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RE: WSF 2021 Annual Report #5242

This report is an outline for the upcoming 2nd year for the WSF #5242 – "Driving Water Savings Through Advanced Data Collection and Modeling in the Twin Platte Natural Resources District." During the 2020-2021 timeframe much time was spent on coordinating flow testing irrigation wells that have been signed up for the program. In 2019, 609 wells had been flow tested, in 2020 and additional 403 wells have been flow tested. An additional 15 flow meter sites or 30 flow meters have been located and installed throughout the district to double the validation sites of the previous year. To date the program has enrolled 166,847 acres; which is 53% of total irrigated acres in the Twin Platte Natural Resources; 803 connections have been made between wells, meters, non-electric IoT devices; and 154 growers have registered. The plan is to work with the well drilling companies to get as many flow rates tested this summer as we can, there are several open houses planned around the district every other month to get as many growers signed up as possible this summer.

The TPNRD Board has approved revisions to its Rules which require mandatory reporting after May 1, 2022 for all irrigated acres, for annual water use and irrigated crops. For irrigated acres enrolled in the District Water Data Program prior to May 1, 2022, the District will provide the water use for the reports and the landowner is required to provide the irrigated crops for the reports. For irrigated acres not enrolled in the Water Data Program after May 1, 2022, the landowner will be required to purchase and install a meter, approved by the District, and provide the water use and the irrigated crops for the reports.

The TPNRD Board will have information meetings in late June and a public hearing on July 8 with the anticipated effective date of August 1, 2021.

The TPNRD will have an aggressive information program and open houses every other month prior to May 1, 2022 for growers to know they may still voluntarily sign up with no cost for the grower.

Background:
During the stakeholder process of the second increment Integrated Management Plan (IMP), stakeholders determined that actual water use needed to be measured and accounted for in the

modeling. While the current modeling tools are considered a marked improvement over the original models, several questions arose upon completion of the Robust Review regarding the effect of several key assumptions on the results. Additionally, accurate reporting of cropping practices, conservation measures, and crop types could also be included in the Robust Review.

The lack of direct measurements of water use is causing need for the assumptions being utilized in the Robust Review to be improved. After careful consideration of the different options, the TPNRD and the NDNR agreed that the approach of this project would significantly improve water management efforts in the TPNRD and provide a superior approach for completing the next Robust Review currently scheduled for 2023. The basic components of this new data collection method include:

1) Using power usage data to determine groundwater pumping;
2) Calibration of the power record data against direct pumping rate measurements to compute actual groundwater pumping;
3) Refinement of the methodology used to compute the crop demand and consumption of groundwater due to irrigation in the TPNRD, which is the key driving factor underlying the results of the Robust Review; and
4) Automation of these and other computations for the grower and to ease future levels of effort required and to significantly improve water management capabilities.

The approach to completing the first two of these components is relatively straight-forward and would utilize practices that have already been developed and implemented. However, the mechanics behind the Robust Review will be significantly upgraded over the course of this project. The Groundwater Evaluation Toolbox (GET), a groundwater modeling platform, will be upgraded and leveraged to automate completion of the computations required to complete the Robust Review. This will facilitate both the testing of various methods for computation of irrigation water budgets and the efficiency of completion of future Robust Reviews. All data collection, processing, and execution of model simulations required for future Robust Reviews will be fully automated for the TPNRD and the NDNR, providing annual to daily scale feedback to water managers and water users. This will provide a true paradigm shift to growers and managers in the TPNRD, fully completing the transformation of water management and use from the reactive pattern of the past to a proactive approach for the future.

Time Frame:
This project will involve the development and delivery of a software solution that will allow the TPNRD to track agricultural groundwater use within the NRD. The project will be completed over the course of four years. During Years 1-2, flow rate testing of wells in the TPNRD will be completed by local well drilling companies. AgHub is a geospatial farm operation data platform that will be used by growers in the TPNRD to store and track data related to their farming practices. AgHub will also give the TPNRD estimates of water use across the District in real-time. Development of AgHub will occur in Year 1, with continuous improvements being made to the platform over the following two years.

Evaluation of existing data and data supplied by the AgHub platform will be front-loaded in Year 1, with less effort required in Years 2-4. Watershed and groundwater model runs will be completed in Years 1-3 leading up to the Robust Review. The Robust Review will be completed in Year 4 and serve as the official measure of progress the TPNRD has made in meeting the second increment IMP goals and objectives. Ongoing during Years 1-4, validation of these components (the flow meter validation component) will run concurrently, and not wait until year 4, allowing for changes to occur to the different components as needed.

Cost:
The total project cost after four years is estimated to be $3,415,000.