

Christine & Hickson Dams, Red River

Dam Modification with a Rock-Arch-Rapids



Christine Dam



Hickson Dam

Owner of both dams: City of Fargo
Year Built: Hickson in 1933, Christine in 1937
Original Function: City drinking water supply during extended drought of the 1930s
Project Partners & Funding Sources: MN DNR, USFWS, City of Fargo and Moorhead, ND Game & Fish, ND State Water Commission, Buffalo-Red Watershed District, National Fish & Wildlife Foundation, Southeast Cass Watershed District

Background: Momentum for removing and modifying dams on the Red River began with Midtown Dam, located in Fargo/Moorhead. This dam was modified in 1999 to improve safety (19 known, as many as 25 people drowned in the hydraulic roller below the dam) and to restore fish passage. Subsequently, four more dams on the Red River were modified (two more in Fargo/Moorhead, one in Wahpeton/Breckenridge, and one in Grand Forks). These dams were no longer serving their original purpose of water supply, so were a safety concern and barriers to fish migration.

Reason for modification: To improve safety of the dam and to provide fish passage.
Project Designers: Nathan Boerboom (Project Engineer), City of Fargo; Luther Aadland, MN DNR
Completed: 2012
Cost: \$1.95 million for both

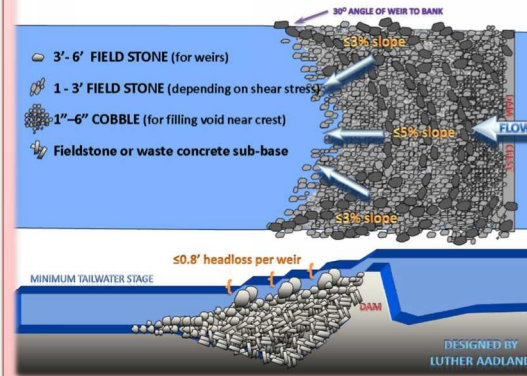


Largest lake sturgeon (405 pounds) taken from Roseau River in 1903, before dams fragmented the rivers making migration to high gradient spawning areas impossible.



Reconnecting the Red River of the North Basin

Reconnect the Red is an effort among numerous agencies, government units, and local communities to restore lake sturgeon populations, enhance other fish populations, and make the river a safer place to fish and boat. To date, 37 barriers to fish migration have been eliminated in the Red River Basin opening hundreds of miles to migrating fish. Stocking of lake sturgeon, which began in 1997, has reintroduced this native species and their survival has been found to be good, so far. Up to two dozen fish species, including walleyes, saugers, northern pike, and channel catfish, have been observed using the artificial rapids to pass upstream. Only two dams remain on the mainstem of the Red River, one in the U.S., in Drayton, and one in Manitoba.



Rock-Arch-Rapids Design: A wedge or ramp is constructed of base rock, with a slope no greater than 5%. Hemi-circular weirs or arches, using properly sized boulders, are constructed on the ramp, with ≤ 0.8 foot of head loss per weir.



Christine site



Hickson site

Advantages of this design:

- Creates convergent flow, where much of the energy is dissipated in the center of the rapids and near bank velocities are reduced. This protects the banks.
- Boulders in the weirs buttress against each other adding stability.
- Provides grade control in streams that are entrenched or susceptible to head cutting.
- Provides fish passage by creating low velocity eddies. Fish passage is possible in all flow conditions.
- Provides spawning habitat.
- Provides whitewater boating opportunities.
- Improves safety by eliminating hydraulic roller.

Ecological and Recreational Benefits:

- ◆ Hundreds of miles of the Red River of the North are now reconnected during all flows. Now only two dam remains on the mainstem of the Red River.
- ◆ Over 70 species of fish in the Red River will benefit, including Lake Sturgeon.
- ◆ Provides whitewater boating opportunities.