

The Oxbow

FROM THE NORTH DAKOTA
STATE WATER COMMISSION

2020

WATER COMMISSION CONSTRUCTION SEASON OVERVIEW

Throughout the 2020 Construction season, the State Water Commission's (SWC) design and construction section conducted various repairs and modifications to water resource structures statewide, as well as assisting in Devils Lake outlet operations. Featured below are an assortment of projects completed in the last 12 months.



Construction of a new gage-house at Willow Creek in Bottineau County.

U.S. GEOLOGIC SURVEY

At the request of the U.S. Geological Survey (USGS), a new gage-house was constructed at Willow Creek. The Willow Creek gage, located in Bottineau County, was gradually deteriorating and needed updating. The SWC construction crew constructed a new gage-house on the opposite bank of the creek, utilizing materials provided by the USGS. The SWC assisted on various other maintenance and improvements of the USGS's stream gaging sites across the state during the 2020 construction season.

WHITE EARTH DAM, MOUNTRAIL COUNTY

White Earth Dam is an embankment dam eight miles north of the city of White Earth in northern North Dakota. White Earth Dam consists of a 160-acre recreation reservoir and was built in 1970. The dam is owned by the Mountrail County Water Resource District.

The dam's principal outlet design consisted of a 60-inch reinforced concrete pipe (RCP) riser and 113 feet of 36-inch RCP conduit through the embankment. Over the years, ice forces caused the upper section of the riser to tilt and separate from the lower section. This created a path for water to enter the outlet at a much lower elevation than originally designed, causing the reservoir level to drop below its normal pool elevation, even during the wettest years.

The SWC's construction crew began work on the project by constructing an earth berm work platform next to the riser to allow for better access to the work site. The crew then used the Water Commission's excavator to lift and reset the top riser section in order to straighten the riser and to close the gap at the joint. The joint was then filled with sealant.

During construction, a tool was dropped into the standing water at the bottom of the riser. When the standing water was pumped out to find the tool, it was discovered that several large holes had formed in the concrete floor from decades of water plunging down the riser. This issue was addressed and the holes were then repaired by placing concrete inside of them and overlaying the original concrete floor.



Mattson Family Trust Dam was reconfigured to no longer hold water in order to help ensure public safety.

MATTSON FAMILY TRUST DAM, WILLIAMS COUNTY

The Mattson Family Trust Dam is a privately owned, high-hazard earth embankment dam located just upstream from an occupied farmstead in Williams County. Upon inspection, the dam was found to be in extremely poor condition and presented a high risk to residents located downstream. Due to safety concerns, the Office of the State Engineer (OSE) ordered the dam to be breached.

The dam is approximately 10 feet high and 300 feet long. The downstream portion of the spillway pipe was heavily corroded and leaked water that led to internal erosion of the embankment. Seepage was also observed along the downstream toe of the dam. If allowed to progress, these conditions could have led to failure of the dam and flooding to the farmstead.

The SWC construction crew proceeded to excavate a portion of the embankment at the principal spillway. Ultimately, the breach was taken down to the elevation of the bottom of the reservoir and widened, leaving the dam in a configuration where it could no longer hold water.



Construction at the Outfall Structure on the Devils Lake East End Outlet features a high-strength, abrasion resistant concrete repair mortar.

EAST DEVILS LAKE OUTLET

The concrete apron at the plunge pool, just prior to outlet water entering Tolna Coulee eroded due to the impact of water coming over the wall of the outfall structure. The SWC construction crew, along with the Devils Lake Outlet staff, removed the deteriorated concrete and replaced it with a high-strength, abrasion resistant concrete repair mortar.

In Addition, downstream of the East Devils Lake Outlet, the SWC construction crew removed Tolna Bridge and its abutments, sloped the abutments, and placed rip-rap to improve the abutments. Tolna Bridge was a small timber bridge downstream of Tolna Dam. The bridge opening was undersized for the flow from the outlet, and erosion and scour had occurred at the bridge since the start of outlet operations.

The erosion led to the loss of the east abutment of the bridge making it unusable and a hazard to the public. This necessitated the closing and ultimate removal of the bridge. To ensure public safety, the Water Commission partnered with the Nelson County Water Resource District to improve an alternate access route to the east side of Tolna Dam.

WEST DEVILS LAKE OUTLET

As part of a landowner mitigation agreement, the SWC construction crew constructed a cattle-crossing at one of the inverted siphons located along the Devils Lake West End Outlet canal. The crossing consists of an elevated gravel pathway adjacent to a wetland area.