Nebraska Ground Water Monitoring Advisory Committee (NGWMAC)
&
Nebraska Surface Water Monitoring Council (NSWMC)
Annual Joint Meeting
Tuesday, October 28, 2014, 10:00 AM-1:00 PM
NDEQ Van Dorn Offices
2717 S. 8th Street, Lincoln, Nebraska

Minutes

1. Attendees: Dave Rus (USGS, and Chair of the NSWMC), Jim Newman (LLCHD), Dan Inman (NDEQ, and Interim Chair of the NGWMAC), John Miyoshi (LPNNRD), Lyle Christensen (NWEA), Sam Capps (NDEQ); Lindsey Phillips (NDEQ), Laura Johnson (NDEQ), Carla McCullough (NDEQ), Mike Archer (NDEQ), Jennifer Swanson (NARD), Dave Tunink (NGPC), Hope Liann (Upstream Weeds), Chris Madden (Upstream Weeds/Neb Watershed Network); Katie Cameron (ENWRA); Dave Bubb (NDEQ), Jeremy Hammen (NDEQ); Greg Michl (NDEQ); Dave Schumacher (NDEQ); Dave Ihrie (NDEQ); Tylr Naprstek (LLNRD); Chris Hobza (USGS); Ron Zelt (USGS); Ken Bazata (NDEQ); Dave Jensen (USACE); John Hargrave (USACE); Craig Romary (NDA); Colleen Steele (CSD); Dana Divine (CSD); John Bender (NDEQ); Ginny McGuire (USGS); Marty Link (NDEQ); Ryan Chapman (NDEQ)

2. Agency Updates
    a. Lancaster County Health
        i. 42 new wells in Lancaster Co
        ii. 572 well permits (508 in city limits)
        iii. 1043 samples; Have started loading data into the Clearinghouse
    b. USGS
        i. National Water Quality Assessment
            1. Surface water sampling continues
            2. 3 GW sampling efforts in 2015 (High Plains Source Water; Eastern Ag Land Use; Vertical flow path sampling in the High Plains)
        ii. Continuous Water Quality continues; New sites at the Niobrara this year and next year on Bow Creek
        iii. Wrapped up sampling for Willow Creek Toxic Algae Study, results forthcoming
        iv. Large River Initiative in the Lower Niobrara/Missouri Natl Rec River to study connectivity of those rivers
        v. Intensive sampling of the Missouri River below two dredge outfalls has wrapped up, so backlogs at Midwest Labs for the rest of you will hopefully let up.
        vi. It's preliminary, but we've noticed 1 GW well that seems to indicate Uranium oxidation by nitrates.

vii. Thermal mapping project in the LLNRD area to look for GW/SW interaction points coming
viii. Spencer Dam sediment flushing being monitored this year
ix. Baseflow characteristics study in the Lower Niobrara with the NPS

c. LPNNRD
   i. 2 Phase II areas for NO3: 1 near Bellwood seeing decreases; 1 near Schuyler seeing increases and probably headed towards phase III
   ii. IMP for the district and the larger basin in development
   iii. Shell Cr continuous water quality w/ the USGS

d. NWEA
   i. Involved with a 4 state governmental affairs group (MO, IA, NE, KS) that meets w/ EPA VII periodically; Meeting minutes available upon request and eventually to be posted at http://www.ne-wea.org/index.php/news/committees/governmental-affars
   ii. With the other 3 states, NWEA has provided commentary related to the new 'Waters of the US' rule being proposed by EPA/USACE (See attachment 1); Comment period ends Nov. 14; Resources/Staffing impacts are being considered;
   iii. IA is implementing a nutrient reduction strategy and is putting a lot of resources into this effort. This has been a cooperative effort between the Iowa Dept. of Agriculture and Land Stewardship (IDALS) for NPS and Iowa DNR for point sources.

e. NDEQ
   i. Sam Capps is now responsible for Wellhead Protection Area programs that are being updated/approved
   ii. Lindsey Phillips is responsible for Source Water monitoring/coordination
   iii. TMDL on Bazile and Chadron Creeks for E. Coli is in development/review
   iv. Grant to make the Integrated report more efficient
   v. Carla McCullough is the new 319 grant coordinator: 2014 319 project award letters were sent Oct. 20. The updated Nebraska Nonpoint Source Management Plan (2015-2030) is currently in review with EPA.
   vi. Beach sampling for E Coli and toxic algae: Fairly typical year this year
   vii. In lieu of the governor's position statement, NDEQ won't be preparing a letter of comment related to the proposed EPA rule
   viii. New standards in review: Biggest change is related to ammonia, but it shouldn't affect folks; New rules for intakes for power plants
   ix. Lake sampling: Some reports of fish kills in addition to the standard sampling
   x. Biological monitoring: Finished up work on the Niobrara basin; Also some side projects on Shell Creek and Lost Creek
   xi. Fish tissue: 63 samples this year of multiple species; 98 advisory sites in the state and most of those are related to mercury; In basins with existing PCB concerns, there will be reanalysis to confirm whether the advisory should continue

xii. Ambient/rotating basin sampling: Just wrapped up sampling on the Niobrara basin (weekly sampling at 41 sites);
xiii. Database: Catching up through 2010. 2010-2012 are now in STORET

f. NGPC
   i. Blue green algae continues to be a problem
   ii. Invasive species: Offutt AFB lake is full of zebra mussels; Angostura has tested positive for Quagga mussels;
   iii. A flush from the McGowan Dam on Plum Creek was an unpermitted flushing of sediment which was a water quality violation. Various state and federal agencies are trying to develop a sediment management policy for the operation of the dam which fills up rapidly with the estimated 37 tons of sand per day moving down Plum Creek. Some experimental flushing events will be monitored to determine the best time of year and length of flush. There is a lot of sand in the lake and upstream as well that needs to be passed downstream.
   iv. Public Information meetings related to Niobrara Instream Flow Requirements Dec 8-10

g. ENWRA
   i. 3 sites continue to be sampled
   ii. Heliborne Geophysics surveys being done this year

h. LLNRD
   i. Installed 7 dedicated monitoring wells as part of Dave Meisbach's program
   ii. Area 28 phase 3 nutrient area/study: All irrigated wells in the area have meters and check valves;
   iii. Two new Watershed Management Plans coming and just wrapped one up

i. USACE
   i. MO River activities
      1. Ambient monitoring the Missouri River at 6 sites in cooperation w/ NDEQ
      2. Intensive sampling on the Missouri River and some of the tributaries from Gavins down to the mouth
      3. Shallow Water Habitat
         a. Intensive sampling below 2 dredge projects related to SWH in cooperation w/ USGS
         b. IA is requiring compliance monitoring as part of its 401 certification requirements
   ii. Continued sampling in Salt and Papio lakes;
      1. Results were pretty much normal
      2. Saw some unusual results related to the late season rains this year

j. NDA
   i. Reviewing ELISA Pesticide analysis from NRDs that will be a subset of the Clearinghouse

k. Ag Clearinghouse
    i. http://dnrdata.dnr.ne.gov/Clearinghouse/Clearinghouse.aspx
    ii. Recently added data from 2013 sampling to the clearinghouse. This included data from Lincoln-Lancaster County Health Dept., which is a new contributor to the clearinghouse.
    iii. Approximately 465,300 results from ~25,900 wells; about 111,000 of the results are nitrates; ~8.6K results added this year;
    iv. Will be working on ELISA data for 2010-2013. These data will be added to the ELISA data link now accessible from the Quality-Assessed website.
    v. See attachment 2
l. CSD
    i. New article from the Spaldings related to the nitrate legacy in Nebraska; The main point is that nitrate concentrations haven't yet reached steady state in general; Water Resources Research, vol. 50, Issue 5, May 2014, p. 4474-4489
    ii. Natural chloride data in the Lincoln area was compiled related to domestic use if interested

3. Upcoming Meetings
    a. AWWA/APWA/WEA Fall conference 11/5-11/7, Kearney, http://www.awwaneb.org/fallconference/
    b. Lower Platte River Summit, 11/6, Camp Carol Joy Holling, https://lowerplatteorg.presencehost.net/what_we_do/events/lower_platte_summit.html
    c. NeFSMA Membership meeting, 11/20, SAC Museum http://www.nefsma.com/upcoming-events/
    d. Missouri Iowa Nebraska Kansas (MINK) River Corridor meeting, 11/17-11/18, Nebraska City, http://www.swico.org/Marketing.html
    e. NEWRA meeting Nov 24-25 in Kearney that will include the history of water planning, http://newra.net/2014/09/2014-joint-convention/

4. Presentation: Using technology to engage/enlist the public through citizen science
    a. Chris Madden, Nebraska Watershed Network and Upstream Weeds; cmadden@unomaha.edu
    b. Many questions/comments that weren't adequately captured, but some here:
        i. How best for traditional sampling to interact with citizen scientists? One path might be with the development of Watershed Groups that can act as liaison between the two; Citizen Science shouldn't overstretch its mandate/resources, but within that context it can be very beneficial.
        ii. What are the data availability/storage and are there concerns about data being used out of context? NWN data are currently available via a facebook page, https://www.facebook.com/nebraskawatershednetwork
        iii. What's next? Part 2 of Lil Miss Atrazine is in the works
        iv. 'Overheard in the crowd' during lunch:

1. Without a QAPP, the data would be difficult to use directly in regulatory programs/decision making. However, the public engagement component of management plans could be well served with this type of work.
2. '*I've known about this type of work in the past, but I didn't realize how powerful it could be*'

c. See attachment 3

5. Presentation: Using UAVs for water sampling
   a. Dr. Carrick Detweiler, UN-L Computer Science and Engineering; cdetweiler2@unl.edu
   b. Many questions/comments that weren't adequately captured, but some here:
      i. What's the payload? Can probably collect up to 100 mL; Could get more with larger UAVs, but those present their own logistical issues/dangers; Water probes are currently built to be durable, not light.
      ii. What's the range? Roughly 15 minutes of flight time per charge
      iii. What would be the regulatory response if a UAV sampled result for microcystins exceeded 20 ppb? NDEQ response that if the method were included into an approved QAPP, it could be used to make regulatory decisions.
      iv. What are the operational limits? The UAV is affected by wind (up to 15 mph) and drag (flowing waters haven't been explored as much as lakes). It can work at night, but there are likely to be FAA limitations.
      v. FAA rules will probably be changing soon, though it's not clear if that means they'll become more or less restrictive.
      vi. It appears that Dave Bubb's job is secure for the moment.

Attachment 1: Water Environment Association Comments on Waters of the U.S. Proposed Rule
Attachment 2: Agrichemical Clearinghouse Status report
Attachment 3: Lil Miss Atrazine flyer

Minutes prepared by Dave Rus with edits from the group

Attachment 1

Submittal Date: October 27, 2014

To: Water Docket, Environmental Protection Agency
Mail Code 2822T
1200 Pennsylvania Avenue NW
Washington, D.C. 20460

Attention: Docket ID No. EPA-HQ-OW-2011-0880

Subject: Comments on Waters of the U.S. Proposed Rule
Federal Register Vol. 79, No. 76, April 21, 2014

From: Water Environment Federation Member Association Governmental Affairs (GA) Committees Representing EPA Region 7:
Iowa (IAWEA), Kansas (KWEA), Missouri (MWEA), and Nebraska (NWEA)

Introduction

Our 4-State GA Committees have met annually for the last 8 years with EPA Region 7 staff and State regulatory staff (IDNR, KDHE, MDNR, and NDEQ) to discuss emerging regulatory issues and how they may affect our respective end users within our respective memberships; to offer constructive suggestions; and disseminate public information. Such suggestions are intended to make water quality programs effective, practical, affordable, and be given due consideration for other competing priorities among both regulatory staff and end users. The set of six (6) comments and questions offered herein are intended to be constructive in a similar manner as all of our past discussions with EPA and will focus on Title 40 – Protection of the Environment issues, and more specifically Part 122 dealing with the NPDES Program.

Comments/Questions

1. Intent for Direct EPA NPDES Permitting Authority for Non-Point Pollution Sources? Since the definitions for "Waters of the U.S." are being added to 40 CFR, Part 122 under the NPDES program, would the Proposed Rule conceivably provide EPA with direct NPDES permitting authority over certain qualifying non-point pollution sources for the first time? It is suggested that EPA clearly state its intent on this issue to avoid unnecessary confusion over the basis for program control, especially under the more difficult case-specific instances involving "Other Waters" and ephemeral areas.

2. Parallel Authority with "Waters of the State" Situations. The proposed rule does not address parallel "Waters of the State" authority already in place for various States as to which entity will likely have primary responsibility for program management and enforcement. For example, the Nebraska Department of Environmental Quality has legislation in place that already deals with all of the key elements contained in the Proposed Rule, plus it also includes groundwater nexus considerations, which the

Proposed Rule excludes. Similar to above, it is suggested that EPA clearly state its intent on the issue of either independent EPA or parallel authority among States, in order to avoid unnecessary confusion over the basis for program control; especially where States already possess similar or even greater authority.

3. Design Storm Issue for "Nexus" Determinations. Will EPA consider implementation of a universal "design storm" approach in its "Nexus" determinations; particularly for "Other Waters," ephemeral surface runoff areas, and so-called "fill and spill" areas? There have been on-going discussions about the need for a universal "design storm" concept for many years for stormwater management and enforcement of water quality standards. Only in limited cases within State MS4 permits have design storms been part of formal regulatory requirements. It is well known that most stormwater management BMPs become ineffective beyond 2-year, 24-hour duration storms due to hydraulic capacity limitation issues.

   It is implied then, that if stormwater "connectivity" of water flow through certain portions of a watershed pathway can only significantly occur with storms beyond standard BMP hydraulic capabilities, then there will be little value in classifying those pathway elements as "Waters of the U.S." In other words, regulatory requirements must be amenable to practical control measures or no defensible purpose is served. It is suggested that EPA include appropriate rationale for design storm considerations in recognition of practical "Nexus" determinations commensurate with typical BMP control measures, rather than leaving causative stormwater connectivity factors open-ended.

   Issue Example: From our past annual 4-State GA meeting discussions, it was estimated by EPA Region 7 staff that at least 80% of the annual nutrient loading from the Mississippi River Watershed to the Gulf of Mexico Hypoxia Zone originates from a few very large storms. Again, these types of storms greatly exceed control measures typically available through stormwater management BMPs. Within EPA Region 7 over 90% of nutrient loadings are from non-point sources. Therefore, the implied reality is that over 90% of 80% = 72% of nutrient loadings will be very difficult, if not impractical to control. Such large storms would largely overwhelm existing NRCS rural standard land management practices and would create exceptionally high flows even in ephemeral watershed areas.

   Bottom line: Such large storm nexus issues may similarly apply to many pollutants of concern, and "nexus" determinations should not include physical, chemical, and biological evidence of water quality impacts that are associated with large storm events that are beyond practical BMP control.

4. Wet Weather Frequency, Duration, and Water Quality-Based Risk Factors. EPA has long struggled with evaluating water quality impacts and risk factors associated with short-term wet weather conditions, and to date this regulatory area has not been adequately resolved. However, the Proposed Rule cites various nexus situations that

would very much depend on such short-term wet weather conditions. Therefore, EPA needs to stipulate the basic technical and administrative approaches that are intended to be used at the source in order to define frequency, duration, and water quality-based risk factors that are directly associated with wet weather events that reportedly transport pollutants of concern to downstream designated beneficial use areas. In other words, how does EPA intend to establish applicable, defensible water quality standards and monitoring requirements at the claimed pollutant sources, such as ephemeral stream areas under short-term wet weather conveyance conditions?

Due to past litigation, the inherent problem with EPA guidance and many of the State water quality standards to date is that there has been no ability to establish upper bounds in stormwater flow and resultant stream flows for the evaluation of pollutants of concern within any water quality-based NPDES permitting activities. Quite the opposite – NPDES wastewater point-source discharge permits are primarily based on applying water quality standards under extremely low flow dry weather conditions for acute and chronic toxicity periods of exposure; that is, during times where transport of pollutants of concern from ephemeral source areas would not logically occur. Therefore, if the ultimate intent of the Proposed Rule under the various "Waters of the U.S." classifications is to include and manage short-term stormwater flow condition events, then EPA must also logically address the corresponding frequency, duration, and risk factors under such short-term conditions to be applied to pollutant source ephemeral areas and appropriate "Other Waters" areas under the Proposed Rule. It is not sufficient to simply cite cases of technical evidence for "connectivity" involving various physical, chemical, and biological factors without mentioning the underlying causative statistical stormwater flow boundary conditions for each of those cases.

As a related matter, such "connectivity" link to water quality standards will be very important in extending the Proposed Rule to the existing TMDL Program where downstream water quality shows impairment. In addition, the Proposed Rule mentions that certain means of stormwater conveyance may potentially be considered to be "point sources"; whereas such point sources may have been previously considered to represent non-point sources. This would imply that certain previous TMDL determinations, involving both point source waste load allocations and non-point source load allocations, may have to be re-examined and re-issued as a result of the Proposed Rule.

Bottom line: It is suggested that "connectivity" factors need to separately distinguish short-term wet weather impacts from long-term impacts (eg. bio-accumulative impacts) and must describe how established water quality standards are to be addressed in a meaningful, defensible manner at the pollutant source.

5. Available Resources to Manage Program. It is very questionable whether or not State Agencies and EPA Regional Offices will have the necessary resources to manage the subsequent regulatory requirements resulting from the Proposed Rule. As an example,

the Kansas Dept. of Health and Environment (KDHE) has recently estimated that the Proposed Rule would quadruple the number of stream miles required to be regulated. The regulatory work would likely include greatly increased field investigation and sampling efforts, updated UAAs and designated beneficial use declarations, possible re-working of State water quality regulations, public hearings, and other administrative requirements. One must keep in mind that these same State agencies are typically already suffering from budgeting shortfalls and staff attrition due to increased levels of retirements.

Bottom line: It is suggested that economic analyses be re-examined for fundamental resource requirements and that Federal grant funding be considered to help offset the budgetary impacts to the State Agencies.

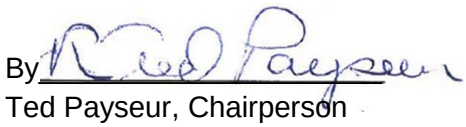
6. Burden-of-Proof Responsibilities for Case-Specific Studies. Somewhat related to the limited resources issue in Item 5 above, USACE economic analyses of the Proposed Rule do not fully address end-user costs due to uncertainties and likely delays in the water quality-related permitting processes. In particular, it is not clear which parties will bear the burden for completing case-specific studies for each "Other Waters" situation. Most private developers, commercial/industrial companies, and county/municipal governmental entities lack the resources and technical skills to perform "Significant Nexus" and water quality type impact studies. Will EPA and/or the State agencies assume this task? The Proposed Rule mentions that case-specific studies may include relatively large "nexus" areas; potentially the size of HUC-10 subwatersheds (equivalent to approximately 62 to 390 square miles in size). Therefore, the study efforts will potentially be a very involved, slow, and costly process. The Proposed Rule Federal Agencies are seeking comments as to how such situations can be more expediently resolved and still maintain a defensible scientific approach.

   Bottom line: There is no easy and inexpensive way to evaluate complex physical, chemical, and biological causative factors and impacts from top to bottom in a watershed. Studies like that usually take multiple years over a wide range of climatic conditions and hundreds of thousands of dollars in funding. Regardless of cost, the delays involved and resultant permitting implications become very worrisome to the end users. This, in turn, can literally halt development projects and compromise preparation of meaningful and acceptable budgets. Such issues are not presently addressed in the economic analyses supporting the Proposed Rule and certainly do not lend themselves well to the intent to provide more program clarity and expediency.

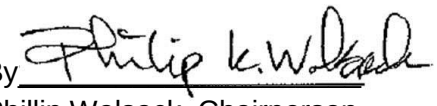
   Therefore, it is incumbent on the Proposed Rule Federal Agencies to clearly define which parties will bear the burden for completing case-specific studies for each "Other Waters" situation and be prepared to re-examine the economics and time requirements involved and the probable actual extent of "Waters of the U.S." determinations that can be practically made within available resources.

Respectfully submitted,

IAWEA GA Committee

By 
Ted Payseur, Chairperson

MWEA GA Committee

By 
Phillip Walsack, Chairperson

KWEA GA Committee

By 
Susan Pekarek, Chairperson

NWEA GA Committee

By 
Gary Brandt, Chairperson

Attachment 2

Clearinghouse Status 10-28-2014

Data for 2013 have been added to the clearinghouse. Data were added for 21 NRDs and the NDEQ and LLCHD. LLCHD submitted data for the first time to the clearinghouse.

The clearinghouse has approximately 465,300 results representing about 25,900 wells. Nitrate analyses account for about 111,000 of the total results. The remainder is pesticides. Approximately 8,600 results were added to the clearinghouse this year.

The clearinghouse has 240 analytes.

We will be working on ELISA data for 2010-2013 to add to the ELISA data link which is now accessible from the Quality-Assessed website.

Attachment 3

NEBRAKSA WATERSHED NETWORK

Lil' Miss Atrazine

FALL 2014 | VOLUME 2 ISSUE 3

This issue of the Nebraska Watershed Network newsletter is dedicated to the Lil' Miss Atrazine project. On June 7th, 2014, the Network launched this event which featured crowd sourcing as the primary mechanism to conduct large-scale water quality testing along the Mississippi River. Respondents sampled water from Lake Itasca, MN to New Orleans, LA all within a 24 hour period. The testing focused on atrazine, the second most commonly applied herbicide in the United States, and the assessment tool consisted of an easy-to-use indicator strip. Atrazine strips are relatively inexpensive yet extremely sensitive, discriminating between the presence or absence of the herbicide at the EPA's drinking water standard of three parts per billion (ppb).

The project, headed by a Nebraska Watershed Network Intern Roni McClellen, used UNO students as "co-captains" to contact and develop partnerships with various universities and organizations throughout the watershed. By the end of the day, 211 useable data points were compiled from 7 states throughout the Mississippi River Watershed (Figure 1). The data collected came primarily from the state of Illinois (Figure 2). While the results were generally (80%) negative, areas of positive hits were clustered in certain geographical areas, such as nearby St. Louis, Missouri.

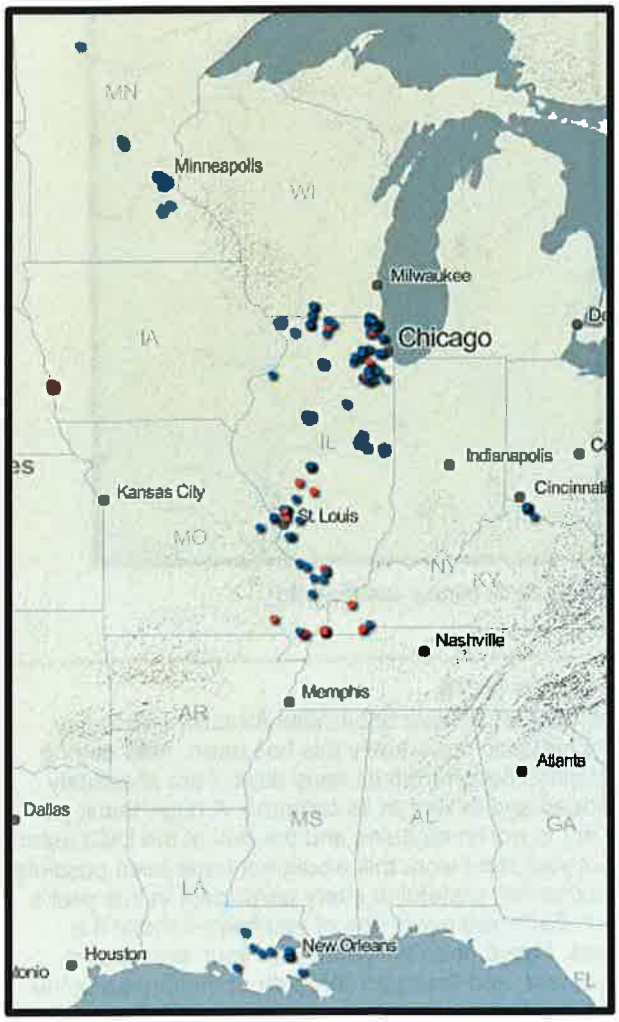


Figure 1. Atrazine results from Lil' Miss Atrazine. Negative responses are in blue, positive in red.

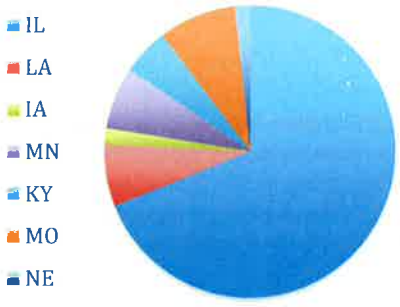


Figure 2. States participating in Lil' Miss Atrazine.
(IL= Illinois; LA= Louisiana; IA = Iowa; MN= Minnesota' KY= Kentucky; MO= Missouri, NE = Nebraska).

A special connection was made between the Network and the Illinois Lake and Stream Monitoring Programs. Almost 70% of the samples collected came from Illinois (Figure 3). Lil' Miss Atrazine sends a big thank you to the state of Illinois and the Illinois Lake Monitoring Program for their outstanding level of participation! They have set a very high bar for the rest of the Mississippi watershed states!

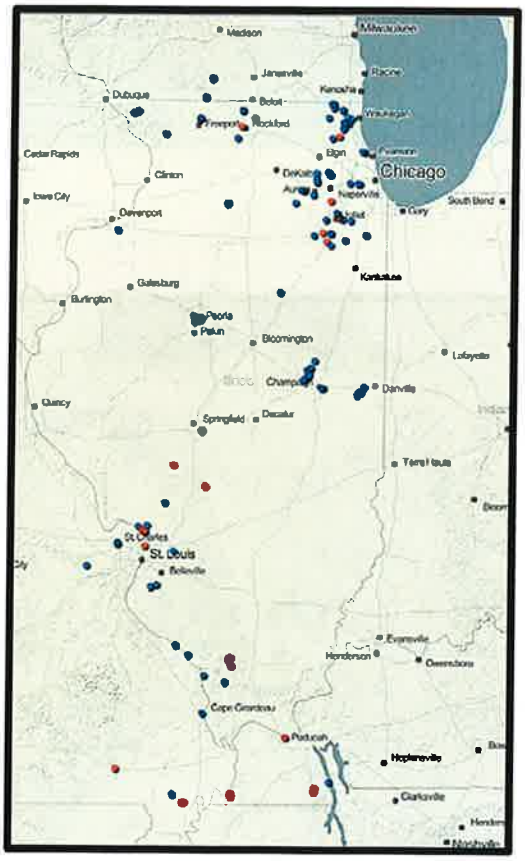


Figure 3. Illinois test results

Director's Note

As the student director of Lil' Miss Atrazine I must say what a fantastic opportunity this has been. After seeing this project flourish from its early days, I am absolutely astounded and thrilled at its outcome. A huge thank you goes out to my co-captains and the rest of the LMA team; without your hard work this would not have been possible. I am extremely grateful to every participant in this year's project. Each and every one of you helped make it a success. I have been delighted with your enthusiasm, involvement, and feedback throughout the course of the project. My hope is that you enjoyed the project as much as I have and that we will see you around next year. Thank you!

~Roni McClellen, Lil' Miss Atrazine Student Director

Social + Science: Enacting Citizen Science through Social Media

Dr. Matt Germonprez, College of Information Science & Technology, UNO

Social media: the technologies that allow people to share and communicate in personal settings. Science: the systematic exploration of the physical, natural, and social worlds. Together, the crossroads of social media and science can extend inquiry and learning beyond the walls of any single classroom or laboratory. On one hand is the ubiquity of social media in the public domain. Platforms such as Facebook, Instagram, Flickr, and Twitter have altered the ways we present ourselves, follow people, and engage in everyday conversations. On the other hand are the scientific methods by which educators advance inquiry and learning. But recently, these methods have grown from traditional experimental settings to now include how we can work with everyday citizens through projects as Cornell University's eBird (ebird.org) and the University of Kansas' Monarch Watch (monarchwatch.org).

At the University of Nebraska Omaha, we explored how to enact a citizen science project vis-à-vis the use of everyday social media tools in the advancement of scientific inquiry and learning. We explored techniques used to engage everyday people through social media to collect, 'mash-up,' and analyze data in efforts to create new learning experiences and public conversations about science, specifically regarding Atrazine levels found within the Mississippi River watershed. In doing so, we explore the crossroads of social and science, to foster both a compelling research agenda and a nascent conversation on how social media and scientific inquiry can be considered collectively in the pairing of social + science.

The incorporation of social + science in the Lil' Miss Atrazine project has proven to be a great success. The June 7th citizen science project to understand Atrazine levels in the Mississippi River watershed leveraged three different social media tools: Facebook, Twitter, and Instagram. Facebook served as the primary project site, capturing the social experiences of the members of the project. Twitter and Instagram served as platforms for citizen scientists to tweet or post their Atrazine results from across the Mississippi River watershed. With the help of the Attic in UNO's College of IS&T (attic.ist.unomaha.edu), and using a project-specific message format (#lmatz yes/no), we captured raw data about Atrazine levels through over 100 tweets, Instagram posts, texts, and emails from citizen scientists across 7 states.

Future Plans

The Nebraska Watershed Network hopes to expand the project in 2015 to include more participants and test sites. Anyone interested in participating in 2015 or in finding out more about the NWN or Lil' Miss Atrazine can contact us at unonwn@unomaha.edu, find us on Facebook, or follow us on Twitter.

University of Nebraska Omaha

COLLEGE OF ARTS & SCIENCES
DEPARTMENT OF BIOLOGY

Chris Madden, B.S.
Post-Baccalaureate Fellow
Nebraska Watershed Network

CEC 117.12
6001 Dodge Street
Omaha, NE 68182

PH : 402-554-2236
Cell: 402-881-6919
cmadden@unomaha.edu