GRWD has relocated much of its infrastructure to comply with federal levee regulations and reach displaced customers. Many dike crossings have been rerouted due to the new laws.

DEALING WITH THE DEVIL

By Amy McIntosh

North Dakota water district battles a flooding lake

The Greater Ramsey Water District (GRWD) in Devils Lake, N.D., owns and operates the rural water and sewer systems once owned by Ramsey County and the Ramsey County Water Resource District. Covering approximately 7,000 sq miles, GRWD's service area surrounds Devils Lake—the body of water after which the city is named and the source of a major headache for the county and its residents for more than 20 years.

Since 1992, heavy rainfall has led to flooding at Devils Lake. When the lake reached its capacity, water began spreading outward at an alarming rate, destroying acres of farmland and displacing residents.

Devils Lake is a closed basin, which means that any movement of water from the lake is regulated by the International Boundary Waters Treaty Act between the U.S. and Canada. Two pump stations pump water from the lake into Canada, but the water must meet quality regulations set by the North Dakota Health Department both when the water enters the system and when it reaches Canada, limiting the amount of water that can be pumped from the lake each year.

In 2011, a combination of heavy rain in the spring and heavy snowfall in the winter caused the lake to rise to record levels. That year, GRWD lost about 40 sewer customers due to the dikes, new road construction and flooding.

"I've got a list of more than 300 people who have been taken off of the system and lost their homes due to the flooding," said Nels Halgren, manager of GRWD. "It's challenging when we lose so many customers because our customer base is small to begin with."

Battling the Floods

GRWD's infrastructure has been in place since the 1980s, designed to reach customers in the Devils Lake area. When the lake began flooding, much of the infrastructure either was lost or was no longer able to serve the customers who had relocated.

"We have our infrastructure in place to serve those homes," Halgren said. "But then they move to a place where we don't have service, so we have to relocate the service."

The Army Corps of Engineers constructed dikes to protect the city of Devils Lake from the flooding, but Halgren said some of GRWD's customers reside outside the protection.

After Hurricane Katrina, new federal rules regarding levees were put in place. GRWD has worked for years to integrate its infrastructure with the dikes, which currently extend 12 miles long and stand almost 1,500 ft high. The district constructed dike crossings that comply with the regulations and extend up and over the levees to reach the customers.

With 600 sewer customers, including National Guard training facility Camp Grafton, GRWD is one of the only water districts in North Dakota with a sewer system. The flooding hit this infrastructure especially hard.

"We used to have about 75 lift stations, and now we're down to 14," Halgren said. "We would maintain a lot of these lift stations in their current spots to keep as many people as we could on the system, but that meant building [the lift stations] up. The lake would actually come up around them and we'd have a little boat going out to them. Trying to maintain a lift station in a lake is pretty difficult."

Two of the 14 remaining stations are GRWD's major stations, which serve approximately one-third of the district's customers.

The stations' original heights stood only 1.5 ft above the lake's 2011 level, putting them at risk of becoming submerged. The district put together a plan to relocate these stations to 1,465 ft above mean sea level, out of danger.

"The old sites were 25 ft deep, right next to the lake, which put a great amount of pressure on the barrels," Halgren said. "We were not able to seal them up to stop the inundation of lake water."

GRWD meters and pays for the amount of sewage it sends to the city for treatment. As the lake floods and the excess water enters the lift stations, it raises costs for the district.

"This stress on the system is hard on employees, pumps and the financial health of the district," Halgren said.

Halgren and his team successfully relocated one lift station in fall 2012 and are in the process of moving the second. The district spent about $260,000 to move both stations to higher ground.

Prepared for More

2012 was a dry year for North Dakota, but the lake is prepared to set another record in 2013.

"[2013] was looking pretty good," Halgren said. "But we just got a bunch of rain, so all the water from up north is coming down. This year we're going to have the highest level ever."

With the measures GRWD has taken to reroute infrastructure, comply with federal levee rules and move vital components of its system to higher ground, Halgren believes the district is now truly prepared.

"It's put a lot of stress on us for the last 15 years, but we think we've met all the challenges," Halgren said. "At one point I thought we may lose the whole system, but we've taken measures to save a majority of what's left." WWD

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For more information, write in 1106 on this issue's reader service form on page 43.

ARTICLE SUMMARY

Challenge: The continuous flooding of a North Dakota lake has displaced residents and destroyed the local water district's infrastructure.

Solution: The district rebuilt lift stations and rerouted infrastructure to reach customers who have left the area.

Conclusion: The district is able to maintain service to its customers while complying with federal levee regulations.