

MINUTES
ENWRA Technical Committee Meeting
Thursday, May 17, 2021 1:30 to 3:30 pm
Virtual Zoom meeting
Eastern, Nebraska

Attendees (~24):

Aaron Young (University of Nebraska-Lincoln, School of Natural Resources, Conservation and Survey Division [UNL CSD]), Jesse Korus (UNL CSD), Myles Lammers (Lewis and Clark NRD [LCNRD]), Alexa Davis (Nebraska Department of Natural Resources [NeDNR]), Justin Ahern (NeDNR), Philip Paitz (NeDNR), Ryan Kelley (NeDNR), Shea Winkler (NeDNR), Brenda Densmore (US Geological Survey [USGS]), Chris Hobza (USGS), Brian Bruckner (Lower Elkhorn NRD [LENRD]), Chuck Wingert (Nemaha NRD [NNRD]), Kyle Hauschild (NNRD), Dan Schulz (Lower Platte South NRD [LPSNRD]), Dave Potter (LPSNRD), Dick Ehrman (LPSNRD), Daryl Andersen (Lower Platte North NRD [LPNNRD]), Paul Woodward (Pappio-Missouri River NRD [P-MRNRD]), Dave Hume (LRE Water), Jared Abraham (Aqua-Geo Frameworks, LLC [AGF]), Dustin Wilcox (NRD/NeDNR Water Resources liaison), Jennifer Swanson (NRD/NDEE liaison), Katie Cameron (Eastern Nebraska Water Resources Assessment [ENWRA] Coordinator/UNL CSD)

Overview and Recent Activity:

Group review of ENWRA Website Updates (interactive map, 2020 AEM tabs, tutorials, Dropbox), Public Inquiries (think about future organization/cataloging), AEM Flight Line renaming (think about another Darcy or student), Geoscene3D projects (made for each NRD on ENWRA Dropbox), and test holes (none in 2020 - LCNRD, LPNNRD, and P-MRNRD upcoming 2021). List of ENWRA Dropbox links linked to the website are attached.

Budget and Interlocal: Updates reviewed. Two UNL bills still expected that would update/reduce the fiscal year (FY) 2021 end/FY 2022 start amount shown for the ENWRA account. Numbers shown and how they match LPSNRD Draft #1 of the budget were discussed. Any changes partners would suggest could get into LPSNRD Draft #2 [**UPDATE changes must get in by 4th of July**] but budget is pretty much set after that date. Future potential aquifer tests and costs discussed relative to the routine expenses; provide technical committee aquifer test scenarios with estimated costs in order to evaluate potentially revising dues (need layout of reasoning for NRD boards like the increase to \$9150 explanation for LCNRD).

Projects/Regional Data Updates Discussions

- Water Sustainability Fund (WSF) Award #4164 - the Nebraska GeoCloud (NGC) is under ENWRA's \$25,000 annual Data Management objective: <https://snr.unl.edu/csd/geology/nebraskageocloud.aspx>. Continue with UNL, USGS, I-GIS and the advisory committee, submit final WSF close out report for GeoCloud in June 2021 working on getting final bills in [**UPDATE:** bills made it in by June 30, 2021 but subsequent reimbursement likely will hit in FY 2022]. Jesse welcomed input from NRDs on future workshops and long-term plans for NGC past FY 2022. Also related to the AEM, Jesse indicated AEM data is changing the way we think about the glacial margin – paper displayed on screen: <https://www.sciencedirect.com/science/article/pii/S2666033421000058>
- Jared Abraham of AGF: 2020 reports for P-MRNRD and NNRD are done and in the final stages of being uploaded to the NGC. The P-MRNRD historical AEM data was incorporated and merged with neighboring NRDs (3,500 miles of data) with reinverted Ashland (spatially constrained) data, a big task. Jared reviewed Dakota bedrock aquifer highlights in the AEM reports and work yet to be done regarding aquifer tests to match up with the Dakota mapping.
- Dave Hume of LRE: Dave gives quarterly updates to NRDs on the WSF grant award Project (scope is similar to the LENRD approach with NeDNR), Roscoe is working to get well logs and

testhole database into hydrogeologic cross-sections, Mike Plant is working to get arms around the AEM data, next phase is working in LeapFrog like was done for LENRD.

- Pilot Site sites: will evaluate 2020-2021 lab results after Ashland site is sampled for the extra parameters and see how new replacement nitrate sensor in AquaTroll 600 sonde did (new May 2021 16.8 mg/L lab result still consistent for the 40-ft well and sensor deployment). Well surging/purging/cleaning work will be conducted at deeper well sites where pumps are having issues getting water to the surface for sampling and sediment buildup or screen clogging is suspected as the cause [**UPDATE:** effort partially complete, expected completion by late July].
- CSD Data: Dakota was logged in P-MRNRD's 3-year test hole program along Missouri River indicating revisions needed to the bedrock map – the goal is to get the holes finalized in the database to do that. Aaron indicated to the group updates have been made to the CSD process of finalizing test holes so they automatically go on interactive map making the process easier now.
- Other NRD upcoming Data plans: P-MRNRD will be looking for additional test hole locations for Arlington paleovalley in the uplands.

ENWRA 2021 WSF Grant Scope:

- \$72,200 out of pocket for ENWRA [**UPDATE:** this has been increased to **\$96,000** to cover CSD-related focus area and water level contouring efforts and it matches the DRAFT LPSNRD FY2022 budget for ENWRA – application submittal period opens July 16th and closes July 31st]
- Added Burt County Logan East Rural Water (Oakland and Craig public water to those communities will likely require enhancements to the system) to the focus areas on the bullet list. **UPDATE:** follow-up meetings with the tech committee reviewed a new list with **5 areas** across district boundaries - See Figure 1 attached
- Reviewed Draft Section A of the Application: Project Timeline (3 years, calendar indicated but dealing with state local VS federal fiscal splits), Partnerships (ENWRA, USGS, UNL-CSD), Budget (Daryl indicated stay under the \$250,000 better chance to get in small projects pool), and Overview (1000 words max).
- Scope comment summary:
 - USGS write-up product will be Scientific Investigations report
 - Paul asked if Phase I resistivity data would be just along lines like the .kmzs for the 3-mile grids VS map for this grant – Chris indicated for different data density areas the areas would be backfilled with other data and uncertainties with the map would be identified.
 - Jared comment: there was no analysis on overland flow or slope analysis with original .kmzs –so that would be big to consider. Chris indicated thickness, slope, landuse will be considered.
 - There was a question on Phase II scope including manual measurements or vadose monitoring. USGS: Phase 2 is mainly desktop work and the phased approach is future roadmap for additional measurements. **UPDATE:** follow-up discussions after the meeting indicated select manual measurements could be planned ahead of time by NRDs (example in Jan kickoff plan if we get the grant – we could discuss potential NRD adjustments to when and which wells). Also, this topic blended with further synoptic water level discussions summarized in next bullet.
 - Jesse K. had a technical comment on using AEM for recharge regarding clay content as the dominant control and recommending characterization of the tills or literature review or coring/modeling combo to get at potential fracture

networks (maybe part of missing 40% in our grant wording regarding preferential pathways? Add to scope in Phase 2/3 break or new pilot territory?). Chris mentioned looking at the bromide tracers on a more field scale for that too. Jesse indicated 2017 WL blitz for SQS#2 was significant for seeing the boundaries (measurements every mile or two compared the usual). LENRD noted Sue recommended one per square mile in the past as a snapshot goal also for synaptic WL measurements. The logistical nightmare of a large multiagency coordinated synaptic measuring event for the region was acknowledged. Aaron indicated a couple days makes a difference with heavy rainfall, you can still get a huge change. Jesse indicated a high density of measurements shows anomalies that correlate with boundaries observed in the AEM powerful data for edges of aquifer units at minimal cost. LENRD indicated it would be interested in a coordinated synaptic event. Maybe Phase I identifies areas of a targeted synaptic plan – get that data for bunch of wells they don't usually measure in a focus area– Daryl indicated we must coordinate across NRD boundaries. Paul also indicated there should be a consistent manner of selecting/using data points to prepare the regional map. Aaron indicated we would break out contours by Aquifer (HPA, Dakota, paleovalley, etc) which would reduce the # of mass collection points. There are local VS regional pros and cons on the approach, and it comes back to what the goals are. The consensus was to meet again on this topic with a few NRDs at a time [**UPDATE**: meetings were conducted for the 5 focus areas where they crossed NRD boundaries with a few NRDs on at a time]. Latest **UPDATE** made in application draft: getting more measuring points accurately located and categorized by aquifer unit was the first order goal on the phased approach but leave Phase II and III flexible for targeted level monitoring or other approaches suggested by grant advisor team.

ENWRA Partner Agency Updates and Discussions:

- **NeDNR** –Philip inquired if there was more detail on AEM work planned around Nemaha and LBB NRDs that could affect the planning on the NeDNR Nemaha groundwater numerical model that is up next in the que for eastern Nebraska after the latest LPMT model work with incorporating LPNNRD and P-MRNRD AEM data. Next year maybe the Department would want to think about the next step on Nemaha model development getting the geology sorted out taking lessons learned for LPMT model. Nemaha just keep that in mind if we have a year or two to be prepared for the model development going on, we will be ahead of things. (**UPDATE**: Dorchester – Sterling Paleochannel is one of the focus areas in the ENWRA grant application [see attached Figure 1] and because of the Phased approach can maybe accommodate for discussions on model development next year]. Plus geologic model planned for LPSNRD would include some of this area. Jared indicated Cass County AEM survey work is on the horizon along with an LLNRD survey planned for summer of 2022 – if there were additional areas needing coverage it would be good to plan for 2022 to share cost savings on mobilization. **UPDATE**: *remember there is slot for NRD transducer data on NeDNR time series data platform (ENWRA NRDs could have a slot like served out for stream gages).

Upcoming Action Review/Meetings/Schedules:

- Ashland pilot site sampling coming up with extra parameters (eval of parameter results and recommendations will come after Ashland results are in)
- Test holes in LPNNRD and P-MRNRD coming up in June
- Upcoming report on nitrate sensor behavior at Firth since it was redeployed
- Timeline on grant submittal: July 16th -31st is submittal period. **UPDATE:** draft application went out for review at the end of June, waiting on draft support letters from NRDs, LPSNRD board meeting is July 21, 2021 (application on behalf of ENWRA - plan to get on the agenda).
- LCNRD **UPDATE:** Scheduled for December 16th 2021 10 am
- P-MRNRD would like to have an ENWRA update when we have a draft interlocal agreement renewal to bring to the board
- Nemaha NRD: ENWRA Update to board around when AGF does the AEM presentation.
- Upcoming informal ENWRA NRD meeting topics: grant discussions, interlocal agreement renewal, potential scenario reviews on aquifer testing (added could be part of both LRP objectives and grant ideas)
- Public inquires discussion: lots of work goes into them – discussion on how much time and if someone with basic training could do them, maybe help could be available. Ideally GeoCloud would end up being the useful platform for self serve inquiries – interactive Maps are so user friendly. Aaron would be excited for GeoCloud as the # questions went from 1-2 a week to 1-2 every couple months with the CSD interactive map being up now, also use of the map is increasing 600 or 700 uses of map. How much time resources are needed and does it keep coordinator away from other things? Discussion on: if BASIC knowledge can answer calls – students under supervision of CSD people is an option– bring up new generation of CSD people – do not forget data management and public needs for good scientific data – train an intern – there are concerns farming out the inquiries.

Adjourn

ENWRA Dropbox Links

Please note the contents in these folders are linked to the ENWRA website (website links substituted below for folders with non-public municipal water supply and utility data). The Nebraska GeoCloud houses the most updated consistently formatted AEM datasets for Nebraska:

<https://snr.unl.edu/csd/geology/nebraskageocloud.aspx> .

>  AEM_Media	https://www.dropbox.com/sh/4ulwuw0vo8pjt1w/AACT-Cv7uLRv6ilqADq5d1YKa?dl=0
>  cloudHQ Videos	https://www.dropbox.com/sh/ih5a8xloefdp2mu/AAATiyh3vBZCECAjGMDLacBWA?dl=0
>  DarcyBoellstorff	https://www.dropbox.com/sh/8zxjbgcnwqomill/AACuwbhJm9_xn9Jm3O75bqwt?dl=0
>  DVB and Clarkson-Howells	https://www.dropbox.com/sh/ekqc6y6c1j0ztq6/AAAbi8Fz0NzCx2hVaXnt2pWa?dl=0
>  enwra_2014	https://www.dropbox.com/sh/133s0tkh1izo5yj/AACeDNWvAWiA4Hqsh5uSyO1-a?dl=0
>  ENWRA_2015	https://www.dropbox.com/sh/etw4ip1p7fujek/AADUVfxrdki5YNkrILLERYzWa?dl=0
>  ENWRA_ARCHIVE	https://www.dropbox.com/sh/ecn95nbxs4fty77/AAB87da3BoLVxRA-12o1iksja?dl=0
>  ENWRA_Pilot_Sites	https://www.dropbox.com/sh/d00uk01yxhI5a56/AADhqshPYCeONxMsWa3enxgGa?dl=0
>  ENWRA_PilotandSprague_kmzs	https://www.dropbox.com/sh/opjg7xlbalm53oq/AADki8OOjWULmpBpykeZczeLa?dl=0
>  ENWRA_Sprague	https://www.dropbox.com/sh/kqwi7b0wkq0iaqn/AABoV8wvUvEwYC4Juteas62ja?dl=0
>  ENWRA_WaterLevelandSamplingData	https://www.dropbox.com/sh/kuq64j1eqk27gh/AAB3PVFTBsK9_iLZ2_8Z-KZCa?dl=0
>  ENWRA_Website_Bazile	https://www.dropbox.com/sh/cpylwefl1wxcy56/AADRvCoWP0RVYAdpPaqEZSIpa?dl=0
>  ENWRA2014_ENWRA2015RECON	https://www.dropbox.com/sh/ja0nhzs13dssgsa/AAB4cAijKHIBIRzleRxrctbaa?dl=0
>  LENRD_2014	https://www.dropbox.com/sh/uq6cs0qeimwbheq/AAC0_vxSkrWCZ13-nb0UnSNaa?dl=0
>  LENRDFullReport_from52915	https://www.dropbox.com/sh/5nb06riezbocew3/AAAqgTEEa17ZT0W15GkGQcOVA?dl=0
>  MeadHEM	https://www.dropbox.com/sh/effigawlk4lyed4/AABjbMcRkIVQ0u8aLu95uFAta?dl=0
>  PilotSiteGeoLogs	https://www.dropbox.com/sh/1p3kok4a1watojk/AAAc3WzqzblISgcwvNQ1vNya?dl=0
>  PPTs	https://www.dropbox.com/sh/m4h4zzx1lgt9hb/AAAWgk2TRShQhkZOICwXl6KMa?dl=0
>  TemperatureFluctuationsinENWRA_GW	https://www.dropbox.com/sh/ftn652jpwrcs6wg/AADhvyqM2Vy5v_5RSvtj4DGoa?dl=0
>  USGS Transducer Data	https://www.dropbox.com/sh/wta3jan5ou5fppi/AAANSu_kHURIdQOsPIds7mTYa?dl=0
>  VuSitu	https://www.dropbox.com/sh/taaujkw6xnljw/AABQA_tjtMUwuOqa9KTnEqSla?dl=0
▼  WSF_AEM_2016	http://enwra.org/aem2016.html
>  Bazile	http://enwra.org/coop.html#uenrd
>  LCNRD	http://enwra.org/aem2016.html#lcnrd
>  LENRD	http://enwra.org/aem2016.html#lenrd
>  LLNRD	http://enwra.org/coop.html#loup
>  LPNDRD	http://enwra.org/aem2016.html#lpn
>  LPSNRD	http://enwra.org/aem2016.html#lps
>  P-MRNRD	http://enwra.org/aem2016.html#papiro
>  PublicAEMWebsite	https://www.dropbox.com/sh/8phit55bp7nigfq/AACayAEhiR7ZSpi3q0S0b2gca?dl=0
>  TPNRD_CPNRD_Delivery	http://enwra.org/coop.html#CPNRD
>  2018_AEM_Flights	http://enwra.org/aem2018.html
>  Appendix 3 - Data Deliver...	https://www.dropbox.com/sh/nbrei967ni49bg5/AAAg08nUFSfPUIOq6fnOU97ka?dl=0
>  ENWRA_Overview_Chapter	https://www.dropbox.com/sh/kwstug3sllvmkv/AACwr9zOrxEP6pulMgtMXQ-Ra?dl=0
>  LCNRD	http://enwra.org/aem2018.html#lcnrd
>  LENRD	http://enwra.org/aem2018.html#lenrd
>  LPNDRD	http://enwra.org/aem2018.html#lpn
>  LPSNRD	http://enwra.org/aem2018.html#lps
>  NNRD	http://enwra.org/aem2018.html#nnrd
>  P-MRNRD	http://enwra.org/aem2018.html#papiro
>  WSF5189	https://www.dropbox.com/sh/rl0148gorwm5a8e/AAAJxDxG-9d8-s9tV6M-JtKta?dl=0
 WARNING.txt	https://www.dropbox.com/s/ach2w5d23ocz8p1/WARNING.txt?dl=0

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▼ 2020_AEM_Flights	http://enwra.org/aem2020.html
> CSD_files	https://www.dropbox.com/sh/ssnyf2pdt22dwss/AACAzn1rJPY0gbiMVLUoC37ca?dl=0
> ENWRA_AEM_3Dproject_...	https://www.dropbox.com/sh/82qbhrcmn04d7kc/AAAqg5_QlBip59tJOYIS-bfQa?dl=0
> Nemaha_NRD	http://enwra.org/aem2020.html#nnrd
> Papio_Missouri_River_NRD	http://enwra.org/aem2020.html#papio

ENWRA Focus Area Map

(WSF App. July 2021)

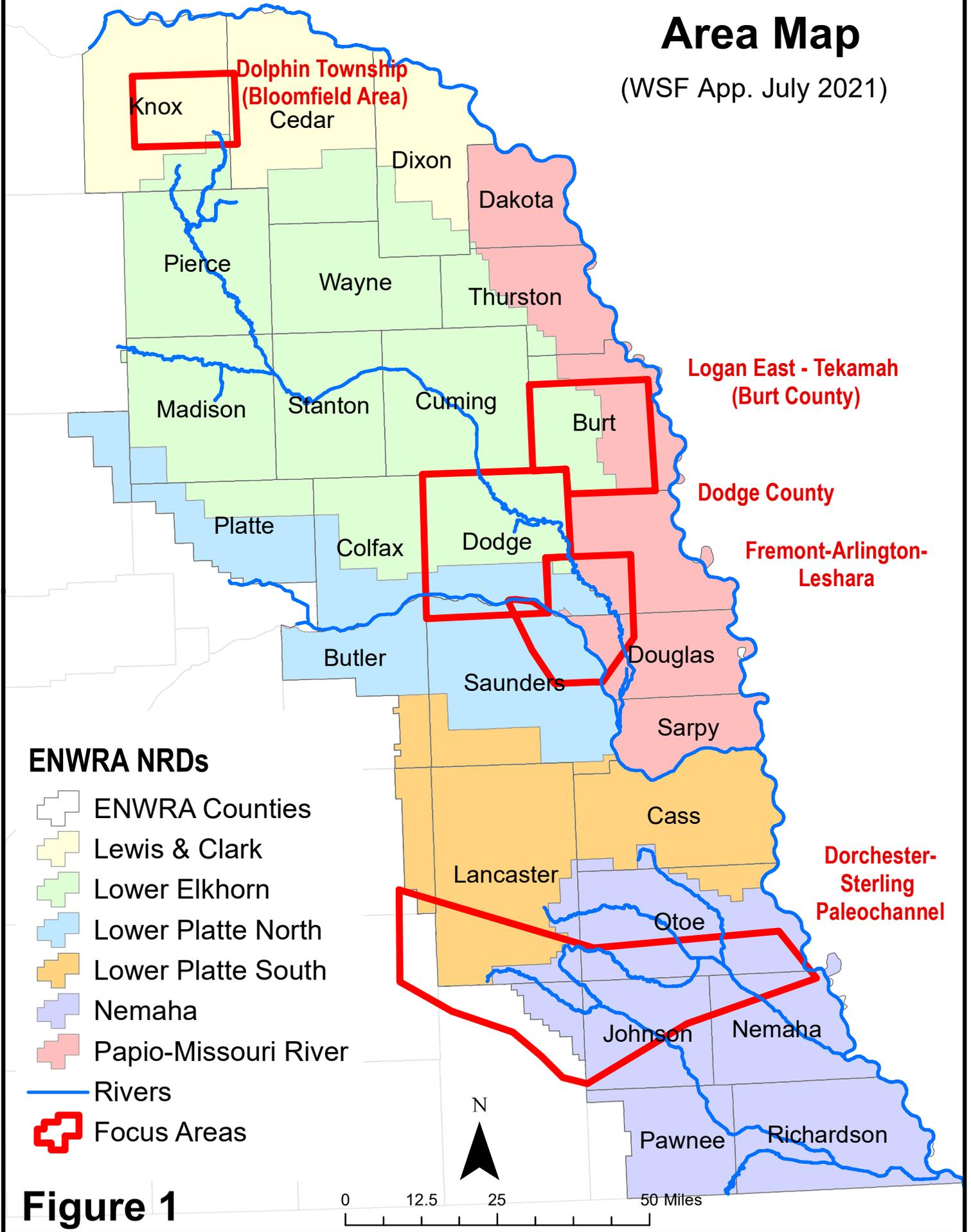


Figure 1