



Historical Background

Improving navigation on the Mississippi River began as early as 1824. In 1878, the U.S. Congress authorized the first comprehensive project on the upper river: a 4 1/2-foot channel. This was followed by authorizations for a 6-foot channel in 1907 and the current 9-foot channel in 1928. To achieve the 9-foot channel in the Upper Mississippi River, the construction of a system of navigation locks and dams was authorized in 1930 and expanded in 1932, 1935, 1937, 1945 and 1958.

The U.S. Army Corps of Engineers, St. Paul District, has jurisdiction over the 13 uppermost structures -- No. 10 at Guttenberg, Iowa, to Upper St. Anthony Falls Lock and Dam in Minneapolis. These locks and dams, supplemented by dredging, maintain the 9-foot depth year around.

The Slack-Water Pool System

The Upper Mississippi River dams are constructed from a series of concrete piers across the river with movable gates between the piers. A dam is formed when the gates are lowered, causing the water level upstream of the dam to rise and form a slack-water pool deep enough for navigation.

In order to operate the slack-water pool system, the federal government acquired the necessary real estate to maintain the channel. Much of this land is now used by the public for recreational purposes and as wildlife refuges. Some land is owned outright and some is covered by "flowage easements" allowing artificial flooding of privately-owned land, when necessary.

Open River

During times of high flows, the river provides a channel deep enough for navigation without the use of the dams. This usually occurs following the spring snow melt across the basin. When this occurs, the dam gates are raised completely out of the water so that the river flows free, just like an open river. The dams are used exclusively to maintain the 9-foot channel. They are not used to reduce flooding for both physical and legal reasons.

The physical reason is the pools do not contain enough storage capacity to reduce flood risks. Even if each pool were to be completely emptied prior to an anticipated heavy runoff period, it would take only a matter of hours to refill them and the storage would not noticeably reduce the peak river stages reached by the flood. This is because the amount of storage that could be made available by pool drawdowns is minimal in comparison with flood volumes.

The legal reason for not drawing down pools is the "Fish and Wildlife Coordination Act." This act of Congress, dated March 10, 1934, is entitled, "An act to promote the conservation of wildlife, fish, and game, and for other purposes," as amended by Public Law 732 on Aug. 14, 1946, and again by Public Law 697 on June 19, 1948. The law directs the Corps consider and recognize the needs of fish and other wildlife resources, including habitat. To the maximum extent possible, the law directs the Corps manage these natural resources while

maintaining navigation, too. The law also directs the Corps to operate and maintain pool levels as though navigation were carried on throughout the year.

Dam Operations

The district operates each of its 13 dams to accommodate for river flow conditions. During normal operations, all gates are partially open to allow water to flow through the dam. The gates are adjusted as flows increase or decrease. The Corps' water management plan provides for a continuous 9 feet of depth within the navigation channel without creating higher river stages during flood events. To do this, a control point is created near the intersection of the average high water line and the elevation rise caused by the dam, also known as the project pool elevation. All water level management decisions are made based on ensuring there is at least 9 feet of depth from the control point to the dam. Periodic dredging is also required to maintain the depth.

The dam has minor localized impacts during flood events. The dams were designed such that when all the gates are out of the water, the difference between the pool elevation and the tail water elevation at the dam is less than 1 foot. This difference is commonly referred to as the head differential.

River Stages

The Corps of Engineers shares its data on river stages and flows to the National Weather Service forecast office in Chanhassen, Minnesota. The NWS is responsible for issuing public warnings, watches and statements on current river levels and flood forecasts. The flood forecasts are referenced to elevation in feet above mean sea level or to an arbitrary stage reference point known as the gage datum.

For safety reasons, those who use the river should become familiar with these reference points and the river levels which results in the most favorable depths and conditions for the particular activity in which they are engaged. Those interested in navigating a particular portion of the river should check river levels in that area.

To obtain further information about pool management, please contact the St. Paul District Water Management Center at **(651) 290-5633**.