

Nutrient Monitoring Council (NMC) 10th Meeting

March 15, 2018

Illinois EPA, Mississippi River Conference Room
1021 North Grand Avenue East, Springfield

Minutes

In attendance: Gregg Good, Illinois EPA; Trevor Sample, Illinois EPA; Jong Lee, University of Illinois – NCSA; Cindy Skrukrud, Sierra Club; Justin Vick, MWRD; Kelly Warner, U.S. Geological Survey; Ann Holtrop, Illinois DNR; Rick Cobb, Illinois EPA; Kevin Culver, Aqua Illinois; Laura Keefer, Illinois State Water Survey; Laura Gentry, University of Illinois – NRES; Kate Gardiner, Illinois Water Resources Center; and (via phone) Greg McIsaac, University of Illinois - NRES

Welcome/Housekeeping – Gregg Good, Illinois EPA

Gregg welcomed everyone, introduced Greg McIsaac as a new official member. Gregg updated the group that Nicole Manasco will replace Chuck Thieling (US Army Corp of Engineers – Rock Island) and that a replacement is needed for Andrew Casper (INHS). The group reviewed NMC charges. Trevor Sample was announced as new NLRS Coordinator at IEPA. Trevor now sits on all committees and works on all things related to the NLRS and looks forward to working with everyone and putting out the new biennial report.

NMC Member Updates

Gregg asked the group to provide updates. Kelly Warner let us know that the Illinois-Iowa Water Science Center has changed to the Central Midwest Water Science Center and now includes Missouri. Rick Cobb updated us on his work with the Mahomet Aquifer and the Mahomet Aquifer Task Force, whose next meeting is in Urbana on March 26th. Laura Keefer let us know that the state scientific surveys are all under the Prairie Research Institute and that the State Water Survey has had an interim director since last January. Kevin Culver told us he represented NLRS at a workshop yesterday and it was well received. He also let us know that Aqua is partnering with the Illinois Farm Bureau to update the Vermilion Watershed plan. Ann Holtrop officially became chief of her division in DNR in July and most of her time is spent on monarch butterflies, which relate to NLRS, and Illinois wants to put 150 million new stems of milkweed on the ground by 2035. Justin Vick had a child last month! He also updated us on MWRD's progress with WASSTRIP at Stickney and an algae reactor pilot at the O'Brien plant. Cindy Skrukrud sits on the Nutrient Research and Education Council, which just funded another round of grants. She also updated us on her work on the Fox River and the Sierra Club group in Quad Cities, which does work on the Green and Rock Rivers. Laura Gentry was just in D.C. representing the Corn Growers Association and let us know about a new bill being proposed, the Agriculture Data Act, and described UIUC faculty members that the NMC might be interested in working with. Jong Lee told us NCSA will be releasing information to the public on dark energy and that UIUC professor Kaiyu Guan will be working on reporting cover crop coverage in Illinois for the past 10 years using NASA data. Greg McIsaac told us he has been working with a group of people on UIUC's campus to look at phosphorus recovery from

wastewater treatment plants and ethanol production facilities. The group is putting on a workshop on campus April 11th-12th if anyone wants to join.

NMC September 6, 2017, Meeting Review and Minutes

While reviewing the minutes from Sept. 6th meeting, Gregg Good would like Greg Mclsaac and Jong Lee to confirm that their updates were correct. Greg Mclsaac's revised update for the Sept. 6th meeting minutes will be "Greg Mclsaac reported that a team at the U of IL was in initial work phase of a research project on the technology and economics of recovering phosphorus from ethanol production facilities and wastewater treatment plants in comparison to changes in agricultural production practices."

Inaugural Nutrient Loss Reduction Strategy Conference – Gregg Good, Illinois EPA

The conference was November 28-30, 2017 in Springfield. The purpose was to celebrate two years of NLRs progress and release of the First Biennial Report (August 2017), as well as encourage communication and collaboration with all involved, as there was little opportunity for all prior to the conference. Day 1 consisted of opening talks. Day 2 consisted of plenary sessions (Sessions A, B, C, and D). For Session C: Monitoring Nutrient Loads and Water Resource Outcomes – Progress, Opportunities, and Challenges, the speakers were Gregg Good, Kelly Warner, Paul Terrio, Greg Mclsaac, and Jong Lee. The speakers were followed by a panel discussion with questions. Day 3 consisted of session wrap-ups. For the Session C wrap-up, there was a discussion of future needs, including those for USGS Super Gage Network, Great Lakes to Gulf and site suggestions, documenting water quality outcomes, the need for water quality standards development, and the question of who will do what Dr. Mark David and Dr. Greg Mclsaac have been doing for us for free? Laura Gentry brought up that U of I is advertising a position for replacing Dr. Mark David, the NMC would need to talk to Dr. Jeff Brawn if they have any recommendations or ideas for the position. Dr. Greg Mclsaac recommends Dr. Reid Christianson or Dr. Laura Christianson as being capable of doing the work. Gregg Good wonders if the work could be part of the function of the science team. The NMC might have Laura Gentry draft up a letter that the council could look at, sign, and send to Dr. Jeff Brawn. NMC members agree they want someone who is both capable and interested in doing the work. Dr. Greg Mclsaac will give more thought to working on the 2019 NLRs Biennial Report. Laura Keefer says the State Water Survey has a long-term sediment monitoring network at the USGS Gage at Rockton, which is right near the Illinois-Wisconsin border. At that site, the sediment is some of the lowest in the state. She wonders if it would be worth testing for Nitrogen or Phosphorus?

New Collaboration with the Univ. of IL Extension – Trevor Sample, Illinois EPA

Trevor provided updates for the NLRs Watershed Coordinators and the NLRs Science Team. The Illinois EPA needs to have some people working on the ground on the watersheds, so they partnered with UIUC Extension to work in priority watersheds for four years. Want to provide outreach and technical assistance, put in 319 grants and other grants, as well as coordinate local initiatives and collaborate with other organizations. The two coordinators will be located in Galva, IL and Effingham, IL. The Galva Watershed Coordinator will be working on the Lower Rock River and Mississippi North Central (Flint/Henderson) and will begin at the end of May. The Effingham Watershed Coordinator will be working on the Embarras River and Little Wabash

River and will start mid-April. The project also includes funding for an Extension Water Quality Science Team. The members are Laura Christianson, Jonathan Coppess, Paul Davidson, Cameron Pittelkow, Maria Villamil, Suzanne Bissonnette (administrative), and Reid Christianson. They will provide technical support, etc. Trevor will be working to have the Science Team meet the Soil & Water District staff and meet people who want to do watershed plans. Similar to the US EPA Watershed Plan, it will be funded through 319 grants, though typically looking at a smaller scale – HUC 10 and HUC 12 watersheds.

NLRS Biennial Reports, First and Future – Gregg Good and Trevor Sample, Illinois EPA

The first biennial report came out in August, 2017. NMC makes up Chapter 7 and it outlines who we are, what we do, and our goals. The data for August 2015 - January 2017 show that for annual load (lb.), Illinois River at Florence/Valley City had the greatest amount of Nitrate, Phosphorus, and suspended sediment. For annual yield (lb/acre), Green River near Geneseo had greatest Nitrate concentrations, Embarrass River at Lawrenceville and Little Wabash River at Carmi had highest Phosphorus, and Embarras River at Lawrenceville had highest suspended sediment. The second biennial report is due for fall of 2019. The goal for the next NMC Summary is to think about what we want to include in the next biennial report.

USGS Happenings and Updates – Kelly Warner, U.S. Geological Survey

USGS has undergone some reorganization, there are now fewer states in each group rather than a Midwest group. Illinois will be a part of the Central Midwest Water Science Center, which consists of Illinois, Missouri, and Iowa. There is a video on USGS Continuous Monitoring in the Mississippi River Basin, which Kelly showed the group. There are 9 Super Gage sites; 8 that we've done previously and now we have the Joliet site. Nitrite is being measured at 7 sites currently, Phosphate at 4 sites currently (had been removed for the winter or due to needed manufacturer servicing), and Chlorophyll at 2 sites (Florence and Joliet). Cindy pointed out that having this continuous Super Gage in Joliet, we might be able to see the change in real time as MWRD implements their changes. The Annual Report will be completed to IEPA by end of April by Paul Terrio. The USGS Mississippi River Basin Nutrient Story Map is a great way to lay out the NLRS visually. Kelly will send out the link to the Story Map. There will be a congressional briefing on Nutrients in the Upper Mississippi River Basin, sponsored by Senator Baldwin's office in Wisconsin.

Great Lakes to Gulf (GLTG) – IL NLRS Data Portal – Jong Lee, University of Illinois NCSA

The GLTG Observatory is a geospatial application that integrates water quality data from multiple sources to visualize nutrient pollution and water quality conditions in the Mississippi River. It is funded by the Walton Foundation and the portal is hosted at NCSA, a GLTG resource. The current URL is <https://ilnlrs.ncsa.illinois.edu>, but they hope to update it to have Great Lakes to Gulf in the URL name. GLTG receives its initial data from IEPA Ambient Water Quality Monitoring Network, Data from Fox River Study Group, Data from Upper MIS River Restoration, USGS, USGS – Super Gages, and GREON, a buoy deployed to collect nutrient data. GREON is deployed in 7 locations: Lake Decatur, IL River near Alton, other locations in Wisconsin. GLTG has initial GIS layers of the river network, US state boundaries, Total annual N from point source by HUC8, Avg. annual nitrogen fertilizer inputs from 1997-2006, and the latest EPA impaired

stream segments. You can pick different parameters to compare between sensors. You can explore and download the data and are able to filter by location, data sources, date/time period, etc. Jong gave a real-time demonstration on his computer and Trevor asked if GLTG could add the super gage number next to the name. GLTG needs feedback on static contents (under About page or Welcome page), parameters, and user interface (it may be needed to be reviewed in terms of feasibility of implementations). The contact is Jong Lee, who can be reached at jonglee1@illinois.edu. The NMC members agreed the partners need to be updated on the GLTG About page. In terms of bringing data to the portal, there are two options. If you have web service and access specification, GLTG team can harvest automatically and regularly from the web service (ex: USGS, EPA STORET). If you have a static file such as Excel, CSV, etc., please send the files to GLTG team, we will parse and load to the portal (ex: Fox River data, UMRR data). Regardless of how data is available, GLTG team needs to understand the data specifications, metadata, parameters, units, etc. – it may require cross-walk among similar parameters.

Legislative Initiatives Update – Gregg Good and Trevor Sample, Illinois EPA

Gregg shared a potential piece of legislation that may be coming from Representatives Kind (WI) and Davis (IL) regarding the Upper Mississippi River Basin. Since early 2000s, Representative Kind has had several bills that haven't ultimately been funded, but he's been trying to get USGS funding to set up a nutrient sediment network for UMR (IA, MN, WI, MO, and IL). The UMR Association folks have been asked by Kind to look at past legislation and see if it could be improved. The UMR Task Force talked about how they would monitor the entirety of the UMR if they had money to do so. This could get slipped into this bill. Many states now have their own nutrient strategies and a few states have dedicated funds to address nutrient strategies. The Governor of Iowa just signed legislation for \$282M to fund their nutrient strategy. At the Policy Working Group Meeting at the November NLRS Conference, people brought up the idea of creating a Communications Subgroup Committee and reaching out to people who haven't been engaged yet. The goals of the subcommittee are to create a general PowerPoint presentation that people can use to deliver the same, unified message and drafting a letter to send to politicians. We haven't brought in politicians to tell them about the strategy, so we are going to send a letter along with copies of the strategy and the biennial report to every senator in IL. This is to let them know that the NLRS is something that's happening in their district and to answer questions their constituents might have.

Statewide Nutrient Load Estimates Corrections – Greg McIsaac, University of Illinois – NRES

At the Illinois River at Valley City, we should've used 85% as the fraction in IL instead of 93%. Vermilion River at Danville should have been 92.6%. This is important because when estimating the loads leaving IL, we scale it back by the fraction of the river that is in IL. In Table 3.4, the 1980-1996 and 1997-2011 studies should have the Nitrate and Total Phosphorus data corrected down. Estimated annual Nitrogen losses leaving IL in 2011-2015 were 8% less than losses during the 1980-1996 baseline period. These losses are not the sum of the loads from the 8 major rivers, but an estimate of the losses from the states as a whole based on losses from the 8 major rivers. In Figure 3.2, the estimated TP load for 1980-1996 changed slightly from the estimate appearing in the NLRS because the additional concentration and flow data modifies

the relationship. Additional issues to consider in the future are about 54% of the Rock River above Joslin is in WI. So we used the difference between loads at Joslin and Rockton to represent the IL portion of the Rock, but this leaves out about 1,100 sq. miles of the IL portion of the Rock River basin above Rockton. For the state as a whole, we implicitly assume that the nutrient yields from the ungauged areas (~30% of the state) are equal to the avg. nutrient yield from the gauged areas. Nutrient yields from the ungauged areas might be better estimated by relationships of nutrient loads to watershed characteristics observed in the gauged areas (e.g. land use, slope, rainfall, etc.). Gregg wondered if there should be an addendum for this information. Trevor said we could mention this in our Nutrient Monitoring section of the next report, but he doesn't know that we need to make an addendum for a 1% difference in the nitrate.

Havana Lowlands Groundwater Study Update – Rick Cobb, Illinois EPA and Kelly Warner, U.S. Geological Survey

Groundwater can be a source of nitrate to the Mississippi River, some of the highest nitrate comes during low flow. They studied a groundwater well site near the edge of an irrigation ditch and Quiver Creek. In a Quiver Creek longitudinal survey, they were looking at various cross sections, seeing low concentrations in streams. They found higher concentrations in low flow conditions and did 54 point readings, as opposed to continuous sampling. Nitrate in the groundwater well ranged from 17.7 (2/16/18) – 22.4 (6/29/17) mg/L as N. Isotope analysis indicates that fertilizer is a major source for the nitrogen. Discreet sampling ranged from 0.6 (1/19/18) to 4.9 (4/11/17) mg/L as N. On October 3rd, 2017, the Quiver Creek longitudinal survey mean was 0.8 mg/L and the groundwater well was 19.4 mg/L. Next steps would be the installation of piezometers near Quiver Creek, along suspected flow path, surveying elevations of piezometers and collecting water level data, pumping piezometers and collecting real time pH, D.O., Temperature, and Nitrate, collect at least one isotope sample, and calculate hydraulic gradient and conductivity.

Next Steps – Gregg Good, Illinois EPA

Today's action items were writing a potential letter for recommendations for U of I's vacant position, considering the role of the new science committee, needing more piezometers for groundwater flow path in the Havana Lowlands study (need another year's worth of data), and considering the Super Gage at Rockton in WI. Kelly will contact Wisconsin. Topics/presentations for next meeting might be how other states are funding their nutrient strategies (both implementation and monitoring work).

The next meeting date is August 29th, 2018 in Urbana. The next annual conference date is to be determined, but possibly in November again.

Adjourn

NMC Member Extended Updates

Kelly Warner: Illinois-Iowa Water Science Center has changed to the Central Midwest Water Science Center and now includes Missouri, which started doing a terrestrial LIDAR group. The

center has not updated its website yet, they need approval from DOI. The trend for groups is to have fewer people in management and more people in field and project roles.

Rick Cobb: Rick has been spending a lot of time working on natural gas storage release in Mahomet Aquifer, there's a lawsuit filed with Attorney General's office because private wells are impacted by gas. Mahomet Aquifer Task Force established and had their first meeting in Decatur, second meeting coming up in Urbana March 26th.

Laura Keefer: State scientific surveys are under Prairie Research Institute (PRI) and there are five surveys (Illinois Natural History Survey, Illinois State Archaeological Survey, Illinois State Geological Survey, Illinois State Water Survey, and Illinois Sustainable Technology Center). The IL State Water Survey has had Kevin O'Brien as an interim director since last January.

Kevin Culver: Represented NLRS at a workshop yesterday and it was well received. Aqua is partnering with IL Farm Bureau and matching funds for 319 grants to update Vermilion Watershed plan.

Ann Holtrop: She officially became chief of her division in DNR in July. Hired someone to devote time to non-game aquatics, work on species recovery, and pick up some work in the Cache. Hired a wildlife action plan coordinator. Most of her time is spent on monarchs, that's why she was presenting at the Farm Bureau meeting today, lots of talk about NLRS when talking about monarchs. IL wants to put 150M new stems of milkweed on the ground by 2035, IL Monarch Project wants to develop a statewide action plan for monarchs and then implement it.

Justin Vick: Had a child last month! Nutrient efforts have been continuing at MWRD, WASSTRIP coming online in spring, pulling P out of recycle stream. 1/3 of the Phosphorus remains in the plant at Stickney. Initially 1-2 mg/L, now 0.9 mg/L, Ostara brings it down to 0.6 mg/L. With WASSTRIP, it gets down to 0.3 mg/L. Doing feasibility studies for all plants. Have an algae reactor pilot at O'Brien plant, using biofilm on tracks and dip into pool and algae grows on the tracks and you can grow the algae and market it, possibly for fish food. Goal for algae reactor is to get to get above 12 hours for HRT and 90% removal.

Cindy Skrukrud: Sits on Nutrient Research and Education Council and they've got another round of grants that they've funded, so far they've funded \$16M in research in their first 5 years. Trying to do more outreach, she was at the DeKalb County Farm Bureau on Monday. Does a lot of work on Fox River, the Survey has updated their Fox River database and is working on a trends report for the summer. On Fox River, all wastewater plants trying to get Phosphorus down to 1 mg/L. By 2021, they will have reduced Phosphorus load during summer months in Fox River by 70%, though their model says it may not resolve the algae problem. Has a Sierra Club group in Quad Cities that does monitoring on Rock River & Green River and they're working on getting their data on their website in real time. Has River Prairie Group that does monitoring in DuPage County. With agreement between environmental groups and MWRD, MWRD will look at nutrients in Chicago waterways. As of January, she cut her time to 3 days/week.

Laura Gentry: Just came back from D.C. last night, she goes every year in March and July for the Corn Growers Assoc. Lots of talk about the Farm Bill, met with TNC, American Farmland Trust, etc. and they're pushing for the same things as conservation groups. Strategically, wants to help pollinator habitat. Landowner who doesn't farm could put land up for pollinator habitat. Wants to get Working Land CRP, so instead of taking it out of production, you are promising for the life of the project to grow cover crops and certain mixes. Wants it to be easier to get an Equip contract, new legislation would take out a lot of the paperwork NRCS has to do to make it easier for farmers. A new bill is being proposed (Agriculture Data Act) to collect more information, tied more to fed dollars being spent on practices. Gulf Hypoxia Task Force update that they're looking at different ways to calculate the reductions – load normalized way (flow normalization) instead of 5 year averages. She described the new UIUC faculty that NMC members might be interested in working with.

Jong Lee: NCSA has a public data release from a dark energy survey, identified that normal matters consist of 5% of universe and 95% is unknown, unobservable energy. They're looking for evidence indirectly to measure these dark energies, it's been going on for 5 years and now they're releasing it to the public. Black hole is an example of the dark energy. NSCA will have a new supercomputer focused on machine learning (AI), they will have a specialized supercomputer for big data analysis, etc. that might be used for hydrology in the future. US has 50 years of tornado data and could possibly track when tornadoes will occur. NMC may be interested in cover crop coverage, different agencies have different observations about it but a U of I professor (Dr. Kaiyu Guan) will generate daily cover crop coverage in IL for the last 10 years using NASA data – the goal for data's resolution is 10 m x 10 m and focusing on the Midwest. NCSA is starting to engage a lot of agricultural partners, including ACES at the University of Illinois, John Deere, and Monsanto.

Greg McIsaac: A group of people on campus has funding to look at Phosphorus recovery from wastewater treatment plants and ethanol production facilities. We are putting on a workshop on April 11th-12th if anyone wants to join.