INSIGHT

Data collection for rural water systems

As seen in the March issue of North Dakota Water magazine.

Water systems face many of the same challenges: limited capital, increasing regulatory requirements, aging infrastructure, shrinking workforce due to retirements and more. System information is critical to combat these challenges. Building a centralized database for collecting and analyzing rural water system geographical data has never been easier or more affordable.

Benefits of system data

For decades, rural water districts kept information about their systems on paper map books. These books had good information but as maintenance and upgrade activities happened, the system operators would make notes and mark up the map books—or worse keep all the information in their own minds. With paper map books, water systems heavily relied on engineering firms to keep records relatively up to date. Moving toward a digital system for data collection and correction increases a rural water system's self-sufficiency and retains important system knowledge as staff retire.

Mapping platforms (commonly known as geographic information systems or GIS) provide affordable and easy-to-use applications to prepare asset inventories and system maps. Advances in the ease of use and lower costs have moved control of GIS data from engineering firms to the hands of water system operators.

Without the use of real-time mapping solutions, rural water systems must use handheld GPS units to collect data and post-process that data during the winter or send it off to a third party for processing. After the data has been dealt with, engineers use that data to update the line drawings and provide new maps back to the system. Some systems pay annual costs of $20,000 or more to keep their paper map books current and live in this cycle without any real-time systemwide data.

Moving toward a mobile mapping platform allows rural water systems to focus engineering costs on facilities, storage and pipe upgrades and maintenance rather than information maintenance. In addition, near real-time data collection and validation allows systems to quickly build an authoritative database of information, which gives a rural water district control over its own system data. That database also protects and retains knowledge about the system through staff transitions and retirements. Plus, data sharing between the water district and others is easy and can be seamless. Staff can make, use and share maps anywhere, anytime and on any device.

Features and capabilities of online/mobile GIS

Some water systems are now using GPS units that connect through Bluetooth to mobile devices, thereby getting the full benefits of GIS. With this method of data collection, information is time stamped and marked with a User ID to show who collected the data. Collecting the data in this way meets accuracy requirements for 811 locating and marking of buried facilities.

Online mapping platforms also can provide some entry-level, basic asset management services through mobile GIS. One common way GIS mapping is used is to start valve exercising or hydrant flushing programs. For example, Fort Berthold Rural Water, serving the MHA Nation, has started using GIS to track the conditions of fire hydrants. That information—photos, locations, condition notes—is used to assess maintenance needs and develop repair and replacement cost estimates. The information can even be used to help apply for funding and grants to pay for those costs.

Greater Ramsey Water District in Devils Lake is another system using an online mapping platform. Their staff in the field input the date each valve was last exercised into their GIS. Then, through a simple function of the program, the valves are marked with red, green or yellow over time to indicate if values are due to exercise again.

Using GIS for rural water

While basic GIS applications are not a replacement for a full asset management system, using an online mapping platform can offer your system some basic functionality for tracking of assets and maintenance. It can also improve knowledge retention, efficiency and even lower operating costs depending on use.

“We converted our field and office operations to an online/mobile based GIS system in 2016. That change has saved us with annual expenses, data processing and GPS software, as well as increasing our field efficiency and data confidence. All members of our staff play a part in keeping our system data up to date and having it all real-time is priceless,” said Nels Halgren, Manager of Greater Ramsey Water District.