Nutrient Monitoring Council (NMC) 6th Meeting

September 13, 2016

Illinois EPA, Mississippi River Conference Room, 1029 North Grand Avenue East, Springfield, IL

Summary, Conclusions, and Next Steps

Charge 1(a) – N and P Leaving the State – Kelly Warner (USGS)

Illinois has the only super gage system for nutrient loads leaving a state. Further, Illinois has the largest P sensor network in the country.

- **USGS Super Gage and Web Display Updates:** All the super gages are up and working. USGS staff are starting to pull data to do regressions. The goal is to have them up and approved by December.
- **Recommended additional Super Gage – Lemont (USGS 05536890) or Joliet (IEPA G-23, USGS 0553790):** Some time prior to this meeting, Kelly Warner, Justin Vick, Jennifer Wassik, and Gary Johnson discussed the best location for an additional super gage. **They recommended the Des Plaines River at Route 53 at Joliet (USGS 05537980).** This location would capture effluent from more MWRD plants and thus, would help NMC capture P reduction at those plants.
- **Cost, funding, specific recommendation to the Policy Working Group:** The installation of an additional super gage is approximately $50K - $70K

NEXT STEP

1. **Kelly Warner will work up Des Plaines River at Route 53 at Joliet super gage cost numbers for NMC to present to PWG.**

Havana Lowlands Groundwater Study - Section 106 Monitoring Grant Update – Rick Cobb (IEPA)

For the past 14 years, IDOA has had monitoring wells as part of a pesticide plan to sample groundwater. They have never found pesticides in high concentrations, but have found nitrate hot spots. In the Havana lowlands, 46% of samples had concentrations greater than 10 mg/L (median 32 mg/L). IEPA realized that there is center point fertigation in the area. They want to analyze Quiver Creek, which is south of this area, and to do discreet sampling of N_2 gas to determine if denitrification is occurring. The highest nutrient concentrations in the Mississippi River are during low flows, therefore, the transport may be due to groundwater.

NEXT STEP

2. **Kelly Warner will let NMC know the location of the continuous groundwater nitrate in situ sensor.**

Great Lakes to Gulf Virtual Observatory Demonstration Using Illinois EPA Ambient Water Quality Monitoring Network Data in Watersheds Recommended for Nutrient Monitoring Plan Development – Update - Jong Lee (U of I - NCSA)

GLTG is focusing on nutrient monitoring. They do smart aggregation of the data set to display it. They are able to display different data sources in one platform.

There are 2 ways to acquire the STORET data: query and web service.

NEXT STEPS

3. **Now that NSCA has the first STORET acquisition method worked out, Jong Lee will put other stations in.**
4. **Jong Lee will test out the second method to acquire the STORET data.**
5. **Jong will continue pulling in Fox River data.**

Intensively Managed Landscapes: Critical Zone Observatory, Upper Sangamon River - Praveen Kumar (U of I)

Prof. Kumar's project is part of a Critical Zone Observatory (CZO) network across the country supported by NSF. The two primary sites are the Upper Sangamon, IL and Clear Creek Watershed, IA. The concept of CZO is becoming more prominent globally. The results from IL and IA in intensely managed landscapes can be applied throughout the world.

The Critical Zone is a vertical column – from the surface down to bedrock. It has been studied in a disciplinary way. The idea is to study from the molecular scale to the watershed scale. The layers have been shaped by glaciers. Put it on a timeline along with human evolution. Climate transitions are shown and eventually resulted in prairie. Wind driven deposition of soil resulted in loess (which is highly productive and erosion prone). Loess supports the right environment for biodiversity. It is an essentially flat and low energy. It sits for a long period of time and is a very low transport driven system. However, the landscape has been modified and the changes have resulted in a transport driven system. Industrial agriculture's goal is to enhance rate limiting. Approximately 50% of energy goes into producing N fertilizer. This creates a discord between the rate limits.

Carbon-Soil/Sediment-Water-Energy-Nutrient-Ecology process: destruction of near surface macropore structure. Agriculture alters the C3/C4 in SOC/SOM mix. Prof. Kumar is doing some simulations. Erosion increases hydraulic conductivity and reduces water holding capacity. There is increased bed and bank area for erosion. They developed the concept of "age of nitrate" (how long nitrate stays in moisture column). The emerging trend of bioenergy crops: miscanthus has 50% increase of transpiration over maize.

A climate change CO_2 elevation study is underway as well. The more CO_2, the warmer the plant. There is a whole suite of impacts. We (humans) are restructuring the heterogeneity at 'decadal to century' time scale. We can no longer assume that the organizational structure of landscape heterogeneity and connectivity is stationary. This is prompting us to rethink modeling. How can LiDAR high resolution data be exploited for modeling? Looking in to how to use waveform LiDAR data.

Summary of key ideas: Significant anthropogenic inputs in IMLs to overcome rate limits and rate limiting states for enhancing ag productivity. Landscape is being re-sculpted – heterogeneity and connectivity are non-stationary. Explore opportunities for new ways to approach modeling in a data rich world for novel insights – phenomenological prediction

May be able to determine where to put BMPs to best improve water quality.

This project has another 2 years remaining.

Watershed Nutrient Monitoring Plan Template Development – NMC Discussion

NMC discussed what would be needed for watershed nutrient monitoring plans to create an interactive template. NMC's role is that of an oversight group. NMC will create a document that is a template for monitoring approach. NMC will not be performing the monitoring in a formal sense and expect to have the work for specific watershed contracted out. NMC will develop cost estimate for watershed level monitoring.

CONCLUSION

NMC will pilot the development of a watershed nutrient monitoring plan with one watershed to answer if existing monitoring efforts provide enough data to evaluate the effect of nutrient BMP efforts. **NMC will start with the Vermilion (IL River) Watershed.**

NEXT STEPS

Develop an interactive Google doc for template Phase I (listed below):

1. NMC will send Jong Lee their gmail account: jonglee1@gmail.com by Sep 16.
2. Jong Lee will create Google folder with subfolders and will share with NMC by Sep 19.
3. Gregg Good will populate "introduction" and "study area description" by Oct 19.
4. Cindy Skrukrud and Gregg Good will populate "public participation" by Oct 19.
5. Laura Keefer and Kelly Warner will work with Jong WQ data by Oct 19.
6. Justin Vick and Andy Casper will work with Jong for biological data (Y/N boxes) by Oct 19.
7. Everyone will populate the template by Dec 6. Gregg Good will remind everyone before Thanksgiving.
8. At Dec 6 meeting, NMC will tweak plan.

Template items might include:

Phase 1: Needs assessment**.** Occurrence and distribution statement.

- ☐ Watershed Nutrient Monitoring Plan Goals/Objectives:
  - N and P Load Estimation
  - Trends in Loading Over Time
  - Water Resource Quality Outcomes
- ☐ Public Participation
- ☐ Study Area Description (e.g., size, land use, water and land resources inventory, inventory of point and nonpoint sources, other) Unique characteristics/features of the watershed
- ☐ Historic and Existing Monitoring and Baseline Data in the Watershed
  - Chemical, Physical, Biological
  - Attach figures

Analysis of additional monitoring [NMC has not decided who will provide this analysis.]

Phase II:

- ☐ Needed Additional Monitoring in the Watershed

- Chemical, Physical, Biological

- Monitoring Design
- Implementation
- Data Management
- Quality Assurance/Quality Control
- Assessment/Evaluation Methodologies
- Results and Reporting
- Monitoring Entities
- Monitoring Costs
- Potential Funding and In-Kind Resources
- Milestones/Timelines
- Limitations/Constraints
- Next Steps
- Appendices
- Other:
- Other:

In attendance (members and guests): Eliana Brown, IWRC; Katie Hollenbeck, IWRC; Brian Miller, IWRC; Gregg Good, Illinois EPA; Kelly Warner, USGS; Jong Lee, UIUC; Cindy Skrukrud, Sierra Club; Andy Casper, Illinois Natural History Survey; Kevin Culver, Aqua America; Matt Short, Illinois EPA; Sarah Lindholm, Illinois EPA; Trevor Sample, Illinois EPA; Justin Vick, Metropolitan Water Reclamation District; Laura Keefer, Illinois State Water Survey; Chuck Theiling, US Army Corps of Engineers; Rick Cobb, Illinois EPA; Praveen Kumar, University of Illinois, Missy Cain, Illinois EPA; Eric Lewey, Illinois EPA

Gregg Good: Thank you all for coming. This is the 6th meeting of the Council. Laura Gentry, Paul Davidson, and Ann Holtrop cannot make it today. Let's go around the room and do some introductions.

Introductions

Gregg Good: I wanted to reiterate that the minutes/notes are up on our website. I'm sure you've all gone on our website. All the groups have their information up there.

Eliana Brown: So who has been there before? My email's signature block has a link to it.

Cindy Skrukrud: If you google Illinois Nutrient Loss Reduction Strategy, it's the first thing that pops up.

Gregg Good:. Kelly was nice enough to give information from the last NMC meeting to the PWG, which was on August 30. Do you want to report?

Kelly Warner: There was only one question, about the Brownwater Study; how it will relate to surface water? That was the only question. They were short 4-minute presentations.

Eliana Brown: I have a question regarding the notes. The way that we have been doing it is that Katie is a human stenographer and I write the conclusions and next steps. If you find it helpful, I can also put in summaries. Since we didn't have notes the last time, I am happy to do summaries.

Kevin Culver: I would like a summary.

Eliana Brown: Okay, I will do that.

Gregg Good: You all have the agenda in front of you.

Eliana Brown: One more thing; if there is anything you want to make sure is in the summary, keep your eye on that and I will change it up if you'd like.

Gregg Good: We will follow up with Rick Cobb on the groundwater study, Jong will do a quick overview, Praveen is a special guest, and then we will talk about nutrient watershed plans. Here is the list of NMC members. So these are our charges. We want to know what's leaving the state of Illinois, what's leaving selected high priority watersheds, local water quality outcomes, reductions in algae etc. This was just a slide that is a placeholder for Kelly. She will give an update on the gaging network and maybe talk about a new site.

Kelly Warner: Everything is up and working today, so that's good news. However, low flows will get sensors out of water. At the Vermilion River at Danville, the phosphorus sensor isn't working because of turbidity. Now we are pumping water up into holding tank and doing it that way. We have pulled the data to see if we can come up with a regression to come up with total phosphorus. The USGS has a relationship with students to help with analysis. December is the goal to have those regressions up. Orthophosphate, turbidity, and suspended sediment are used for regression. During low flows, there is very little input.

Cindy Skrukrud: Does turbidity take into account that in the summer, phosphorus is in algae and not in water column?

Kelly Warner: At one of the sites, there is a blue-green algae sensor. But we haven't done anything with that yet.

Cindy Skrukrud: I only ask because it's in the algae, and some samples are pretty green.

Kelly Warner: It would be interesting to go with a hand held kit and give validation of what they are seeing versus what's in the water.

Gregg Good: Do you take water chemistry samples?

Kelly Warner: Once a month and during high flow. The dissolved concentration is in the regression. So this is a follow up from our last meeting. Justin, myself, Jennifer, and Gary met and got together and

discussed where we would potentially put a super gage to monitor upstate versus downstate. We looked at Lamont and Joliet at Rte 53. The recommendation was Des Plaines River at 53 in Joliet. Lamont would be cost effective, but we'd get better representation with Des Plaines River at 53 in Joliet. This is current USGS gage. Do we have anything else?

Justin Vick: The MWRD plants feed into the Des Plaines. The Lamont is only Stickney.

Cindy Skrukrud: Lamont would capture the "big 3" and not those others. Joliet would be my recommendation too.

Kelly Warner: The biggest thing is you don't want to go south of Kankakee. Des Plaines is more ideal. It's a little tricky construction-wise but we pulled in our construction wise folks. It is IEPA G23.

Gregg Good: Any idea who's going to pay for this? The hope is that we can capture what's coming out of Chicago.

Kelly Warner: And some of the biggest loss is happening outside of Chicago, so you want to capture those.

Gregg Good: Have we pushed a pencil on cost?

Kelly Warner: I can give you a ballpark. It would maybe cost about $50,000 to install and get all of the installation and equipment. The nitrate sensor would maybe cost about $18,000, the EXO 8. The phosphate sensor would maybe cost around $18,000. So I would say the cost would be between $50,000 and $60,000. But it could go as high as $70,000. There is another sensor out there that does better with higher phosphate. Operation and maintenance is maybe around $60,000. Don't quote me on this!

Cindy Skrukrud: This includes field technicians to sample?

Kelly Warner: Yes. The big thing is to get people out there during storm events.

Cindy Skrukrud: Which office is it out of?

Kelly Warner: DeKalb. One doing Rock and Green is out of DeKalb.

Chuck Theiling: What does a regular gage cost?

Kelly Warner: I would estimate around $14,000 for just discharge. But again, I'm not entirely sure. These are just estimates.

Cindy Skrukrud: Who's funding all other supergages?

Gregg Good: We are. We committed to 5 years' worth of monitoring. Director Bonnett did it. Now that we know where it would go, I would like to get an actual estimate to be added on to existing program. Iowa and Illinois USGS are now together.

Kelly Warner: The combined Iowa and Illinois USGS is known as ILIA. A lot of USGS offices have merged for cost effectiveness. What Gregg is getting at, is this network is shown at national meetings to look at loads leaving the state. Phosphorus sensors are new for using in river systems. It has held up as the largest continuous phosphate sensor in country.

Chuck Theiling: The director of Iowa put in sensors and integrated water quality with Engineer Research and Development Center engineers. We are making water quality models and it is used for alternative analysis. We are looking at nutrient reduction potential in floodplain and working it into agriculture.

Gregg Good: So let's work up a number. Kevin, as a member of the NLRS Policy Working Group, do we need a specific recommendation?

Kevin Culver: I would just say "hey this is what we are doing" and everyone will be happy.

Kelly Warner: If you just brought it up in the meeting.

Cindy Skrukrud: Is MWRD interested in throwing money into the pot?

Justin Vick: I'll ask them. Gregg, you probably know more about that talk.

Andy Casper: What about more opportunities associated with BMPs? I don't think any town or council would use this. One thing they would have is the science.

Gregg Good: I think that our charge is a bigger picture than to provide individual watershed BMPs.

Cindy Skrukrud: How would you tease that out?

Andy Casper: Could you separate urban from agriculture? I wondered if there was a way to tag along on urban environment without being a leader in it.

Cindy Skrukrud: You could do that if you have a gage and know what's coming out of plant and then subtract it.

Chuck Theiling: Could you crowd source for funds? That way you have community buy-in.

Cindy Skrukrud: Crowd sourcing would have to be done through an NGO to accept money.

Gregg Good: Rick Cobb, good timing. He gave a talk about new project we received a grant for and he will talk about how groundwater fits in.

Rick Cobb: Could you scroll down to where the grant description is? We are working with Kelly and Bill and the Illinois Department of Agriculture has designated monitoring wells. They have those at the edges of farms fields. It was set up to do pesticides, first transformation products. Also we are sampling wells for nitrates. We did an analysis before the integrated report was published and found hotspots that go above the MCL. In the Havana lowlands, 46% had concentrations greater that 10mg/L. One thing that we realized is that there is lots of center point irrigation. How much of a load is going to Illinois River and thus the Mississippi River? The goal is to do an initial assessment. It would be nice to put a

well in and assess the concentration. We want to see the concentration of nutrients. We also want to do a discrete sample of nitrogen gas and nitrogen isotopes. We don't have any deep community wells. We have one of these wells elsewhere and there is an upward trend of nitrate. The cone of depression many be pulling shallow water into deeper groundwater.

Kevin Culver: Is there backflow prevention on those tanks?

Rick Cobb: Those regulations came about in the 1980s and there are rules for that. I don't think that's what's going on here.

Gregg Good: Mechanical failures are another issue.

Rick Cobb: Oh yeah, nothing is foolproof. We will come out with a report at the end of the year and allow stakeholder input. The highest concentrations are during times of low flow which indicates that it is groundwater.

Gregg Good: So we got the grant from USEPA and started a month ago. What year does this go until?

Kelly Warner: 2018. So the idea is that we get a well installed with continuous monitoring within the next month. This is most susceptible because of high hydraulics within area. Next time we will let you know the location of the continuous sensor. We can get it in next month depending on cooperation since it is on private land. The plan is for the data to be on web. There is continuous monitoring of nitrate in the groundwater sensor.

Rick Cobb: Did I mention we will also be comparing to the supergage in Florence?

Gregg Good: Next we want to get an update from Jong Lee. We have the IEPA STORET staff Matt, Missy, and Eric here as well.

Jong Lee: We brought data in from Illinois EPA to the dashboard which is Great Lakes to Gulf. I showed you last time how you can acquire data from STORET and ingest it into the system. When we do it, there are 2 ways to do it. The 1st way is the web interface download and the 2nd way is using web service. We are not done yet. About the 2nd method; we use the web service using SOAP and use Python. When you use a parameter, if you do something wrong, it's not going to work. It is a huge XML file. We have a hard time parsing through it. For those questions we can get help from STORET people. We are still in the process of bringing Fox watershed data into the system. It seems like STORET has a special identifier for variables. Now we have stations on one river, we can compare a variable sensor. That's what we have been working on so far. We are in the stage that we can do it quickly now. The featured watershed will zoom into the area.

Kelly Warner: I saw a talk by Dwayne Young with the Office of Water and a lot of groups are doing this for all the data they have in STORET. A lot of people are doing this, pulling all data together and showing it. What is the difference between all of this? What is our niche? What do we provide what others don't?

Jong Lee: For Great Lakes to Gulf, we focus on nutrient variables. The user is able to interact with charts, but for the usage of data sources – we are able to get different data sources on one platform. It matters what to bring in and what to show.

Kelly Warner: What I would be interested in knowing is how Great Lakes to Gulf compares to others? Do we have more data? Do we have more sites? We don't want to replicate efforts.

Brian Miller: Jong tapped into a process and how to do it. What this has done was a smart aggregation, not a snapshot of time that's outdated as soon as it is pulled.

Jong Lee: It is geodashboard technology on how to configure system and display for users. Great Lakes to Gulf monitoring is seasonal based and how to process and manage data within the site.

Cindy Skrukrud: Are you pulling in algae data? What are the levels of algae?

Jong Lee: If the data source has it, we display the algae data. We have some real time sensors deployed.

Andy Casper: How do you handle data sources not in the database?

Jong Lee: Well there are 2 or 3 possible scenarios. Web storage can pull from web system or excel files and work with adjusting it into the system.

Gregg Good: Next up is Praveen Kumar. Let's allow Laura to do the introduction.

Laura Keefer: Praveen is in the civil and environmental engineering department. He's been there forever. He worked on a number of projects. We invited Praveen to talk about what ACZO is all about.

Praveen Kumar: I have worked with a variety of people with a variety of different backgrounds and will talk about my own learning and will explain what the terms mean. We are part of a network. There are 9 observatories. We have 2 primary sites, and the exciting part is the concept of the critical zone. The critical zone is from the top of canopy to the bottom of the bedrock. When you study something in a disciplinary way you leave out things you don't understand. Understanding the molecular scale to the watershed scale is fundamental to the large scale. The concept was put together early on. The Midwest is different, with a largely altered environment. As part of this project, we have been taking a look across the historical landscape. Red areas are in agriculture. So when you look at landscape, there are fine scale features like how the landscape transports materials. What we see at the surface is a very small portion. We have put it on a timeline and cast it in terms of human evolution. Since the last glacial maximum, went from ice covered to what we see currently. This is a period of climate transition with succession of trees, establish of species, etc. It took about 4,000 years for prairies to get established. Going from that transition, this is essentially a flat landscape. This is a system that sits for a long period of time and it is a low transport driven system. There is modification of networks and as a result of modification; there is a reduced residence time. Anthropogenic modifications are the result of overcoming great limits.
We had a student look at how much energy goes into overcoming great limits. 50% is adding and developing fertilizer. The other 50% is tile drains, etc. Because we are putting in so much energy, is it creating a discord between rate limits of productive and assimilative processes? Waste is transported

out of the system instead of being assimilated. It creates a lot of stuff. We looked at carbon, soil, water sediment, and water. We looked at all of the interactions. If you compare concentrations, we are hoping for characterization of soil, when you apply the soil, how long it stays, etc. We are trying to get to that kind of story. With the nitrogen story, I'm going to add the ecology story. There is biodiversity impact and habitat impact. So it is going to reduce low flow. How does that balance out? Then a story about climate change effects. The study fumigated an area with CO2. Plants receiving CO2 are warmer. There is a whole suite of impacts. A lot of it is driven by socio-economic processes. This landscape has evolved with geologic time. If it's evolving over time then how do we go about modeling, stationary and non-stationary? What we have is an overlay in terms of landscape. How do we model these? Models are informed by the available measurements. LIDAR is available to categorize the vertical profile. We can stop looking at micro-topographical controls. Normally water will run into the landscape and transient bonds. How do we model these things and with LIDAR, you can look at unprecedented details. This is the kind of data becoming available. How can we use this data? Each color is a different tree, each circle is a tree. We can monitor corn, soybean, runoffs, and details at the 1 meter range. The computational needs of these are immense. But we can run these things. It also allows us to resolve the moisture regime in incredible detail. We are trying to run this on a large scale. Some key ideas: significance of anthropogenic inputs, enhancing agriculture productivity, new ways in which to model the landscape, and how the landscape is being resculpted.

Brian Miller: So to connect some dots, where to concentrate in areas? The Upper Sangamon to Lake Decatur was one of the selected areas. We have efforts going on. At some point, we will have to have a causal relationship; do you think this will help us?

Praveen Kumar: This study may help us understand dependencies, particularly feedback dependencies. This may help us reveal what those are.

Brian Miller: At some point, what will we need more of?

Praveen Kumar: Optimizing landscape. We may be able to answer questions with that.

Kelly Warner: SWAP monitoring. What info will help better inform the SWAP model?

Praveen Kumar: They aggregate processes. Our model provides a lot more detail. Is there a way to understand it?

Kelly Warner: It's a scale thing.

Brian Miller: How many years is this project going for?

Praveen Kumar: This project has 2 years remaining. There is a debate at NSF about in what form should it be continued. We cannot translate this as tools for people to use, but maybe we can get additional funds to do this.

Brian Miller: Can you do perennial crops?

Praveen Kumar: Yes.

Chuck Theiling: Don't forget about questions you have already answered. Also, I would like to reiterate one thing; what Praveen says of changing landscape from transformation to transport is so true. If you can't get it into the soil, you can't keep it on the landscape.

Cindy Skrukrud: What about bioenergey crops and biotranspiration rates?

Praveen Kumar: That's a good question, it's how you measure them, so we have to trust the models more than the measurement.

Andy Casper: I was thinking about a question the committee has been wrestling with, urban versus agriculture landscape. In your basins, there are large urban areas. Do you have insights into what their role is? Do they play an outsized role or is it best to focus on landscape drivers?

Praveen Kumar: No, I don't have insights. The 2 things drive resources and interest of people in project. People are interested in looking at that question but everything is driven by who is interested in answering the question.

Lunch Break

Gregg Good: We talked about priority watersheds and talked about nutrient watershed plans. This is kind of where we left off at the last meeting. Ann, Justin, and Andy developed the biological part of that. We picked a watershed to start in, developed a template, and some questions come up. That's what we are charged with. What should these things look like? Where is the watershed? What's the detail? What's needed? I started looking at examples of monitoring plans and watershed plans. These are some of the watersheds that we talked about. I don't know if we want to try to spell out the template for these things. I know we need these plans, but I'm not sure how to get to the next step. Should we be an oversight group to a contractor? How do we get there with a pot of money, if we get that pot of money?

Andy Casper: What is the cost of plan development or watershed assessment?

Cindy Skrukrud: Would putting a template together be useful?

Andy Casper: Some questions for the plan, how do they answer it?

Kelly Warner: We could use Google Docs to cut and paste into one document.

Cindy Skrukrud: Fox River, Upper Des Plaines, etc. all have monitoring groups. Did IEPA assess validity or quality assurance?

Gregg Good: Michelle Rousey is not going out and auditing folks. What are the goal and objectives? What is the general description of study area, what's going on existing, what's going on to answer questions?

Chuck Theiling: What are the unique characteristics of the watershed?

Andy Casper: What about resources to be protected?

Chuck Theiling: Yes.

Gregg Good: Monitoring design, implementing steps, etc.?

Andy Casper: It should be logistical and practical. Would someone have a set of guidelines or would people just do this on their own?

Chuck Theiling: Riverwatch?

Andy Casper: What about something for people to use if they haven't developed their set of guidelines already?

Kelly Warner: A template? You can attach figures, a map of biologic sampling, and parallel comparisons.

Laura Keefer: What this committee can lend help to is some analysis of the historic and existing monitoring. Do they have any monitoring? How much more do they need? Maybe there is a Riverwatch to evaluate data to address resource quality and analyze data. We can fine tune parts that are in there. We need that piece. Once we translate and analyze that, then it is rather cookbook. They need to pull the information together. What are we short by and what are the needs? There is a Phase 1 and a Phase 2. Phase 1 is gathering and finding all that data, Phase 2 is analysis.

Chuck Theiling: What are your criteria and are you achieving target level?

Laura Keefer: Trends over time and annual loads. Some of the information is not a trend but that information is 15 years old. Are there any changes? Do you calculate annual loads? Biologically, Andy or Justin? These species collected at these times, biomass, etc. Do we have information to start and is any of it is useful?

Cindy Skrukrud: Can't the way we are using the superstations help?

Kelly Warner: Depending on the occurrence and distribution assessment. What is the occurrence and distribution of the data that we have? We need to evaluate them to determine the loads.

Rick Cobb: Guidance document. Groundwater protection needs assessment.

Andy Casper: Is that the Phase 1? A needs assessment?

Laura Keefer: I think so. We would have to define goals for watersheds.

Matt Short: The reality is data is not together and people do not know how to find it. Where is this existing data in Illinois? Did I capture that watershed data?

Laura Keefer: All of us know where 90% of watershed data is. Anything we couldn't find is probably so obscure it's not useful.

Kelly Warner: It's having them know where to go to find it.

Gregg Good: I was not envisioning volunteer groups putting this together. One goal of the NLRS is to find out what's leaving the state, so we need to find out. That's our responsibility in any way shape or form. We have watersheds in our state and we have to come up with these plans, not the small watershed groups. Here's what the NLRS did and why. This will be the result of that. I guess I'm seeing it's our responsibility as an oversight group. This group gives the charge.

Chuck Theiling: HUC 8 or HUC 12?

Gregg Good: We were talking about throwing out Middle Fox, Upper Middle Fox, Kaskaskia, Lake Springfield, Calumet, etc. My point is that it's the state's responsibility to engage local folks, but we have defined 3 goals.

Laura Keefer: The document is more of an approach for us to decide. How are we going to do it? Should it be uniform, templated, etc.?

Gregg Good: It's great to have the nutrient strategy, but maybe there is a little extra sampling we can do or additional sampling that we have to pay for?

Brian Miller: Could part of the plan be coming up with a budget? Maybe cost it out on what you think is needed?

Cindy Skrukrud: In all these potential pilots, I'm only not sure about Kaskaskia. There is existing work in the watersheds.

Laura Keefer: There is stuff happening in Kaskaskia.

Gregg Good: That's why these 4 were picked. Are they all doing biological programs?

Cindy Skrukrud: We aren't doing any biology. We are only doing water quality parameters. We would be interested in that.

Kelly Warner: We can start to look at a template to do our first one.

Gregg Good: Phase 1 is what's out there, and then Phase 2 is analyzing it. If we ever get to the analyzing, then we have to figure out goals. Upper Mississippi was a million and a half, etc.

Matt Short: For the full blown Clean Lakes Diagnostic Feasibility Study, there is fish, macroinvertebrates, pesticides, nutrients, etc. It is a big scale project. Even after we generated that, we can't implement this. Minnesota and Wisconsin started looking at the plan and can pick down from there, if you wanted to.

Laura Keefer: Large basins are monitored by USGS, in priority watersheds, and are captured sooner. Are these the only ones? Are they a canary in the coal mine? On a smaller scale at major watershed outlets, what about developing plans? Things that have no data are going to be very expensive for startups.

Kelly Warner: I would like to have someone develop a Google Doc that was interactive. Lots are monitoring and data related. We can pull out data, data management, quality assurance, a prototype as a shared document. Just to see how much this group could populate for the monitoring component. It

might be a way of seeing how far they go. It's our needs assessment. Some of them such as implementation and where we need additional monitoring, we might have to come back to that as a group.

Gregg Good: At these stations we collect bugs, fish, habitat, etc.

Andy Casper: Potentially at different intervals.

Kelly Warner: You can upload and download, etc. and the descriptors and Google Doc is straightforward.

Laura Keefer: It's in the cloud. We can use that to find what we are missing and can populate where the gaps are.

Rick Cobb: That sounds like good visualization.

Kevin Culver: It would be a good starting point.

Laura Keefer: We can have 2 groups put together minimum amounts of data. We can do sheets too, spreadsheets, etc. Everyone should be able to access it.

Jong Lee: Metadata. Create a form and send it back. It is useful to have a Google Doc to start with making a template.

Kelly Warner: So the first step is picking out one watershed that we want to focus on.

Brian Miller: Do we want to do a non-point source nitrate, phosphorus, and/or point sources?

Chuck Theiling: If you rely on NGOs, there is lots of help in Chicago.

Cindy Skrukrud: We have data in the Fox, and Chicago Calumet is MWRD.

Andy Casper: Illinois DNR does have a couple programs in and around the area.

Chuck Theiling: Data is accessible.

Kevin Culver: Is it a 5 year assessment?

Gregg Good: That's what ours are.

Kelly Warner: Sangamon might be interesting.

Laura Keefer: Heart of the Sangamon.

Brian Miller: Kelly, why do you want to pull one with not a lot of data?

Kelly Warner: Because it is middle of the road. Some watersheds can aspire to that and others not very quick. It might be too easy for others.

Brian Miller: Sangamon jumps out. It is a perfect storm that has a lot of data.

Jong Lee: We looked at an older dataset. Our point of view is related to nutrients.

Chuck Theiling: NGRECC has continuous data.

Cindy Skrukrud: Are we looking at data that has changing data? We will see big changes in Fox 2019-2021.

Andy Casper: Some BMPs are already under construction.

Justin Vick: We are collecting tons of data. For this first one, we are using a template, so going kind of middle of road is good.

Laura Keefer: What about Vermilion? I have a few years, with a smattering of middle of the road data.

Matt Short: There is lots of data on Lake Decatur - a wastewater plant, we have some monitoring, a shift in sources, what's coming in there, and what the impacts are.

Andy Casper: Does it make a difference that there are shifts over time?

Matt Short: Looking at a watershed you might see significant shifts in pollutant sources. That's just a different part of the watershed, if you want to consider that.

Gregg Good: I'm hearing good aspects from all of them.

Matt Short: Lake Shelbyville sucks all of the nutrients out and the watershed has a different nutrient structure above that above Lake Shelbyville.

Kelly Warner: I think, to start, we should pick one without a superstation. I would propose the Vermilion or the Sangamon.

Cindy Skrukrud: Why is Lake Springfield on there?

Gregg Good: There is lots of stuff going on. The list was where the monitoring is occurring and where the BMP implementation is going on.

Laura Keefer: We are always monitoring upstream Lake Decatur.

Matt Short: It is a HUC 8 there.

Kelly Warner: I would suggest Vermilion.

Kevin Culver: Vermilion.

Laura Keefer: Vermilion.

Sarah Lindholm: Vermilion.

Cindy Skrukrud: Are there changes in point sources in Vermilion?

Kelly Warner: Agriculture.

Andy Casper: BMPs or agricultural land use?

Kelly Warner: CREP.

Laura Keefer: There are some point sources in there.

Matt Short: Pass.

Justin Vick: Vermilion.

Chuck Theiling: Sangamon.

Andy Casper: Sangamon.

Cindy Skrukrud: Sangamon, since it is both an agricultural and point source.

Andy Casper: Sangamon has a lot of biological data.

Brian Miller: Any wisdom in considering both as you do the template? What if, as you develop the template, you develop both? What are the fields that you need to fill in?

Kelly Warner: It will take more time, but I like that idea.

Gregg Good: We are going to do Vermilion.

Kelly Warner: Cindy, you have experience working with lots of data, the broader we focus, the better.

Gregg Good: So create a Google Doc?

Jong Lee: I can create a template of what type of information we want to collect. Everyone will need to send information to my Gmail account.

Kelly Warner: Laura, Jong, and I will make the spreadsheet. Who will do biological?

Andy Casper: It may not be in proper format.

Jong Lee: I like that idea; it doesn't burden volunteers to enter a lot of data.

Gregg Good: Justin and Andy will send Jong biological data. The teams of Andy and Justin will send Jong a template. Kelly and Laura will send data to Jong by October 19.

Laura Keefer: More information will go into it.

Jong Lee: I will create a folder to populate. Everyone has a month and half to populate.

Gregg Good: Let's populate by the December meeting.

Kelly Warner: We should remind everybody to fill it out by Thanksgiving.

Gregg Good: December 6 would be devoted to tweaking that.

Kelly Warner: We can write out the study area description and introduction for Vermilion. What is the goal for the next meeting? Public participation? Cindy? What watershed groups? October 19 is the due date for the introduction and data and by that date we will have a skeleton. Between October 19 and December 6, we will figure out the type of data to put in there.

Gregg Good: Alright, thank you all for coming. March 14 and June 6 are the next meeting dates and we'll have a fall workshop date.