



WILLOW RIVER

REMOVAL OF THE WILLOW FALLS AND MOUNDS DAMS IN WISCONSIN

DAM REMOVAL BENEFITS: IMPROVED FISH HABITAT, ENHANCED AESTHETICS, IMPROVED WATER QUALITY, ELIMINATED PUBLIC SAFETY HAZARD, COST SAVINGS

SUMMARY

The Willow Falls and Mounds Dams were both removed during the 1990s from the Willow River in northwestern Wisconsin. The dams were located in the Willow Falls State Park, just across the border from the Twin Cities of Minneapolis-St. Paul, Minnesota. Public safety factors triggered both removals, and both removal decisions were made primarily for economic reasons.

There were three dams on the Willow in the state park. The steep gradient that made these sites ideal for power generation also made them visually striking restorations. The Willow Falls Dam (the middle of the three dams) was taken out in 1992, restoring a valuable coolwater fishery, as well as the dam's namesake, Willow Falls. The removal also uncovered a stunning limestone gorge, a scenic waterfall, and cold springs. The Mounds Dam, upstream from the former Willow Falls Dam site, came out in the winter of 1998, exposing a narrow and steep stream channel with cascading riffles. Removal of both dams together has restored four miles of trout stream.



THE RIVER

The Willow River is naturally a coolwater stream. It flows from its headwaters in Polk County, northeast of the town of Deer Park, 40 miles southwest through the heart of the Willow Falls State Park, to the federally-designated Wild and Scenic St. Croix River near North Hudson. (The St. Croix then continues on to the Mississippi River.) The Willow River segment that flows through the park has a steep gradient and steep sides. In the late 1850s, before any of the three dams had been built, the Willow's picturesque gorge was a

fashionable place to picnic. Today the river corridor and park, located along the Mississippi Flyway, provide habitat for over 200 species of birds.

THE IMPACT PRIOR TO REMOVAL

Although the reported dates vary, it appears that all three dams were originally built in the late 1800s to power lumber and flourmills. All were later used to produce electricity. Northern States Power Company, the last private owner of the dams, stopped generating power on the river in 1963 and shortly thereafter donated the dams and 1,300 acres of land to the state for a park.

Damming the Willow River destroyed its historic cool water fishery and rerouted water away from the scenic Willow Falls. The dams caused unnatural and damaging changes in river flows, temperatures, and oxygen levels. The solar heat in the impoundments was especially damaging to trout populations. The Mounds impoundment had very poor water quality largely due to polluted runoff from farmland and urban areas. Prior to removal sediments built up behind the dams and filled the impoundments with silt. Floating vegetation and debris were present three seasons of the year, and were particularly prolific during summer months, making recreational values of the impoundment poor.

WILLOW FALLS & MOUNDS DAM REMOVAL FACTS:

- ¥ Height: 60 ft & 58 ft
- ¥ Impoundment: 100 acres & 57 acres
- ¥ Built: 1870 & 1926
- ¥ Purpose: power for mills (both)
- ¥ Owner: Wisconsin DNR (both)
- ¥ Regulatory jurisdiction: state (both)
- ¥ Estimated cost of repair: concrete beyond repair, no estimates made & \$3.3 million to \$6 million
- ¥ Estimated cost of removal: \$622,000 & \$1.1 million
- ¥ Cost of removal: \$450,000 & \$170,000
- ¥ Removed: 1992 & 1998

THE REMOVAL DECISION & PROCESS

There was considerable study of all three dams. In the late 1980s, the owner of the dams, the Wisconsin Department of Natural Resources (DNR), formed the Willow River Dams Task Force to address complex issues involving the state's ownership of the dams. A 1988 report showed overwhelming public support for the repair of all three structures, but concrete testing showed that the Willow Falls Dam was in such bad condition it was literally beyond repair. The state proceeded with removal of the Willow Falls Dam. The actual cost of removal was approximately 85 percent less than estimated.

The state was planning to repair the Mounds Dam when a 1989 inspection found the structure did not meet safety standards. Preliminary repair estimates for the Mounds Dam were \$1.5 million. But, within a few years, these estimates increased to at least \$3.5 million, and by 1997 repair estimates skyrocketed as high as almost \$7 million. (Wisconsin experiences show that underestimation of dam repair costs is typical. In the early 1990s, for example, the Mounds Dam underwent sluice gate repairs that were estimated to cost \$35,000, but actually cost \$102,500—a nearly 300 percent increase from the estimate.) In contrast, estimates for the removal of the Mounds Dam in 1997 were \$1.1 million. For economic reasons, the state decided to proceed with removal. The actual cost of removal was only \$170,000.

RESTORATION OF THE RIVER

The two-mile river segment restored by the Mounds Dam removal contains a 37-foot drop in elevation. Removal of both dams has restored a total of four miles of the Willow River. This stretch of the river now features a narrow and steep stream channel with cascading riffles, several small waterfalls, cold

springs, and a stunning limestone canyon. The restored Willow Falls waterfall has become one of the most popular attractions in the park. In 1996, it graced the cover of the city of Hudson's promotional brochure.

REMOVAL BENEFITS:

- ¥ Restoration of 4 miles of trout fishery
- ¥ Recreational improvements to the Willow River State Park, including a new trail system
- ¥ Restoration of scenic Willow Falls and other natural landscape features
- ¥ Removal of safety threat to park visitors
- ¥ Saving of taxpayer dollars

Following removal of the Mounds Dam, the river's natural flushing ability gradually moved sediment downstream from the reservoir. The exposed lakebed was then ripped and seeded, and stream stabilization structures were installed. The stream segment is now managed as habitat for brown, brook, and rainbow trout. Just one year after the Mounds Dam removal, a fish survey found 13-inch brown trout and 15-inch rainbow trout in the restored stream segment.

A new series of hiking and running trails now runs along the restored stream, providing easy public access to the water and overlooking many scenic vistas restored through the dam removal. Visitors to Willow Falls State Park might also be interested in visiting the nearby town

of Somerset (11 miles north), where river tubing businesses now thrive on the Apple River, following removal of the Somerset Dam in 1965.

FUTURE EFFORTS TO RESTORE THE RIVER

According to local anglers, the trout fishery below Willow Falls was excellent after the removal of the Willow Falls Dam. As expected, following the removal of the Mounds Dam upstream, the fishery has been degraded as years of sediments continue to flush downstream. However, the river segment was stocked last season with trout, and now maintains a healthy fishery. Some sediment from the removal of the Mounds and Willow Falls Dams has settled downstream in Little Falls Lake (formed by the Little Falls Dam). The Wisconsin DNR is considering dredging this sediment from the impoundment when funding becomes available. There are no plans to remove Little Falls Dam.

THE SIGNIFICANCE OF THIS REMOVAL

The Willow Falls State Park is one of the most popular in the state, not only for its scenic beauty, but also because of its close proximity to the Twin Cities area (Minneapolis-St. Paul, Minnesota) which has a population of over two million people. The removal of the Willow Falls and Mounds Dams restored four miles of trout waters adjacent to this large and rapidly growing metropolitan area. The dam removals also restored the scenic beauty of the original gorge. The restoration saved taxpayers the high costs of repairing the two old structures and the burden of future repair and liability.

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