Award Number:	G18AC00082
Agency Name:	Mississippi Department of Environmental Quality, Office of Land and Water Resources
Title: .	Final Report of Work for Mississippi Department of Environmental Quality's Observation Well Network: Request to continue participating as a data provider while also expanding lithology web services.
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Date of final report	May 29, 2020

Overview

The Office of Land and Water Resources (OLWR), a division of the Mississippi Department of Environmental Quality (MDEQ) was awarded funding under Objectives 2 and 3 (Award number G18AC00082) as an existing data provider of the National Groundwater Monitoring Network (NGWMN). This document is being submitted to explain in detail the processes and techniques used to complete both objectives.

Description of Work Performed Under Objective 2

During this award period, OLWR staff continued to maintain connections to the database and update metadata as needed. Due to limitations of the database currently housing water level, lithology, and construction data, all data provided to the NGWMN is stored in separate Excel Workbook files outside of the OLWR's main database. Updates and changes to data are entered manually into this external Workbook quarterly. Once data has been checked for accuracy, data entered into these external data tables is uploaded and converted to the appropriate format using a tool in ArcGIS. This information is then served out externally via a dedicated server. A week after the data is published as a web service, staff check values entered for successful data transfer into web services. In addition to routine maintenance, OLWR staff continued entering data obtained during field observations into web services data tables. Information added under this objective includes observation of casing materials made in the field, updated measuring points, and updated location information when applicable. Construction data collected through work under Objective three was entered as routine maintenance work under Objective two. A list of these changes can be found in Appendix A. Observations and measurements taken during this period were managed according to the requirements set forth in the data management plan submitted with the original funding request (Attachment 1).

During this award period, the OLWR has completed the first phase of development of MSWIS (the Mississippi Water Information System), a website backed by a SQL database to house all information collected by the OLWR. Currently MSWIS stores permitting and well construction information for all wells on record in the state of Mississippi. Staff has been working to verify the accuracy of construction information for NGWMN wells in this database. The next phase of MSWIS development will include the portion of OLWR's two separate databases that house water level data. Staff involved in the NGWMN grant have begun the planning stages for migration of NGWMN well data into MSWIS once this expansion is complete. This expansion will allow the OLWR to store all water level, lithology, and well construction data in a singular location. This will reduce the workload associated with storing water levels in multiple databases and using multiple programs to serve web services to the NGWMN data portal. Staff intends to use this database as the new source of web services served to the NGWMN once the database has been tested and implemented. Upon completion of this project, staff compiled a final report to document all activities performed under Objective 2.

Description of Work Performed Under Objective 3

During this award period, the OLWR worked to add detailed lithology information for 59 sites. Staff transcribed historical records such as drillers logs and well schedules for all wells under this objective. On rare occasions, logs from adjacent wells were used. Once logs were transcribed,

staff interpreted existing electric logs and compared their interpretations to the transcriptions of historical paper records. These interpretations were also compared to surrounding wells and cross sections when available. For more difficult interpretations, staff consulted with regional hydrologists, surface geologists, and registered drillers to decipher and correlate records. All data was entered into a data sheet for secondary review and quality control checks. Once all interpretations were approved by a Registered Professional Geologist, the final interpretations were uploaded to web services. Copies of all records associated with this project have been centrally located and are available by request. A list of the sites updated can be found in Appendix B.

Many of the historical documents reviewed for this project also contained construction metadata that was previously unavailable in the construction web services data table. Staff recorded any missing construction information and entered this information as routine maintenance work under objective 2. Any data updates made to web services under this objective have been entered into MSWIS to facilitate future use of MSWIS as the source of OLWR's web services. Upon completion of this project, staff compiled a final report to document all activities performed under Objective 3. Methods of observation and interpretation were documented internally and will be used for any future projects performed under Objective 3. All data acquired under this objective has been managed in accordance with the data management plan previously submitted (attached).

Appendix A

Construction Metadata Updates				
Well Number	Casing	Screen	Depth	Well Number
011C0018	X			
011H0047	X			
017F0018	X	X		
017K0015		X		
019K0001	X			
027F0012	X			
029P0049	X			
035G0116	X			
041N0038	X			
047O0209	X			
057H0008	X	X		
059P0395	X			
059Q0112	X			
081O0014	X			
087G0271	X	X		
087L0034	X			
087N0029	X			
093U0001	X			
095D0033	X			
095D0034	X			
095P0022	X	X		
097A0017		X		
105C0022	X			
109W0004	X			
111H0008	X			
115E0003				X
117K0089	X	X		
117M0022		X		
121J0010		X		
125C0025	X	X	X	
131B0003	X			
133H0024	X	X		
133N0014	X			
135H0009	X			
135P0029		X		
139D0014	X			
141D0040	X			
141D0041	X			
151D0033		X		
151G0257	X			
161E0031	X			
163F0003	X	X		
165E0020		X		

Appendix B

OLWR Detailed Lithology Sites			
Site ID	Latitude	Longitude	Principal Aquifer
001G0021	31.4593	-91.3365	Coastal Lowlands Aquifer System
003H0125	34.9304	-88.4636	Mississippian Aquifers
011F0048	33.8540	-91.0303	Mississippi Embayment Aquifer System
011M0048	33.7044	-90.7266	Mississippi Embayment Aquifer System
013L0008	33.8408	-89.1898	Southeastern Coastal Plains Aquifer System
015A0058	33.6239	-90.1045	Mississippi Embayment Aquifer System
015O0002	33.3308	-89.7422	Mississippi Embayment Aquifer System
017F0018	33.9007	-88.9985	Southeastern Coastal Plains Aquifer System
019K0001	33.2715	-89.1464	Mississippi Embayment Aquifer System
023G0002	32.1354	-88.7881	Mississippi Embayment Aquifer System
023P0038	31.9435	-88.8665	Mississippi Embayment Aquifer System
023R0012	31.8610	-88.6991	Mississippi Embayment Aquifer System
025H0099	33.5906	-88.6720	Southeastern Coastal Plains Aquifer System
033B0009	34.9524	-90.0349	Mississippi Embayment Aquifer System
033J0014	34.8282	-90.1870	Mississippi Embayment Aquifer System
035D0103	31.3238	-89.2929	Coastal Lowlands Aquifer System
035G0116	31.1945	-89.1875	Coastal Lowlands Aquifer System
043J0002	33.6982	-89.7158	Mississippi Embayment Aquifer System
047O0001	30.3477	-89.1721	Coastal Lowlands Aquifer System
047O0307	30.3674	-89.1741	Coastal Lowlands Aquifer System
049N0158	32.3036	-90.1854	Mississippi Embayment Aquifer System
049P0072	31.1975	-90.5464	Mississippi Embayment Aquifer System
051N0010	33.1029	-89.9151	Mississippi Embayment Aquifer System
053G0061	33.1350	-90.3486	Mississippi Embayment Aquifer System
057E0005	34.3837	-88.3834	Southeastern Coastal Plains Aquifer System
057G0035	34.2558	-88.5561	Southeastern Coastal Plains Aquifer System
061B0013	32.2202	-89.1579	Mississippi Embayment Aquifer System
071B0001	34.5017	-89.4996	Mississippi Embayment Aquifer System
073L0063	31.1596	-89.4197	Coastal Lowlands Aquifer System
075G0111	32.4119	-88.7829	Mississippi Embayment Aquifer System
079L0033	32.6841	-89.5097	Mississippi Embayment Aquifer System
081G0043	34.2648	-88.7771	Southeastern Coastal Plains Aquifer System
081H0042	34.2600	-88.7028	Southeastern Coastal Plains Aquifer System
081L0004	34.2269	-88.7166	Southeastern Coastal Plains Aquifer System
081L0108	34.2269	-88.7167	Southeastern Coastal Plains Aquifer System
089F0020	32.6707	-90.0461	Mississippi Embayment Aquifer System
089V0042	32.4431	-90.1069	Mississippi Embayment Aquifer System
103A0010	33.2792	-88.7917	Southeastern Coastal Plains Aquifer System

Appendix B

Site ID	Latitude	Longitude	Principal Aquifer
103Q0018	32.9902	-88.7413	Southeastern Coastal Plains Aquifer System
105C0022	33.5346	-88.8501	Southeastern Coastal Plains Aquifer System
121J0110	32.3128	-89.7968	Mississippi Embayment Aquifer System
121N0027	32.2480	-89.7716	Mississippi Embayment Aquifer System
121V0017	32.0613	-89.9934	Coastal Lowlands Aquifer System
127L0013	31.8834	-89.6549	Coastal Lowlands Aquifer System
135P0029	33.8602	-90.1795	Mississippi Embayment Aquifer System
137F0022	34.6121	-89.9906	Mississippi Embayment Aquifer System
137G0037	34.6330	-89.9674	Mississippi Embayment Aquifer System
139D0014	34.8952	-88.9124	Southeastern Coastal Plains Aquifer System
139E0013	34.8450	-88.9336	Southeastern Coastal Plains Aquifer System
139J0022	34.7343	-88.9477	Southeastern Coastal Plains Aquifer System
141E0039	34.7867	-88.1967	Southeastern Coastal Plains Aquifer System
141J0065	34.6361	-88.2031	Southeastern Coastal Plains Aquifer System
141L0018	34.5045	-88.2089	Southeastern Coastal Plains Aquifer System
149C0006	32.5389	-90.7509	Mississippi Embayment Aquifer System
149M0023	32.2959	-90.8619	Coastal Lowlands Aquifer System
151D0056	33.3569	-91.0559	Mississippi Embayment Aquifer System
151D0067	33.4100	-91.0533	Mississippi Embayment Aquifer System
155H0004	33.5345	-89.2650	Mississippi Embayment Aquifer System

Attachment 1

Data Management Plan

Type of Data: The OLWR is collecting water level data to assess hydrogeologic conditions of Aquifers on the Principal Aquifer scale. Water levels are collected yearly at 167 wells.

Data and Metadata Standards: Data will be collected according to common field practices and standards set by the USGS for collecting water level data. Data will be collected using either a steel tape or electronic tape (e-tape). Measurements with a steel tape will match within .02 ft, and measurements with an e-tape will be tested three times before being recorded. These instruments will be calibrated yearly.

All data collected is manually entered into a separate Excel spreadsheet and then converted into an ArcMap layer file. The ArcMap file (.mxd) will be translated to an .xml format by ArcMap. These separate web services will be titled "Lithology", "Water Level", and "Well Construction". The final data format conforms to the metadata standard ISO 19115 series. All data entered will be reviewed for accuracy by a second party before final submission.

Policies for Access and Sharing: All Personally Identifiable Information (PII) has been removed from the data that will be collected as part of this project. The data will be made available through the NGWMN Data Portal without restriction.

Provisions for re-use, re-distribution: Any data obtained through the data portal may be redistributed if the source of the data is properly cited.

Plans for Archiving and Preservation of Access: All original data collected as part of this project is stored in multiple databases. The original data will be stored on a Windows computer that is backed up weekly. The original data will also be stored on an internal server that is backed up to physical tapes which are stored offsite. The final dataset submitted to USGS will be saved on an external server with connection to the NGWMN database. This server will also be backed up weekly.