

Rehabilitation of North Dakota Watershed Dam Ensures Continued Flood Protection and Availability of Water-Based Recreational Area

Tongue River Watershed Dam No. M-4, known locally as Renwick Dam, was constructed in 1962 by the Pembina County Water Resource District with the assistance of the USDA Natural Resources Conservation Service (NRCS). It is one of ten dams in the Tongue River Watershed Project.

The dam is located five miles west of the City of Cavalier in Icelandic State Park. The dam creates a 181 surface acre lake that is a popular recreation area with camping, boating and a beach with public swimming.



Renwick Dam was originally constructed as part of a USDA Pilot Watershed Program for the purpose of protecting downstream agricultural lands from flooding. As a result of the flood protection, development downstream from the dam was possible, which allowed the establishment of many residences and businesses.

In response to this growth of downstream residences and businesses, the North Dakota State Water Commission in 1978 determined that the Renwick Dam was a high hazard structure and was in need of maintenance and rehabilitation. They made this determination based on the potential loss of life due to numerous homes, businesses, public care facilities, roads and bridges existing in the downstream dam breach zone. The NRCS also classified this dam as a high hazard structure.

Project sponsors rehabilitated the dam with assistance from NRCS in two phases between 2010 and 2014. The dam was upgraded to meet current high hazard dam safety criteria and extend its service life for another 100 years. Phase one completed in 2012 raised the height of the dam by five feet and settlement plates were placed across the new fill material to monitor any settlement prior to phase two. Phase two included excavation of a new 500-foot wide spillway near the center of the dam. Concrete retaining walls over 20-foot in height were constructed along both sides of the spillway.

The stepped spillway was then constructed with air-entrained roller compacted concrete. A five-foot thick stilling basin was constructed at the bottom of the spillway and then 32 one-foot thick steps each 500 feet wide were constructed to the top of the spillway.

A 2,200-foot long two-lane road was constructed along the upstream face of the dam to provide access to Icelandic State Park located on the north side of the lake.

The NRCS provided technical assistance and 65 percent of the design and construction cost (\$5.8 million); the North Dakota State Water Commission provided \$1.5 million; the Red River Joint Board, \$800,000; Pembina County, \$800,000; and the City of Cavalier, \$56,000.

Rehabilitation extended the life of the dam for another 100 years and will provide flood protection for buildings, transportation services land, crops, and the City of Cavalier as well as providing a major water-based recreational area.

Dwain Phillips
Media Director
National Watershed Coalition
March 2017