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.

**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.
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.