

WSF 2021 Final Annual Report # 4125

PROJECT: Secondary Bedrock Aquifer Reconnaissance Sampling in Eastern Nebraska –WSF Application #4125 (awarded April 2016)

DATE: MARCH 24, 2021
(FIRST ANNUAL REPORT DUE ON OR BEFORE APRIL 1, 2021)

See Application 4125 Section D #2 For Project Scope Summary and Timeline

PROJECT PROGRESS APRIL 2020 TO APRIL 2021:

The US Geological Survey (USGS) continued interpretations, analyzation and report writing. The results of the water quality sampling are currently in the USGS NWIS database for 40 eastern Nebraska samples (attached map and list). Chris Hobza of the USGS provided a project results presentation to the Eastern Nebraska Water Resources Assessment (ENWRA) on December 9, 2020 and to the Natural Resources Districts (NRDs) at the March 2, 2021 Water Programs Conference (see attached) indicating that the report is done but in the final review stage before publication at USGS.

ANTICIPATED ACTIVITIES FROM NOW UNTIL NEXT ANNUAL REPORT DUE APRIL 1, 2022

The Project is completed and once public, the final USGS report will be posted online at USGS with a link from the ENWRA website under the media/downloads tab (<https://enwra.org/downloads.html>)

ANTICIPATED CASH FLOW FOR REMAINDER OF THE PROJECT:

\$0.00 Reimbursement Claims #1 through #4 totaling **\$96,300 have been received** from WSF (60% of USGS invoices). No more reimbursement claims are anticipated:

LIKELIHOOD THAT BENEFITS PROJECTED IN APPLICATION 4125 WILL BE REALIZED:

Based on results provided and presented by USGS at the stakeholders meetings, the project achieved the benefits as described in the application:

- find out more about the secondary bedrock aquifers (for basic water chemistry, nutrients, stable isotopes and selected age tracers for 20 wells proposed, 40 wells reported).
- Disseminate and present findings to stakeholders (likely ongoing beyond the presentations).

Additionally, the project satisfied one of ENWRA's long range plan objectives in the study of Secondary Bedrock Aquifers as well as some of the fund's sustainability goals outlined in Neb. Rev. Stat. § 2-1506. Generally, bedrock aquifers are considered a secondary water source; however, in some areas eastern Nebraska, bedrock aquifers are the only source of groundwater. In response to increased development of groundwater resources, water resource managers have been evaluating the use of secondary aquifers to meet future needs. To improve the understanding of the quality, geochemistry, and age of groundwater from bedrock aquifers, 40 wells were sampled and results presented with future recommendations on quality and quantity implications. ENWRA NRDs plan to consider the USGS recommendations and build off the findings presented with potential additional focused sampling and/or consideration with other study objectives/project work.

December 9, 2020 - 9:30am to 11:30am - Zoom Conference

Program Objective:

Present findings to stakeholders for the Secondary bedrock aquifer sampling and age-dating reconnaissance in Eastern Nebraska Water Sustainability Fund Project #4125.

Program Content:

In eastern Nebraska, bedrock aquifers are increasingly being considered to supplement growing municipal, domestic, commercial/industrial and agricultural water demands. The Eastern Nebraska Water Resources Assessment (ENWRA) is a project sponsored by six Natural Resources Districts to develop a geologic framework for water resources management. Airborne geophysical surveys have mapped the thickness and extent of aquifers over much of eastern Nebraska. Currently little is known about the age and quality of water in the Dakota Aquifer and other bedrock aquifers, which is needed to determine the sustainability of the resource. Older groundwater ages generally indicate lower recharge rates and a potential sensitivity to additional development. An increased reliance on groundwater that is determined to be old (recharged pre-1950s) may lead to an unsustainable situation negatively impacting future water supplies. This webinar program summarizes the results and interpretation for 40 well samples collected and analyzed for basic water chemistry, nutrients, stable isotopes and selected age tracers, provides opportunity for discussion and evaluation of outcomes for eastern Nebraska. Following this presentation program, an accompanying USGS interpretive report will be published summarizing the sample collection, analysis, and data interpretation effort.

Posted: <https://enwra.org/downloads.html> (toward the bottom of the media and downloads tab, 40 well list attached with result links)

Presenter: Chris Hobza is a hydrologist from the U.S. Geological Survey Nebraska Water Science Center

Attendance was kept on the Zoom call (<https://csuf.screenstepslive.com/s/12867/m/59146/l/1219888-taking-attendance-in-a-zoom-meeting>) and the list will be kept in the ENWRA presentation files (5 years plus).

SiteNumber	SiteName	SiteCategory	SiteAgency	SiteLongitude	SiteLatitude	SiteNWISURL
401759096003301	4N 13E 19BC(N-5)	GW	USGS	-96.00916670	40.29972220	Access Data
401819095493701	4N 14E 15DD (N-6)	GW	USGS	-95.82702780	40.30516667	Access Data
402313095512401	5N 14E 21 BC (N-3)	GW	USGS	-95.85655280	40.38694167	Access Data
404950096205501	10N 10E 18CC (LPS-4)	GW	USGS	-96.34872220	40.83052778	Access Data
405139096194801	10N 10E 5CB (LPS-1)	GW	USGS	-96.33000000	40.86083330	Access Data
405213096205001	10N 10E 6BB (LPS-2)	GW	USGS	-96.34722220	40.87027778	Access Data
405921096535101	12N 5E 19DC (LPS-3)	GW	USGS	-96.89761110	40.98927778	Access Data
410002096551101	12N 4E 24 AB (LPS-5)	GW	USGS	-96.91983330	41.00041667	Access Data
410335096150101	13N 10E 36BB (D-SWSarpy1)	GW	USGS	-96.25016670	41.05966667	Access Data
410335096150102	13N 10E 36BB (D-SWSarpy2)	GW	USGS	-96.25038890	41.05950000	Access Data
410613096071101	13N 11E 12DD (D-Sp1)	GW	USGS	-96.11966670	41.10369444	Access Data
410613096071102	13N 11E 12DD (D-Sp2)	GW	USGS	-96.11969440	41.10366667	Access Data
411005096311701	14N 8E 22CB (LPN-1)	GW	USGS	-96.52144720	41.16803889	Access Data
411005096311702	14N 8E 22CB (LPN-2)	GW	USGS	-96.52144440	41.16813889	Access Data
411845096211201	16N 9E36NESE (Valley shallow, P-Va1)	GW	USGS	-96.35333330	41.31257220	Access Data
411845096211202	16N 9E 36NESE (Valley medium, D-Va2)	GW	USGS	-96.35333330	41.31250000	Access Data
411845096211203	16N 9E 36NESE (Valley City Park deep, D-Va3)	GW	USGS	-96.35333330	41.31250000	Access Data
412758096222801	17N 9E 2DC (D-A1)	GW	USGS	-96.37438890	41.46600000	Access Data
412758096222802	17N 9E 2DC 2 (D-A2)	GW	USGS	-96.37441670	41.46594444	Access Data
412758096222803	17N 9E 2DC 3 (U-A3)	GW	USGS	-96.37433330	41.46591667	Access Data
413618096322901	19N 8E 20AD (LE-1)	GW	USGS	-96.54131670	41.60498330	Access Data
413639096274901	19N 8E 24AA (LE-2)	GW	USGS	-96.46366670	41.61088889	Access Data
413828096465801	19N 6E 6CD (LE-4)	GW	USGS	-96.78275830	41.64106667	Access Data
413912096462201	19N 6E 6AA (LE-3)	GW	USGS	-96.77277780	41.65333330	Access Data
415958096152201	23N 10E 2DA (D-D1)	GW	USGS	-96.25602780	41.99944444	Access Data
415958096152202	23N 10E 2CA (D-D2)	GW	USGS	-96.25605560	41.99944444	Access Data
421406096294901	26N 8E 11CC (D-Th1)	GW	USGS	-96.49683330	42.23494444	Access Data
421406096294902	26N 8E 11CC (D-Th2)	GW	USGS	-96.49691670	42.23508330	Access Data
421406096294903	26N 8E 11CC (D-Th3)	GW	USGS	-96.49691670	42.23511110	Access Data
421730096390001	27N 7E 30AA (PM D-1)	GW	USGS	-96.65000000	42.29154720	Access Data
422344097120801	28N 2E 16DC(LE-5)	GW	USGS	-97.20222220	42.39555556	Access Data
422409097124601	28N 2E 16BC (LE-6)	GW	USGS	-97.21277780	42.40250000	Access Data
422616096343801	29N 7E 35DC (D-J1)	GW	USGS	-96.57713890	42.43769444	Access Data
422616096343802	29N 7E 35DC (D-J2)	GW	USGS	-96.57572220	42.43766667	Access Data
422616096343803	29N 7E 35DC (D-J3)	GW	USGS	-96.57577780	42.43761110	Access Data
423317097160901	30N 1E 25BB (LC-4M)	GW	USGS	-97.26911110	42.55464720	Access Data
423317097161001	30N 1E 25BB (LC-4S)	GW	USGS	-97.26951670	42.55466667	Access Data
424611097185201	32N 1E 9BA (LC-6S domestic)	GW	USGS	-97.31455000	42.76971667	Access Data
424713097170101	33N 1E 35CC (LC-6M)	GW	USGS	-97.28368330	42.78700000	Access Data
424713097170102	33N 1E 35CC (LC-6D)	GW	USGS	-97.28371940	42.78698889	Access Data

Water Programs Conference Agenda

March 2, 2021

9:00 am to 9:45 am	<p>Increase in Groundwater levels leads to increase in irrigated acres</p> <p>Cam Conrad, LLNRD</p> <p><i>The Lower Loup will provide information on how they manage their irrigated acres data within their enterprise GIS environment (ArcGIS Pro, Server, Online). The enterprise environment is the foundation that allows for efficiently managing complex datasets and thus the efficient and accurate scoring tool that consumes those datasets. The environment allows for easy incorporation of “live” enterprise datasets from NeDNR, like registered wells and surface water rights, into our projects.</i></p> <p><i>They will discuss the value of modernized data management practices, which allow for efficient management of the irrigated acres data among multiple staff, as well as develop useful tools, like on-the-fly scoring of applications for landowners.</i></p>
9:50 am to 10:35 am	<p>Groundwater Modeling Panel: Snapshots of different models and lessons learned</p> <p>Panel made up of NRD & DNR</p> <p><i>This presentation will provide an overview of the different groundwater models across the state. Panelist will highlight how the models are utilized for local and state purposes.</i></p>
10:35 am to 10:45 am	<p>BREAK</p>
10:45 am to 11:30 am	<p>Groundwater Modeling Panel: Technical aspects of modeling</p> <p>Dave Hume</p> <p><i>This presentation will explain the technical aspects of groundwater modeling and how Lower Elkhorn, Lower Platte North and Papio Missouri NRD are incorporating AEM data into their modeling.</i></p>
11:35 am to 12:20 pm	<p>USGS</p> <p>Chris Hobza, USGS</p> <p><i>In response to increased groundwater demand, water resource managers within the Eastern Nebraska Water Resources Assessment (ENWRA) area have been evaluating the use of secondary aquifers to meet future drinking-water needs. The quality, geochemistry, and age of groundwater from the Dakota, Niobrara, and Paleozoic aquifers was studied by sampling 31 wells for major ions, physical properties, nutrients, stable isotopes, and selected age tracers. The recharge source and geochemistry of groundwater in the secondary bedrock aquifers and potential groundwater management implications will be discussed.</i></p>
12:25 pm to 12:55 pm	<p>Clearinghouse Update</p> <p>Dave Miesbach-NDEE</p> <p><i>NDEE will give an overview of how the new Clearinghouse works and how the NRDs will input their groundwater data.</i></p>