MINUTES
ENWRA Annual Meeting
Tuesday, January 23, 2018 3:00-5:00 pm
Meeting Room: Embassy Bar & Grille
Embassy Suites- 1040 P Street - Lincoln

Attendees (24):
Amanda Flynn (USGS), Chris Hobza (USGS), Steve Peterson (USGS), Joslynn VanDerslice (LCNRD), Ginny McGuire (USGS), Amy Zoller (NeDNR), Carrie Weise (NeDNR), Jesse Bradley (NeDNR), Marlin Petermann (P-MRNRD), Bob Hilske (NNRD), Jim Cannia (AGF), Daryl Andersen (LPNNRD), Russell Oaklund (LPNNRD), Dan Schulz (LPSNRD), Matt Joeckel (UNL CSD), Dana Divine (UNL CSD), Sue Lackey (UNL CSD) and Brian Bruckner (LENRD) via Zoom, Mike Sousek (LENRD), Paul Woodward (P-MRNRD), Jesse Korus (UNL CSD), Dick Ehrman (LPSNRD), Chuck Wingert (NNRD), Katie Cameron (Coordinator)

Financials:
ENWRA had ~$325,000 in the account to work with at the start of Fiscal Year (FY) 2018 and collected $147,000 in routine annual dues. We had ~$80,000 in routine expenses projected, $18,300 in test hole credits (LCNRD and LENRD), $13,334 for the episodic recharge project, $25,392 for WSF 4125 USGS bedrock sampling match, and $25,000 WSF GeoCloud match covered in ENWRA's FY18 budget **[**GeoCloud projection is corrected here from the meeting slide**]**. However, we are over budget on our equipment budget of $7,500 ($4,500 in 2 previous years) due to three pumps and multiple transducers going down (knew it would be more due to aging fleet but still was not enough). Please see FY18 Budget Addendum included as **Attachment 1** for cost overruns and revised amounts. There is an estimate of $300,000 to $320,000 for the ENWRA account banked funds starting FY19. Please also refer to the FY19 Test hole Credit **Attachment 2** for a revised schedule of test hole credits.

Review of 2017:
Flights and Water Sustainability Fund (WSF) Applications:
The LPNNRD, LPSNRD, LENRD, LCNRD, P-MRNRD, LLNRD, TPNRD/CPNRD, and Bazile Man. Area group each flew Airborne electromagnetic survey (AEM) flights in summer 2016 and the associated Aqua Geo Frameworks, LLC (AGF). All the 2016 AEM reports came out in 2017 and each of the final status reports for the funded applications are posted as final on the NRC website except the LPSNRD which is scheduled for April 2018. Additionally each of the 2016 AEM Flight reports (pdfs and Google Earth .kmzs) are available through the ENWRA website under the "2016 AEM" tab for ENWRA NRDs and under the "AEM Project Partners" tab for the Lower Loup, Bazile area and TPNRD/CPNRD AEM reports. The ENWRA group also has been working on WSF 4125 with the USGS for quality and age-dating reconnaissance of secondary aquifers and a webcast was scheduled for February 2018. Generally speaking: the deeper the well - the older the water (thousands to tens-of-thousands years old). A couple of the wells had high nitrates. The results are published on NWIS and letters summarizing the results will be sent to NRDs and landowners following verification with a final USGS report expected in December 2019 **[Amanda's February 22, 2018 Webcast power point was sent to attendees].** The Nebraska GeoCloud (NGC) #4164 is another WSF application ENWRA was awarded in 2016 with CSD and USGS. Jesse Korus gave a brief update mentioning the summer 2017 workshop and other recent work/upcoming presentations on the NGC.

Recharge Project with USGS: The USGS gave a webcast on the results of the Episodic Master Recession (EMR) method used for the ENWRA area to look at NRD and ENWRA provided transducer data with precipitation events to get water-level derived recharge estimates. This work built on the previous John Gates work (Water Resources Research Vol 50, p1-16, 2014 - John estimated 40% of the picture was missing in low lying areas and preferential recharge paths) and used recommendations from John R. Nimmo, U.S. Geological Survey, Menlo Park, California who presented to ENWRA at the previous January 2017 ENWRA meeting: The results of

the EMR method evaluations indicated 11 calibration points (possibly more if the episodes from partial datasets can be used), including some higher ones getting at that missing 40% for regional water balance approaches.

Other Routine Activities: ENWRA Test holes (LCNRD and LENRD planned FY18 and LPSNRD in FY19 [see Attachment 2 for proposed test hole schedule]); WSF Grant was submitted in July 2017 for more flights (Nov. 28, 2017 award #5189); presentations of 2016 AEM reports in 2017; ENWRA update to P-MRNRD; pilot study site routine activities (some wells were not sampled in 2017 due to scheduling problems & see equipment budget request - Attachment 1); website updates (2017 annual pilot site data is compiled and posted); new ENWRA Dropbox folders/links for handling ENWRA data have been created (terabyte for $99/yr, the contents of the ENWRA folder on the NeDNR ftp site has been moved to a USB and a txt file note with links to dropbox remains).

ENWRA Long Range Plan Updates:
The Long Range Objectives remain the same, the Priority Areas for each NRD were updated in the text and on the Appendix B Table Matrix. Other minor edits to Figures and text were also updated accordingly in the November 27, 2017 draft sent out to the ENWRA group following update meetings held with the partner agencies. The final version of the LRP update will be sent out to the ENWRA group by the end of March 2018.

Upcoming ENWRA Plans:
AEM: Planning under the WSF Award #5189 for additional AEM flights for each of the 6 ENWRA NRDs is underway and will continue throughout the first part of 2018. The LENRD and LCNRD have signed side contracts with Aqua-Geo Frameworks, LLC (AGF) for additional flight lines beyond those planned with WSF funding (please see March 2018 updated Attachment 3). The additional lines will be part of the same flight campaign and NRD chapter reporting, just under separate contracts with AGF. AGF's contractor selection is anticipated around May 15, 2018, the flights starting around June 2018, and the next AGF invoice for 50% of the project anticipated for early July 2018 **[Update:** ENWRA submitted Claim 1 to NeDNR for the upfront costs and will send checks back to each of the NRDs as soon as the 60% reimbursement comes in**]**. Report delivery plans are staggered, starting in December 2018 (LENRD) and ending in fall 2019 (LPSNRD), please refer to Attachment 3 for the Flight reporting and AGF payment schedules as of March 29, 2018. The 2016 AEM flight report presentations should wrap up in early 2018 (LPNNRD Feb.- Mar. presentations and LPSNRD 2016 AEM flight report presentation planned for early April 2018). Early April is last call for NRD changes to flight lines before detailed routing by AGF.

USGS Secondary Bedrock WSF #4125: Letters summarizing the results will be sent to NRDs and landowners following verification with a final USGS report expected in December 2019 [Amanda's February 22, 2018 Webcast power point was sent to attendees].

Recharge Work: USGS provided a proposal to do a Soil Water Balance (SWB) Model proof of concept with the 3 pilot sites dividing them into three topographic regions with differing recharge properties: glaciated uplands, glaciated lowlands and alluvial (non-glaciated) and quantifying them with recharge estimates based on topographic setting, land use and total precipitation. The resulting rasters and information could be used in a variety of ways including as a revised groundwater input to existing models to better represent the hydrologic conditions of the aquifer in glaciated areas. The consensus on the next step at the end of the meeting was to have USGS and NeDNR discuss the potential model plan details before the next technical meeting. **[Update:** USGS is looking to have a roundtable discussion at ENWRA's next technical committee meeting in May 2018 on a new revised scope direction for looking at recharge considering NRDs' management needs and USGS expertise**].**

Nebraska GeoCloud WSF#4164: Jesse Korus presented at the March 6, 2018 NRD water programs conference in Kearney (included information about the free extended GS3D "Nebraska Viewer", August 2018 workshop).

Test holes: See attachment 2, coordinator will also provide logging on NNRD's NET test hole grant FY19.

Meetings: ENWRA presentations to the NRD boards are wrapping up in early 2018. ENWRA presented an update to the Managers at the March 7th 2018 NRD Managers meeting. The ENWRA Technical meeting will be scheduled around May 2018 to coordinate with AEM contractor bid selection time before 2018 AEM flights and in time to coordinate for potential grant applications.

Pilot Sites: Review 2007-2017 data and evaluate potential changes to the annual sampling schedule (if cost/time benefit from reduction makes sense). Conduct routine maintenance and downloads (See Attachment 1 on costs), provide coordinator assistance at Oakland site with LENRD's NET telemetry grant (FY19 and FY20) and Oakland pilot site bulletin reviews are scheduled for 2018.

Jesse Bradley presentation on LENRD 3X3 Mile AEM grid results:
Jesse presented the results of the Hydrogeologic Conceptual Framework project conducted for the LENRD by the Flatwater Group, Inc. combining available Water Use and Geologic Information into a framework useable by the NRD. This is the first step in AEM data integration into a model by the ENWRA NRDs. Regarding water use, the project developed a water budget using models and data, comparisons to NRD and other outside datasets, and looked at results and future scenarios. Water budget data (CROPSIM and Watershed Model) represented: soils, landuse, climate, farming practices, and irrigation source with recharge, pumping and quarter section (½ mile by ½ mile) cell datasets created (replicates approach used in USGS SWB model while addressing certain limitations). For the geologic information, the available AEM methodology (ex: 4 categories from AEM deliverables) and data were reviewed with transmissivity maps and confined aquifer maps/characteristics and general patterns and zonation of geologic features created. A GIS model with the geologic information in one large geodatabase was created (2015 water levels, k values for AEM interp. categories, transmissivity as high, med., low etc. – host of products). The resulting framework was a combined view of water budget and geology information. The LENRD was provided framework use examples using a defined set of identification criteria: status of geophysical (AEM) derived hydrogeologic framework and geologic sub-surface investigations and analyses; potential access to ground water sources; projected water budget; soil types / land slope; and current land use conditions. Example uses of the framework (local scale water budgets and other factors affecting water management decisions [Safe Yield Concepts]):

1. Having available ground water in sufficient quantities to support irrigation of area crops
2. Where additional development will not make an existing problem worse
3. Where additional development will not create new problems

Many example maps and GIS screenshots were shown including a Potential for Development Map with 29 (½ mile) grid cells map and a framework example.

Sue Lackey mentioned the red polygons on CSD 2005 transmissivity map slide shown in the power point only reflected one confined area (area B) off the CSD OFR 71 produced (A, B, C, D named areas were defined on the 2005 CSD map product) and did not take into account the confined aquifer verbiage regarding the uncertainty of connections between groundwater and surface water systems in the much larger area C and western part of Area D. Jim Cannia also made a comment about till cover (related to the non-aquifer category in the AEM) and delay factors from till. Jesse indicated he was showing examples today with use of data provided and will go back and look.

Jesse also talked about the new water budget viewer and groundwater model scenario tool being developed for release by NeDNR called SUSTAIN (**S**ustainable **U**se **S**cenario **T**ool for **A**nalysis and **I**nforming **N**ebraskans). There was another talk on SUSTAIN scheduled at the legislative conference. The SUSTAIN is a viewer tool that works with inputs at any user defined level that NRDs will have access to. The Upper Niobrara White NRD Integrated water model was mentioned where you can change pumping in the tool and see potential impacts from the changes. The Missouri River Tributaries NeDNR model in the ENWRA area is in the final calibration stage and should be accessible by the end of February and should work with SUSTAIN tool viewer. The Nemaha NeDNR numerical model in the ENWRA area will be next.

Comments/Afterward Discussions:
The new tool for NRDs SUSTAIN on watershed scale is available, Jesse encouraged helpful feedback – LENRD has taken the first step in advancing the use of AEM for management purposes with this integration into a groundwater model. Accommodating everyone's pace on modelling/data evaluation while still advancing the use and creation of further products out of AEM data for management purposes was discussed. Consistency in approach and needs for accomplishing useful integration of the data were discussed: updated transmissivity maps, water level data (more local, more recent, more representative than 1995), Saturated and unsaturated hydraulic properties or other properties important to data analysis (till thickness layers/degree of confinement, k value evaluations w/pump tests or literature etc.). When we start talking about water budget related products on a regional level – which is where we are getting once 2018 AEM is done - this will be critical. Other topics discussed: need versioning control (raw and reported data component sources/authors, resulting product sources/authors) on AEM related products are part of the Nebraska GeoCloud.

Partner Updates:
USGS: Steve Peterson mentioned that he and Jason are tag teaming as the interim Water Science Center director now that Bob Swanson has left as it may be a while until his position is filled. There will be a symposium in **April 11, 2018** at Innovation Campus in Lincoln with lightning talks and hands on activities. Refer to the USGS emails for registration information and further details.

NeDNR: Amy Zoller mentioned the American Water Resources Management Association is holding a specialty conference on Integrated Water Management in Omaha **March 2019**. She is on the Committee for the conference. There will be a call for abstracts for that so spread the word and be thinking about attending and/or submitting. Jesse Bradley mentioned the state budget will get tighter but the funding obligations made to date, thus far, remain unaffected.

5:00 Adjourn

Attachment 1
FY 18 Equipment Budget Addendum

Ordered:	Cost:	Date:	Wells:
In-Situ	$2,749.75	9/5/2017	Level troll 500s for ASH07-158 and FIR07-63, baroTroll for ASH03 site
Nebraska Pump	$5,570.09	1/20/2018	FIR04-145, ASH03-250, OAK12-255 (only one pump failed in previous 4 years)

Total: **$8,319.84 Total** as of February 2018, FY18 Budget was **$7,500**

Spring 2018:	Cost:	Date:	Wells:		
	$995	**3/2018**	OAK04-146	Level Troll 500 vented 100psi	need to replace, important locations/aquifer units
	$995		OAK05-30	Level Troll 500 vented 30 psi	
	$995		OAK09-180	Level Troll 500 vented 100 psi	
	$680		ASH03-108	Level Troll 400 ABSOLUTE	need to replace, batt died 10yr
	$680		ASH06-92	Level Troll 400 ABSOLUTE	
	$995		EXTRA (FIR	Level Troll 500 vented 30 psi	not dead yet but battery low
	$995		EXTRA (FIR	Level Troll 500 vented 100psi	
	$995		EXTRA	Level Troll 500 vented 100psi	
	$7,330	**Will put us at ~$16,000 VS our $7,500 budget, LPSNRD fin. has ok'ed exceedance**			

Future anticipated:

$7500+	**FY19**	Oakland, Ashland and Firth (includes 2 transducers for LENRD NET at Oakland)	more equip. expected fail
$3,000	**FY20**	telemetry system for Oakland Site	7/2019 NET match
$4,500		Firth and Ashland Sites	more expected to fail

Note: telelmetry or external batt. packs can extend the battery life of the trolls

ATTACHMENT 2 - ENWRA Payment Schedule for Test Holes

Test Holes Drilled Along Flight Lines - Schedule for Using ENWRA Fund Credits	ENWRA's Fiscal Budget Year	Test Hole Amounts out of ENWRA banked funds:
P-MRNRD reimbursed $9,150 through Dues credit for 2015 holes	FY16	$9,150
LPNNRD reimbursed $9,150 through Dues credit for June 2015 holes	FY17	$18,300
NNRD reimbursed for $9,150 through Dues credit for October 2016 holes		
LENRD scheduled for $9,150 check from ENWRA for May 2018 holes	FY18	$18,300
LCNRD scheduled for $9,150 check from ENWRA for May 2018 holes		
Up for approval: $9,150 to LPSNRD, $9,150 to LPNNRD, $9,150 to Nemaha	FY19	$27,450
Future:$9,150 to P-MRNRD, $9,150 to LCNRD and/or LENRD	FY20	$18,300-$27,450
Future: $9,150 to LPSNRD, $9,150 to LCNRD and/or LENRD	FY21	$18,300-$27,450

ENWRA NOV 2017 WSF AWARD #5189
(anticipated payment/reimbursement summary for the Project)

Income From	Project Commitment	Amount ENWRA Will Bill NRD	Estimated Bill Date	ENWRA Invoice Number	Invoice Period	Amount to be Reimbursed by DNR (60%)	NRD out-of-pocket (40% to budget for)	Estimated Date NRDs Will Receive Reimbursement back from ENWRA
LC NRD	$150,000.00	$150,000.00	1/31/2018	5000		$90,000.00	$60,000.00	4/2/2018
LC NRD (sidecontract)	$45,000.00	-	3/1/2018	-		-	$45,000.00	-
LE NRD	$195,000.00	$195,000.00	1/31/2018	5001		$117,000.00	$78,000.00	4/2/2018
LE NRD (sidecontract)	$66,000.00	-	-	-	**FY18**	-	$66,000.00	-
LPN NRD	$225,000.00	$225,000.00	1/31/2018	5002	**(30%)**	$135,000.00	$90,000.00	4/2/2018
LPS NRD	$255,000.00	$255,000.00	1/31/2018	5003		$153,000.00	$102,000.00	4/2/2018
N NRD	$90,000.00	$90,000.00	1/31/2018	5004		$54,000.00	$36,000.00	4/2/2018
PMR NRD	$69,000.00	$69,000.00	1/31/2018	5005		$41,400.00	$27,600.00	4/2/2018
	$1,095,000.00							
LE NRD (50% WSF)	$325,000.00	$325,000.00	7/1/2018	5006		$195,000.00	$130,000.00	8/31/2018 (after flights)
LE NRD (side cont. 50%)	$110,000.00	-	7/1/2018	-		-	$110,000.00	-
LE NRD (WSF last 20%)	$130,000.00	$130,000.00	**12/31/2018**	5012		$78,000.00	$52,000.00	12/31/18 (after report chapter)
LE NRD (side last 20%)	$44,000.00	-	12/31/2018	-		-	$44,000.00	-
LC NRD (50% WSF)	$250,000.00	$250,000.00	7/1/2018	5007		$150,000.00	$100,000.00	8/31/2018 (after flights)
LC NRD (side cont 50%)	$75,000.00	-	7/1/2018	-		-	$75,000.00	
LC NRD (side last 20%)	$30,000.00	-	**2/14/2019**	-	**FY19**	-	$30,000.00	-
LPN NRD (WSF 50%)	$375,000.00	$375,000.00	7/1/2018	5008		$225,000.00	$150,000.00	8/31/2018 (after flights)
LPS NRD (WSF 50%)	$425,000.00	$425,000.00	7/1/2018	5009		$255,000.00	$170,000.00	8/31/2018 (after flights)
N NRD (WSF 50%)	$150,000.00	$150,000.00	7/1/2018	5010		$90,000.00	$60,000.00	8/31/2018 (after flights)
N NRD (last 20%)	$60,000.00	$60,000.00	**3/21/2019**	5010		$36,000.00	$24,000.00	6/30/19 (after report chapter)
PMR NRD (WSF 50%)	$115,000.00	$115,000.00	7/1/2018	5011		$69,000.00	$46,000.00	8/31/2018 (after flights)
PMR NRD (last 20%)	$46,000.00	$46,000.00	**5/3/2019**	5012		$27,600.00	$18,400.00	6/30/19 (after report chapter)
	$2,135,000.00							
LPN NRD (WSF last 20%)	$150,000.00	$150,000.00	**7/2/2019**	5015		$90,000.00	$60,000.00	9/2/19 (after report chapter)
LC NRD (WSF last 20%)	$100,000.00	$100,000.00	**8/26/2019**	5013	**FY20**	$60,000.00	$40,000.00	10/30/19 (after report chapter)
LPS NRD (WSF last 20%)	$170,000.00	$170,000.00	**11/1/2019**	5016		$102,000.00	$68,000.00	12/31/19 (after report chapter)
	$270,000.00							
TOTALS:	**$3,575,000.00**	**$3,280,000.00**				**$1,968,000.00**	**$1,682,000.00**	

Notes:

The bill dates listed above for the "WSF last 20%" reflect the planned report due dates for each NRD's Chapter deliverable from AGF.