

MINUTES
ENWRA Annual Meeting
Tuesday, January 24, 2017 3:00-5:00 pm
Meeting Room: Embassy Bar & Grille
Embassy Suites- 1040 P Street - Lincoln

Attendees (24):

Rick Wozniak (LENRD), Amy Zoller (NeDNR), John Miyoshi (LPNNRD), Josh Schnitzler (LENRD), Miles Lammers (LCNRD), Megan Wolf (LCNRD), Ginny McGuire (USGS), Marlin Petermann (P-MRNRD), John Nimmo (USGS), Chris Hobza (USGS), Steve Peterson (USGS), Bob Hilske (NNRD), Jim Cannia (AGF), Russell Oaklund (LPNNRD), Dan Schulz (LPSNRD), Tom Mountford (LPNNRD), Matt Joeckel (UN-L CSD), Dana Divine (UN-L CSD), Brian Bruckner (LENRD), Paul Woodward (PMRNRD), Larry Angle (LPNNRD), Jesse Korus (UN-L CSD), Dick Ehrman (LPSNRD), Chuck Wingert (NNRD), Katie Cameron (Coordinator)

Review of 2016:

Water Sustainability Fund (WSF) Applications: 6 NRDs (LPNNRD, LPSNRD, LENRD, LCNRD, LLNRD, P-MRNRD) and Bazile Man. Area group each flew Airborne electromagnetic survey (AEM) flights in summer 2016 and the associated Aqua Geo Frameworks, LLC (AGF) reports are coming out in 2017. The ENWRA group also has been working on WSF 4125 with the USGS for quality and age-dating reconnaissance of secondary aquifers and there is one NRD left to sample (anticipated in March 2017). Preliminary results indicate big range of age in two wells (old water in a deep LCNRD well to young water in an LENRD well). The Nebraska GeoCloud is another WSF application ENWRA was awarded in 2016 with CSD and USGS (see below).

Other Routine Activities: ENWRA Test holes in Nemaha, LPNNRD and P-MRNRD are complete, LCNRD and LENRD planned FY18 and LPSNRD in FY19; presentations; and pilot study site routine activities (transducer budget increasing for expected older unit replacements), website updates and new ENWRA Dropbox.

FY17-18 Budget:

~\$350,000 in ENWRA budget to work with at start of FY18 after commitments and income. Will have: \$75,000 routine expenses, \$30,000 for WSF 4125 USGS bedrock sampling match, and \$45,200 WSF GeoCloud match in ENWRA's FY18 budget (\$25k/yr data management budget category going to GeoCloud FY18, 19, & 20). Estimated \$350k banked starting FY19 **[March 2017 update: more like \$320k estimated for start FY19]**

ENWRA Recharge Study:

John R. Nimmo, U.S. Geological Survey, Menlo Park, California, United States (jrnimmo@usgs.gov): John Nimmo, a recharge expert with the USGS, has been looking at the ENWRA datasets (transducer data, recharge station matric potential data, the John Gates et. al paper [Water Resources Research Vol 50, p1-16, 2014]). John Nimmo presented the latest techniques and case studies on understanding recharge through the unsaturated zone. John explained diffuse, preferential (difficult - no standard formulation to quantify), seasonal, and episodic recharge and associated case studies and analysis methods:

- Steady-State Darcian Method for Recharge Estimation (Nimmo et al. (1994), Imperial Nebraska example)
- Time-varying Darcian Method Water content profiles measured by TDR (Eguchi and Hasegawa [2008], TDR probes, Japan example)
- Soil water balance model adapted for preferential flow in addition to Darcian flow (Cuthbert et al. [2013] - Shropshire, UK example)
- The Episodic Master Recession (EMR) Method Automation of the water table fluctuation method that allows necessary hydrologic judgments to be applied uniformly through an entire data set (Nimmo, J.R., Horowitz, C., and Mitchell, L., 2015, Discrete-storm water-table

fluctuation method to estimate episodic recharge: Groundwater, v. 53, no. 2, p. 282-292).
Masser Recharge Site, Pennsylvania examples – looking for signals, spikes from storm events.

- Other: Tracers, Subsurface instrumentation, Controlled infiltration, Etc. (Perkins et al. [2011], Mississippi delta example)

Possibilities regarding the ENWRA data:

- Analyze existing data (not in Gates et. al, 2014: continuous groundwater-levels, Fordyce matrix potential data, Other data sets?) - prioritize needs and identify funding sources
- Additional recharge sites: focus on specific locations to address local issues, water-level methods, TDR, HDP, tracer experiments
- Field experiments to measure unsaturated hydraulic properties or other properties important to data analysis

Questions/discussions from John's talk: frost zone effects, irrigation/seasonality effects, recharge to paleochannels, hourly transducers better than daily for seeing episodic signals, timing of nitrate applications, AEM, modern water age-tracers, the TDR probes are robust read water content highs and lows near the probes, ENWRA station HDP probes robust but not sensitive to wettest ranges, ENWRA aquispy moisture content probes not robust). The consensus on the plan was to have USGS look at the ENWRA existing data using the EMR method with ENWRA seed money and provide recommendations for continued/additional study and guidance to each NRD on various priority areas based on the findings and up-to-date research possibilities. **[Update: \$20,000 Joint funding Agreement w/USGS in-place]**

Upcoming 2017 Action Discussions

AEM flights – LENRD, LPSNRD, LCNRD budgeted for FY 2018 WSF AEM project match but did not get awarded, all 6 NRDs have specific AEM flight plans. Discussions on whether to go again in 2017 as one big application or team up or go individual to stay under the \$250,000 on each application. Nemaha indicated that they plan to be eligible for WSF by the July 2016 application time. LENRD, LPSNRD, LCNRD have budgeted amounts to consider. The consensus was: NRDs would conduct internal discussions following the meeting so ENWRA could coordinate potential plans to fly in 2017 with or without WSF funding and/or to coordinate potential grant applications at the spring tech committee meeting.

GeoCloud: – Dr. Jesse Korus, project lead, reviewed the Nebraska GeoCloud project awarded to ENWRA/CSD/USGS Dec 2016: partners, 3-D visualizations, WSF award scope and potential outcomes. A draft Interlocal Agreement to secure the local match for the award was handed out for NRD review (included 3years of funds from 10 NRDs). Jesse indicated there would be February 2017 kick-off web-based conference with Denmark on the GeoCloud specifically planned for early input from NRDs.

ENWRA Interlocal Agreement and Coordinator Position: – ENWRA's 5-year interlocal term and associated coordinator agreement with CSD is up for renewal May 24, 2017. Matt Joeckel, CSD director, spoke on the potential implications of pending UNL budget cuts and indicated that he would have potential revisions to the coordinator renewal agreement ready for the group by April 2017. **[Update: ENWRA NRDs approved \$5-\$10,000/yr increase to ENWRA budget for the Coordinator position for next 3 yrs with a re-evaluation for a return to the 50/50 coordinator share following the 3 yr term]**

Upcoming Meetings:

Spring Technical Meeting planned April 2017, will discuss follow-ups on grant applications, AEM flights, WSF projects, recharge etc. Recharge technical meeting with USGS, AGF presentations (2 for each NRD), ENWRA update to each NRD board – summer and fall 2017. Dick mentioned a vadose workshop will be held at fall programs conference at Kearney the week of February 27th

ENWRA Test Holes 3 NRDs left: LCNRD & LENRD FY18, LPSNRD FY19 - Schedule before June 2017

Pilot Sites: ENWRA routine annual sampling for pilot sites March-June 2017 **[March 2017 Update: 2008 to 2016 ENWRA pilot site water level and sampling data linked via Dropbox to ENWRA website]**

Minutes
ENWRA Spring Meeting
Tuesday, April 18, 2017 1:30-3:30 pm
Lower Platte North NRD
Wahoo, NE

Attendees (21):

Ginny McGuire (USGS), Chris Hobza (USGS), Amanda Flynn (USGS), Dustin Wilcox (NARD), John Miyoshi (LPNNRD), Dan Schulz (LPSNRD), Daryl Andersen (LPNNRD), Dick Ehrman (LPSNRD), Mike Sousek (LENRD), Tom Mountford (LPNNRD), Jesse Bradley (NeDNR), Dave Miesbach (NDEQ), Brian Bruckner (LENRD), Annette Sudbeck (LCNRD), Miles Lammers (LCNRD), Bob Hilske (NNRD), Chuck Wingert (NNRD), Paul Woodward (PMRNRD), Jesse Korus (UN-L CSD), Josh Schnitzler (LENRD), Jim Cannia (AGF) AEM discussions, Katie Cameron (Coordinator)

January Meeting Follow-ups:

Water Sustainability Fund (WSF) Projects: annual reports sent to Kent Zimmerman by 3/31/17

USGS JFA signed for \$20k recharge project work

Nebraska GeoCloud (NGC) Interlocal in place [UPDATE: all related NGC agreements are in place]

ENWRA interlocal [UPDATE: LPSNRD signed]: need all 6 NRDs signed by end of May 2017

Current Project Review:

Test Holes: 3 more NRDs left for CSD THs along AEM lines (some NRDs are doing more on their own). The Group decided to put ~\$18,300 in the annual routine ENWRA budget for test holes.

WSF 4125 - Secondary Bedrock Aquifer Sampling: ~26 wells were sampled, some of the age-dating results are partially in and we reviewed results (primarily Dakota, limestone in the southern areas) indicating the % of modern water across the areas sampled (recharged since 1950: <10%, 10-50%, 50-75%, >75%). Will start work on interpretative report this summer.

WSF 4164 - Nebraska GeoCloud: Jesse Korus recapped the February Webinar, CSD/USGS/ENWRA have been working on contracting and getting IGIS scope defined, August workshop/roundtables planned. Show of hands indicated equal amount technical user and administrative user interest in attendance – discussed potentially Grand Island as the location since they are set-up for and host GIS workshops and pretty central for NRDs in the interlocal.

USGS JFA Recharge Project - Preliminary results: Chris Hobza went over John Nimmo's initial runs of the NRD transducer data. ~ 220 transducer datasets, ~24 were culled out where episodic signals could be observed without pumping or surface water interference. Two examples near Firth and two near Valley were presented: example tables with reference recharge rates in comparison with ENWRA's previous recharge numbers from John Gates' work. Good questions/discussion by the group, USGS will work on tables/reporting to incorporate wells with meaningful signals and then try to put together what we learned, where data gaps are, what works for what settings and, and frame up a potential next phase. Need input from NRDs on priority areas - stations are \$30k plus misc. install/sampling, includes \$15k weather station and \$15 new recharge equipment. [UPDATE: will shoot for May 2017 web call on results, next step planning – added placeholder in ENWRA FY18 budget]

ENWRA Financials:

Reviewed Last Spring Fiscal Year (FY) 2017 planned VS spent budget tables and FY18 and FY19 budget tables. [UPDATE: an updated FY18 table that will be going through LPSNRD board April 17th on ENWRA behalf was circulated to technical committee – included recharge/weather station placeholder and minor updates].

2016 Airborne Electromagnetic (AEM) Flights and AEM Future Planning:

Report schedules 2016 surveys: Bazile – Delivered 1/10/17, P-MRNRD – Delivered 3/1/17, LLNRD – Delivered 4/10/17, LENRD – Next 5/22/17, LCNRD – 6/15/17, LPNNRD – 8/30/17, LPSNRD – 11/15/17

Future AEM Planning: Reviewed areas that each NRD would like to fly. LCNRD, LENRD, LPSNRD applied for WSF last year and budgeted match funds but did not get funded, discussed funding/budgeting and potential flight plans. [UPDATE: working through scenarios based on NRD specific budgeting & planning for next few FYs]

WSF and Nebraska Environmental Trust (NET) applications: Group plans to coordinate through the budgeting process prior to grant submittals.

Upcoming Meetings, Partner Agency Updates:Upcoming Meetings:

- Nebraska GeoCloud August Workshops/Roundtable
- Next Recharge Project Update – May 2017
- AGF presentations to the NRD boards (2 official visits per AEM contract) Papio was April 13th
- ENWRA presentations to the NRD Boards in calendar 2017 Papio is May 9th , LPNNRD in Sept or Oct

NeDNR: Dan asked about Missouri River Tributaries model. Contractor is finishing Northern model using 2005 CSD datasets. A future effort will be to better refine, subdelineate and do water budgets. Parallel plans to pilot test LENRD areas with more dense spacing of AEM, but there are budgeting issues with timeframes and how to use more refined datasets - it depends on funding.

ENWRA test holes: LCNRD & LENRD planned for May 2018, LPSNRD FY19 (calendar summer 2018). The group decided to add test holes with ENWRA funds to the routine budget (\$18,300 – ~2 NRDs/year at \$9,150 each)

Upcoming Spring Pilot Study Sampling: June 2017 for Oakland, Ashland, Firth

ENWRA Website Updates:

New Partner Project Tab: Bazile data will be posted, could post other NRD non-ENWRA AEM or other related project data [UPDATE- Bazile report is online]. Also converted to linking to ENWRA Dropbox. Weather Station, Sampling and Transducer Data available from ENWRA website linked to Dropbox.

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