The US Experience

The majority of dam removals have occurred in the US, where more than 75,000 dams over two-meters high obstruct some 950,000 km of waterways. In the past 75 years, hundreds of dams have been removed in at least 43 states. The dam decommissioning trend is accelerating in the US, with 177 dams removed in the past decade, including 26 small dam removals in 1999.

One reason for the increase in decommissioning activities is the poor condition of the nation's dams, 1,800 of which are officially deemed unsafe. By 2020, 85% of all government-owned US dams will be at least 50 years old, the typical design lifespan. Supporters of dam removal are calling attention to a serious lack of funding for dam safety programs. Secondly, dam removal is an emerging option in relicensing proceedings, in which private hydropower dam owners seek to renew 30- to 50-year operation agreements with the Federal Energy Regulatory Commission (FERC). More than 500 FERC licenses will expire in the next decade.

The dam relicensing process is forcing dam owners, government decision-makers, river advocates, and affected communities to re-evaluate the costs and benefits of dams, especially in light of mandates to protect endangered species, recognize tribal fishing rights, and give "equal consideration" to fisheries, recreation, and environmental quality. In a growing number of cases, removal of unsafe or obsolete dams represents the best river management option. A flood of river restoration campaigns currently advocates the removal of more than 100 dams from Maine to California. The most ambitious of these proposals is the effort to drain the huge "Lake" Powell reservoir and restore the desert beauty of Glen Canyon.

FISHERY RESTORATION

Dams wreak havoc on native fisheries and river ecosystems. Dams obstruct river flows, alter nutrient cycles, block fish migration, and disrupt temperature regimes and dissolved oxygen levels favorable to aquatic life. In addition, prime habitat is commonly lost, and exotic fish species introduced.

Rivers are resilient, however. After a dam is removed, fisheries and hospitable habitat conditions return remarkably quickly. Dam removal alone may be insufficient to fully restore river systems, however, and may need to be accompanied by additional measures, such as protection of native fisheries, pollution abatement, restoration of riparian habitat, and stricter watershed management policies, to increase the rate and extent of restoration.

One year after the 1999 Edwards Dam removal, migratory fish returned in abundance to previously impounded parts of Maine's Kennebec River. The alewife, a migratory species that depends on access to upstream spawning grounds, returned by the millions to a stretch of that river which hadn't seen them in 160 years. In an attempt to protect other sea-run species, including endangered Atlantic salmon, nine more dams are slated for removal on Maine's coastal rivers. Fish diversity in Wisconsin's Baraboo River more than doubled, from 11 to 24 species, just eighteen months after restoration of the first free-flowing conditions since 1850. In France, the 1998 removal of two dams on Loire River tributaries is already revitalizing native shad, lamprey and salmon populations.

Small Dam Removal

Most of the 500 documented dam removals in the US involve obstructions less than 12 meters high. Removal of these dams is helping to restore hundreds of kilometers of habitat and invigorate stewardship of local watersheds.

COST

Dam owners, whether private or government, rarely plan or accept responsibility for the costs of decommissioning. Yet dam removal costs in many cases are significantly less than estimated expenditures for long-term safety and environmental compliance, repair, and maintenance. Removal costs of 70 small dams in Wisconsin, for example, were found to be an average of two to five times less than estimated repair costs. On the Baraboo River, the cost of removing the 3-meter-high Oak Street Dam was $30,000, compared to dam repair estimates of $300,000. In Maine, removal costs for the 8-meter-high Edwards Dam were roughly one-third the $9 million price tag of upgrading fish ladders to meet mandatory relicensing conditions.

Even large dams may be cheaper to remove than to repair and refurbish. Removing the 40-meter-high Condit Dam in Washington, for example, is predicted to cost $15 million. Estimated repair costs are twice that amount. The full cost of purchasing and removing the Elwha River dams is expected to exceed $200 million over a 20-year period, but paying reparations to local affected people could cost much more.

In Wisconsin, community advocates working with state and local governments are making small dam removal the cornerstone of a statewide river restoration program, establishing the state as the national leader in small dam removal. The River Alliance of Wisconsin recently worked with a community to remove three unsafe, uneconomical small dams on the Baraboo River in south central Wisconsin. Removal of a total of four Baraboo River dams will be completed by 2002, freeing a 193-km stretch of river—the largest ever restored through dam removal in the US. Dismantling the dams on the Baraboo River will improve recreational fisheries, benefit diverse local stakeholders, and cost significantly less than dam repair.

Cost-effective river restoration projects in Wisconsin, and elsewhere across the US, are spurring efforts to decommission larger, more complicated projects in North America and around the world.

Columbia River Basin Regional Case Study

More large dams are proposed for removal in the Northwest US than anywhere else. Dams built since 1900 have caused catastrophic declines in Pacific salmon runs. As a result, activists, including the Northwest office of Friends of the Earth, are demanding removal of several large dams in Washington, including those on the Elwha, White Salmon, and Lower Snake rivers. Native American communities affected by these dams are redefining the legal basis for dam removal by affirming tribal fishing rights and government treaty obligations.

Dam decommissioning in the Northwest is significant for several reasons:

- indigenous peoples are intervening in dam relicensing and exerting fishing rights;
- endangered species protection and watershed restoration are being made a higher public policy priority;
- government agencies are funding decommissioning studies and dam removal,
- the size, complexity, and cost of dams proposed for decommissioning is unprecedented.

Elwha River, Washington

The 32-meter-high Elwha Dam and 82-meter-high Glines Canyon Dam—the highest dams ever slated for removal at government expense—were built in the early 1900s to power timber mills in the nearby town of Port Angeles. The private dams, now within the Olympic Peninsula National Park, destroyed magnificent local runs of Pacific salmon, diminishing an important cultural symbol. Extinction of Elwha River sockeye salmon, and drastic declines in the river's ten other native species, undermines fishing rights of the Lower Elwha Klallam, a federally recognized Indian Nation. In 1992, the government finally heeded tribal demands to provide "full restoration" of the Elwha River, including dam removal. After 25 years of campaigning by the Lower Elwha Klallam Nation and conservation organizations, Congress approved funds in 1999 to purchase the dams. Once acquired, the government will begin dam removal activities estimated to cost at least $100 million. Restoration of the Elwha represents the last, best hope for resolution of Lower Klallam fishing rights and the return of a once spectacular salmon river.

White Salmon River, Washington

A historic 1999 agreement between the Yakima Tribe, government agencies, conservation groups, and the dam owner requires the removal of a 38-meter-high private hydropower dam at the owner's expense. Dismantling the 87-year-old Condit Dam will bring back free-flowing conditions to the entire 72-km White Salmon River. Dam removal will help restore critical habitat for endangered salmon from the river's pristine headwaters all the way to its confluence with the Columbia River. Keeping the dams and complying with FERC relicensing conditions, including modern fish ladders, could cost dam-owner PacifiCorp more than $30 million—roughly two times dam removal estimates. PacifiCorp, a major regional power company, promises to finance the removal through a decommissioning fund generated by future hydropower revenues. Successful incorporation of tribal interests and dam-owner acceptance of financial accountability for decommissioning costs are critically important lessons with far-reaching implications for river advocates around the world.

Lower Snake River, Washington

A high-profile national campaign is pushing for decommissioning of four dams on the Lower Snake River in eastern Washington, which historically supported 50% of the 15 million salmon returning annually to the Columbia River Basin. Today, the river faces a fisheries catastrophe, despite a 30-year, $3-billion hatchery and mitigation program. The 30-meter-high dams were built after 1960, severely impeding fish migration, and are now blamed for the salmon's imminent extinction. Dam critics, including Lower Columbia River Basin tribes whose salmon are guaranteed by treaty, are calling on government agencies to honor native fishing rights and uphold the Endangered Species Act. Many support breaching the multi-purpose dams, thus returning a 225km stretch of river to free-flowing conditions. Immediate breaching of the dams and recovery of the fishery will avert further litigation and tribal trust liabilities that could cost the government billions of dollars—many times more than the cost of removing the dams in the first place.

The debate on whether to remove the Lower Snake River dams illuminates a trade-off between particular economic benefits, such as subsidized irrigation, electricity, and river barge traffic, and broader societal values supporting healthier river systems.