Nebraska Ground Water Monitoring Advisory Committee (NGWMAC) & Nebraska Surface Water Monitoring Council (NSWMC)

Annual Joint Meeting

Tuesday, October 15, 2019, 10:00 AM-12:00 PM

USGS Nebraska Water Science Center, 5231 South 19th St, Lincoln, NE

Notes

1. Welcome and introductions
    a. On the phone: Crystal Powers (Nebraska Water Center), Shuhai Zheng (NDNR), Brian Bruckner (LENRD)
    b. In the room: USGS (Ginny McGuire, Matt Moser, Dave Rus, Brenda Densmore, Nathan Schaepe, Amanda Flynn, Steve Peterson), NDEE (Ryan Chapman, Dan Inman, Marty Link, Tatiana Davila, Dave Miesbach, Dave Bubb, Mike Archer, Laura Johnson, Carla McCullough), NARD (Jennifer Swanson, Dustin Wilcox), Olsson's (Karen Griffin), NGPC (Tony Barada, Rick Holland), LPNNRD (Tom Mountford, Daryl Andersen), NEHHS (Elizabeth Esseks), JEO (Rick Wilson), LLNRD (Jason Moudry), LLCHD (Chris Schroeder and Michael Gude), LPSNRD (Dick Ehrman), NDA (Craig Romary), CSD (Colleen Steele)
2. Agency updates:
    a. USACE: Doing field work today; 2018 Summary Reports should be available in a month or so; Physical/Chemical sampling data through 2016 have been posted to the Water Quality Portal, with zoo/phytoplankton and all 2017 data coming this winter; Turning out to be another record year of flow on the Missouri.
    b. USGS:
        i. 2018 sampling: Wrapping up approval on the ~61,200 values from ~360 samples from 2018 (Note that ~21,000 of those values are undiscoverable on our public website per requests from NDNR and DHHS about municipal wells); ~27,000 values back so far for 2019 samples.
        ii. Minimal surface water sampling during the spring flooding due to the ice hazards. Some of our long term groundwater sampling sites were inundated.
        iii. The USGS National Water Quality Assessment is sunsetting in Sept 2021 and will transition to support new national science priorities, like integrated water availability assessments. Monitoring will continue past 2021, but the scope of that monitoring will likely change.
        iv. Surface water monitoring: Missouri River at 4 sites near Omaha on a monthly basis; NAWQA sites (Maple, Waterloo, Louisville, Thedford); Platte at Ashland sampling; South Loup tracers; South Loup E. coli; Omaha stormwater quality; High Water Mark information is available online for the spring flood at https://stn.wim.usgs.gov/fev/#CentralUSSpring2019;
        v. Continuous water quality (Salt Cr; 3 sites on lower Platte; Multiple Missouri River sites near Omaha; Elkhorn R at Waterloo, Camp Ashland

chutes, South Loup sites near Arnold; 2 Sites on the Niobrara coming in 2020; Spring flood data collected on the Missouri River and at 1 chute, but not the other sites);

vi. GW: Papio NRD: Pharmaceutical and Hormone sampling at selected wells, a few hits, followup sampling, Sampled wells focused on inundated wells; ENWRA age-dating report coming out this winter for review; Lincoln Water System: 2 wells lost (sampling substitute wells during interim b4 replacement), sampling continues, data available upon request; Wrapped up statewide sampling of alluvial supply wells;

c. Ag Chem Clearinghouse: 502,000 data in there now (See attached status report); NDA ELISA data coming; Addressing outstanding 2018 issues now; No new news on the transition to a new database (prob. at least a year out);

d. NGPC
   i. Fish mgmt: Chemical renovation at Cunningham; Helped w/ dewatering event at Harlan County (fish salvage, carp removal); Aquatic Invasive Species (6 crews doing sampling for zebra mussel veligers); Fall gill net surveys are in progress;
   ii. Research: Angler survey results being compiled; Urban program emphasizing urban fisheries; Asian carp research;
   iii. Rivers and Streams program: 3 new hires; Scope will be in the inland rivers and streams of the state; Invasive species, conservation, rare species; Cool water streams program to improve habitat;

e. LLNRD:
   i. Weekly sampling for basin rotation work; Sampled with 2 people all year because of high water safety
   ii. Ravenna Lake project: Chlorophyll sampling and profiling;
   iii. Pesticide analysis at their monitoring wells;
   iv. Floodwater community (12+) support: Floodproofing supply infrastructure; Flooded basements; Bacteria screens with a non-regulatory disclaimer; Public health issues;

f. NDHHS:
   i. Flood: Prob. not a good sense of the scope of impacted private wells; Number of wells needing testing outpaced analytical capacity (primarily because of hold times) ; Winslow lost their well and lots of infrastructure; Would be good to talk about what worked well and what didn't related to the spring flood;
      1. 3 NRD's (LPSNRD, LPNNRD, +1) worked out a deal with Midwest Labs where homeowners could send a samples and the NRD would pay for the analysis. 800 samples; Results were mostly positive/negative;
   ii. EPA released new lead/copper guidelines last week (might be final but might be in public comment phase); Action levels rather than MCL's. More info to come; Sampling is from the tap, not the well, Data are

probably publicly available without location info. Vulnerability is tied primarily to older homes

iii. Manganese: No new reg numbers, but 300 ug/L is the infant threshold that is getting more attention and is affecting many communities;

g. NDEE

i. Microcystin

1. Public Water Sources (SW or GW under the influence) were sampled. A couple detects, but not actionable; Waterloo and Auburn both had detectable MC in the rivers
2. Beaches: Moving to 8 ug/L for recreational alert levels; 31 lakes in the last 10 years have been above 8; Expects that the usual suspect lakes will continue to be alerted, but with more frequency; Lake owners/managers may need to decide whether swimming beaches should continue; New alert policy will be just 1 week instead of 2 consecutive under threshold samples

ii. GW:

1. Working on the clearinghouse transition with Dana; Plan to have an update at the March NARD meeting; Working to aggregate more of the data but to add a public access filter;
2. Water Well Standards is looking for a well inspector in the next week or so; Based out of North Platte;
3. Wellhead protection coordinator is now Tatiana
4. Pesticides expanding to include other pesticides using immunoassays;
5. Farm Bill mandate for 10% of funds going to source-water protection: Impacts EQIP; Submitted an application to NRCS that prioritizes Wellhead protection areas in the state; GIS-based tool to identify where those are when applications to conservation funds are made; It impacts ranking of those applications

iii. SW:

1. Integrated report: Data are being compiled at present; New position to fill roles coming soon
2. NRSA sampling is being completed, but high water has delayed its completion;
3. Moving to the Niobrara for basin rotation
4. State is looking to assume responsibility of the 404 program from USACE (see attached handout); Probably a lengthy process with stakeholder input needed; Trying to speed up the turnaround time for 404 permit review; Funding to manage this program will not go to the state (~10 USACE staff currently administer the program)
5. Title 117 was approved in July; New standards coordinator, Tara; Some changes to levels, but not to parameters that are commonly sampled

h. LENRD:
    i. Handed out sample kits (~100) that went to the GI health lab during the flood; Many had positive hits for bacteria;
    ii. Concern about the impact of the 8 ppb Microcystin on recreational opportunities (especially at Willow Creek); Struggling with how to remedy HABs at the lake
    iii. GW: Bazile partnership; Routine sampling continue; 3 wells were inundated; Targeting Dodge, Cuming, and another county for identifying another potential management area; Pierce County phase 3 management area (incentives and regulations being ramped up), 800 sample kits given out; Winslow is getting water from Logan East RWD and are planning to move the town a mile away from the river.
    iv. Manganese: Lyons is looking for assistance/expertise on dealing with it;
i. Nebraska Water Center
    i. Vadose Zone website, http://nebraskavadose.unl.edu/ continues to add locations (Bazile and others in NE Nebraska recently added; Over 300 sites now); If you have data to add to the database, contact Dan Snow
    ii. 2 Citizen Science projects:
        1. Know your well program (FFA and science clubs; a group picks 20 wells and samples them; 20 schools so far with 5 more coming; https://knowyourwell.unl.edu/ , results aren't public);
        2. Water Quality Citizen Science (Civil Eng, Mostly in Eastern Nebraska; Dip strips for nitrate, phosphate; GW wells as well as SW; Public engagement component; Results are attached)
    iii. Getting a quadruple mass spec that will have more analytical capacity; Probably an open house this winter
    iv. Thanks to those that came to the Nebraska Water Conference in Norfolk last week; Presentations will be posted soon;
    v. Hoping to work with the statewide stakeholder group that NDEE put together to develop a state action plan for nitrate
j. NDNR
    i. Flood: Highest runoff on record for Loup and Platte; Worked with NEMA and FEMA; NEMA working on long term recovery program; FEMA public assistance grants to repair/upgrade stream gages;
    ii. Because of high water across the state, didn't have to restrict much water this year
k. Olsson's
    i. Thanks for the data that we all collect; They use it!
    ii. Update to the GW Mgmt plan for CPNRD
l. JEO
    i. Local community support has been helped by the monitoring data; Busy dealing with flood recovery projects
    ii. Upper Big Blue Watershed plan just completed;
m. Nebraska Department of Ag

i. Any assistance in spreading the word about funding for the Nebraska Buffer Strip Program is much appreciated! NDA had some media posts on FB and Twitter in the last month, which can be shared, and any of the images or files at http://bit.ly/NDAbuffer might be helpful as well. Pictures of a buffer in action are found at http://bit.ly/bufferswork.
ii. Lastly, our newsletter to applicators can be found at http://bit.ly/NDAPPnews2. It's intended for private and commercial applicators, and there are often water quality related articles. Archives are found here as well as the link to subscribe. I'm always open to suggestions for info.

3. Monitoring council(s)
   a. EPA just released new aquatic life benchmarks for registered pesticides (4 new & 36 updated)
   b. Flood followup; How did agencies inform the public?
      i. UNL website was very useful for 'what do I do?' questions
      ii. NDEE website had info about how to document damages that related to FEMA/NEMA
      iii. NDEE Started a FB/Twitter page post flood
      iv. Press releases
      v. Work directly with local health departments
      vi. NDEE and NDHHS had 6-8 weeks of a phone line staffed by 3 people to help answer questions about the flood impacts
      vii. Waste staff at NDEE prioritized meeting with local communities
         1. Created a field book with QR codes related to specific info
      viii. Surface water quality 'assessment' was more subjective than quantitative; Requests for historical data to put the flood into context
   c. Recent paper by Jon Atkinson was dedicated to the memory of Michael Swiggart and John Lund.
   d. Some related organizations:
      i. Nebraska One Health, http://nebraskaonehealth.unl.edu/index.asp
      ii. National Water Quality Monitoring Council
         1. 2019 Conference proceedings online
4. Presentation: **Lab Certification for Drinking Water Testing**, Mary Boden
   a. Slides available at http://deq.ne.gov/GroundW.nsf/pages/GWSWMC
   b. Presentation was also recorded as a shockwave flash file, which is available upon request from Dave Rus (dlrus@usgs.gov).

Minutes drafted by Dave Rus

Attachments:

(1) Upcoming meetings and recent Nebraska-related water-quality publications
(2) Status of Quality-Assessed Agrichemical Contaminant Database
(3) Handout describing LB302 and the proposal for NDEE to administer the 404 program
(4) Summary of UNL coordinated Citizen Science Monitoring, spring 2019

Some meetings of possible interest:

October 9-10, 2019: UNL Nebraska Water Conference, Norfolk, Building a clean water future in northeast Nebraska
October 16, 2019; Missouri River Ecosystem Coordination Group, DeSoto NWR, 9:30-3PM
November 7-8, 2019; Joint meeting of the NWEA, APWA, and AWWA, Kearney, NE
November 24-26, 2019: NeWRA & NSIA Joint Convention, Kearney

Some recent Nebraska-related publications of possible interest:

Akbariyeh and others, 2019, Prediction of nitrate accumulation and leaching beneath groundwater irrigated corn fields in the Upper Platte basin under a future climate scenario: Science of the Total Environment 685 (2019) 514–526, https://doi.org/10.1016/j.scitotenv.2019.05.417

Atkinson, Jon C., 2019, Interpretation of storage and retrieval major-ion chemistry, with emphasis on significant sulfate and sodium concentrations in the White River watershed, northwestern Nebraska, United States: Environmental Geosciences, v. 26, no. 2 (June 2019), pp. 51–71, https://doi.org/10.1306/eg.01091918007

M.L. Erickson, R.M. Yager, L.J. Kauffman, J.T. Wilson, 2019, Drinking water quality in the glacial aquifer system, northern USA: Science of The Total Environment, v. 694, https://doi.org/10.1016/j.scitotenv.2019.133735

Samuel P. Hansen, Tiffany L. Messer, Aaron R. Mittelstet, 2019, Mitigating the risk of atrazine exposure: Identifying hot spots and hot times in surface waters across Nebraska, USA: Journal of Environmental Management, vol. 250, https://doi.org/10.1016/j.jenvman.2019.109424

Juntakut, P., Daniel D. Snow, Erin M.K. Haacker, Chittaranjan Ray, 2019, The long term effect of agricultural, vadose zone and climatic factors on nitrate contamination in Nebraska's groundwater system: Journal of Contaminant Hydrology, Volume 220, p. 33-48, https://doi.org/10.1016/j.jconhyd.2018.11.007.

Kaemingk, M. A., C. J. Chizinski, C. R. Allen, and K. L. Pope. 2019. Ecosystem size predicts social-ecological dynamics. Ecology and Society 24(2):17. https://doi.org/10.5751/ES-10961-240217

Manish Kumar, Daniel D. Snow, Yusong Li, Patrick J. Shea, 2019, Perchlorate behavior in the context of black carbon and metal cogeneration following fireworks emission at Oak Lake, Lincoln, Nebraska, USA: Environmental Pollution, vol. 253, p. 930-938, https://doi.org/10.1016/j.envpol.2019.07.038

Masoner and others, 2019, Urban Stormwater: An Overlooked Pathway of Extensive Mixed Contaminants to Surface and Groundwaters in the United States: Environ. Sci. Technol., vol. 53, 10070-10081, https://doi.org/10.1021/acs.est.9b02867

Pierce and others, 2019, Emigration of hatchery-reared Pallid Sturgeon, Scaphirhynchus albus (Forbes and Richardson), through a Missouri River dam: Fish Manag Ecol. 2019;26:295–305, https://doi.org/10.1111/fme.12349

Schaepe, N.J., and Boyd, P.M., 2019, Sediment Monitoring to Support Modeling a Reservoir Sediment Flush on a Sand-bed River in Northern Nebraska: Proceedings of the 2019 Federal Interagency Sedimentation and Hydrologic Modeling Conference, 14 p.

Schepker, Travis J., Elisabeth B. Webb, Donald Tillitt, Ted LaGrange, 2020, Neonicotinoid insecticide concentrations in agricultural wetlands and associations with aquatic invertebrate communities: Agriculture, Ecosystems & Environment, Volume 287, https://doi.org/10.1016/j.agee.2019.106678.

Sixt, G.N.; Klerkx, L.; Aiken, J.D. and Griffin, T.S. 2019, Nebraska's Natural Resource District system: Collaborative approaches to adaptive groundwater quality governance: Water Alternatives 12(2): 676-698

Wesner, J.S., Swanson, D.L., Dixon, M.D. et al. (2019). Loss of Potential Aquatic-Terrestrial Subsidies Along the Missouri River Floodplain: Ecosystems, https://doi.org/10.1007/s10021-019-00391-9

Quality-Assessed Agrichemical Contaminant Database for Nebraska Ground Water

Status 10-15-2019

Data for 2018 from 22 NRDs and 2017 data from 1 NRD were added to the Quality-Assessed clearinghouse in September. We have over 502,000 analytical results representing about 29,000 wells. Approximately 134,000 of these results are nitrate results.

Approximately 1,900 pesticide results were added in September.

The clearinghouse web site will be updated by December with the newly added Quality-Assessed data. This update will also include non-quality inspected data for 2018 from the Nebraska Department of Agriculture for the ELISA (Enzyme-linked immunosorbent assay) data link, which is accessible from the Quality-Assessed web site. The website address is
https://clearinghouse.nebraska.gov/Clearinghouse.aspx

We are addressing outstanding issues from the 2018 processing with collaborating agencies and will be collecting data for 2019, as issues are resolved.

LB 302 (2019)
New Sections in Statute pertaining to the CWA Section 404

These three statute sections were part of LB302 which also merged NDEQ with the Nebraska Energy Office.

81-1504 ...

(34) To exercise such powers and duties as may be delegated by the federal government to administer an individual and general permit program for the discharge of dredged or fill material consistent with section 404 of the Clean Water Act, as amended, 33 U.S.C. 1344;

81-1505 ...

(23) The council may adopt and promulgate rules and regulations for the issuance of permits relating to the discharge of dredged or fill material into the waters of the United States under section 404 of the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., giving consideration to

(a) when such permits are required and exemptions, application, and filing requirements,
(b) terms and conditions affecting such permits, notice and public participation, and duration,
(c) review of such permits,
(d) monitoring, recording, and reporting requirements, and
(e) such other requirements not inconsistent with the Clean Water Act, as amended, 33 U.S.C. 1251 et seq.

81-1506 ...

(2)(f) Discharge any dredged or fill material into waters of the United States without obtaining a permit as required by section 404 of the Clean Water Act, as amended, 33 U.S.C. 1344, and by rules and regulations adopted and promulgated pursuant to section 81-1505.

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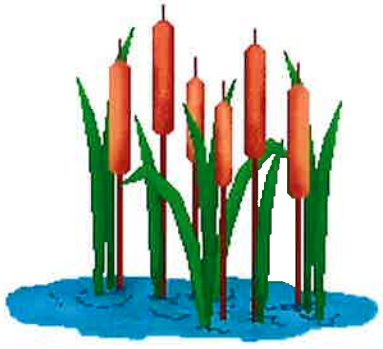


Elements of a 404 Program Submission (§233.10), which would be presented to the US EPA

A. A letter from the Governor requesting program approval.
B. A complete program description (§233.11).
    a. Description of scope and structure of state program, including jurisdiction extent, anticipated coordination, permit exemptions (if any), and permit review criteria.
    b. Permitting, administrative, judicial review procedures.
    c. State agency organization.
    d. Funding and staffing description.
    e. Estimated workload.
    f. Permit application forms, permit template, reporting forms.
    g. Description of compliance evaluation and enforcement and coordination with Corps and EPA.
    h. Description of waters in state jurisdiction and those remaining in Corps jurisdiction.
    i. Best management practices for exemption provisions in 404(f)(1)(E) for construction/maintenance of farm roads, forest roads, temporary roads for moving mining equipment.
C. Attorney General's Statement (§233.12).
    a. Laws and regulations provide proper/adequate authority.
    b. Tribal lands covered with authority over such land or acknowledgement that tribal land is not a state assumption option.
    c. Legal analysis of prohibition of taking private property without just compensation.
    d. Multiple agency responsibilities and authorities.
D. MOA with EPA Regional Administrator (§233.13).
    a. Identification of classes and categories of permit applications which EPA will waive federal review.
    b. Frequency and content of reports/files to be submitted to EPA.
    c. Roles and coordination for compliance monitoring and enforcement.
E. MOA with Secretary of the Army (§233.14).
    a. Description of waters the Corps maintains jurisdiction over.
    b. Procedures to transfer pending 404 permit applications upon program approval.
    c. Existing Corps general permits and how the state plans on administering them.
F. Copies of all applicable state statutes and regulations, including those governing applicable state administrative procedures.

Stakeholder Input CRITICAL!

Summary of Citizen Science Water Monitoring Campaign, Spring 2019

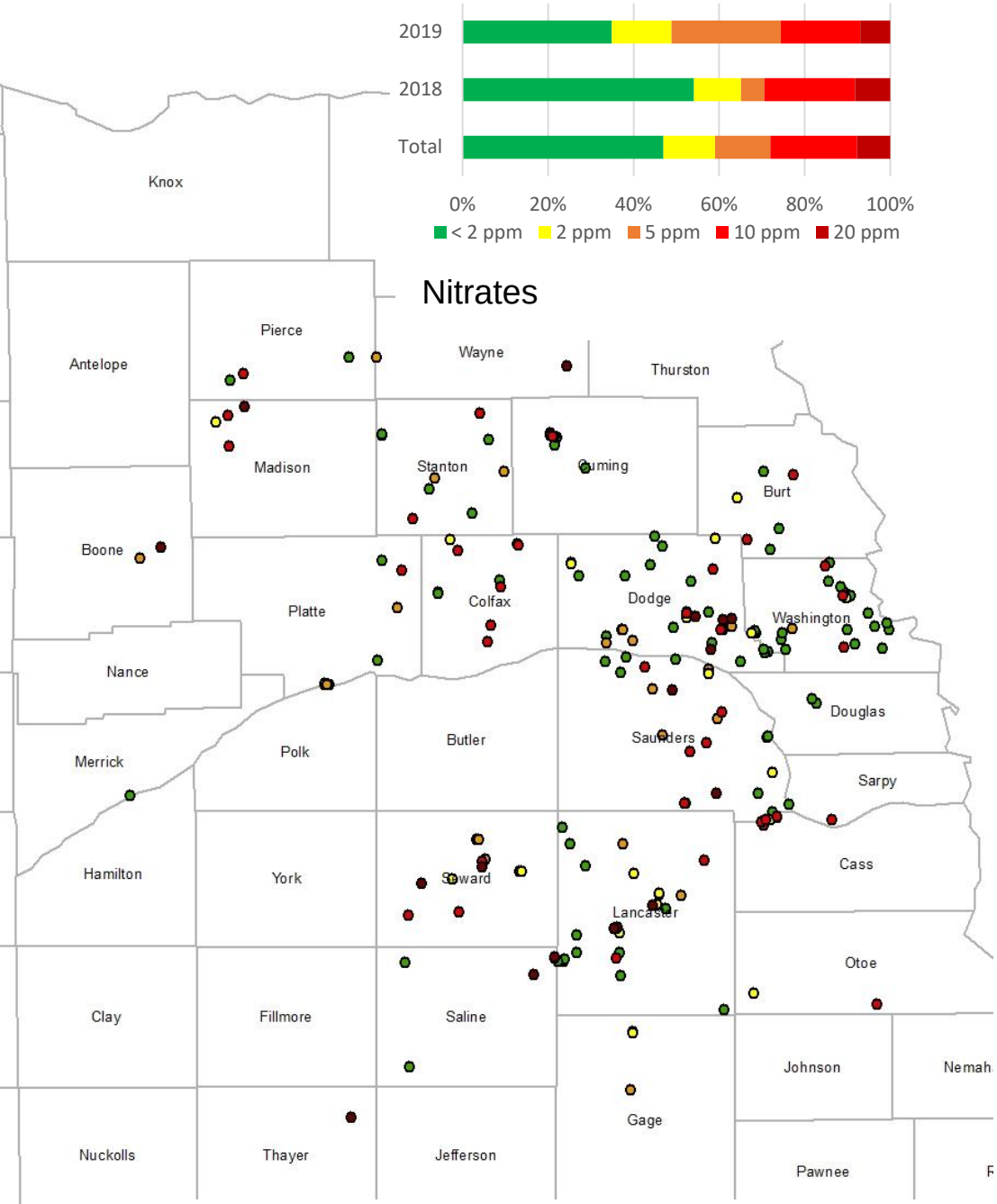


Figure 1. Measured nitrate concentrations in well water with the frequency of detection of measured concentrations for the current year (2019), last year (2018), and the running total for the project.

Thank you for your participation. The scale of this project would not be possible without citizen scientists like you.

How was water quality measured?
Test results were gathered using rapid test strips, described in the following link: https://go.unl.edu/wqcs. These tools detect nutrients at the level of parts-per-million (ppm), which is a unit of measure for dissolved chemicals. To put this in perspective, detecting *1 ppm of nitrate in 1 liter of water* is like detecting *1 grain of table salt within 1/3 cup of granulated sugar.* While this scale of measure is small, changes in nitrates and phosphates at this scale can have serious impacts on water quality.

Groundwater Quality in Eastern Nebraska

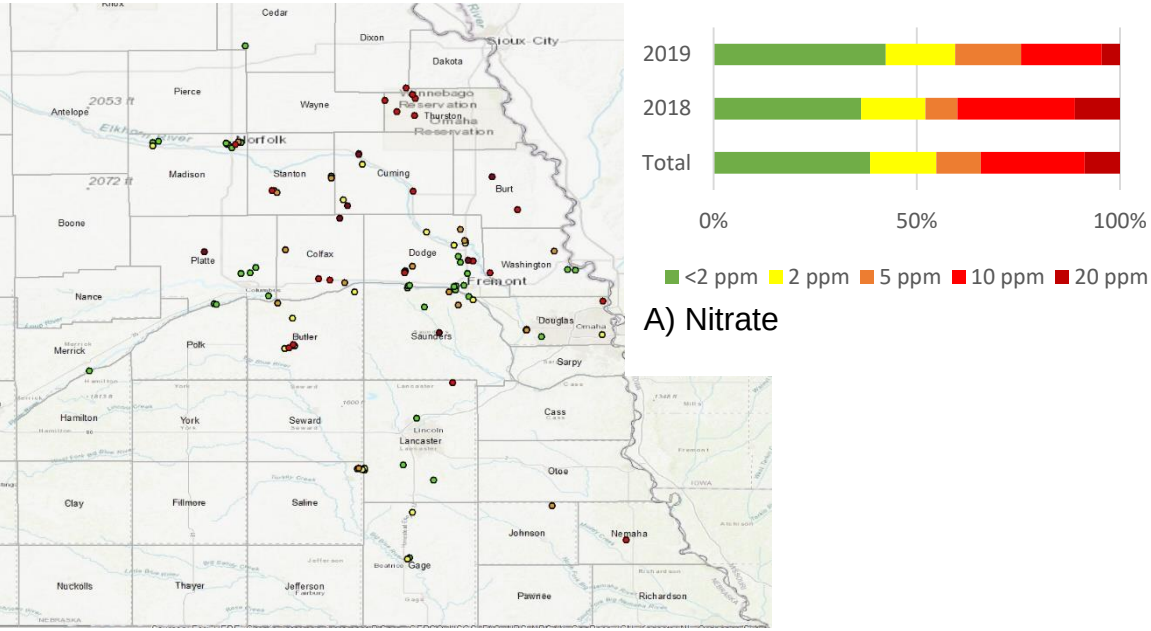
Groundwater quality is of great concern in rural communities as many residents rely on private wells as a source of drinking water. To date, volunteers have collected 283 well water samples across 24 counties in Nebraska.

Nitrate (NO3) Results
The presence of nitrate in well water is indicative of surrounding groundwater contamination and is a potential public health hazard in the absence of proper filtration equipment for drinking water. Well water samples as high as 20 ppm nitrate were reported in 9 counties; Thayer, Boone, Wayne, Madison, Dodge, Lancaster, Seward, Saline, and Saunders. In 2018, 29.5% of wells tested above the U.S. EPA safe drinking water limit of 10 ppm. In the spring of 2019, 25.6% of wells tested at or above this limit.

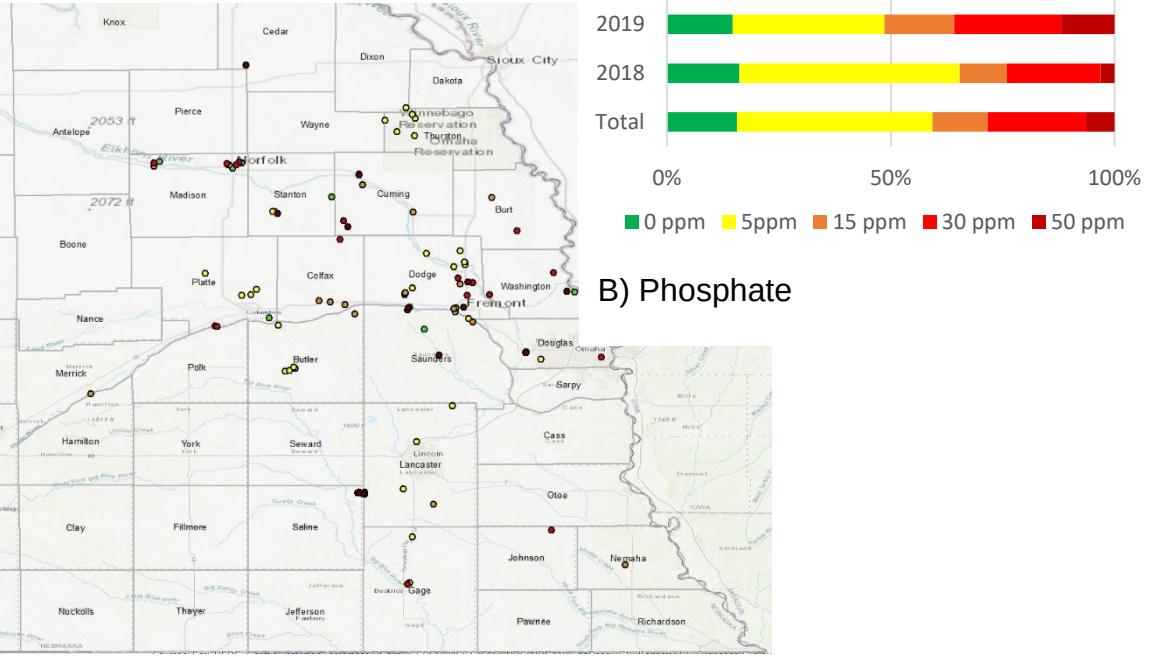
Nitrite (NO2) Results
Nitrite is produced from nitrate and has similar health and environmental impacts as nitrate. However, nitrite is less persistent than nitrate and therefore occurs at lower concentrations. Only 1 sample exceeded the U.S. EPA safe drinking water limit of 1 ppm nitrite during this study.

Phosphate (PO4) Results
Excess phosphate in well or surface water does not directly impair drinking water quality. During the spring 2019 testing session, phosphate was measured as high as 50 ppm in well water samples.

Summary of Citizen Science Water Monitoring Campaign, Spring 2019



A) Nitrate



B) Phosphate

Figure 2. Measured nitrate (A) and phosphate (B) concentrations in surface water during spring 2019 with frequency of detection of measured concentrations for the current year (2019), last year (2018), and the running total for the project.

Surface Water Quality in Eastern Nebraska

In communities surrounded by agriculture, there is potential for contamination of water resources by manure and fertilizer application. Nitrates and phosphates are nutrients needed to improve plant growth, but excesses of these nutrients cause adverse impacts on water resources. This was of especial concern this year in light of the catastrophic flooding experienced throughout the state.

Nitrate (NO3) Results

In surface water, such as streams, lakes, and rivers, the presence of excess nitrate leads to eutrophication which is the overproduction of algae that can be harmful to aquatic organisms. Nitrate tends to be mobile in aquatic systems, moving through both surface and groundwater. In 2018, 40% of surface water samples tested at or above 10 ppm. The flooding we experienced appeared to dilute the nitrate in surface water with 24.3% of spring 2019 samples testing at or above this level.

Nitrite (NO2) Results

Nitrite was only detected in 17.7% of samples at a maximum concentration of 1.5 ppm during this testing session.

Phosphate (PO4) Results

Excess phosphate in surface water leads to eutrophication and the overproduction of harmful algae. In the environment, phosphate is less mobile than nitrate and tends to be associated with soil and sediment. In 2018, phosphate was measure at or above 15 ppm in 34.6% of surface water samples. The frequency of phosphate detection increased in the spring of 2019 with 51.4% measuring at or above this level. This is likely due to the increased erosion caused by flooding.

For Additional Questions or Information:
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