488-3701.

# Restoring Florida's Ocklawaha River

*—continued from page 11—*

Given the political maneuvering by reservoir and barge canal proponents over the decades, and now the political manipulations by a powerful state senator, FDE believes that sound science and economics, and the public interest may not prevail. Only an informed and active public pressuring their legislators can ensure that the river restoration alternative becomes state policy in 1995. FDE has developed an impressive set of materials—a professional quality video, editorials from newspapers across the state, numerous calls to action in FDE newsletters, and letters of support from prominent agencies, organizations and individuals—to educate concerned citizens and to encourage them to voice their support to their state legislative representatives. Other FDE public education strategies include making presentations on the issue across the state and actively working with the media to cover the issue.

FDE is also focusing on direct lobbying of the state legislature. It wants to make sure that Florida legislators have all the facts and support they need to make a final decision to restore the river in 1995. FDE has given a copy of their impressive 20-minute video and literature to each state legislator, and has taken many of them out on the river to experience it firsthand.

FDE has built a strong economic argument for removing Rodman. The cost of restoring the Ocklawaha to its original course has been estimated at $4 to $6 million, while the maintenance and management of the dam and reservoir costs Florida taxpayers approximately $1 million each year, forever. A proportion of these costs are for controlling noxious weeds in the shallow, six-foot reservoir with drawdowns and herbicides. Once restored, the Ocklawaha River, renowned for over a century for its excellent fishing, will maintain itself at virtually no cost.

To counter the argument that the loss of bass fishing—the only use for the reservoir—would hurt local economies around the reservoir, FDE and others note that a restored flowing river would actually increase recreational opportunities for canoers, boaters, hikers, campers, and hunters, while bass fishing interests still have access to an abundance of natural lakes within a 30-mile radius. In January the economic component of the new study was released. It reinforced what FDE has long claimed to be the case: the benefits to the local economy from keeping the reservoir and managing it as a recreational fishery are negligible—amounting to less than 1% of taxable sales.

As the 1995 Legislative session is about to begin, the case for restoring the Ocklawaha is stronger than ever. The decades of work by river conservationists is paying off in new state policies and programs designed to protect and restore river systems. Florida's Statewide Greenway Program, restoration of the Kissimmee and the Everglades, and the widespread support for the restoration of the Ocklawaha are examples of a changing political climate. It is now up to the Florida State Legislature to decide if it will endorse existing state policy to restore valuable natural systems like the Ocklawaha River, or bow to the pressures of a few local politicians that are willing to sacrifice a state natural treasure for short-sighted, local interests.

For more information about Rodman Dam, Ocklawaha restoration efforts and how you can help, contact Florida Defenders of the Environment, Ocklawaha Restoration Project, 2606 NW Sixth St., Suite E, Gainesville, FL 32609, (904) 372-6965.

*Gary Appelson is the coordinator of FDE's Ocklawaha Restoration Project.*

# Join the River Network Partnership

*Becoming a River Network Partner will help you save your river by:*

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- **Enabling you to share information and learn from other river guardians;**
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## Benefits

River Network Partners receive ongoing service:

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*— George Cofer*
*Save Barton Creek Association, TX*

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River Network Partners are asked to **share information** about their river-saving work, **provide feedback** on assistance provided, and **pay annual dues:**

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| Budget | Annual Dues |
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| $0-20,000 | $60 |
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*Individual Partners*—Individuals committed to taking action or a leadership role to save a particular river or watershed. Dues: $60.

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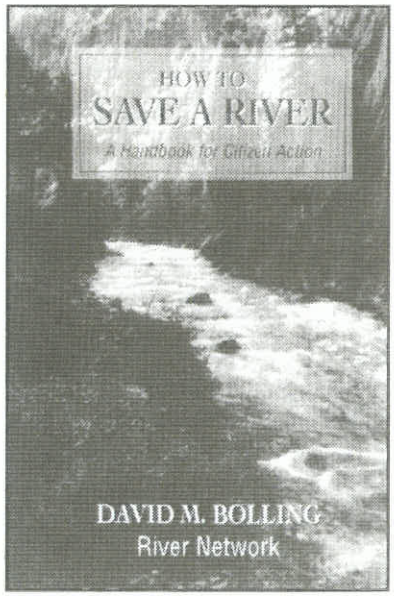


David Bolling is an award-winning journalist who has written about rivers and river issues for more than 20 years. He is cofounder and president of Friends of the Russian River and former executive director of Friends of the River.

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