

**New Hampshire Geological Survey  
National Ground-Water Monitoring Network Project**

**Grant Agreement No. G21AC10474  
11/01/2021 – 10/31/2023**

**Final Report**

**Submitted to:**

**U.S. Geological Survey  
Office of Acquisition and Grants  
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## **Introduction**

The New Hampshire Geological Survey (NHGS), a unit within the New Hampshire Department of Environmental Services (NHDES), has been involved with the National Ground Water Monitoring Network (NGWMN) since becoming a new data provider in 2016. NHGS's involvement with NGWMN has been as an initial data provider, standing up web services, performing evaluation and maintenance of network wells to ensure compliance with criteria for inclusion, implementing procedures for data handling and quality control, replacing existing network wells, installing network expansion wells, identifying data gaps, and installation of groundwater level loggers. All groundwater level monitoring wells monitored by NHGS provide groundwater level data to the NGWMN and are part of New Hampshire's Groundwater Level Monitoring Network ("the network"). In addition to contributing hourly and monthly groundwater level measurements to the NGWMN, the network is also utilized to evaluate the effects of meteorological drought on groundwater conditions within the State of New Hampshire.

This document is submitted to fulfill our obligation of a Final Report for our 2021 grant, Cooperative Grant Agreement No. G21AC10474, with a project period of 11/01/2021 to 10/31/2023. NHGS was awarded federal funds under Objective 6 of grant G21AC10474 to purchase and install groundwater level transducers and data loggers in 21 network wells. Agency in-kind match for federal funds requested under Objective 6 are partially generated by NHGS' continued activities under Objective 2, Part A, to collect, database, and make groundwater level data available through our web services.

### **Objective 2, Part A – Data and Web Service Management**

NHGS continued to collect, database, and make groundwater level data from our network of monitoring wells available through our web services during year 2 of this project, as proposed under grant G21AC10474. The configuration of the current NHGS well network that provides data to the NGWMN Portal can be seen in Figure 1. The current network includes 37 dedicated observation/monitoring wells installed in either the Sand and gravel aquifers (glaciated regions) [N100GLCIAL] or the New England Crystalline-rock Aquifer [N600NECRSN]. We continue to collect hand-level measurements at monthly frequency at all network wells and hourly logger data at wells so equipped at weekly or monthly frequency. These data are then exposed to the public through our web services and through a NHGS-maintained GIS web mapping application which displays both a time-series of the groundwater level data and the statistical analysis of the most recent groundwater level measurements. NHGS continues to work with USGS to ensure our web services are operating continuously and that groundwater level data are available to the NGWMN network.

Over the last year, NHGS has worked with the USGS New England Water Science Center to align statistical analysis methods and to include NHGS' NGWMN sites on the interim replacement for the recently discontinued USGS Groundwater Watch site. The USGS

Groundwater Levels in New England website is now operating and includes the NGWMN-funded wells in New Hampshire monitored by NHGS. Inclusion of the NHGS' NGWMN data alongside other USGS monitored sites in New Hampshire has benefitted both the internal NH stakeholders and federal partners at the NWS and US Drought Monitor map authors.

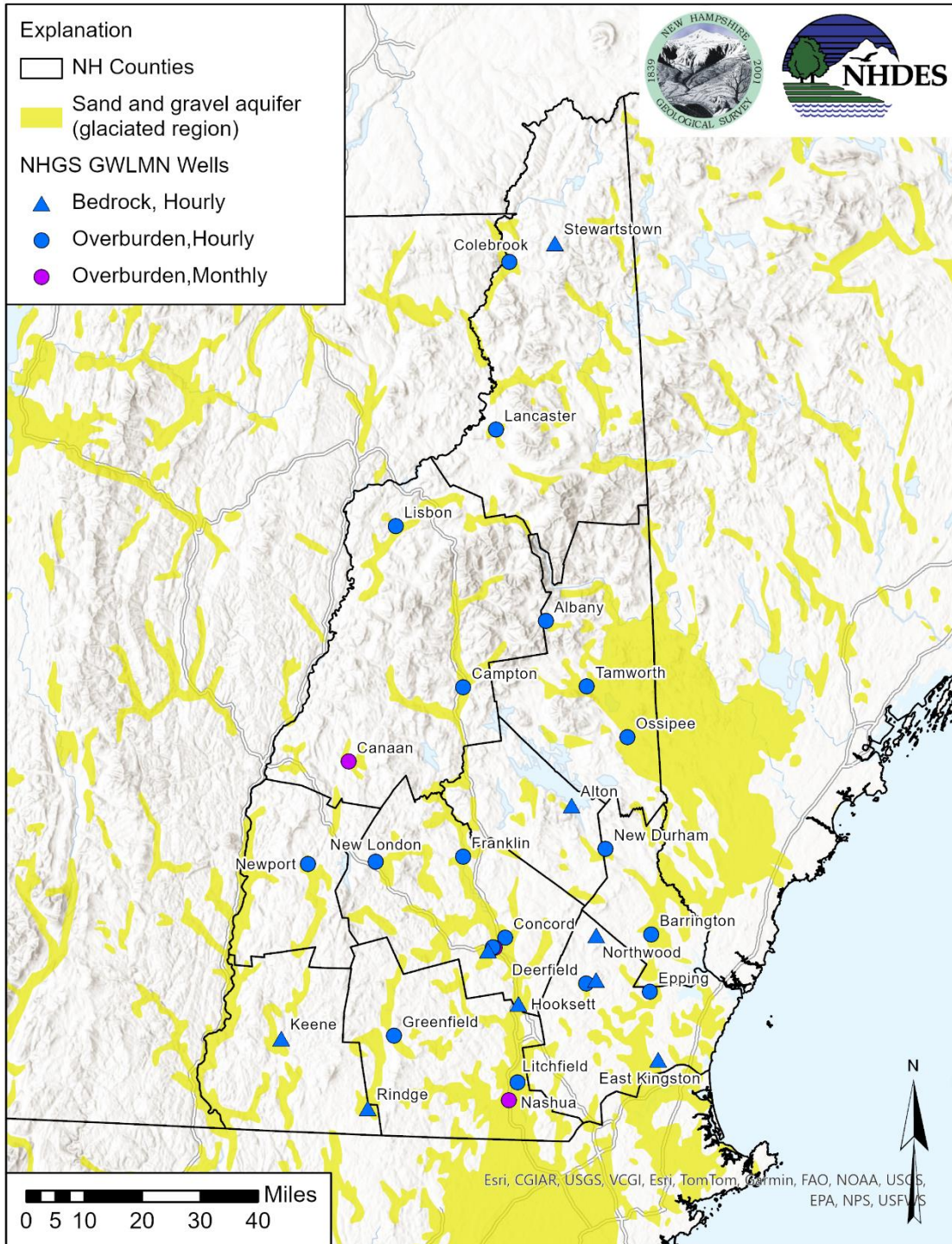
### **Objective 6 – Purchase equipment to support continuous water-level data collection**

Under Objective 6 of grant G21AC10474, NHGS proposed to purchase and install 21 replacement groundwater pressure transducer/data loggers (“loggers”). The equipment was proposed to be installed in 20 wells monitored by NHGS that were previously equipped with loggers, and in one additional well that did not previously have a logger installed. Federal funds in the amount of \$30,663.13 were awarded to NHGS under Objective 6 of grant G21AC10474 for purchasing the specified equipment.

The logger selected by NHGS and specified in the grant proposal is the OTT Hydromet EcoLog 1000. The EcoLog 1000 has several advantages, including: accuracy within 0.01'; barometrically corrected measurements; long term (>10 year), replaceable batteries; standardized free software to configure logger and download data; Bluetooth connection and cellular modem equipped; and temperature sensor. After the grant was awarded and the equipment manufacturer was contacted to arrange the equipment purchase, NHGS was informed that the cost per logger had increased from \$1,433 (quoted at the time of the proposal) to \$1,692 (both prices for 20-foot cable length logger unit). The approximately 18% price increase between April and November of 2021 reduced the quantity of loggers that NHGS was able to purchase with the awarded federal funds from 21 to 18. NHGS utilized State of New Hampshire funds to purchase 3 additional loggers, increasing the total quantity purchased back up to 21, as specified in the proposal.

The 21 loggers purchased with a combination of NGWMN grant funds and State of New Hampshire funds were installed in many of the wells specified in NHGS' proposal between December 2021 and April 2022. One of the wells included in the proposal, located in Barnstead, NH (NGWMN Registry ID NHGS:BAW-10), is no longer monitored by NHGS due to a real estate transfer of the property where the well is located and subsequent loss of access. The logger purchased for BAW-10 was instead installed in a well monitored by NHGS located in Lancaster, NH (NGWMN Registry ID NHGS:LCW-01). The hourly groundwater level data recorded by all newly installed loggers is being collected, databased, and made available through our web services to the NGWMN.

# New Hampshire Groundwater Level Monitoring Network: May 2024 Network Configuration



**Figure 1 - Current configuration of NHGS' Groundwater Level Monitoring Network wells, all of which are NGWMN data contributors.**