

Restoration of the Baraboo River through Dam Removal: A Summary

by John Exo, UW-Extension

The Setting

The Baraboo River flows approximately 100 miles from its headwaters near Hillsboro to its confluence with the Wisconsin River south of Portage. Its watershed encompasses 650 square miles, or about 415,000 acres. Through its course, the Baraboo drops over 150 feet in elevation. However, forty-five feet of that gradient occurs in a four to five mile stretch of the river through the City of Baraboo. This concentration of relatively steep gradient was recognized by early white settlers for its potential to generate mechanical power and became known as the "Baraboo Rapids." In 1837 settlers began displacing Native American inhabitants and soon thereafter constructed the first of five dams on the river. From the mid- to late nineteenth century the dams were the life and economic engine that drove the local economy, powering grist, lumber, and other essential milling enterprises.



The Situation

Dams transformed the Baraboo Rapids segment of the river from a fast-moving stream with healthy fish populations to a series of sluggish impoundments. Swift currents once kept river sediments scoured from the bottom and maintained steady oxygen levels. The impoundments' slow current and deep pools allowed silt from the watershed's developing agricultural lands to settle on the river bottom, covering once-productive aquatic habitat for invertebrates and the fish they support. Except during extremely high flows, when the dams were occasionally destroyed, fish migration into and through the Baraboo Rapids for spawning ceased. An environment that once supported a spawning population of lake sturgeon in pre-settlement days became known in modern times for the size of its carp, which thrive in the shallow backwaters of the impoundments. Over the years two of the dams were removed (the latest in 1973), re-exposing a portion of the former rapids. Of the three remaining dams one was owned by the City; two by a private individual.



Two events occurring in the fall of 1994 helped bring the situation into focus. A survey by Wisconsin Department of Natural Resources (WDNR) fisheries biologists revealed vast differences in both abundance and diversity of fish species between the impoundments and riffle areas. Ten species of fish found below the lowest dam were not found between or above the

dams, including walleye, sauger, burbot and lake sturgeon. At about this time, an inspection of the middle, City-owned Waterworks dam by the WDNR revealed deficiencies in its structure, maintenance and flood routing capacity. The City was given the option of either making the necessary repairs necessary to bring the dam up to state codes or remove it. After hiring an outside consultant to study the feasibility and cost of the options, the **City of Baraboo** decided to remove the dam, which provided no economic value. The Department of Natural Resources, a local canoe club, a statewide river advocacy organization, [the River Alliance of Wisconsin \(exit DNR\)](#), and many others actively supported dam removal for environmental, economic, and recreational benefits.

In addition, the WDNR began negotiations to acquire the Linen Mill and Oak Street dams to enable eventual removal. These structures have long since been converted to small hydroelectric dams, and thus, fell under the jurisdiction of the Federal Energy Regulatory Commission (FERC). FERC regulations require hydro facilities to be licensed every 50 years, and, since these dams had never been licensed, were required to do so. Inspections and photographs revealed that their physical condition was worse than the City Dam. WDNR, recognizing the owner's extraordinary financial liability as well as the environmental potential removing *all three* dams presented, was successful in negotiating to acquire them.

The Solution

After numerous public meetings and successful negotiations between the City, WDNR, State Historical Society and the Circus World Museum, a decision was finally made to remove the Waterworks dam, conditioned on certain steps to mitigate the loss of historic appearance the impounded river provided. In December, 1997 breaching of the dam began, with final removal in April, 1998. That Spring, after three river cleanups by the Baraboo River Canoe Club, the exposed banks quickly re-vegetated, and the river became a central focus of Circus World Museum's new attraction, the "elephant splash-around."



Meanwhile, negotiations between the WDNR, the City and the remaining dams' owner continued until an agreement was reached. WDNR took title to those dams for one dollar each, while the City has acquired accessory properties for park and transportation use. This landmark agreement -- made possible by the hard work of several partners, including the **City of Baraboo**, [UW-Extension \(exit DNR\)](#), the WDNR, the [River Alliance of Wisconsin \(exit DNR\)](#), local citizens, and many others -- facilitates removal of the final two dams on the mainstem of the lower 60 miles of the Baraboo River. The Oak Street Dam was planned to be removed in 1999. Contaminated sediments in the impounded area were discovered and will have to be removed first---causing the dam removal to be delayed. The Linen Mill Dam will be removed by September, 2002.

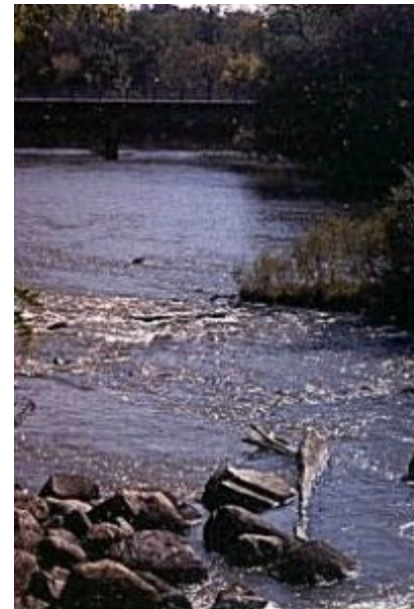
The Outcomes

Some of the outcomes have yet to be determined (especially economic benefits), since the project is far from complete. However, a number of key results should be noted:



By removing the Waterworks Dam, the City of Baraboo has permanently eliminated a major current and future liability, for less than one-third the cost of repairing the structure. The City was paying \$5,000 annually in liability insurance for the dam and its association structures.

Three-quarters of a mile of high-quality riffle habitat, rare in southern Wisconsin rivers, has been restored to its free-flowing condition following removal of the Waterworks Dam. Full function will be restored once remaining sediment scours itself from the former impoundment.



By transferring title to the WDNR, the owner of the two private dams eliminates 1) the present liability of licensing them (estimated by many to be several hundred thousand dollars) under FERC regulations, 2) repairs needed to maintain them as safe structures capable of upstream and downstream fish passage.

The City, as part of the Oak Street dam agreement, has acquired a key parcel of land for its developing Riverwalk, and another integral to a safe, revitalized transportation corridor on the historic Water Street.

Expanded opportunities for recreation for locals and tourists will result from removal of the dams. The free-flowing "Baraboo Rapids" will be a significant attraction for people seeking more challenging canoeing or kayaking. As sediment gradually scours itself from the former impoundments, game fish habitat will reappear, providing a new and expanded fishery and creating additional angling opportunities.