

2019 WATER COMMISSION CONSTRUCTION SEASON RECAP

During the 2019 Construction season, the State Water Commission’s design and construction section conducted repairs and modifications to water resource structures throughout the state, as well as assisting in Devils Lake outlet operations. Below are a handful of projects completed in the last 12 months.

DAUB DAM, MERCER COUNTY



View of the new low-level outlet pipe, entering the principal spillway structure.

Daub Dam forms the embankment of ND Highway 200A and creates two small recreational fishing reservoirs divided by a narrow isthmus. The reservoirs, also known as East and West Arroda Lakes, are located 11 miles west of Washburn. The dam is formed by two earth embankments which were built in 1971 during improvements to Hwy 200A. The dam is owned by the state, with responsibility for the dam functions falling under the state’s Game and Fish Department.

Daub dam had two low-level drawdown systems, one in each embankment, which were used primarily for water quality improvement in the reservoirs. The low-level drawdown systems consisted of 12-inch ductile iron pipe (DIP) conduits with gate valves at the downstream end. Outlet works with valves at the downstream end, referred to as “downstream

control,” were once popular in dam construction because they are easier to construct and less costly than upstream control systems.

However, downstream control presents a risk of dam failure if the pipe full of water near the downstream toe of the dam starts to leak. A possibility made more likely by the fact the conduit is made of iron. That is what happened at the west embankment of Daub Dam in the spring of 2018. Fortunately, the leak was detected early by Game and Fish staff before significant damage to the embankment occurred. The west reservoir was quickly drained to prevent further damage to the embankment, avoiding the potential loss of this important transportation corridor.

The work on this project began in 2018 when the Game and Fish Department requested cost-share along with technical and construction support from the Water Commission. The goal of the project was to mitigate the risk of the downstream control on both embankments, and to install a new low-level outlet on the west reservoir for water quality benefits. The Water Commission’s construction crew grouted the old low-level drawdown pipes closed in fall 2018. This eliminated the potential for a leak in the pipes, which could erode the dam. But, due to the late season start of the project, the installation of the new low-level outlet had to wait until the 2019 construction season.

The project was completed in the spring of 2019 when the new low-level outlet was constructed. This consisted of installing approximately 300 feet of pipe into the reservoir and connecting it to the west embankment’s principal spillway, with a control structure on the upstream side of the dam, eliminating the hazard of pressurized water inside the embankment.



Before repairs were conducted, sagging and warping of the pipe and a sinkhole was forming. The pipe is shown with new supports after repairs were completed.

DAVIS DAM, SLOPE COUNTY

Davis Dam is located in rural Slope County on a tributary to the Little Missouri River. The dam is an earth embankment built in 1963, and raised in 1985. The dam is a recreation, and fish and wildlife facility owned by the Game and Fish Department.

In spring 2019, a sinkhole was observed above the principal spillway conduit a short distance from the downstream toe of the dam. The conduit is a 36-inch corrugated aluminum pipe. Further investigation revealed that the last section of pipe, added during the dam raise in 1985, had separated from the original pipe. The separation allowed embankment material to erode through the opening, creating the sinkhole.

The Water Commission's construction crew excavated and removed the downstream piece of pipe, constructed a concrete footing under the joint where the two pipes meet to better support the joint, and reinstalled the pipe with a new, wider connecting band to ensure the joint remains tight for years to come. The conduit was then backfilled, and the site was restored by seeding the disturbed areas. The crew also made a repair to the concrete floor of the principal spillway drop structure, where the concrete had deteriorated over the years.

INDIAN CREEK DAM, HETTINGER COUNTY

Indian Creek Dam is an earth embankment dam southwest of Regent, North Dakota. The dam was built in 1979 as a recreation facility. The dam is owned by the Game and Fish Department.

Over the previous several years, the concrete cradle supporting the 36-inch reinforced concrete pipe (RCP) of the principal spillway has been deteriorating. This led to the supports for the toe-drain pipes dropping into the plunge pool, with the end section of RCP soon to follow.

The Water Commission's construction crew excavated the downstream end of the RCP conduit and cradle, demolished the cradle, and removed the RCP conduit sections. This also required removing the downstream sections of the toe-drain pipes. The toe-drains were asbestos-cement-pipe (ACP), which required special asbestos abatement procedures performed by an asbestos abatement contractor.



Prior to repairs, the footings for the pipe were deteriorating. After construction was finalized, the pipe was intact and reinforced.

With the demolition completed, forms were constructed and concrete was placed for a new concrete cradle to support the RCP conduit and toe-drains. The toe-drain sections were replaced with PVC pipe since ACP is no longer installed for water conveyance. The conduit and cradle were then backfilled and graded. The final site restoration has been put off until spring 2020 due to very wet conditions at the site.

US GEOLOGIC SURVEY

Throughout 2019, the Water Commission continued to cooperate with the US Geological Survey (USGS) on the maintenance and improvement of the USGS's stream gaging sites throughout the state.



Maintenance at the USGS gage at Deep Creek in Bottineau County.