

The U. S. Army Corps of Engineers (USACE) constructed the Princeton Dam in 1897 as part of its river transportation improvements on the Fox River. The dam is located approximately eight miles downstream from Lake Puckaway, and about 1 mile upstream from the City of Princeton. The site was chosen so the dam would raise the water in the river channel enough to provide clearance for the large steamboats that were expected to navigate the river.

The dam is 180 feet long and is constructed of timber rock-filled cribs, covered with wood planking and a concrete cap. The structural height of the dam is about eight feet. USACE used 12 inches of wooden flashboards placed along the concrete crest of the dam behind metal pins to raise the water for navigation.

The lock chamber was constructed of large sandstone blocks and originally lined with wood planking. The lock is about 35 feet wide and 100 feet long. Two sets of double gates allowed the lock tender to raise and lower boats by flooding the lock chamber from above and lowering the water in the lock chamber by releasing it below.

The dam and lock were constructed, along with other dams on the river, to allow steamboat access from Lake Butte des Morts to the Portage canal connecting the Fox and Wisconsin Rivers. USACE operated the lock system to maintain adequate depth for navigation during low-flow periods. In addition to raising water levels with the dams, USACE also had an extensive dredging program to deepen the main channel of the river to aid navigation.



During the 1950s, USACE realized river navigation would never economically compete with the railroad. So, they abandoned the lock canals, removing the double swing gates and replacing them with one set of lift gates. The State of Wisconsin took ownership of the dam from the USACE in 1961. In the early 1970s, the Wisconsin Department of Natural Resources (DNR) began placing an additional 6 inches of boards on the dam to raise the water levels further.

For the most part, DNR maintains the same operational regimen of placing flashboards on the dam in spring and removing them in fall, that USACE used to control water levels. The operator of the dam must walk out in the water on the concrete spillway and place metal pins in pre-drilled holes along the crest. Three layers of wooden 2- by 6-inch flashboards are then set on the upstream side of the pins and the water flow holds them in place. As each layer is put on the dam, the water rises behind the flashboards.

In the fall, the procedure is reversed; but in order to take some of the water pressure off the flashboards, the lock gate is opened and flow is redirected through the lock channel. Then the operator is able to walk out on the crest and remove the flashboards.

DNR Fisheries staff has been responsible for the dam's operation from the 1960s until 2000. Safety has always been an issue, since this type of dam operation is extremely hazardous. Since 2000, DNR has hired a contractor to put the flashboards on in the spring and remove them in the fall. In recent years, several modifications to the Princeton Dam have been considered. The DNR and USACOE have examined if the dam could be modified to address safety, fish passage, and habitat restoration concerns.

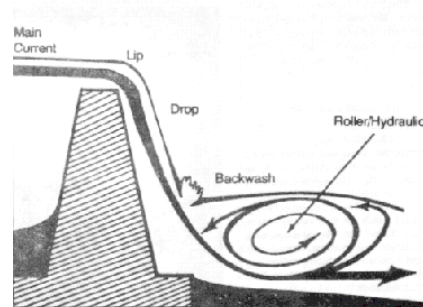
Dam Myths

- The Princeton Dam provides water level control.
- There is a 1:1 ratio of board elevation to lake elevation. In other words if you put two feet of boards on the Princeton Dam, you'll get two feet more water on Lake Puckaway.
- The Princeton Dam should be operated to maintain constant water levels on Lake Puckaway.
- Lake Puckaway will disappear without the Princeton Dam.
- The Princeton Dam provides flood control.
- The Princeton Dam poses no hazard.

For more information readers may contact LPPRD at P.O. Box 6, Marquette, WI 53947, or visit the Wisconsin Association of Lakes website at www.wisconsinlakes.org.

Dam Facts

- The dam raises the water levels on the lake by about two feet. In other words, if the dam weren't there, Lake Puckaway's depth would average about two feet less. However, the dam is a "run-of-the-river" dam - what comes into the lake runs out, without control.
- The actual ratio is closer to 18:11, meaning during periods of low flow, 18 inches of boards on the dam leads to 11 inches of water on the lake. That's due to the terrain around the lake. Increased board elevation causes near-shore wetlands to flood. This prevents the lake from rising the same amount as the boards.
- Constant water levels are not desirable. Vegetation for fish and insect habitat, waterfowl food, and protection from predators thrives on fluctuating water levels. Water levels that are too consistently high kill the vegetation, provide additional spawning habitat for rough fish, reduce the flood buffering effect of fringe wetlands, threaten the shoreline with increased erosion and septic failures, and reduce water quality. Fish, waterfowl, and recreation could all suffer, creating an economic backlash to communities near the lake.
- The area that is the lake was a natural depression and widening in the river before the dam was constructed.
- The dam does not prevent flooding. The design of the dam provides only about two feet of hydraulic head, so has little storage capacity for floodwater.
- A dangerous roller wave occurs below the dam under most flow conditions. (see figure)



A very dangerous roller wave exists below the crest of the Princeton Dam. This roller wave can pull a boat from downstream against the toe of the dam and hold it there, rolling over and over again. It's not unusual to see logs and other debris turning in the roller wave for weeks or months.