

COVER PAGE

AWARD NUMBER: G20AC00177

SPONSORING ORGANIZATION: Grand County

PROJECT TITLE: Data Provider Proposal for Spanish Valley and Grand County, UT

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MAJOR GOALS: Become a new data provider to the National Groundwater Monitoring Network (Objective 1- Become a new data provider)

PROJECT SUMMARY: Grand County, Utah prepared and delivered well and water level data to the UGS. UGS was contracted by the Grand County to use their portal to the National Ground-Water Monitoring Network (NGWMN) for Grand County collected data. This project establishes a long-term goal to continue integrating county groundwater level data into one secure and publicly available at a national level. The funding available for this project was \$41,222.00 but less than \$10,000 was actually invoiced to execute the efforts to complete the tasks for this grant

OVERVIEW OF WORK

The Grand County cooperated with the UGS and provide data for five sites that were added to the UGS data base. UGS also received historical files containing average daily water levels from five wells of those sites. Three of the sites Grand County is responsible for are currently serviced and maintained by UGS as part of another study and the daily average water depth for those three is also available to be to the UGS for inclusion in their database. Grand County will continue to provide support and data to the UGS for inclusion in their database. The UGS has continued connection between the UGS Water-Quality Network and the NGWMN, providing the NGWMN with the selected sites and related quality-controlled data. The UGS linked a database from their network for entry and integration of data to the NGWMN portal. The UGS provided ongoing maintenance by updating the list of Grand County network sites, populating data elements for new sites acquired and ensuring the NGWMN Portal connection to the databases stayed operational.

Data flow maintenance by Grand County and UGS consisted of the following four tasks:

1. **Data Acquisition and Delivery (Development of sites and data)** Arne Hultquist, Ben Mussleman and UGS staff.
 - a. Selected wells;
 - b. Installed, serviced and acquired data from transducers and acoustic ranging devices (Well Watch 700);
 - c. Performed regular manual and automated quality assurance and quality control;
 - d. Delivered meta-data and well level data to the UGS
2. **Ongoing network maintenance (persistent data services)**
–The UGS provides those services to Grand County
UGS personnel who were responsible for this effort were:
Paul Inkenbrandt and Nathan Payne

- a. administered and maintained the UGS database;
- b. performed regular manual and automated quality assurance and quality control (Paul Inkenbrandt and Nathan Payne);
- c. maintained a user interface (UI) application that allows for upload of site and field chemistry information (Nathan Payne);
- d. Created and maintained data services for water level and well construction information.

3. Updating network site list

Arne Hultquist coordinated with other County cooperating individuals, agencies and groundwater geologists at the UGS to check station data and add data where necessary. The UGS groundwater geologists inspected records related to the respective sample sites and verified the accuracy of the information of each location to ensure that it is correct and current. Under the direction of Paul, the geologists entered new data related to the NGWMN sites into the UGS database, which allowed for the flow of that data to the NGWMN.

3. Ensured an operational connection between the UGS and the NGWMN Portal

Grand County has a Memorandum of Agreement with the UGS for this connection. The UGS provides these services to Grand County for a fee. The UGS works closely with the USGS and the UGS continued to provide data to the NGWMN. The UGS:

1. ensured that the data is flowing from UGS to WQX to NGWMN;
2. maintained data integrity and proper flow of results data;
3. established best practices for data transfer and upkeep;
4. maintained a schema/field mapping and conversion in cooperation with USGS;
5. maintained REST service to serve data via web service in cooperation with USGS;
6. Communicated with Candice Hopkins (USGS) to ensure data were mapping correctly.

WEB SERVICES

In the same Memorandum of Agreement the UGS provides web services that facilitate access to Grand County garnered data through the NGWMN portal. Grand County appreciates UGS providing the following web services for Grand County. The UGS uses an ESRI-based ArcGIS SDE (spatial database engine) to store data collected for the UGS networks. The ArcGIS platform allows us to serve data via REST-based public web services. The schema of the database was modeled after the EPA's WQX database under the guidance of the USGS, where the primary tables are a Results table that holds measured data and a Stations table that holds monitoring location/site information. Many of the field names are different from those of the WQX to meet field name limitations of the SDE and some fields have been added to comply with the minimum data requirements (Subcommittee on Ground Water, 2013) of the NGWMN. Well owner information, well construction information, and lithology information tables are included. Well owner information is not made publicly available by the UGS.

All the data transmitted and services follow existing federal schemas, specifically the WQX schema. The UGS provides services that contain the following tables:

1. Stations

- a. unique identification is the station identification number
- b. contains minimum data requirements for sites

2. Results

- a. many to one relationship with stations
- b. joined to stations using station identification number
- c. parameter per row format
- d. contains results returned by the U.S. EPA laboratory and the Utah Department of Epidemiology and Lab Services
- e. contains measured field parameters

3. Lithology

- a. lithology describes the geology from the well driller's record
- b. this information is connected to the station table via the station identification number

4. Well Information

- a. this table includes completion and well construction

b. it is derived from the Utah Division of Water Rights database

The current UGS services can be found at the following web addresses:

- REST URL:
https://webmaps.geology.utah.gov/arcgis/rest/services/Groundwater/NGWMN_USGS_V2/MapServer
- SOAP URL:
https://webmaps.geology.utah.gov/arcgis/services/Groundwater/NGWMN_USGS_V2/MapServer