

**USGS National Ground-Water Monitoring Network Cooperative Agreement  
Final Technical Report.**

**A. Project Information Summary**

1. Award Number: G20AC00188
2. Agency Name: University of Nebraska-Lincoln, School of Natural Resources,  
Conservation & Survey Division
3. Title: UNL proposal to support persistent data services and install a new  
observation well.
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5. Award Term: July 15<sup>th</sup>, 2020-July 14<sup>th</sup>, 2021 (Objective 2)  
July 15<sup>th</sup>, 2020-July 14<sup>th</sup>, 2022 (Objective 5)
6. Final Report Date: September 13, 2021

## **B. Main body of the report**

### **Overview of work planned and accomplished during the project**

The Conservation and Survey Division at the University of Nebraska-Lincoln (CSD) has been a data provider to the National Ground Water Monitoring Network (NGWMN) since 2017. Currently, the CSD is serving data for 5,335 sites, of which 5,268 wells are active. Under Objective 2, the wells currently served in the registry were reviewed, and edited to reflect changes in the network. Under Objective 5, a nested pair of wells were drilled near Seneca Nebraska to fill a data gap in the Nebraska Sandhills.

### **Detailed description of work accomplished under each objective**

Under Objective 2, the CSD performed a number of tasks to keep the wells in the registry current. Those tasks include:

1. Locating wells served by both the USGS and the CSD. A list of wells served by the USGS was obtained from the NGWMN portal and compared against the list of wells served by the CSD. The list of wells was provided to the USGS Nebraska Water Science Center (USGS-NWSC). After discussion with the USGS-NWSC, it was decided that the USGS would continue to serve wells that were actively measured by the USGS, and the CSD would continue to serve all other wells. Two wells were an exception to this rule, well 412151096180801, and well 411231096193202. Water levels for these wells are measured by the USGS and reported to the CSD. Water quality samples are obtained for these wells by other agencies and reported to the Nebraska Department of Energy and Environment (NDEE). Both wells have WQ data served by the NDEE, and will continue to have WL data served by the CSD. A great deal of effort was required to establish webservices to combined this data from multiple agencies, and it was decided that it was not worth the effort for the USGS to rebuild the web services necessary for these two wells. A list of the duplicated wells and the actions taken is provided in Appendix A.
2. Task two included locating wells that are no longer being measured. To achieve this task, a copy of the Nebraska Water Well Registration Database was obtained from the Nebraska Department of Natural Resources. The Database was queried for wells that were decommissioned between January 1<sup>st</sup> 2020, and July 1<sup>st</sup> 2021. The query results were compared against the wells currently being served to the NGWMN, and any decommissioned wells were disabled in the registry. A list of decommissioned wells is included in Appendix B.
3. Task three located new wells added to the CSD Water-Level Database since 1/1/2020. Wells that were in the High Plains Aquifer (HPA) and included required construction and lithology information were added to the NGWMN. All wells were classified as Special Studies wells, with Suspected/Anticipated Changes characteristics. None of the wells met the requirements to be background wells. A list of the new wells added to the NGWMN are included in Appendix C.
4. Task four involved correcting data errors in the NGWMN registry for CSD wells. When the HPA wells were loaded into the registry through bulk upload in 2020, we believe that the large number of wells caused some corruption in the data. The CSD worked very closely with NGWMN IT staff to retrieve a copy of the registry, repair the data, and re-upload all 5,335 wells 100 sites at a time. At this point, all data in the registry is accurate to the best of our knowledge.
5. In the last task, at the request of the NGWMN, small adjustments were made to our webservices to meet the needs of the NGWMN. Adjustments were made to properly transmit the time zone code, remove an unnecessary space in the time format, and resolve some minor formatting issues.

Under Objective 5, the CSD installed a pair of nested wells near Seneca Nebraska to fill a data gap left by the loss of NGWMN-CSD Well #42 in 2018. Based on the best information available, the new well had an expected depth of 200'. However, based on the geology encountered the targeted sandstone unit was encountered at a shallower depth of 125'. A change to our proposal allowing the installation of a second observation well at the same site was

approved by phone call with Daryll Pope on August 4<sup>th</sup>, 2020. The second well was installed in a separate borehole approximately 5 feet to the east of the 125' deep well. The well is screened in an unexpected coarse Ogallala group sandstone unit encountered from approximately 30'-67'. The addition of this second well will provide important data to the NGWMN. Wells screened in shallower units provide valuable data on year-to-year changes, while the deeper well will provides information on longer term water level change trends.

All drilling and well installation activities are complete for both wells, and the wells are displaying data on the NGWMN portal. All that remains is travel associated with collecting data from other NGWMN wells as match through July of 2022.

## Appendix A

Wells duplicated by the USGS and the CSD, and actions taken to eliminate the duplication.

NGWMN Site ID	Served to NGWMN by	CSD Notes
403309099250701	CSD	Well disabled in the USGS-NWSC registry
403941099331901	CSD	Well disabled in the USGS-NWSC registry
403454099304801	CSD	Well disabled in the USGS-NWSC registry
404237098395402	CSD	Well disabled in the USGS-NWSC registry
405921097514701	CSD	Well disabled in the USGS-NWSC registry
405305097351503	CSD	Well disabled in the USGS-NWSC registry
405406097115001	CSD	Well disabled in the USGS-NWSC registry
403855097072501	CSD	Well disabled in the USGS-NWSC registry
401626097210701	CSD	Well disabled in the USGS-NWSC registry
401837097015301	CSD	Well disabled in the USGS-NWSC registry
403422098395701	CSD	Well disabled in the USGS-NWSC registry
403409098263901	CSD	Well disabled in the USGS-NWSC registry
403903098295101	CSD	Well disabled in the USGS-NWSC registry
402324098220601	CSD	Well disabled in the USGS-NWSC registry
402411098370101	CSD	Well disabled in the USGS-NWSC registry
402415098311601	CSD	Well disabled in the USGS-NWSC registry
402507098255801	CSD	Well disabled in the USGS-NWSC registry
403014098002201	CSD	Well disabled in the USGS-NWSC registry
403107098210701	CSD	Well disabled in the USGS-NWSC registry
401928098292502	CSD	Well disabled in the USGS-NWSC registry
413022098241001	CSD	Well disabled in the USGS-NWSC registry
414506098285901	CSD	Well disabled in the USGS-NWSC registry
413042098462401	CSD	Well disabled in the USGS-NWSC registry
415803098440901	CSD	Well disabled in the USGS-NWSC registry
420500099244001	CSD	Well disabled in the USGS-NWSC registry
414413099440801	CSD	Well disabled in the USGS-NWSC registry

412507100074901	CSD	Well disabled in the USGS-NWSC registry
412706096332801	CSD	Well disabled in the USGS-NWSC registry
412946096423101	CSD	Well disabled in the USGS-NWSC registry
411710097145901	CSD	Well disabled in the USGS-NWSC registry
412905097085101	CSD	Well disabled in the USGS-NWSC registry
413315097181801	CSD	Well disabled in the USGS-NWSC registry
413549097260501	CSD	Well disabled in the USGS-NWSC registry
413801097140101	CSD	Well disabled in the USGS-NWSC registry
411711097211101	CSD	Well disabled in the USGS-NWSC registry
422849099521503	CSD	Well disabled in the USGS-NWSC registry
404233100132301	CSD	Well disabled in the USGS-NWSC registry
404854100451401	CSD	Well disabled in the USGS-NWSC registry
402614100373001	CSD	Well disabled in the USGS-NWSC registry
404129100340901	CSD	Well disabled in the USGS-NWSC registry
402623100222001	CSD	Well disabled in the USGS-NWSC registry
403658100225301	CSD	Well disabled in the USGS-NWSC registry
404157101060001	CSD	Well disabled in the USGS-NWSC registry
404742101010801	CSD	Well disabled in the USGS-NWSC registry
404159100494601	CSD	Well disabled in the USGS-NWSC registry
401919100223001	CSD	Well disabled in the USGS-NWSC registry
400400100531501	CSD	Well disabled in the USGS-NWSC registry
401548101080501	CSD	Well disabled in the USGS-NWSC registry
412526102252701	CSD	Well disabled in the USGS-NWSC registry
413455102370701	CSD	Well disabled in the USGS-NWSC registry
413216102520201	CSD	Well disabled in the USGS-NWSC registry
412944103452701	CSD	Well disabled in the USGS-NWSC registry
412336104022801	CSD	Well disabled in the USGS-NWSC registry
414153103561402	CSD	Well disabled in the USGS-NWSC registry
412151096180802	CSD	Well disabled in the USGS-NWSC registry
411231096193203	CSD	Well disabled in the USGS-NWSC registry
410312102052001	CSD	Well disabled in the USGS-NWSC registry
410330102433801	CSD	Well disabled in the USGS-NWSC registry
411555102385601	CSD	Well disabled in the USGS-NWSC registry
410102102232301	CSD	Well disabled in the USGS-NWSC registry
410808103023902	CSD	Well disabled in the USGS-NWSC registry
410437103121101	CSD	Well disabled in the USGS-NWSC registry
410725103104201	CSD	Well disabled in the USGS-NWSC registry
411130103454901	CSD	Well disabled in the USGS-NWSC registry
411739103401501	CSD	Well disabled in the USGS-NWSC registry
411416103361101	CSD	Well disabled in the USGS-NWSC registry
411130104024401	CSD	Well disabled in the USGS-NWSC registry
402726099461700	CSD	Well disabled in the USGS-NWSC registry
402946099481501	CSD	Well disabled in the USGS-NWSC registry
403853099493501	CSD	Well disabled in the USGS-NWSC registry
404001099463601	CSD	Well disabled in the USGS-NWSC registry
402236100013201	CSD	Well disabled in the USGS-NWSC registry

403952099583201	CSD	Well disabled in the USGS-NWSC registry
403326099582301	CSD	Well disabled in the USGS-NWSC registry
403509098463601	CSD	Well disabled in the USGS-NWSC registry
402103098475701	CSD	Well disabled in the USGS-NWSC registry
402636098534401	CSD	Well disabled in the USGS-NWSC registry
402105098543201	CSD	Well disabled in the USGS-NWSC registry
411817101450901	CSD	Well disabled in the USGS-NWSC registry
410538101355701	CSD	Well disabled in the USGS-NWSC registry
410836102010901	CSD	Well disabled in the USGS-NWSC registry
412006102003501	CSD	Well disabled in the USGS-NWSC registry
413324101494101	CSD	Well disabled in the USGS-NWSC registry
410517100144901	CSD	Well disabled in the USGS-NWSC registry
410250101004201	CSD	Well disabled in the USGS-NWSC registry
405732100531201	CSD	Well disabled in the USGS-NWSC registry
405744100403701	CSD	Well disabled in the USGS-NWSC registry
413253100565401	CSD	Well disabled in the USGS-NWSC registry
414031101305602	CSD	Well disabled in the USGS-NWSC registry
412810101190001	CSD	Well disabled in the USGS-NWSC registry
411059101071101	CSD	Well disabled in the USGS-NWSC registry
414518101445401	CSD	Well disabled in the USGS-NWSC registry
420806100222301	CSD	Well disabled in the USGS-NWSC registry
421519101173601	CSD	Well disabled in the USGS-NWSC registry
422155100381301	CSD	Well disabled in the USGS-NWSC registry
415151100335601	CSD	Well disabled in the USGS-NWSC registry
415532101135801	CSD	Well disabled in the USGS-NWSC registry
420904102525201	CSD	Well disabled in the USGS-NWSC registry
420530103104001	CSD	Well disabled in the USGS-NWSC registry
421505103051701	CSD	Well disabled in the USGS-NWSC registry
423432100404001	CSD	Well disabled in the USGS-NWSC registry
422150097402401	USGS	Well disabled in the CSD registry
410618098113401	USGS	Well disabled in the CSD registry
423148098300601	USGS	Well disabled in the CSD registry
415559098005201	USGS	Well disabled in the CSD registry
413156098591201	USGS	Well disabled in the CSD registry
421210098402001	USGS	Well disabled in the CSD registry
404519101170301	USGS	Well disabled in the CSD registry
404706101282201	USGS	Well disabled in the CSD registry
404620101433401	USGS	Well disabled in the CSD registry
403235101395501	USGS	Well disabled in the CSD registry
403516101560601	USGS	Well disabled in the CSD registry
402757101591201	USGS	Well disabled in the CSD registry
415325103392801	USGS	Well disabled in the CSD registry
423730098560001	USGS	Well disabled in the CSD registry
405137099085201	USGS	Well disabled in the CSD registry
405129099090201	USGS	Well disabled in the CSD registry
404618098504401	USGS	Well disabled in the CSD registry

405632098373501	USGS	Well disabled in the CSD registry
405315098304302	USGS	Well disabled in the CSD registry
410154099394701	USGS	Well disabled in the CSD registry
404343099272901	USGS	Well disabled in the CSD registry
404717099460501	USGS	Well disabled in the CSD registry
404949099445701	USGS	Well disabled in the CSD registry
425225100320501	USGS	Well disabled in the CSD registry
405445100074001	USGS	Well disabled in the CSD registry
413130100531202	USGS	Well disabled in the CSD registry
420204101200502	USGS	Well disabled in the CSD registry
410943097575001	USGS	Well disabled in the CSD registry
411738097264301	USGS	Well disabled in the CSD registry
405227098165601	USGS	Well disabled in the CSD registry
404513098181202	USGS	Well disabled in the CSD registry
404513098181201	USGS	Well disabled in the CSD registry
400852101352701	USGS	Well disabled in the CSD registry
401703101394801	USGS	Well disabled in the CSD registry
400155101521302	USGS	Well disabled in the CSD registry
412151096180801	CSD	Well disabled in the USGS-NWSC registry
415558096434501	USGS	Well disabled in the CSD registry
414141096371701	USGS	Well disabled in the CSD registry
415918096350501	USGS	Well disabled in the CSD registry
414931096321101	USGS	Well disabled in the CSD registry
413853096483801	USGS	Well disabled in the CSD registry
422011096595401	USGS	Well disabled in the CSD registry
422031097043501	USGS	Well disabled in the CSD registry
420922096514401	USGS	Well disabled in the CSD registry
421303097011601	USGS	Well disabled in the CSD registry
414343096595801	USGS	Well disabled in the CSD registry
414401096531301	USGS	Well disabled in the CSD registry
420024096485901	USGS	Well disabled in the CSD registry
415458097142201	USGS	Well disabled in the CSD registry
421445097123801	USGS	Well disabled in the CSD registry
422756097334901	USGS	Well disabled in the CSD registry
422947097142701	USGS	Well disabled in the CSD registry
414527097094101	USGS	Well disabled in the CSD registry
411231096193202	CSD	Well disabled in the USGS-NWSC registry
411733096185501	USGS	Well disabled in the CSD registry
403954099152101	USGS	Well disabled in the CSD registry
405014099591001	USGS	Well disabled in the CSD registry
411231096193201	USGS	Well disabled in the CSD registry
410102098374201	USGS	Well disabled in the CSD registry
401401101510701	USGS	Well disabled in the CSD registry

Appendix B- Decommissioned wells disabled in the CSD well registry.

NGWMN Site ID	Decommission Date	CSD Action
G-120673	5/6/2021	Disable well in NGWMN Registry
410411097145801	4/29/2021	Disable well in NGWMN Registry
400933098472001	10/30/2020	Disable well in NGWMN Registry
412013098145301	10/12/2020	Disable well in NGWMN Registry
402708098510401	10/6/2020	Disable well in NGWMN Registry
403215099393601	9/24/2020	Disable well in NGWMN Registry
422443098285101	5/21/2020	Disable well in NGWMN Registry
405911097421601	4/2/2020	Disable well in NGWMN Registry
G-044825	1/1/2020	Disable well in NGWMN Registry

Appendix C- New wells added to the NGWMN Registry. All wells are screened in the High Plains Aquifer.

NGWMN Site ID	Year Added	Well Depth
403037099443701	2020	320
403129099053902	2020	170
403555099083402	2020	254
G-029656	2020	263
G-032350	2020	256
G-033369	2020	180
G-056175	2020	178
G-059405	2020	371
G-060712	2020	180
G-061846	2020	169
G-063340	2020	250
G-154773	2020	30
G-154774	2020	375
G-158484A	2020	38
G-185188	2020	160
G-186356	2020	127
G-186640	2020	35
G-186641	2020	38
G-187572	2020	90
G-188801	2020	305