

MINUTES
ENWRA Annual Meeting
Tuesday, January 29, 2019 3:00-4:30 pm
The Foundry

211 N 14th Street (14th & P Street 3 blocks east of the Embassy Suites)
Downtown Lincoln

Attendees (25*):

Amanda Flynn (US Geological Survey [USGS]), Jesse Bradley (Nebraska Department of Natural Resources [NeDNR]), Carrie Wiese (NeDNR), Shea Winkler (NeDNR), Philip Paitz (NeDNR), Karen Griffin (Olsson), Chuck Wingert (Nemaha NRD [NNRD]), Brian Bruckner (Lower Elkhorn NRD [LENRD]), Mike Murphy (LENRD), Dan Schulz (Lower Platte South NRD [LPSNRD]), Dick Ehrman (LPSNRD), Jim Cannia (Aqua-Geo Frameworks, LLC [AGF]), Jared Abraham (AGF), Daryl Andersen (Lower Platte North NRD [LPNNRD]), Russell Oaklund (LPNNRD), Tyler Benal (LPNNRD), Will Brueggemann (LPNNRD), Robert Joeckel (University of Nebraska-Lincoln, School of Natural Resources, Conservation and Survey Division [UNL CSD]), Dana Divine (UNL CSD), Jesse Korus (UNL CSD), Marlin Petermann (Papio-Missouri River NRD [P-MRNRD]), Paul Woodward (P-MRNRD), Connor Baldwin (Lewis and Clark NRD), Joslynn VanDerslice (Upper Elkhorn NRD), Katie Cameron (Eastern Nebraska Water Resources Assessment [ENWRA] Coordinator/UNL CSD)

Financials:

Reviewed ENWRA account Fiscal Year (FY) 2019 (19) budget items showing a \$50,000 placeholder which is not estimated to be spent by June 30th allowing for just over \$300,000 estimated bank in the ENWRA account for the start of FY20 (presentation slide also included previous year table budgeted VS actual). The equipment maintenance spending was increased for FY19 to account for aging fleet of transducers and pumps and spring site visits will show if we are on track with that figure in time to adjust for FY20 budgeting. Also one of the rediflo2 pumps repaired by grundfos did not work when hooked up for 2018 sampling (another NRD also had this problem FYI). There are 3 test hole credits totaling \$27,450 (LPNNRD, NNRD, LPSNRD) that should be paid out by June 30th 2019. A draft ENWRA FY20 budget will be circulated prior to the next Spring Meeting tentatively scheduled for **June 17th, 2019**.

Recent activity:

Test Holes/Monitoring Well Installations:

- ENWRA has cycled through the NRDs getting \$9,150 for test holes advanced along AEM flight lines and we will be through all NRDs getting reimbursed twice by the end of FY21 providing P-MRNRD, LCNRD, LENRD and LPSNRD are the next four paid out (FY20-21). The ENWRA group decided to modify the purpose of the \$9,150 test hole credit rotation so it covers any hydrogeological study efforts covered under the Long Range Plan (LRP) that the NRDs desire to use it for (example: wells, equipment etc.). Also, ENWRA will stay flexible with the order, schedule and annual payouts (\$9,150-\$27,450) as they break on the fiscals.

Pilot Study Sites

- Ashland, Oakland and Firth: over 10 years of transducer and lab data have been collected and compiled at nested wells. Maybe try to get the word out the sites are available for study (both the data and potential access to the wells?). Several shallow transducers (especially ones along streams or rivers) have been changed to hourly readings, the rest are still at 8 hour (examples were shown for each site on hourly results V.S. 8 hour readings to see the detailed

differences). Also graphs of nitrates for the past 10 years at each site were reviewed. Consensus was positive to try out a new probe's (in-situ multi parameter sonde previously demo by LPSNRD) performance over time at target well(s) with known nitrate concentrations (~\$5,000? – will get quote). The ENWRA website has simplified graphs for the public on the Dropbox but ENWRA in-house excel files include many different graph options to look different at trends.

Water Sustainability Fund (WSF) Natural Resources Commission (NRC) Projects– Status for Annual Reports due in March 2019 (estimated **\$3,374,937 total awarded** to ENWRA through the WSF projects listed below):

- The 2016 AEM flights for ENWRA NRDs are all posted as final with close-out reports on NRC website (WSF award total above does not include Lower Loup and Bazile AEM awards also listed with final close out reports on the NRC website).
- Award #4125: The last reimbursement for the Secondary Bedrock Aquifer Age dating project has been received. Amanda Flynn of the USGS provided an update to the group that the lab and age dating results are in and the draft report is in progress – the JFA was extended to Sept 30, 2019 for final reporting. Kent Zimmerman was given an update ahead of the March status report. He indicated an internal administrative workflow was being developed to handle WSF project close out financial tracking in April maybe and the Fund allows for projects get delayed/extended. We just need to indicate the updated timeline in our annual status report.
- The Award #4164 the Nebraska GeoCloud (NGC): Just over half of the project budget is spent (~221k spent with \$192k left to go of the \$412,396 total project budget not including \$50,500 in USGS Coop funds). ENWRA pays 45% of the local match and the 10 NRD interlocal (which includes ENWRA NRDs) pays 55% of the local match for the project (WSF pays 60% with ~\$132k reimbursed so far out of the \$247,437.60 award).
- Award #5189: NRDs have paid and been reimbursed back the bulk of the 2018 flight costs, just the reporting costs are left as they get completed (see attached handout). The LCNRD will get a presentation from AGF and preliminary interpreted profiles for AEM flight areas with tighter spacing for their rural water source investigation project on February 14, 2019 under their side-contract with AGF that was tacked onto the WSF effort. The NNRD chapter report is next in line scheduled for March 21st, followed by the P-MRNRD May 3rd, then LPNNRD July 2nd, LCNRD August 26th and the LPSNRD in early November 2019. The last overarching report for ENWRA (more background text and borehole files added) is scheduled by the end of December with a presentation planned at the next NRD Legislative Conference in January 2020. ENWRA will bill each NRD ahead of the chapter report due dates to expedite the payments to AGF (once NRD checks clear to ENWRA, ENWRA pays AGF).

ENWRA Partner Agency Updates:

- **USGS** – Amanda gave an update previously for the WSF #4125 project. John Nimmo from the USGS had worked with Chris Hobza and the Nebraska Water Science Center on using the Episodic Master Recession (EMR) method with ENWRA transducer data with stream gage data to arrive at recharge estimates (results presented to ENWRA Feb. last year) and a paper recently came out in December 2018 regarding EMR (focused on Pennsylvania site data) (https://wwwrcamnl.wr.usgs.gov/uzf/EMR_Method/EMR.method.html).

- CSD** – Dana gave an update to the group on the CSD test hole database (<http://snr.unl.edu/data/geologysoils/NebraskaTestHole/NebraskaTestHoleIntro.aspx>), the database interactive map was off line for some time and is back up and running now with different backend software. Jared of AGF asked about certain logs (some 1953 series or 1949 series logs in particular) that he finds during the AEM work that have maybe typo errors or possible location errors. Dana indicated she would take any format of error reporting (pdf of the log with notes, spreadsheet, just text etc.) and just email her at ddivine2@unl.edu with any errors people have come across and she will look into it and update the database accordingly. Dana also indicated the CSD Quality-Assessed Agrichemical Contaminant Database for Nebraska Ground Water (AG CHEM database <https://clearinghouse.nebraska.gov/Clearinghouse.aspx>) is getting a major overhaul and CSD has been working with the USGS national water quality network to select certain Nebraska AG CHEM database wells to include in the USGS network. Please provide Dana feedback if you have opinions on which wells CSD picked to include (Dana indicated ~300-400 wells were chosen). Also Aaron Young with CSD is working with the USGS national water level network currently to linkup CSD data points in the USGS mapper. Troy Gilmore of CSD has an NET grant for an NRD Director Watershed Science Education program with online modules. Jesse Korus indicated he helped with the Watershed Science Education program. He also had discussed with Matt Joeckel the possibility of CSD completing a statewide water table dataset. One possible way to accomplish this would be to scale up the recent Middle Republican methodology to a statewide product because many entities have expressed interest in an update. Dick Ehrman asked if the method could be designed so it is easier to update so it can come out more often than the last two 1979 and 1995 main datasets. Jesse Korus indicated that it could be more automated but would also require manual checking by a qualified person. More to come on this topic before our June 17th 2019 technical meeting (will keep the increased frequency of future updates and scales in mind with this water level mapping plan, also 2015, 2016 or 2017 was mentioned as possible dates to use for the product as well as possible mass water level collection efforts).
- NeDNR** – Jesse Bradley gave an estimate of the approximate preliminary WSF budget up for adoption through the legislature: \$14 M available for projects submitting applications in July 2019 (about \$3M carryover added to the annual \$11M) - this has been a good fund for ENWRA. NeDNR also has a student working on modeling and is cost sharing on transducers for Jesse Korus' work on the LPNNRD area north of Columbus and would be interested in teaming up with other NRDs potentially interested in adding transducers or telemetry. The NeDNR has the Lower Platte Missouri Tributaries (LPMT) Model out on their website <https://dnr.nebraska.gov/Lower-Platte-Missouri-Tributaries-Groundwater-Model> and is taking the numerical model framework and incorporating the AEM which is maybe one year out if things go well. The NeDNR is cosponsoring a pilot project with the LENRD integrating the AEM data using the LPMT numerical model in Wayne County and the report on that effort may be out in March. Everyone is interested in that effort to see how the Hydraulically Connected Areas (HCA) maps might change with the AEM added. Jesse Bradley also mentioned understanding the NRDs needs for specific areas and local scales play in to the use of the AEM with the models and to let him know if any of the other NRDs are interested in looking at different areas like LENRD is doing at Wayne. Carrie Weise Integrated Water Management Coordinator with NeDNR has been working on updates to Voluntary Integrated Management Plans (IMPs) with some of the ENWRA NRDs.

Airborne Electromagnetic (AEM) Survey Discussions:

Following up to the budget and report deadlines indicated above, The LENRD 2018 AEM report came out Dec. 2018 and is posted on the ENWRA website (<http://enwra.org/>) under the 2018 AEM tab. You can hotlink down to each NRD's report and the pdf report text and pdf Appendices

with the Google Earth .kmz files are linked to the ENWRA Dropbox for download. Instructions on how to use and save the files are provided with example screenshots. Jim Cannia and Jared Abraham of AGF were present at the meeting and were available for questions during the NRD Legislative Conference. A change to the Google Earth .kmz file deliverables for the new reports starting with the Nemaha report in March (as compared to the recent LENRD report deliverable which included an 8 part .kmz deliverable) due to the size of the files was discussed. AGF explained the data reported at the dots (x,y, ground, water table, tops and bottoms of first aquifer material, tops and bottoms of coarse material, tops and bottoms of second aquifer material, bedrock top, each identified formation top etc. - like 35 items) will still be available in a database file but the public front end where they click on the dots in Google Earth the pop-up will be changed to a much more simplified box of information. LENRD indicated that could give feedback in the next 4 weeks on their deliverable in time for adjustments on the next one in March. **[...After the meeting:** it was suggested the dots be limited to the following: x, y in feet only, “ground elevation”, water level elevation, and link to the image being the main item drawing people to click on it **AND** to add readme file for the separate database file or something in the report text to explain or make it clear what the database file is/content/how to use it. AGF will get the group an example of the new data dot appearance by the end of February and then that format will be used for each of the report deliverables including a potential revision for LENRD...] Also, the new report deliverables will be generated with the new 40 layer inversion model rather than the 30 layer that was used for previous reports. The LENRD stayed with a 30 layer deliverable to match up with the 2014 through 2016 AEM 3-mile grid efforts. The question was asked about reinverting the 30 layer data from previous years into 40 layer model deliverables and Jared indicated yes that can be done with a computer code to enhance older data but keep in mind the evolution and advancements in the ENWRA AEM approach through the years and caveats to the certain ways previous data collected, produced and/or calibrated. By knowing ahead on this 2018 set, everything was tailored to the 40 layers. Jared also mentioned the size of combined datasets gets unwieldy to work with and recommended a plan of getting the Nebraska GeoCloud up and then thinking about the desktop exercise of what makes sense in stitching or meshing the several different coordinate systems and AEM system generations together for the eastern Nebraska data as a separate project (FY21? – NGC interlocal ends June 30, 2021).

Upcoming ENWRA Plans:

ENWRA 2019 grant plans?/Preliminary FY20 budgeting starts in March 2019:

- Example discussion or possible bullets were shown on the power point slide: potential projects crossing over NRD boundaries were mentioned (goes along with ENWRA LRP guidelines), creating projects in Geoscen3D or other projects using AEM, recharge projects getting at recharge (picks up with 2018 discussions – refer to May 2018 meeting minutes), projects catering to the NeDNR LPMT numerical model needs. The statewide water table effort was revisited, any funding help to CSD would be appreciated and students would be needed (maybe because ENWRA is more complex than the Middle Republican that could justify the eastern Nebraska funding assistance to the effort – CSD will meet internally and follow-up with a plan). Looking at transient water level changes with the AEM and having a more strategic look with targeted transducer placements helps with understanding boundary conditions between aquifers. Along those lines, NeDNR indicated that they would be

interested in NRDs' expansion of transducer data networks and efforts to evaluate and quantify recharge. The LPNNRD indicated that they would need AEM incorporated products on management area boundaries within the year so in some cases that projects with AEM budget might be something the NRDs will do separately from the ENWRA budget. The ENWRA LRP will be updated in 2019 and initial updates will be discussed at the spring technical meeting planned for June 17, 2019 with final hashing through the updated draft version planned for fall 2019.

Jesse Korus provided an update on the NGC:

- Jesse indicated I-GIS went through a staff turnover so they are a little behind on the project but plan to come to Lincoln for a potential visit to Lincoln ahead of the formal workshop like we have done the previous 2 years. The Nebraska special viewer is getting some refinements and optimizing and should be ready for testing soon. Jesse described work with taking NeDNR well logs and running tools he developed to get the log information into Geoscene3D. These tools (LithKat, hydra PET) would be made available but it is not perfect and some logs you have to manually treat because they report lithologies different than the typical registration well logs (example description: 2 inches of sand, 4 feet clay, 13 feet sand all on one line entry).
- Jesse showed an example from Lower Platte North Platte/Colfax area north of Columbus with a pumping well near a transducer with a hydrograph that showed a possible confined system indicating it might be closed off from other aquifers and/or alluvial systems. Jackie is the student working on this project and her position is co-funded through Water for Food.
- Chris Hobza of the USGS indicated to Jesse before the meeting that the Bazile project has been assembled and the current focus is an enhanced interpretation of the age tracer results with additional geologic data and an improved hydrostratigraphic framework. There has been age tracer data collected from 2 published studies (Snow and Miller, 2018; Burbach and Spalding, 2000) and two unpublished studies (Steele, 2003; 2007). Within the Bazile area, the previous work contains 36 age dates with a nitrate concentration. Chris Hobza is working on interpretation of results and working with Sue Lackey and Dan Snow on scoping a product that will be of use to the Bazile group.
- Jesse introduced a couple of additional project funding opportunities to do more with the NGC platform and software: Earth cube (due March 5th and focuses on public private partnerships- maybe deadline is too tight?) or National Science Foundation (NSF) geoinformatics (due July 1st), buildouts where you could use transducer data to build forecasting tools.
- Jesse also expanded on the upcoming NGC **workshop Aug. 2019** in Norfolk and asked if there were materials or online training modules provided ahead of time that maybe required 3-4 hours of prep work would anyone think that is beneficial? Some comments were made that they would not have time because of what all goes on in July-August with NRDs but others expressed they would appreciate materials to run through ahead of time and they would get more out of the workshop.

Recap: The ENWRA Spring Technical Meeting **June 17th 2019** (draft budget will be circulated ahead of time to the tech. comm. in March), ENWRA plans an update to the Managers at one of the upcoming 2019 manager meetings, LRP Update planned for fall 2019, several 2018 AEM report chapter presentations, AEM presentation at NRD Legislative 2020 (Sept 2019 - talk to Jeanne). Board Updates done for each NRD and will cycle back again starting with the Papio-Missouri River NRD (sometime after AEM report?). **Adjourn**