

The Oxbow

FROM THE NORTH DAKOTA STATE WATER COMMISSION

OFFICE OF STATE ENGINEER WATER USE TELEMETRY PILOT STUDY



The city of Parshall's water depot during the installation of their new telemetry system in February 2012. The old billing system of 53 clipboards are still hanging on the walls. The new telemetry system is at the far right of the picture.

In 2011, in response to legislative concerns about monitoring of water withdrawals in North Dakota, especially in the process of oil extraction, the Office of the State Engineer initiated a telemetry (remote, real-time data collection) pilot study at the request of Governor Dalrymple.

To address these concerns, the State Engineer took the following actions:

- an increase in the frequency of monitoring of meters by staff;
- a monthly report to be submitted by water permit holders;
- and the implementation of a pilot study, examining the feasibility of deploying telemetry at water depots.

The pilot study was divided into three phases. The first phase was research and review of existing technologies and monitoring regimes in comparable situations to avoid reinventing the wheel, and making the process as cost effective and efficient as possible. The second phase tested the methods and feasibility of data transmission from field sites to the Office of the State Engineer using telemetry. This was potentially a large obstacle, with some regions of the state receiving sporadic or no cell phone coverage. The last phase was the installation of telemetry at four test sites, and subsequent analysis of those sites.

During the first phase, four possible methods of data transmission were investigated, with satellite and cell phone technologies determined to be the most effective and cost efficient.

In the second phase, sites with existing telemetry were analyzed. Only one site had existing telemetry at the beginning of the pilot study. Data communication effectiveness from that site was evaluated.

For the third phase, telemetry was installed in January 2012 at four water depots; Dodge Depot, Timber Creek, Trenton Depot, and Schaper Depot.

The end of the testing phase, which concluded in late 2012, resulted in several preliminary findings.

- 1) Each telemetry vendor provides useful and convenient tools for analyzing data. However, all of that data is in a file format unique to that vendor. Conversion of that data into a format useful for the Office

of the State Engineer would be time consuming and unmanageable for a greater number of depots than were included in the pilot study. While technology provided a manageable hurdle for telemetry, the greatest obstacles were on the data processing side, where no simple options existed to collect, process and interpret the large volumes of data that would result from telemetry for all water withdrawals.

- 2) Any solution for statewide telemetry monitoring of water withdrawals will incur additional costs, ranging from \$1,000 to \$40,000 per site, and \$200 to \$500 in annual costs for communication and data storage services.

The completed Telemetry Pilot Study resulted in the following conclusions:

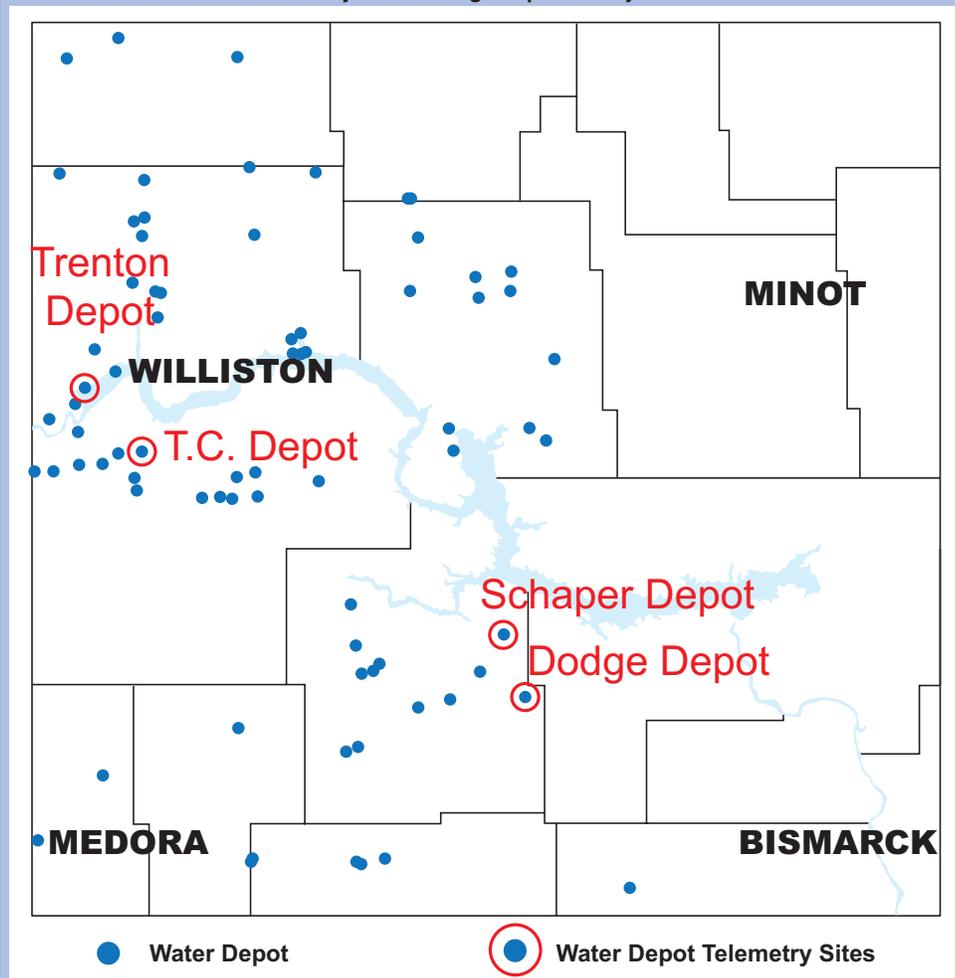
- 1) One additional staff member to accommodate the increased workload will be needed in order to prevent long-term, cumulative impacts to the water resources of the state, with changes in the reporting interval at depots for water permits were determined to be sufficient, without the addition of telemetry.
- 2) If telemetry is ultimately utilized, there are several alternatives.
 - a) A comprehensive, completely state-controlled system, essentially creating a state-controlled supervisory control and data acquisition (SCADA) system for water depots.
 - b) A “pull” system, where the depot client chooses the telemetry vendor and associated technology

from the wide variety and quality available, and the state accesses that data periodically, resulting in what would likely be an extremely expensive and time consuming effort.

- c) A “push” system, which would result in the state mandating that water use permit holders follow consistent technologies, methodologies and data outputs, in order to facilitate rapid and accurate data analysis.

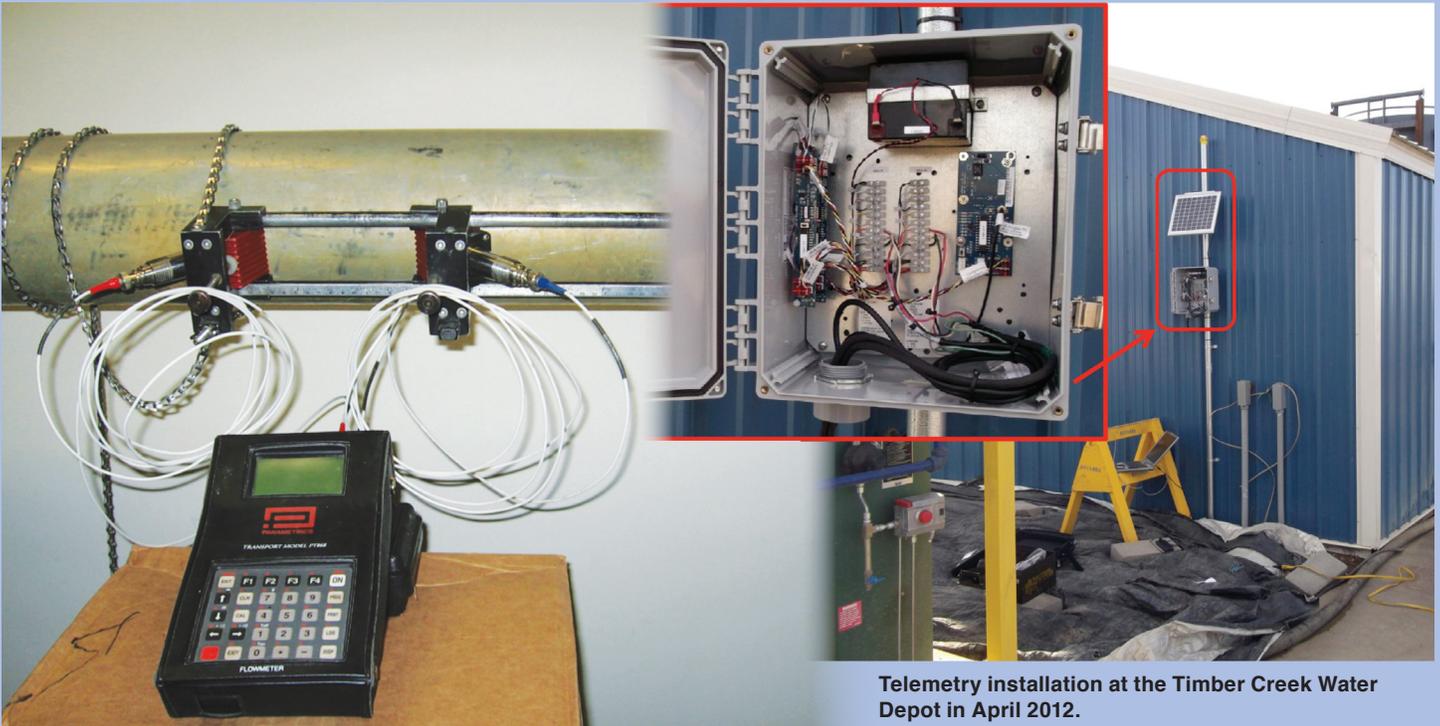
- 3) That water supply depot water permit holders should pay the cost of any telemetry system, plus operations and maintenance.
- 4) Even if telemetry is pursued, regular field inspections in order to verify telemetry accuracy will still be necessary.
- 5) It is impossible to guarantee freedom from inaccuracies in the reporting of water withdrawals using telemetry. Further, the existence of

The location of the four telemetry sites during the pilot study.



North Dakota State Water Commission
 Todd Sando, P.E., State Engineer
 900 East Boulevard Ave. • Bismarck, ND 58505
 (701) 328-2750 • <http://swc.nd.gov>

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Telemetry installation at the Timber Creek Water Depot in April 2012.

A Panametrics Ultrasonic Flow Meter, one of the devices used to measure water use.

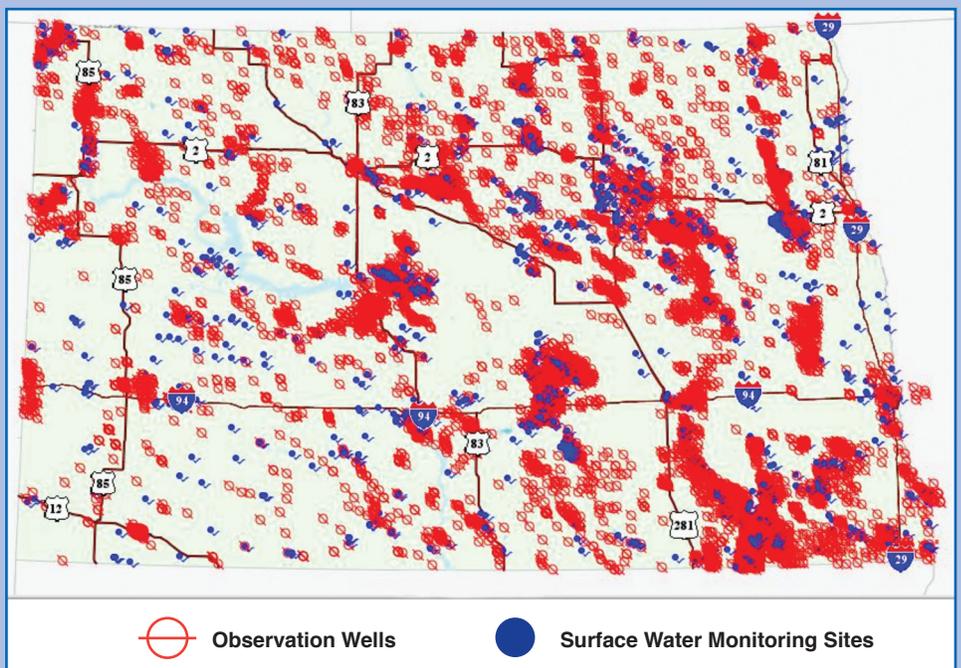
5) *continued from previous page* telemetry data does not imply state responsibility, or liability for notification of water suppliers when they utilize the water resource beyond the permitted amount, or serve as justification for mitigation of penalties.

In addition to the telemetry pilot study, another action taken to address legislative concerns was the request for additional water permit processing staff. Historically, one Water Rights Administrator, a full time employee position, has administered the State Engineer's water use program. While that staffing level has been adequate in years past, the dramatic increase in workload as a direct consequence of the demands of oil field water supply depot monitoring, has resulted in backlogs and longer processing times for water use permits, and also excessively long work hours for staff. As a result, the Office of the State Engineer has requested an additional full

time employee position to address a workload greater than current staffing can accommodate.

With the completion of the Telemetry Pilot Study, and the request for an additional staff position, the State Engineer is

addressing concerns expressed by the Legislature about industrial water use monitoring, and will move forward with an appropriate course of action in the near future.



Observation Wells & Surface Water Monitoring Sites in North Dakota.