URNRD Remote Water Monitoring and Efficiency
Annual Report, March 2023

Water Sustainability Fund Application #5221

The URNRD was awarded a $375,336 grant by the Natural Resources Commission in December 2018 and executed a contract with the Department of Natural Resources in February 2019. The project entails equipping irrigation well flow meters throughout the district with radio-based telemetry units so that water management is improved with real-time water usage information provided to irrigators, and the URNRD. The screen shot above illustrates current usage and other information about an individual meter transmitted by the telemetry equipment that is being installed. Usage data as granular as hourly water application rates is available from the radio-

based system that utilizes a network of towers and gateways erected by neighboring electric utilities that have partnered with the URNRD. The URNRD pays the partnering utilities a communication/data transmission fee for use of their network infrastructure. The fee the URNRD pays for each meter is approximately $1 per month; comparatively, monthly cellular fees would be approximately $3/month and fees for satellite-based transmissions about $5/month based on the most current information that we have.

Project Progress

In 2022, we focused on facets of the project not directly covered by the WSF grant – namely the storage, internal analytics, and customer display of the data. Purchase and installation of hardware that is the intended use of this grant will resume this year, in 2023.

The URNRD in 2022 entered into a contract with a firm to develop data solutions for internal and external use, both of which are currently nearing completion. Water-usage data from meters that have been digitally converted under this grant project are collected by the proprietary Sensus radio network and temporarily stored in the Sensus Regional Network Interface (RNI). The data is then grabbed by the URNRD, stored permanently, and made available to what is known as the Orbit Meter Data Management (MDM) developed and operated by the firm with which we contracted. The MDM is a management tool for internal use by the URNRD. It provides a range of meter-specific information such as readings over selected time periods, current and year-to-date water usage relative to historic water usage from the same meter, alerts if the meter appears to be malfunctioning, and low-battery alarms, among other information. The MDM may also help inform future policy and regulatory decisions because of its ability, for instance, to allow for regional comparisons of water usage within the URNRD in near real time relative to evapotranspiration rates that suggest crops' water demands. On the following page is a screenshot of an example of meter data displayed by the MDM:

Meter	Read Date	Reading	Read Type
29532	2022-08-21 23:00:00.0	3957.74	Register Read
29532	2022-08-21 22:00:00.0	3956.25	Register Read
29532	2022-08-21 21:00:00.0	3954.76	Register Read
29532	2022-08-21 20:00:00.0	3953.27	Register Read
29532	2022-08-21 19:00:00.0	3951.78	Register Read
29532	2022-08-21 18:00:00.0	3950.3	Register Read
29532	2022-08-21 17:00:00.0	3949.1	Register Read
29532	2022-08-21 16:00:00.0	3947.66	Register Read
29532	2022-08-21 15:00:00.0	3946.16	Register Read
29532	2022-08-21 14:00:00.0	3944.65	Register Read
29532	2022-08-21 13:00:00.0	3943.15	Register Read
29532	2022-08-21 12:00:00.0	3941.63	Register Read
29532	2022-08-21 11:00:00.0	3940.12	Register Read
29532	2022-08-21 10:00:00.0	3938.6	Register Read
29532	2022-08-21 09:00:00.0	3937.08	Register Read
29532	2022-08-21 08:00:00.0	3935.81	Register Read
29532	2022-08-21 07:00:00.0	3934.33	Register Read

Daily Use
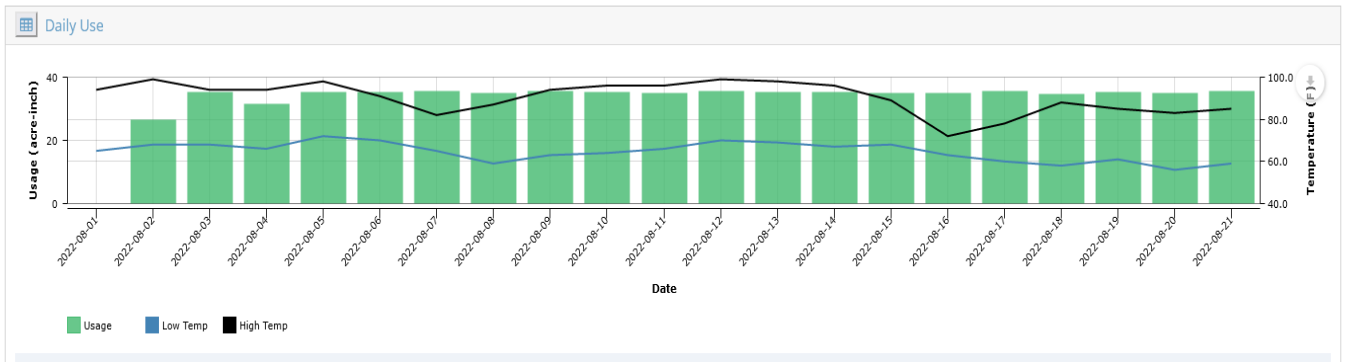
Also in development in 2022 and currently near completion is a customer-facing dashboard of usage information that will help irrigators improve irrigation scheduling. The customer portal will allow irrigators to see historic, year-to-date, recent, and date-selected water usage from all of their meters on their smart devices and/or home computers. The primary usefulness of the tool to irrigators is expected to be real-time knowledge of how their accumulated water usage year-to-date affects their remaining water allocation that is established by the URNRD. For instance, the allocation for 2023-2027 will be 62.5" of water use per acre, total, over that five-year period. During the course of an allocation period, irrigators often want to know how much remaining allocation they have so they can for how much they will irrigate in the future to avoid exceeding the allocation and being penalized by the URNRD. Currently, having that information requires driving to the middle of a center pivot, manually reading the meter, calculating the number of acre inches used per acre, and subtracting that from their remaining allocation the URNRD provided the previous winter. While none of those steps is particularly difficult, there are enough of them that practically speaking it prevents many irrigators - especially those that farm many fields – from regularly using the information to make irrigation decisions. Having the information at their fingertips, we believe, will improve on-farm water management and lessen instances of irrigators exceeding the allocation.

Project Activities To-Date and Upcoming

There are approximately 3,300 irrigation wells within the URNRD and pursuant to our rules, all have been required since 1979 to be equipped with flow meters to measure water usage relative to our limitations on usage. To date, approximately one-third of the meters have been equipped with the necessary telemetry hardware to automate transmission of usage information and all of those are actively communicating water-usage data.

The picture below shows the units that are being installed. The white, cylindrical piece mounted to the horizontal irrigation pipe is a digital meter head that captures and stores water usage data generated by a traditional, prop-style water meter. It replaces an odometer-style head that must be manually read to collect water-usage information. A sensor placed inside the bearings of the prop-style meters logs usage detected by the prop and relays information to the digital meter head. The digital meter head is connected via cable to a radio module that relays the data to the URNRD using a network of radio towers owned by an electric utility that provides service to much of our NRD. The radio module in the photo is the box mounted to the top of the pole.

The following picture shows the digital "FlowCom" meter head that replaces manual, odometer-style meter heads.

Installing the new meter heads and sensors located within the bearing near the prop of the meters requires removing the meters from the field and bringing them to the shop. This makes it impractical to do any installation during the spring and summer when irrigation is occurring and meters are operating.

Beginning this spring and summer, we will select areas of the district to install telemetry units, order the needed equipment, and begin installation in the fall. I expect we will install between 300-500 units from fall 2023-spring 2024.

Thank you and please contact me if you have questions about our project.

Nate Jenkins
Assistant Manager