

# Rural Water District No. 6, Franklin County, Weathers the Storm

**R**ural Water District No. 6, Franklin County was founded in the early 1970's. As with most new water systems, one of the first major decisions to make was determining the source of the water that would be captured and distributed. While the founders of the district are no longer present, it appears that previous petroleum exploration work may have contributed to the knowledge of the groundwater resources that were originally utilized. The system's three water wells are located on the floodplain of the Marais des Cygnes River (pronounced mare-duh-SEEN which is French for Marsh of Swans), in the middle of an oil field which was

discovered in 1918. The logs of the early oil wells apparently showed a deposit of sand and/or gravel at the base of the alluvium above the bedrock, which served the water district well in the early years. As the district grew, it became clear that the river nearby was the best alternative to an expensive and time-consuming search for more groundwater that had no guarantee of success. Likely with another round of funding, the district moved forward to use water from the river.

## Flood of 1951

For many of us who live in the Topeka area – even those of us that weren't alive then, the years of 1951 and 1966 stand out as years of significance due to natural disasters. A large tornado devastated the southwest side of Topeka all the way to downtown and beyond in 1966. In 1951, it was a very large flood on the Kansas River. This flood also affected Manhattan, Lawrence and Kansas City and all of the communities between and nearby. The flooding was not

restricted to the Kansas River. The Neosho and Verdigris River valleys were flooded, as was the Marais des Cygnes River valley. Some flooding occurred on the Saline, Smoky Hill, Republican and Big Blue Rivers. For Franklin County, the flooding of the Marais des Cygnes River in 1951 was the worst-ever recorded, and that distinction remains today. It is estimated that at the peak of flooding, 148,000 cubic feet per second (c.f.s.) was flowing past the gage at Ottawa.

## Flood of 2019

Improvements have been made to control the flooding on the Marais des Cygnes after the '51 Flood. Dikes now line the river through Ottawa, and rolling flood gates keep the water in the channel where old U.S. Highway 59 crosses the river and connects North Ottawa with the main part of town. Upstream, the United States Army Corps of Engineers constructed Pomona Reservoir and Melvern Reservoir in Osage County to capture high flows in the upper part of the drainage basin and to store water for municipalities and industries when rainfall is lacking. In 2007, flooding in the Marais des Cygnes valley occurred again, with flows at Ottawa reaching an estimated 54,600 c.f.s. Floodwaters were more than three feet above RWD 6's initial settling basin near the river at the peak of flooding. Since 2007, the



City of Ottawa employees use a hook and rope to dislodge tree debris from the upstream side of the Prairie Spirit Rail Trail bridge over the Marais des Cygnes River.



Marais des Cygnes River in Franklin County has only had very minor flooding (in terms of water depth), including May of 2021. However, during the overnight hours of July 31 to August 1, 2019, a flash flooding event comparable to a 500-year flood occurred in Douglas and Franklin counties north of Ottawa.

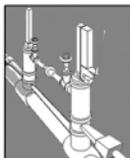
Rainfall reports filed with the Community Collaborative Rain, Hail & Snow Network – CoCoRaHS for short – show that three observations in the city of Ottawa ranged from 7.24 inches to 9.40 inches for the 24-hour period ending around 7:00 A.M. on August 1. South of town, rainfall was commonly between five and six inches. In north-central Franklin County and south-central Douglas County, even heavier rain fell in less than 12 hours. The largest report was accompanied with this comment: “Confirmed 11.00 inches with gauge overflow. Washed out driveway.” Much of this rainfall was carried to the Marais des Cygnes by Eightmile Creek and Tauy Creek. Eightmile Creek joins the Marais des Cygnes above the Ottawa stream gage. Tauy Creek empties just upstream of the RWD 6 intake but below the gage, and therefore its contributions to the river’s streamflow are not recorded. And while the river in Ottawa reached flood stage during the event, it was

Looking south (downstream) one can see the boulder-sized rip rap that protects the lower levels of the stream bank. Further up from the bank is the sheet piling which allows two different levels of 4:1 slopes. Water levels have risen a few times in the last nine months, enough to cover the rip rap and deposit silt in the crevices of the boulders. The intake tower is located on the far right on the top of the riverbank.

water that could not be pumped fast enough from backside of the levee in North Ottawa that caused the most damage of the flood there. At least 15 pumps were operating to move water

into the river. Some of those were portable pumps brought in by the Corps of Engineers to assist the permanent pumps designed to handle typical stormwater behind the levee.

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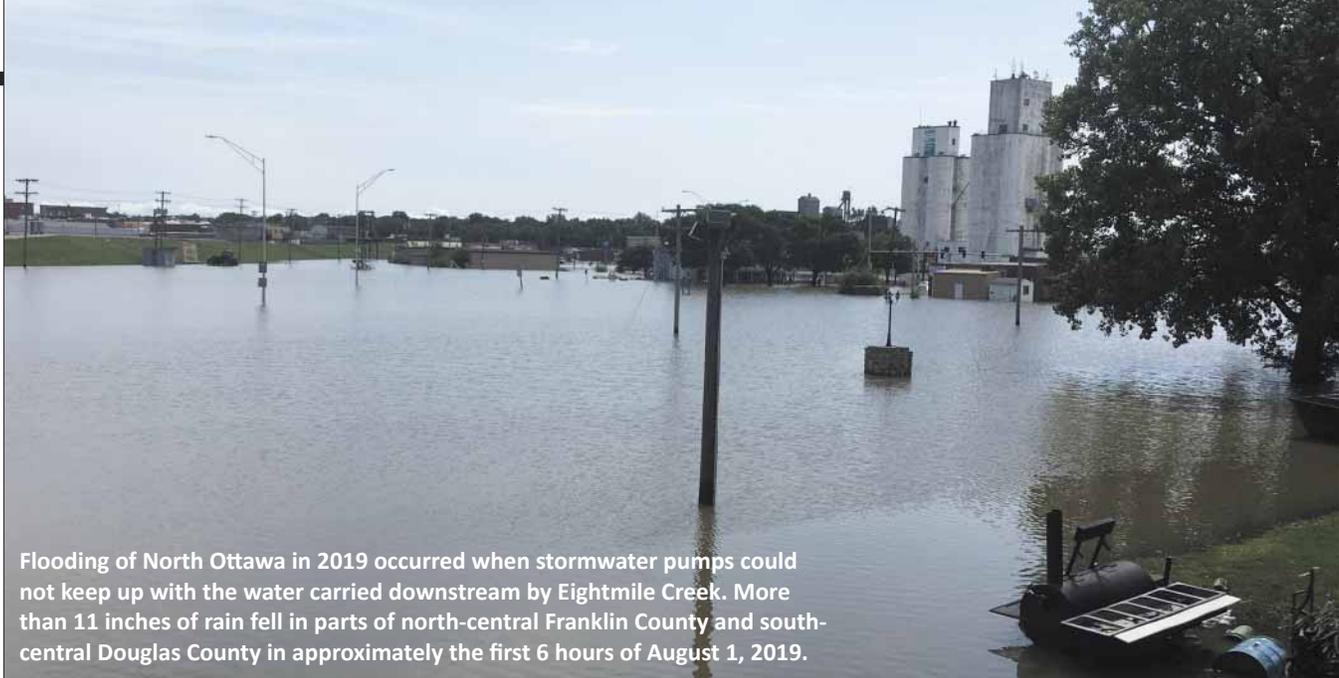
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Flooding of North Ottawa in 2019 occurred when stormwater pumps could not keep up with the water carried downstream by Eightmile Creek. More than 11 inches of rain fell in parts of north-central Franklin County and south-central Douglas County in approximately the first 6 hours of August 1, 2019.

A review of the United States Geological Survey streamflow data for the summer of 2019 revealed that three previous events were higher than the August 1 event. Two events in May were 16,200 c.f.s. and 18,000 c.f.s. and one in June reached 17,500 c.f.s. Of course, the contributions on Tauy Creek were not included, as previously mentioned, nor was Middle Creek's flow from south of Ottawa measured, so the flow at the Franklin RWD 6

intake was likely higher than the 14,000 c.f.s. recorded at the Ottawa gage on August 1.

### Streambank slides

Staff at Franklin RWD 6 had noticed that the riverbank immediately upstream of the intake was slowly settling toward the river in the months ahead of the high water events. While there was some movement, it was very small and could theoretically stop

moving before there was a problem. But to be sure, they kept their eye on it every time there was a need to mow near the intake, to replace nearly empty chemical treatment containers, etc. After the fourth event of the summer, after an unknown amount of water surged past the intake, a significant amount of the riverbank was gone.

Consulting engineers Bartlett & West was brought in to assess the damage to the riverbank and to offer a solution. As an even larger flooding event could happen at any time, this project was assessed, approved, designed and installed with great urgency.

The existing intake pipe lays perpendicular to the flow in the river and has a screen attached to its end that

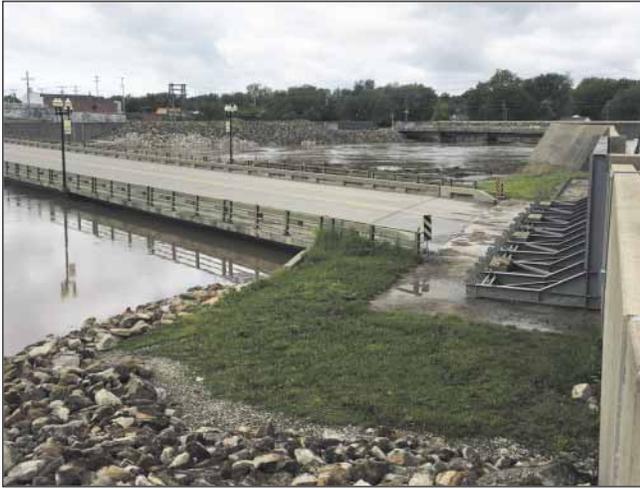
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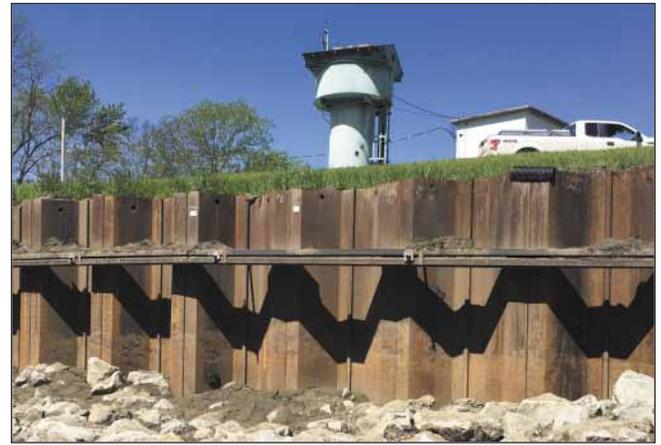
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**On May 17, 2021, the Marais des Cygnes River reached flood stage again. On May 18, the gates on both ends of Old Highway 59 / Main Street remained closed to keep flood water inside the levees. Rain remains in the forecast for the next few days.**



**The exposed sheetpiling in the foreground is approximately 8 feet high. Running across the front of the piling is part of the anchoring system with connects the piling to the concrete deadman buried behind the piling. The intake tower is in the background.**

is parallel to the river flow like a “T”. Water flows by gravity through the screen into the intake pipe, which slopes downward toward the raw water intake tower. This tower is a steel pipe approximately six feet in diameter and only occasionally needs to have sediment removed from the bottom. Air is injected into the screen via its own high-density polyethylene piping to remove inorganic debris and biological material that may accumulate on the screen.

The base of the intake tower is at an estimated elevation of 822 feet above sea level. Pumps at the base of the tower draw water from the tower to be delivered to the initial settling pond nearby. The surface elevation of the riverbank at the tower and settling pond is approximately 865 feet. None of this was changed in this project.

### **Intake stabilization**

Near the river’s edge at normal flow, a rock toe was installed parallel to the edge of the river, to anchor the riverbank from further rotational slumping. Approximately 50 to 60 feet from the river’s edge (and farther away at the ends), 25-foot long sheet pilings were driven into the bank to allow the bank slope and elevation to be reduced by excavation. These interlocking sheets of steel were driven to an

elevation of 831 feet, except for the piling that was directly over the intake pipe and air line, which was only driven to approximately 835 feet to prevent possible damage to the important infrastructure below. After excavating the streambank to a 4:1 slope on the river side of the piling, a geotextile fabric was laid on the surface and large 18-inch diameter boulders were installed to prevent further erosion. On the bank behind the piling, an 80-foot long concrete deadman anchor two feet wide by four feet deep was installed. Each sheet of piling was anchored to the deadman. The land on the opposite side of the piling was backfilled with the excavated material to create a new

4:1 slope specified by the engineers between the piling and the intake tower. Engineering drawings were completed in January 2020. Construction on the project started in July 2020. It was completed with no delays in September of 2020.

The cost of the project was approximately \$350,000. Rural Water District No. 6 expects to hear from the Federal Emergency Management Agency (FEMA) very soon to learn how much reimbursement they will receive for the emergency repairs.

As luck would have it, another flood occurred two days after this article’s deadline. Streamflow at the Ottawa gage was over 18,000 c.f.s. on May 17, 2021. An attempt was made to see how the project responded to this latest flood, but water over the intake access road prohibited viewing by staff. KRWA hopes an addendum providing good news can be provided later.

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