Minutes

ENWRA Annual Technical Meeting
Tuesday, January 27, 2015 3:00-5:00 pm
Meeting Room: Chancellors 2/3
Embassy Suites
1040 P Street - Lincoln

Attendees (24):
Jim Cannia (XRI), Ginny McGuire (USGS), Jared Abraham (XRI), Paul Zillig (LPSNRD), Larry Angle (LPNNRD), David Miesbach (NDEQ), Annette Sudbeck (LCNRD), Tom Moser (LCNRD), Amanda Flynn (USGS), Chris Hobza (USGS), Rick Wozniak (LENRD), Amy Zoller (NDNR), Rod DeBuhr (UBBNRD), Ken Feather (UBBNRD), R. M. Joeckel (UNL CSD), Dana Divine (UNL CSD), Dan Schulz (LPSNRD), Dick Ehrman (LPSNRD), Paul Woodward (PMRNRD), Chuck Wingert (NNRD), Curt Becker (LENRD), Myles Lammers (LCNRD), Jesse Korus (UNL CSD), Sue Lackey (UNLCSD), Katie Cameron (ENWRA Coordinator, UNL CSD)

Introduction and 2014 Review

- Recap on 2014 ENWRA activities: northern area Airborne Electromagnetic (AEM) survey flights w/ breakdown by NRD, Interlocal Agreement w/ Nebraska Department of Natural Resources (NDNR), ENWRA Nebraska Environmental Trust (NET) grant application, other misc.
- ENWRA financials: have enough to do test holes and CSD and USGS scope items without NET grant money but would have ~ $100k buffer if we split it over two fiscal years

Discussion of Upcoming Actions for 2015

- Southern ENWRA Flights planned for March/April 2015 – Katie will get the NRDs example flyers, media announcements, parcel owner lists along lines and post card examples (including UBBNRD and LBBNRD). Katie will coordinate media day at Lincoln airport and local airport in Nemaha District, we have 15 min segment in March on community announcement platform on local TV channel in Lincoln too.
- Initial scoping meeting with and NDNR's modeling contractor regarding upcoming flight data formats/reporting. Katie will work with NDNR to get scheduled when contractor is available to come up from Kansas City.
- Nemaha and Lower Elkhorn ENWRA Board presentations. Katie will work with Rick and Chuck to get scheduled.
- ENWRA Long Range Plan (LRP) meeting Spring 2015. Group seemed open to this time frame, Katie will get scheduled when it gets closer.
- Spring 2015 sampling at pilot sites – Oakland, Ashland, Firth planned for Spring.
- Technical advisory meetings and doing NET scope without funding: Rick and Larry have test holes planned in their districts; starting test hole planning at this stage with ENWRA funds without NET was suggested. USGS (Chris) indicated Coop funds were still on the table for USGS products and CSD would still match geologist time on drilling (coordinator logging as CSD).
- Mead HEM data and revisiting Farm Process Model (FPM): 2015 AEM recon data, Mead HEM data are new data sources that could be used to update the model. USGS (Amanda) indicated a new version of the FPM modelling method is out and could be used to prepare a report for this area. More could be teased out of Mead HEM flight area through reprocessing. Group will consider.
- Recharge stations – Discussion on need for more sites and what to do with the data we have been downloading and how to plan for additional recharge work: who we could get for that to take Gates' role [USGS follow-up on 1/29/15: Brent Hall who works with ET stations, is suggested by Ginny], USGS (Chris) offered to help go over downloaded data with Katie.
- ENWRA presentation at GMDA in 2016? Consensus is yes, Katie will coordinate that with Larry.

XRI Presentation of preliminary AEM data from October 2014 flights

- Overview of technology, details about the Oct flight planning and details on the data used in the processing and interpretation and difference between those, 24-hr inversions for QAQC, example AEM lines and match-ups with existing cross sections, "depth of investigation" VS depth of information, XRI status with data and datasets that will be generated (Quaternary aquifer units outlined, bedrock unit products, Google Earth formats) and XRI recommendations.

  Technical notes: Can "see" Quaternary, Ogallala, Pierre, Niobrara, Carlile, Dakota, Paleozoics (east) but Greenhorn/Graneros cannot be differentiated out (also Ogallala-Quat. boundary cannot be drawn where resistors are in contact); thinner shale layers in Dakota at depth cannot be resolved but Dakota group can be outlined (some Dakota bottoms can be seen but not everywhere); good downhole geophysical logs with the test holes can be used in the actual AEM processing (many logs from THs were order of mag. off on resistivity values and could not be used in processing but are still looked at for kicks and useful with interpretations – deep O&G calibrated well).

- Q&A Session:

  1) 304 VS 508 SkyTem systems, trading resolution for depth? Yes, 508 done for recon, 304 was used at 2013 blocks but match up with each other and HEM very well (example: Quaternary resistivity values could be used to estimate aquifer secondary hydraulic parameters but resolution for deeper units with 508 system not good enough to do that);

  2) Dr. Chen streambed conductance work discussed with slide shown for newer system flown down Elkhorn River showing presence absence of clay layers between Niobrara and Quat. Alluvium;

  3) Can you see TDS on AEM? Not quantitatively but around brackish levels ~3,000 ppm TDS and up yes - but have not seen it in the October flight area AEM, will be looking for it in southern area flights.

- FYI to group: get final tweaks on the lines to XRI by end of February at the latest – they are working on offsets for power lines/infrastructure now.

- Suggestions/discussions for presentation of the AEM next day at conference: do less technical than for our meeting, be prepared for answering why the NRDs are doing flights, like Clarkson would be good example– relocating water sources; NRDs seeing more development deeper; talking about blocks VS recon line purposes; how to talk about costs (costs for 69 mile cross section to drill and publish from scratch VS $400 a line km – just to put perspective on line costs VS $9 per acre costs for blocks) but stressing AEM is not replacing that and can't get an accurate AEM product without that existing TH/geo data [~$44k for AEM and $160kfor 27 THs 6,570 feet drilling and cross sec. was comparison estimate used in presentation 1/28/15].

Adjourned 4:45pm

Minutes
ENWRA Annual Technical Meeting
Tuesday, April 20, 2015 10:00 am
Lower Platte North NRD Board Room
511 Commercial Park Road - Wahoo

Attendees (19):
Jared Abraham (XRI), Larry Angle (LPNNRD), Bret Schomer (LPNNRD), John Miyoshi (LPNNRD), Annette Sudbeck (LCNRD), Rick Wozniak (LENRD), Curt Becker (LENRD), Russ Oaklund (LENRD), Mike Sousek (LENRD), Chuck Wingert (NNRD), Dan Schulz (LPSNRD), Paul Woodward (PMRNRD), Jeanne Dryburg (NARD), Amanda Flynn (USGS), Amy Zoller (NDNR), Dana Divine (UNL CSD), Jesse Korus (UNL CSD), Sue Lackey (UNL CSD), Katie Cameron (ENWRA Coordinator, UNL CSD)

XRI Presentation of Lower Elkhorn Natural Resources District (LENRD) and Interim Eastern Nebraska Water Resources Assessment (ENWRA) Airborne Electromagnetic (AEM) survey data from flights conducted in October 2014:

- LENRD and Interim ENWRA Report formats: CSD and O&G geophysical logs used in inversions, as you go deeper harder and harder to see thin layers – Jared went over AEM layered earth model VS geophysical logs, sensitivity analysis is almost done for the LENRD final report and ENWRA interim report (histogram and statistics were done on the borehole lithologies VS resistivity thresholds for non-aquifer, marginal aquifer and principal and coarse aquifer materials), looking at revising reports to bump threshold for principal aquifer materials VS marginal aquifer materials up or down from 20 ohm-m based on results of sensitivity analysis, used cross-sections and strat picks as a guide for interpretation but had to throw out some stratigraphy picks because of elevation busts. Jared will get Dana those borehole IDs (eastern tool had issues with sp – some early ENWRA ones, grounding, western tool resistor in circuit, cable heads).
- New/revised Google Earth application will show a Location map with Section/Township/Range at the top with the flight line drawn in and then the interpretation below when you click on a dot along the flight lines and touch the hyper link to the profile. The interpretation will be cut off at Dakota so can see upper details. The distance shown on the linked profiles will be 10 miles instead of the whole flight line (a different, area-specific zoomed-in view for every 10 miles along a flight line). The legend hyper link is still shown for each dot and that explains terminology in pop-up box when you click dots on the map.
- Surfaces built (AR GIS files): limited data, machine contoured, 1500ft resolution good scale for water balance/budget and modeling– could get better with hand contouring and tease out more, ARC grids used to draw the black lines, 16 feet was the thinnest resolvable unit. Raw x, y, z files available - could re-run data later in future with more/updated information, depth of investigation paper is an appendix in the report.
- The Quaternary and Tertiary-aged deposits (an orange contact line between the two is depicted on the profiles) were treated as one and separated into four resistivity threshold groupings on the northeast LENRD and ENWRA AEM line profiles: “principal aquifer” is yellow color “coarse aquifer” is brown color “marginal aquifer” is tan color “non-aquifer” is blue color. Carlile, Greenhorn, and Graneros are undifferentiated. The full thickness of Dakota was imaged and Paleozic units were differentiated into two blue colors: Pennsylvanian and Mississippian.
- Dakota Discussions: two colors are used on AEM profile interpretations in the report. Light green and Army Green. Light green indicates the materials are resistive (unknown porosity, specific yield, and degree of cementation but they are not saline). Dark green indicates conductive but unknown if clay/shale or salty. Jared indicated not enough quality data for Dakota to map salt/fresh, you can start to see changes on AEM with 1500 TDS but did not see obvious salty Dakota in northeast flights except below the Pierre in the western part. For the southeast, salt/high TDS is obvious on the preliminary flight AEM (where we have archived quality data to confirm it – if you have sandstone on the logs and AEM is showing 3 ohm-m you would likely have 25,000 to 30,000 TDS in that

saturated sandstone- discussion regarding saturated VS un-saturated materials and resistivity) – can get shape of those areas from the air but need more control with groundwater monitoring results to map it out. Monitoring wells needed at boundary of salt/fresh in Dakota. Larry indicated some wells completed in Dakota are ok for now but don't know about use over time affecting quality – need for aquifer monitoring in shallow and deep sections of Dakota.

- Data management is critical should start planning that now since amassing so much - Danish are best example, GERDA, SQL calls, can update the baseline data and lithologies, even have water quality built into the framework.
- Aquifer tests: Aquifer tests could be conducted for each resistivity threshold grouping on the AEM "principal aquifer" "coarse aquifer" "marginal aquifer" "non-aquifer" at different eastern NE settings near the flight lines. Jesse and Sue indicated it would be possible to back calculate that for AEM based on aquifer testing results of those areas. You could also generate tabular K values for the 4 resistivity thresholds of material and see how that looked VS the actual aquifer test results for that same set of 4 materials. Dana indicated that the ENWRA archive has quite a few aquifer tests on file we could look at too to see if they match up with flight lines ora re representative of the threshold materials. Jared thinks these four thresholds may be ok for the south area too based on prelim.
- Confined aquifer: Larry indicated sum is greater than the parts single well aquifer tests won't show what whole region pumping at same week will do to the flow system and mentioned Brainard to Bruno area. Can see bottoms of the drawdown curves getting deeper. There was discussion about how to manage in-season declines that occur in a short time span in confined aquifers where this occurs (drought clause/mid-summer trigger/no new development/put irrigation rotation even if spring looks ok/dual approach of some kind). Dan indicated how much more development/ pumping can we allow is what we are getting at too.
- Discussion on CSD and induction logger going through cased wells. Jared indicated if PVC-cased, can see in water but pay attention to drift in temperature and have careful calibration (one kind has hat with known calibration solution in it at a specific temp, Century tool self-compensates but ambient air should be like the groundwater fall is good – if steel-cased need active source tool). Jesse indicated wireline cores end of June/early July could get porosities/resistive properties from those cores to compare with/enhance AEM – could move more near lines.
- Groundwater model discussions: Jesse – structure is important and intergranular VS fracture aquifer supply need to model differently, Dan: issue in modeling for paleovalleys and Dakota ironstone VS sand totally different transmissivity but resistivity might be similar. Jared: Australia project is good example of the application of aquifer/slug tests and NMR used with AEM to populate groundwater model. Jared sent Katie this report after the meeting.
- NDNR numerical modeling: Amy Zoller indicated that the NDNR model work for the northeast part of eastern NE is scheduled to be done in December and Nemaha area will be next year. There was discussion about incorporating AEM into the model at this time and what it would show but people were getting confused with using the AEM to build the model and just running the model with and without the additional AEM detail after it is built (top of aquifer/base of aquifer/aquifer thickness details and more if we can get it). Amy clarified that step of incorporating the AEM in the design updates/modifications of the model would come later.
- Jesse Korus mentioned Paleozoics will be increasingly used (2 deep wells past 6 months for large supplies). Larry indicated that Mahoney State Park (Dwight Hansen) is going to Pennsylvanian to get water – high resistivity areas will help with demarcations – faults never before imaged in 2-D like this, new geologic and seismic perspectives. Seeing structure under Platte and mid-continent rift system understandings from preliminary looks at the data. Dan: relay to NRD boards value beyond aquifer mapping (geology, seismic etc).

XRI Presentation of Preliminary AEM dataset for southeast Nebraska flights:

- No borehole constraints yet, a few transects in the southeast were shown.

- Structure is visible on E-W line through Nemaha and possibly along some other areas
- Also some differences within the Paleozoics are observed

Technical Committee regarding Pesticides analysis – based on previous meetings/discussions with USGS let us move our routine May/June 2015 event to fall 2015 and do large pesticide event with ELISA pre-screening kits– Katie will send costs to look at.

Adjourned 12:30pm

Minutes

ENWRA Technical Meeting and 2015 AEM Report Meeting
Tuesday, August 18, 2015 11:00 am to 3:00 pm
Lower Platte South NRD Board Room
3125 Portia Street - Lincoln

Attendees (20):
Jared Abraham (XRI), Jim Cannia (AGF), Larry Angle (LPNNRD), Annette Sudbeck (LCNRD), Rick Wozniak (LENRD), Curt Becker (LENRD), Chuck Wingert (NNRD), Dan Schulz (LPSNRD), Dick Ehrman (LPSNRD), Paul Woodward (PMRNRD), Marlin Petermann (PMRNRD), Caitlin Thomas (Olsson Associates), Dustin Wilcox (NRD/NDNR Water Resources liaison), Jennifer Swanson (NRD/NDEQ liaison), Amanda Flynn (USGS), Chris Hobza (USGS), Tim Freed (NDNR), Dana Divine (UNL CSD), Sue Lackey (UNL CSD), Katie Cameron (ENWRA Coordinator, UNL CSD)

ENWRA Technical Meeting - Upcoming Actions /Discussion Items - 11:00 am to 1:00 pm

1. Close out of Nebraska Department of Natural Resources (NDNR) Airborne Electromagnetic Survey (AEM) Contract
    a. Last semi-annual report will be Dec 2015 based on meeting with Jesse Bradley on July 2, 2015 and sent DNR final financial documents for contract closeout
    b. No further questions yet from Florida group looking at the data
2. Pesticide sampling at pilot sites
    a. September upcoming sampling plan is on schedule with crews, PMRNRD and/or NNRD have reader equipment available for use on test kits, and USGS JFA is going for LPSNRD board approval on behalf of ENWRA 8/19/15
3. USGS:– Dakota aquifer quality products
    a. Will find out more after meeting and Katie will send technical committee more detail to review – generally this will get us recon on quality of the Dakota
4. Discussion of potential test hole locations where we still have questions:
    a. Plan potential test holes with ENWRA funds? – Yes from group – 6 ENWRA NRDs will pick a location in each NRD that goes along with areas along the flight lines with questions still left over after AEM review – could be Dakota or other shallower target depth units. Get locations to Katie and she will work on gathering estimated depths and costs in pre-planning for next meeting where we revisit test hole and funding topics (Katie will draft test hole agreement with CSD as an option for review). Test hole work will be over next two years, some NRDs will want to install deep wells in test holes upon completion (take into account for the costs and planning).
    b. Schedules of other NRDs for test holes: reviewed each NRD and plans for test holes (TH) and monitoring wells (MWs). LCNRD has 2 recently installed MWs in the Dakota & sample results will be in by October; PMRNRD has bid out for 6 TH/MW locations thru Dakota, LPSNRD is planning TH/MWs in Dwight-Valparaiso area ~spring 2016 –generally above or possibly just into the Dakota; LENRD has two TH/MW locations planned into the Dakota ~700-800 feet deep but on hold for now, LPNNRD has 4 THs completed thru Dakota and one ~150 feet into Dakota – more on the horizon. NNRD has no THs planned right now.
5. PA viewer Sessions:
    a. Jared gave a live example of the PA viewer capabilities; handout included draft agreement and rough idea of costs was discussed. Katie will work to get contract and training lined-up.
6. Water Sustainability Fund Application (Fund):
    a. Discussed application acceptance status and possibility of going in together on an application for additional flight lines. Previous NET application scope was for top of Dakota and CSD cross-section match products from USGS and CSD but XRI report provided that type of information. Keeping under the $250k asking amount from the Fund and possible match was discussed (ENWRA had $70k in the budget for each FY15 and FY16). Since the application process is not set yet, hard to make decisions on the planned match, cooperation and partners for this.

b. Long term planning for additional AEM was discussed. As a pre-planning effort each of the 6 ENWRA NRDs will get Katie a total line km (lines on a scanned pdf or Google Earth layer map) of target areas they may be considering (planning on their own and/or if they are planning to go for potential funding). Katie can work on gathering some costs based on combining mobilizations for the flights. Side discussion: how NRDs and others are going to use the AEM data and what line spacing to use on NRD specific areas and what tools might go into refining the 1050 line when in some cases AEM is indicating should be bigger or smaller etc.
c. Regarding the system of choice: Jared indicated if thick till is present, would not go with system smaller than the 304 system (will need to consider the right system for the job and there could be different scale and depth needs for each NRD).

7. Discussion of AEM before the ENWRA Meeting at 1pm: went over general presentation plan (see presentation summary below). Also showed ENWRA website with 2015 AEM tab for public access to report.

ENWRA 2015 AEM Report Meeting - 1:00 pm to 3:00 pm

Final Reports on Airborne Electromagnetic Geophysical Surveys and Hydrogeologic Framework Development for the Eastern Nebraska Water Resources Assessment – **Volumes 1 and 2 –** Jared and Jim went over:

- Report authors and contributors
- ENWRA and LENRD flight line locations with existing AEM survey block locations
- Critical nature of the flight line planning
- Background of borehole data used for the AEM survey work [CSD and O&G geophysical logs used in inversions]
- CSD Cross-sections digitized and used
- Resistivity versus lithology and aquifer materials (where and how the resistivity thresholds were chosen for non-aquifer, marginal aquifer, principal aquifer and coarse aquifer interpretive categories – blue, tan, yellow, and brown colors on profiles)
- Statistical results of the CSD and O&G borehole logs with good e-logs used near the lines for the Quaternary and Tertiary (Ogallala - an orange top contact line is depicted on the profiles) deposits (percentages of each lithology type in each interpretive aquifer material category and demonstration of results of tweaking resistivity value breaks between bottom end of principal aquifer category [20 VS 21 ohm-m sensitivity analysis done for LENRD 2014 3X3 mile grid report]).
- Statistical results of the CSD and O&G borehole logs used near the lines for the Dakota formation - distribution of each lithology description in Dakota compared to resistivity values and 3 categories for Dakota (dark green [shale dominant or saline], medium green [intermixed materials], and light green [sand/sandstone dominant] colors presented on profiles).
- Report organization: **Volume 1** includes the Lewis and Clark, Lower Elkhorn, and Papio- Missouri River Natural Resources Districts and **Volume 2** includes the Lower Platte North, Lower Platte South, and Nemaha Natural Resources Districts. Jared went over the breakout and how LPNNRD and PMRNRD have fall (north area) and spring (south area) flight lines but PMRNRD was placed in the Volume 1 and LPNNRD is in Volume 2.
- The heart of the report: Appendix 1 of each Volume (most time spent generating this portion of report). Also: AEM resistivity data is depicted on one consistent color scale, AEM Depth of Investigation [DOI], CSD TH and NDNR reg. well database info used, CSD water table – key to know material saturated, interpretations of geological layers, interpretations of lithology and aquifer materials).
- Other Appendices: Appendix 2 -AEM inversion results versus historic CSD cross sections, Appendix 3 - DOI - Jared is going to be putting a paper out soon on the DOI, Appendix 4 - data deliverables, Appendix 5 – water quality data and plots/diagrams

- Other deliverables: ARC GIS databases (north and south) and surfaces – machine contoured. Some areas would need to be hand contoured and much more could be done with hand contouring in the vicinity of the lines where so much variability exists and/or not enough nearby flight lines to contour with (example: no surfaces for Sarpy County and surfaces are only provided along lines in some Nemaha areas). 1500ft resolution on surfaces is good scale for water balance/budget and modeling but hand contouring (manually reviewing/adjusting digital data/contours) is still needed in some areas to extend the surfaces for full ENWRA coverage.
- Google Earth application: Jared showed demonstration. When you click on a dot along the flight lines and touch the hyper link to the profile a Location map with Section/Township/Range at the top with the flight line drawn in and then the interpretation below is depicted. The interpretation is cut off at Dakota so can see upper details. The distance shown on the linked profiles is ~10 miles instead of the whole flight line (a different, area-specific zoomed-in view for every 10 miles along a flight line). The legend hyper link is still shown for each dot and that explains terminology in pop-up box when you click dots on the map.
- Went over report conclusions and recommendations (condensed version – see reports):
    - variability of aquifer materials mapped across project area (non-aquifer materials are abundant and the survey results show confined, semi-confined, unconfined zones and the boundary conditions that exist)
    - recharge areas and their connection with the aquifers can be imaged
    - The different lithologies categorized in the Dakota - unknown character
    - Full strata down to Paleozoic was imaged, imaging of the Paleozoic system indicates complexities
    - The finer line spacing such as 3 miles grids can be used to guide groundwater management areas. The reconnaissance line spacing and detail 1200 feet down for the ENWRA flights shows areas of interest for future work/where to focus.

Comments/Questions:

- Jared indicated that data management is critical should start planning that now since amassing so much - Danish are best example, GERDA, SQL calls, can update the baseline data and lithologies, even have water quality built into the framework.
- Dana mentioned that CSD, NRDs, and DNR are at the planning stages of going in together on an NET grant for a hydrogeologic portal database hosting 1) groundwater geology, such as test-hole logs and aquifer properties, 2) groundwater-level monitoring data, and 3) hydrogeophysics, including AEM surveys that will serve as a statewide central repository and house future hydrogeology data collection efforts too.
- Larry asked about Mead HEM data: Jared indicated that the Mead data was run using a fixed model and Jared thought a smooth model would have been better and they did not constrain the inversions to boreholes like was done for ENWRA survey which enhances the inversion interpretations.
- Rick asked about report recommendations -> AEM use in management discussion: ENWRA recon AEM can help define aquifer boundaries, define paleovalleys, and give you a direction on where recharge areas may be and if you need to make changes (extend/reduce) to your management area boundaries or locations. If you have water quality issues, the imaging (interconnectedness/potential pathways for natural & human contaminants to move) can help with reasoning for that in certain areas. Getting the report data in a viewer with zooming and scaling capabilities (Sue mentioned CSD County Atlas scale examples from Jared looking at 1inch = 4,000 feet on the horizontal and 1 inch = 100 feet on the vertical for Pierce County Nitrates) will enhance the usage of the AEM results.

MINUTES
ENWRA Long Range Plan Meeting
1:30-3:30 p.m. Tuesday, November 10, 2015
Papio-Missouri River NRD, Omaha, NE

Attendees (25):
Sue Lackey (CSD), Dick Ehrman (LPSNRD), Dan Schulz (LPSNRD), Annette Sudbeck (LCNRD), Paul Zillig (LPSNRD), Tom Mountford (LPNNRD), John Miyoshi (LPNNRD), Mike Sotak (FYRA Engineering), Jennifer Swanson (NARD), Curt Becker (LENRD), Marlin Petermann (PMRNRD), Chuck Wingert (NNRD), Bob Hilske (NNRD), Steve Peterson (USGS), Chris Hobza (USGS), Amanda Flynn (USGS), Paul Woodward (PMRNRD), Ginny McGuire (USGS), Jim Cannia (AGF), Dana Divine (CSD), Larry Angle (LPNNRD), Michael Ou (NDNR), Amy Zoller (NDNR), Rick Wozniak (LENRD), Katie Cameron (Coordinator)

Review of completed and on-going ENWRA tasks and FY16 Budget
Completed & Ongoing tasks (abridged): Recon flights are done, giving presentations on results. DNR interlocal agreement for flights closing out in December. Annual water samples collected at ENWRA pilot study sites in September with pesticide sampling event (results not in yet), recent transducer downloads/water level graphing, graphing and statistics on water quality samples, folders on dnrftp will continue to be updated as data is compiled. Need to get testhole locations to coordinator so estimated depths and scheduling can be done - $9,150 of test holes to evaluate flight lines per district.
Budget: ~$320k in ENWRA budget to work with in FY16 after commitments and income. Have $70 k budgeted for Water Sustainability Fund (WSF) application match with estimated start of FY17 at $297k.

WSF Applications
AEM: Some NRDs are planning to go in on application for the WSF due December 16 through December 30, 2015 for additional AEM flights. FYRA Engineering has sent contracts to LLNRD, LENRD, LPNNRD, LPSNRD and PMRNRD to go in on the application writing effort together (each application will be considered separate but use a similar template and each will stay at or under the $250,000 small project asking cap). The NRDs are open to additional NRDs joining the application effort and would be able to adjust the templates – John Miyoshi went over details, NRD need, and application involvement (management areas under pressure for answers from complaints in the drought etc.). FYRA needs the 1) area polygons, 2) quantity-quality management areas involved, 3) estimated line km, 4) desired depths of investigation worked out by the NRDs **by Thanksgiving**.
USGS: The ENWRA group agreed to move forward with the USGS and ENWRA coordinator preparing a recon sampling application for the ENWRA NRD's review. During the meeting, the planned scope was expanded to include other potential secondary aquifers (example: fractured limestones) since the Dakota formation is absent in the Nemaha. ENWRA is proposing to enter into a two-year joint funding agreement (JFA) with the USGS Nebraska Water Science Center, to accomplish this goal if the WSF application is accepted (note: potential Federal cooperative funding must be subtracted off the total when calculating the WSF/ENWRA match amounts). The total cost to ENWRA for the agreement for the current scope of 20 wells would be $63,000 over a 2-year period (providing WSF provides match in the first year). ENWRA currently has $70,000 in the budget for WSF match in FY16 and also has $70,000 in FY 17 for a second year potential WSF match. FY17 was discussed at the ENWRA LRP meeting with the thought that additional recon could be done in a second year with the potential funds if the initial recon results warrant further sampling. Coordinator will follow-up with each NRD on wells to target in their districts for the application.

Review/Revision of Long Range Plan (LRP) - Highlights

Reviewed ENWRA LRP Objectives – they were updated in 2013 and group agrees still look good/all-encompassing for this update (also will keep 10 year span outlined in App B). The following summarizes discussions regarding the NRD-specific LRP objectives (Appendix B Project Table Matrix edits):

Objective 2 (Location and Volume of Aquifers):

- Transect lines (old version Objective 2A) for airborne time domain geophysical work are done - remove this row.
- Priority areas (now Objective 2A): Recon lines flown in 2014/2015 crossed almost all of the areas in some way. Group discussed which areas to keep in the tables and their priority - see attached Draft #1 2015 LRP App B edits which include areas planned for in FYRA AEM WSF application.
- Dakota Formation (Obj. 2B): This objective is ongoing with additional AEM, deep THs, and USGS proposal to recon age and quality planned.
- Advance Test holes (Obj. 2C): Added this in after meeting, we are currently doing ENWRA THs and may do more in the future
- Maintain/add monitoring wells and technical resources (Obj. 2D and 2E): discussed keeping these items in the LRP. County Atlas work is/will be a CSD focus for eastern Nebraska.

Objective 3 (Estimate Recharge Rates - changed to "Estimate Recharge Areas and Rates"):

- Madison County and Bazile mapping area moved up to Obj. 2A with nitrate and recharge management concerns - need to update this area on LRP Figures
- 10 planned vadose stations allowing for overlap of soil type and topographic settings – will keep this in, we have 6 planned in next phase once we get an expert and plan in place to guide the effort to expand/enhance the network.
- Potential recharge areas will continue to be mapped along with new AEM surveys will add this as objective for all 6 NRDs

Objective 4 (Hydrologically Connected Areas):

- Keep these objectives.

Objective 5 (Estimate/Calculate Water Budgets):

- Keep these objectives

Objectives 6 through 9:

- Keep these objectives
- Add data management of AEM into the Appendix B Project table as its own line item and put in LRIP for ENWRA budget in FY17

Coordinator will get revised Draft of LRP incorporating changes discussed/understandings out for review and work on final approvals for finalizing Long Range Plan 2015 Update.

Discussion of Funding/other topics:

- recap of upcoming FY16/FY17 actions – coordinator get with NRDs on Dakota/secondary aquifer recon sampling locations, draft the ENWRA application with USGS, send out to group for review before December 16th, NRDs will work on getting their planned flight locations and details to FYRA for WSF AEM application.
- Adding other districts to ENWRA? Discussion on pros and cons and where their level of interest might be considering most are aware of ENWRA and some have been kept in the loop on the AEM.