

FINAL TECHNICAL REPORT
OBSERVATION WELL EQUIPMENT UPGRADES
Grant/Cooperative Agreement Number G22AC00124-00

Ohio Department of Natural Resources
Division of Geological Survey
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The Groundwater Program of the Ohio Department of Natural Resources, Division of Geological Survey (ODNR-DGS) is responsible for collecting, researching, interpreting, and disseminating hydrologic and groundwater resource information for the State of Ohio. An important component of this program is to characterize Ohio's groundwater resources through the monitoring and evaluating of long-term trends in groundwater level fluctuations throughout the state's aquifers. To do this, ODNR-DGS operates a network of State observation wells, which record water-level measurements and, for some wells, transmit this data in real-time via satellite.

Wells equipped with satellite telemetry allow ODNR-DGS to provide real-time groundwater-level data to its end users, who are often concerned with localized and/or recent issues that require immediate information. With ODNR-DGS's 2023 migration to the AQUARIUS system for the processing and publication of its groundwater-level data, telemetered wells will now be automatically servicing the public-facing AQUARIUS WebPortal in real time. ODNR-DGS will continue to download data in the field on a quarterly basis and use the downloaded data to apply corrections and correct instrument drift, etc., but real-time data will now be available for sites equipped with telemetry equipment.

This grant project upgraded the satellite transmission equipment of five wells over the one-year grant period.

Project Description

Purchase of Equipment to Support Continuous Water-level Data Collection

Under Objective 6 – Purchase of equipment to support continuous water-level data collection, this project upgraded five State observation wells to GOES Satlink 3 units. The existing transmitter models on these wells, GOES V1, have been scheduled to have their support phased out by 2025, so this upgrade puts the sites in compliance with regulation and up to more current data standards. ODNR-DGS staff worked with United States Geological Survey (USGS) staff to perform the installations and configure the telemetry equipment.

The purchasing of equipment began in October 2022, and the installations took place between December of 2022 and June of 2023. A list of the upgraded wells is shown in Table 1. Please note that the original proposal for this project included well SH-5 instead of WA-2, but WA-2 was upgraded due to SH-5's existing shelter type and its location near a machine shop, which made it more suitable for an upgrade to a Satlink Lite unit in the future. This was change was recommended by USGS staff.

Well Upgraded	County
G-2	Gallia
PO-124	Portage
V-100	Vinton
WA-2	Washington
WN-8	Wayne

Table 1. List of wells upgraded with new telemetry equipment

The locations and principal aquifers of the wells upgraded by this project are shown in Figure 1.

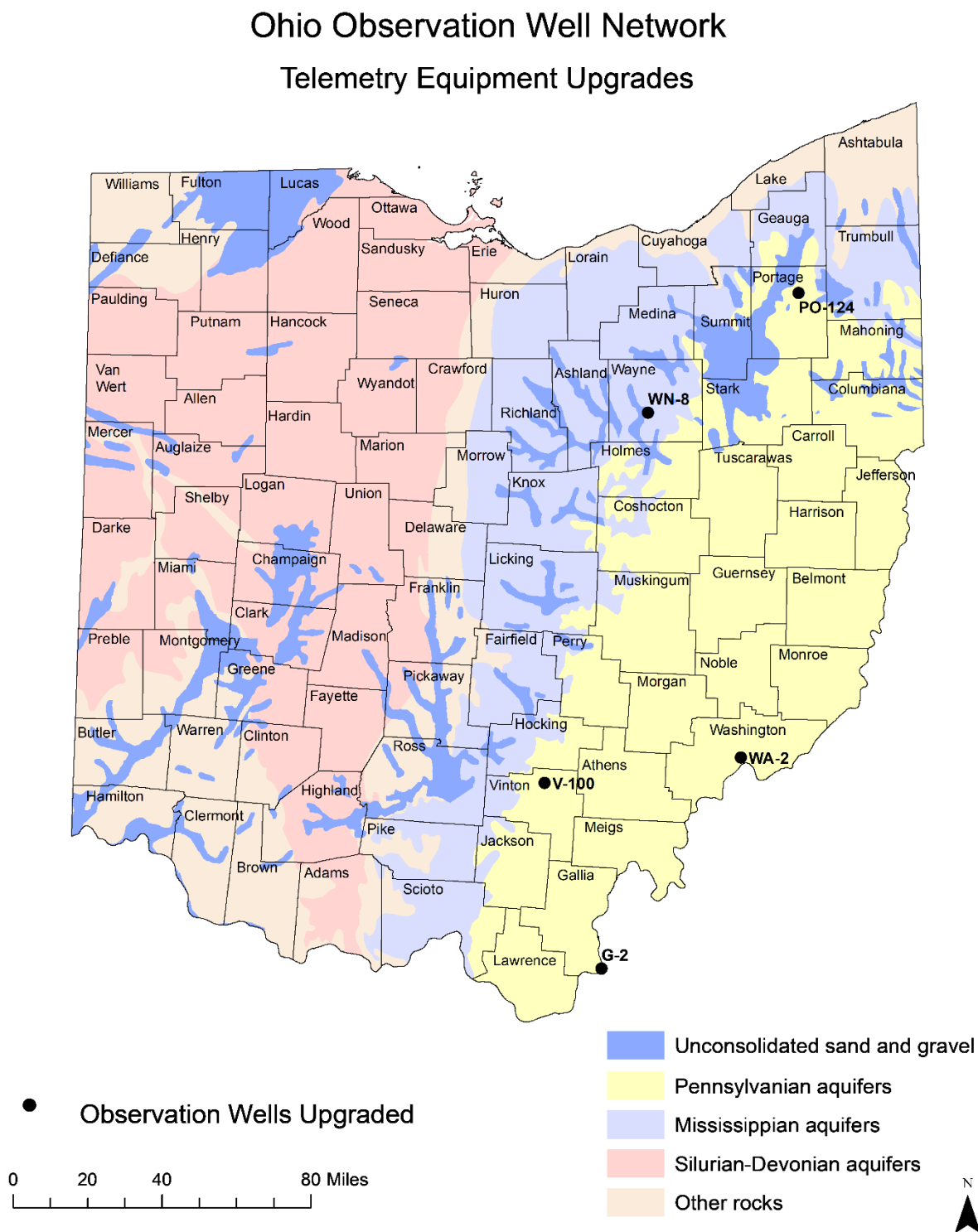


Figure 1. Locations of upgraded wells and their principal aquifers

In addition to the purchase, installation, and configuration of the telemetry equipment itself, this project also included funding for the purchase and installation of two stainless-steel enclosures that were needed to house the telemetry units at two sites. These sites are listed in Table 2. Upon completion of the new enclosures' installation, these sites' existing wooden shelters were discarded.

Well Upgraded	County
PO-124	Portage
V-100	Vinton

Table 2. List of wells upgraded with new enclosures

Since the installation and configuration of the new equipment, telemetry data have been continuously transmitted for all five sites. These data have been ingested by USGS and are configured to automatically update on ODNR-DGS's AQUARIUS WebPortal via AQUARIUS Connect. ODNR-DGS intends to launch its new AQUARIUS WebPortal to the public in November 2023. It can be accessed at <https://odnr.aquaticinformatics.net/>.

Samples of telemetry data from the five upgraded sites as of the writing of this report are shown in figures 2–6. It is ODNR-DGS's intent to propose the continuation of telemetry upgrades for other sites in subsequent NGWMN grant cycles.

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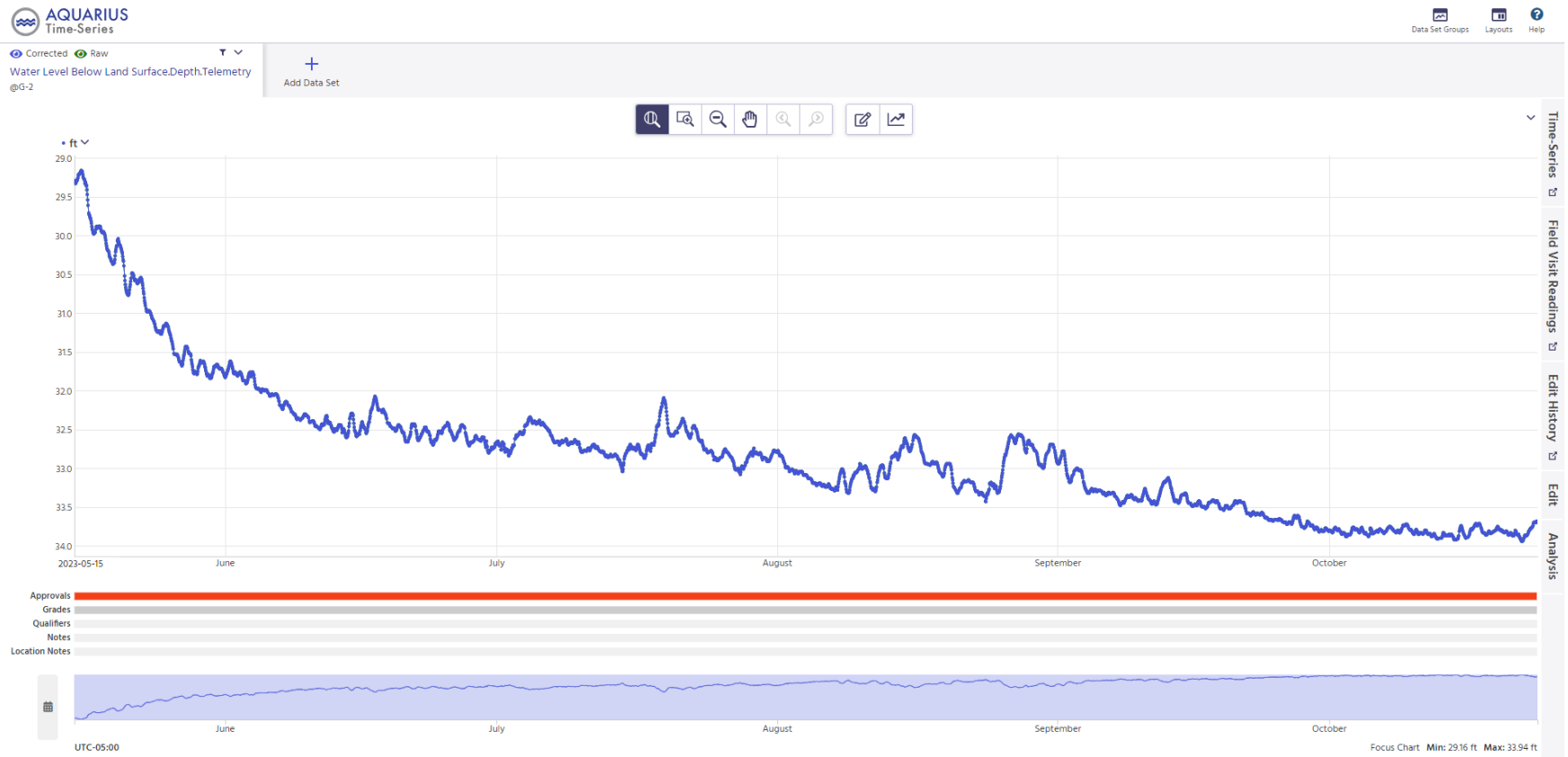


Figure 2. G-2 telemetry data as of 10/24/23

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Figure 3. PO-124 telemetry data as of 10/24/23

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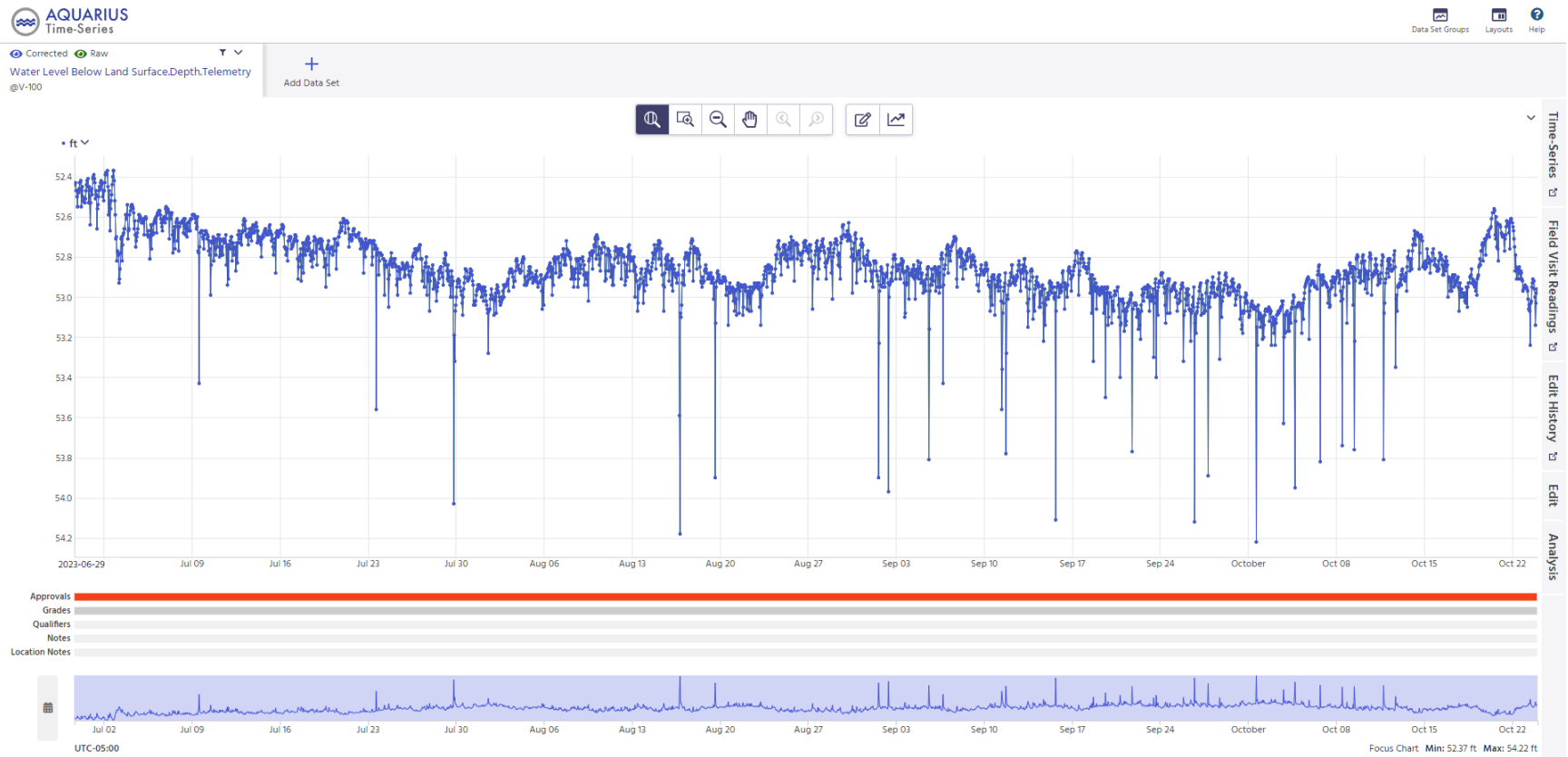


Figure 4. V-100 telemetry data as of 10/24/23

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Figure 5. WA-2 telemetry data as of 10/24/23

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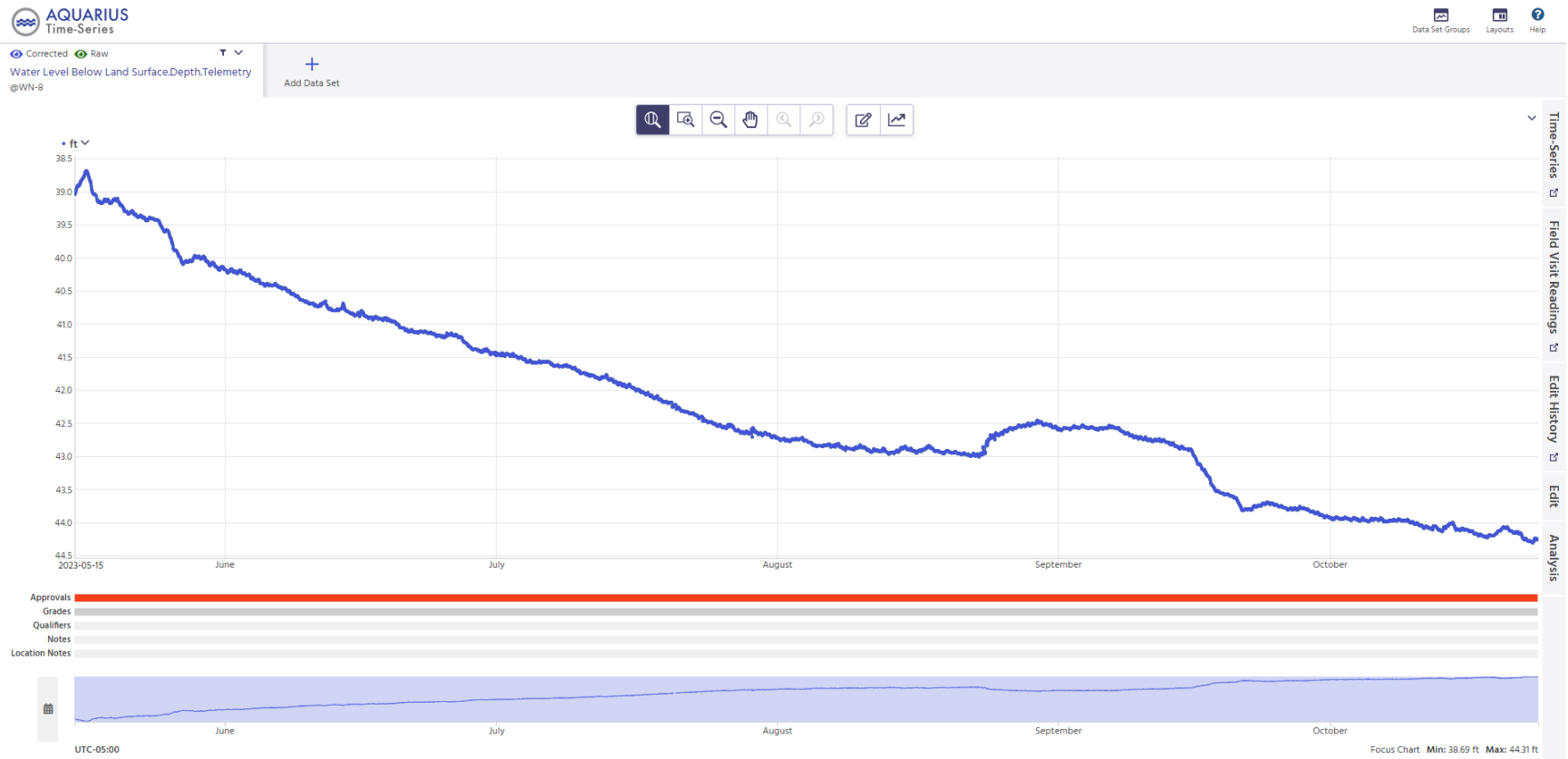


Figure 6. WN-8 telemetry data as of 10/24/23