# Nitrates and Your Water System

## Welcome and Overview—Cindy Kreifels, Executive Vice President of The Groundwater Foundation

- Wellhead protection Network—brings together agencies and organizations in Nebraska that works to support communities as they develop and adopt wellhead protection programs.
    - Know what one another are doing. Learn from one another
    - Share resources, ideas and collaborate
    - Quarterly meetings
    - GWF facilitates meetings
    - Talk about what they are doing in relation to wellhead protection
    - Everyone invited to attend these meetings.
- Groundwater Foundation—around for almost 30 years. Educate the public about groundwater.
    - Growing Groundwater Awareness in Nebraska program—educating communities about groundwater. Groundwater Foundation program—if you are interested contact the Groundwater Foundation to get involved.
- Nitrates:
    - What are nitrates—when microorganisms break down
        - Plants use nitrates for nutrients…more than the plants can use it can leak into groundwater and cause problems. Where does it come from?—Confined Animal Operations, fertilizers, etc.
        - MCL-10 ppm maximum—Over half the communities in NE are past 5 ppm…on the way to being over the maximum
        - Why do we care? –we need to make plans to address this rise.
            - Health risks—Blue Baby syndrome (can cause death in infants)
                - Other possible health issues
            - Economic issues—clean up cost more than prevention

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## The Costs of Nitrates—Steve McNulty—Engineering Services—Nebraska Department of Health and Human Services

- EPA showing that there is a problem with nitrate levels in Nebraska
- Department of Health is looking at this problem.
    - Since 2001-2012—systems and number of points of entry where nitrates have risen above 5 ppm
        - Below that level, wells tested on an annual basis. Above 5 ppm, looking at the levels on a quarterly basis
    - Drinking Water State Revolving Fund (DWSRF)
        - Nitrates are Nebraska's number 1 ranking criteria
        - Annual needs survey—Deadline Dec. 31st
            - Helps determine who is developing a problem
        - Current Fiscal Year Nitrate Systems—48

        - Project with just under $79 million in needs
- The amount of money that has been spent on Nitrates in the last decade

| | |
|---|---|
| $ Spent SFY 2002-2012 on Nitrate Projects | $26,148,021 |
| SFY 2012 needs Survey involving Nitrates | $61,572,284 |
| Subtotal | $87,720,305—75.8% |
| SFY 2002-2012 Total DWSRF/ARRA $ | $115,675,626 |

- What does this mean to you?
    - Probably not much
        - You will have a specific nitrate problem with a unique solution
            - Some communities are more fortunate than others
    - To address nitrate problem
        - Hire an engineer
        - Develop a plan
        - Finance the plan
        - Construct the project
            - A lot of money that most communities do not have on hand
- Project financing today
    - DWSRF
    - 20 to 30 year loans at 3% rate
    - 20% to 35% forgiveness for nitrate projects
    - CDBG--$250,000 grants with 25% local match
    - USDA rural development
        - 40 year loans—2.75-4.625% Rates
        - Grants range up to 75% of project amount (likely 45% or less)
    - Private market
        - Estimated 2.6% to 4.4% for 10 to 30 year terms
- Project financing tomorrow
    - If you are thinking about doing a project later, there is going to be less funding
        - DWSRF
            - 15%-60% Federal Program cuts
    - USDA Rural Development
        - Rumored similar cuts
    - CDBG
        - Largest cuts of the 3 government programs
- Private market?
    - There were some favorable rates, but the federal reserve hinted at changing and the rates jumped

Recommendations

- First: are you above the nitrate NCL and do you have a sustainable project?
    - You should do it **now** if the answers to these are yes
    - Every year that we move out, government programs are going to be cut and interest rates will also go up

    - Financing will never be markedly better
- If you are not above the MCL then **prevention** is the key. It is a huge financial burden to fix these problems.

Comparison to San Juan Chama Drinking water project:

- Not a nitrate but an aquifer project
    - In New Mexico—Huge undertaking to move water from the Colorado river basin to the Rio Grande River basin
- Huge drop in the aquifer below their community
- $500,000,000 cost and only $1/10^{th}$ of the anticipated recharge

San Juan Chama Lessons for Today

- Aquifer changes take time, so nitrate changes also take time!
- Today's workshop can help you!
    - Use it to plan
    - Use it to avoid me
- If you are working with me on nitrates…
    - Expect $50 a month water rates
    - Call Steven McNulty; 402-471-1006; steve.mcnulty@nebraska.gov

**Questions from this session:**

What's a worst case scenario for water rates? $60 a month (funded projects that brought water rates up to this level twice already)

What is the lowest interest rate that can be offered to a community?

- Limited by statute at 2%...also bond covenants—setting the floor at 3%

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**Identifying Sources of Groundwater Nitrates with Isotopes—Daniel D Snow—Nebraska Water Center and Daugherty Water for Food Institute, University of Nebraska**

- Nitrates in US groundwater
    - Risk of high nitrate in groundwater depends on nitrogen sources, transport (vulnerability) and attenuation potential
    - Is there anything in nitrate that can trace it to its source?
- Significance of sources--Multiple sources and complex transformation pathways of nitrogen in agroecosystems
- Stable isotope "fingerprint"
    - Does the isotope composition nitrate in groundwater reflect the nitrogen source and/or transport history?
- Many elements have more than one isotope
- Isotopes in water
    - Hydrogen (3 isotopes)
- Isotope composition changes
    - Even in water
    - Variation to help figure out where water came from
- Variation in multiple elements (oxygen…varies)
- Varies because of fractionation

    - Partitioning of isotopes between two substances or phases results in predictable isotopic composition
        - Residual water becomes enriched in heavier isotope
        - Water evaporating can cause isotopes to change
        - Predictable variation to be used as a tracer
- Nitrogen Isotopes (2 isotopes of nitrogen)
    - Groundwater nitrate is variable—can use this to tell us where it came from
- How do we measure isotopes
    - Sample must be a gas
    - Molecular mass determines trajectories

Compare to the sample nitrogen

The standards that we use to compare the isotope composition—compare the sample ratio to a standard (atmospheric nitrogen)

- Does the isotope composition of nitrate in groundwater reflect the nitrate history?
    - Commercial fertilizer comparable to atmospheric nitrogen
    - Natural sources are higher
- Haber Bosch Process—reason that N15 analysis works for tracing nitrates
    - Process in making commercial fertilizer
- Excess nitrate leaches and accumulates below plant roots
    - Use more on the surface…the more we find in the plant roots
- Microbial denitrification increases N in residual nitrate
    - Can work for us, but can also work against us when we're trying to find a fingerprint for that nitrate source
- Effect of denitrification
    - The higher the concentration, the isotope gets lighter—indication it's coming from a commercial source

What about the other isotope in nitrate?

- Oxygen from nitrate is obtained by soil air and water
    - From atmospheric oxygen and from the water
        - Predictable nitrate oxygen isotope composition
        - Allows us to predict what the nitrate isotope level is
        - Predictable enrichment from denitrification
- Isotopes are only one tool!
    - Nitrate and nitrous oxide
    - Dissolved organic carbon
    - Dissolved oxygen
    - Dissolved solids/conductivity
    - pH
    - Dissolved air
- Supporting measurements for isotope "fingerprinting"
- Conclusion:
    - Isotopes of nitrate can be used as a fingerprint of sources
    - Predictable variation from sources and expected transformation reactions
    - Best accuracy when used with other measurements to help with interpretation

**Questions from this session:**

- Do you run samples from all states?

    - From all over the world—specialized method.
- What is the lab charge?
    - $200 per sample
    - Ideally you should provide more than one sample. And they will provide help with interpretation
- What is the Turnaround time?
    - Moving to automated system, but it's 4-6 months now. Depending on how many they have to run. Anticipating a quicker turn around once there is an automated system. (shortest time is 2 weeks for an "express" order)
- Where are the samples typically taken?
    - From the source. Collect in a liter bottle that's clean. Frozen sample so there is no change in the water.

**100 Million Looming Reasons to Experiment—Marty Stange—Environmental Supervisor—City of Hastings—Hastings Utilities**

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Overview of City of Hastings water system:

- Water supply wells pump water from multiple locations directly into the water Distribution system without treatment or storage
- Water Is supplied to the Village of Trumbull, Phill Johnson Water System and the Hastings East Industrial Park/ Central Community College
- Neighboring water systems within 2 to 5 miles including Juniata, Glenvil, Inland, AC Schools and several rural subdivisions
- 20 year Time of Travel—Feed lot close
- Facing nitrate, uranium, gross alpha, selenium, pH, hardness and inorganic levels increasing
- Atrazine detected at low levels
- Several wells taken off line due to nitrates
- Insufficient water capacity in 2016 without additional water supplies or blending

- HU Board: "Marching orders"
    - Implement wellhead protection plan to help address long term water quality issues and continue efforts to educate the public
    - Enlist the assistance of the NRDs as they have jurisdiction outside the City of Hastings
    - Find a cost effective method to secure a potable water source (think outside the box)
    - Some areas with 30 ppm…very high nitrate levels in the surrounding area
    - 25% of water is coming from irrigation return…means farmers are overwatering by at least 25%
- Water sampling effort:
    - 2010 Sampling
        - 576 water samples collected for nitrates over 76 square mile area
        - 87.5% sampling of all known wells in Hastings Wellhead Protection area
    - 2011 Sampling
        - 200 water samples collected in an area exceeding 200 square miles

        - 42 samples analyzed for uranium
    - Results from 2010 and 2011
        - 25% of samples exceeded nitrate MCL (10 mg/L)
        - Uranium levels ranged from 1.2 to 74.8
    - 2012 Sampling
        - 138 water samples collected
        - 25% of samples exceeded nitrate MCL (10mg/L)
        - Uranium levels ranged from 1 to 345
    - 2013 Sampling
        - 58 water samples collected (No significant change to nitrates and Uranium contamination is better defined)
    - 2014 Sampling and Beyond
        - Minimum 40 samples each year
        - All wells in 2015 and every 5 years
    - Isotope sampling—a lot of farmers saying it was the feedlot…isotope sampling allowed them to be able to say it is fertilizer…but other sources too.
        - Both urban and rural sources—much comes from excessive irrigation
        - Putting on 30% more fertilizer than they need. If they put on just as much as they need and there is a wet year, then they lose that fertilizer.
        - Water conservation and nitrate management go hand in hand
- Uranium in wellhead protection area
    - What is the source of uranium?
        - Is it natural? From fertilizer? Biologic activities?
            - Not exactly sure
- Nitrates Source
    - Nitrates are from both urban and rural use of fertilizer and excessive irrigation
    - Nitrate and water management
        - Nitrate management (Reduce wasting -30%)
        - Water conservation (Limit movement of N)
            - Best management practice must include both the proper use of fertilizer and irrigation. Overuse of irrigation drives the nitrogen below the root zone thus requiring more fertilizer.
    - Uranium the unexpected problem
        - Uranium source is unknown
            - Naturally occurring?
            - Phosphate fertilizers?
            - Biological release of uranium in the vadose zone?
        - If naturally occurring why is it now showing up in the municipal wells
        - New information being developed—more to follow at end of presentation
- How do we solve the problem?'
    - New source is not feasible
        - No alternative aquifers are available
        - Nitrate sampling indicates contamination in principal aquifer cannot be avoided
    - Conventional water treatment
        - No existing treatment facility

        - No centralized collection point
    - Wellhead management?
        - Won't solve the problem alone (long-term issue)
- Plan objectives
    - Continue to provide safe and reliable supply of water
        - Nitrates and uranium are a 50 year problem (or more)
    - Minimize financial impact to utility and customers
    - Protect long term viability of aquifer
    - Extend useful life of existing wells and delay/minimize treatment
- Disposal of nitrates is a costly issue
    - Dual pumping
        - Nitrate skimming (dual pump)
            - Goal—extend useful life of existing wells and delay/minimize treatment
            - Nitrates appear to be highest at the top of the aquifer
            - Dual pumping is an idea where two wells located in close proximity simultaneously withdraw water from the top and bottom of the aquifer thus separating these two water layers
        - Implementing a dual pump system
            - Low volume/high concentration raw water can be intercepted by a second pump installed in a municipal well
            - Concept can be applied in the design of future wells or by modifying existing wells
            - Dual pump is a viable alternative
                - Reduce volume of water requiring treatment
                - Reduce capital improvement and O&M costs
        - Aquifer Storage and Restoration-Concept
            - Protect long term viability of aquifer
            - Key—intercepting contamination up gradient of city well field
            - Treat with reverse osmosis and returned to the aquifer
                - Recover using existing down gradient wells
            - Blending and storage within the aquifer thus delaying storage
            - Retains use of existing wells
        - Treatment and residual disposal
            - Modular approach to treatment—add on as needed
            - Uranium treatment
                - Uranium absorptive media with disposal in licensed facility
            - Nitrate treatment
                - Reverse osmosis
            - RO residuals
                - 325 gpm to sewer (25% of PCF treatment capacity)
                - Remainder to evaporation and irrigation
                    - Approximately 40 acres required at North Baltimore Site

        - Pump up to 1,500 gpm for agricultural reuse during summer months
    - Irrigation reuse and management
        - Protects stored ASR water for potable use
        - Beneficially disposes of nitrates by agricultural production
    - Blending
        - Blending of several wells to lower the nitrate level in the potable water prior to delivery into the water distribution system—water storage reservoirs
  - Reduce the dollars by 30 million
  - HU board concerns?
    - Future potable water supply is threatened by activities outside the City of Hastings' control
    - The proposed cost of water treatment is too high and threatens the City of Hastings' and the surrounding communities' economic viability
  - Regional concerns
    - Nitrates is a regional issue impacting other water system such as the Village of Juniata, Prosser, Kenesaw, Glenvil, Trumbull, Inland, Adam Central Schools and the Hastings Regional Center
    - The Hastings Water System may be needed to develop an Adams County Rural Water System
- Policy questions:
  - Based upon the recent 130 years of water system operation, the citizens of Hastings have come to expect access to potable water. Is the right to use groundwater only a quantity issue or does it imply a reasonable expectation for potable quality?

Uranium Saga

- Initial discussion with UNL Professor Dr. Karrie Weber has indicated that nitrates are increasing aquifer biological activity and thus mobilizing uranium from the soils
- Source of uranium is naturally occurring as uraninite is found in our geological formation (clay soils). The biological activity mobilizing the uranium naturally occurring in soils
- We know we have uranium in our aquifer as we use gamma logging of wells to detect the radioactive decay found in these clay soils
- Nitrates, carbonates, iron, increasing pH, increasing water velocity all contribute to increased biological activity in the aquifer
- We have seen an increase in pH from 7.0 to 8.0. Going up everywhere in the aquifer
- Increased water velocity in the aquifer due to increased irrigation pumping
- Increased in nitrate and phosphorous loading
- Hardness is increasing—releasing CO2
- Water is also being evaporated so concentrating the hardness and putting it back in the ground.
- Surface soils are becoming more acidic yet groundwater is becoming more alkaline
  - Need more work in this area to understand what is happening
- Trying to enter into an agreement with UNL to get some samples and to develop the uranium issue more.

Recommended action items

- Look at historical data and plot it out.
- Sample more than one well per township…will give you a better idea of what's going on
- Groundwater modeling is necessary to know where you water is coming from (recharging from)

**Questions for this session:**

- More information?
    - Nitrate database with a lot of nitrate data on there…and put your information in to help your neighbor out
- Have you taken sediment samples?
    - haven't sampled the soil for uranium levels but have checked for atrazine

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**Salvaging Wells through Sealing the Annual Space and Explosion Abandonment—Tom Christopherson, Program Manager—Water Well Standards, Nebraska Department of Health and Human Services**

- Task force: Protect groundwater
- Most of our groundwater goes to irrigation…but domestic is what we're here to talk about
- Out of the 5% of domestic use—chemicals in drinking water
- Many wells put in without grouting standard—looking at the ones before PVC casings
    - Perforating the concrete casing without collapsing the well is an issue
        - Not just irrigation wells made like these concrete tile and cement asbestos wells…some domestic wells are so if we can figure it out with irrigation, we can figure it out with domestic
- Driving goal is to protect human health
- Gravel-packed cased well
    - Before standards the bore hole was gravel-packed from the surface to the bottom
    - The only seal of the bore hole was around the earth and the pit-less adapter or concrete pad
        - Why not just fill them up?
            - Even a fully decommissioned well casing is subject to being a potential source for contamination
- Brushing and Airlift Development
    - Before brushing—leaking, and debris
    - After brushing—got back to the original casing. Much cleaner
    - Water quality before and after—nitrates dropped to .394 all other levels significantly dropped.
- Retrofit Design
    - The challenge—install a sufficient volume of grout material without destroying the well to
        - Provide groundwater protection by preventing the comingling of waters through the annular space gravel pack and;
        - Retain the functional use of the well
- The answer: Utilizes the properties of micro fine cement

    - By pressure grouting from the inside of the casing through a joint out to the borehole wall or;
    - install grouting pipe in the annular space and pressure grout on the outside of the casing forcing the cement into the gravel pack to the borehole wall.
- Microfine Cement—stable product—gives a good tight seal and will fill some fine cracks
- Good seal…no dye leak during dye testing

Discoveries:

- See slide
    - Extreme movement in the gravel pack space—minutes verses days or weeks
    - Joints can be sealed—just can't put grout through the joint to the borehole wall
    - Temperature can double initial gel set
        - If it is wet, can triple initial gel set

Just need to perfect the materials and method to get the seal tight.

- Applied for a grant from NET—identify at least two wells that can be rehabilitated
- Going to do the same thing to decommission two other wells.

Chester well decommissioning

- (a method tried this fall)
- Blowing up the well essentially
- Wanted to protect new public water system
    - Designed to separate waters of different qualities
    - Fill the well full of cement and then detonate—leaving the well house intact
        - More expensive than traditional methods
- Found a previously abandoned well in the wellhouse filled with sand and gravel. Now have to figure out what to do with this well…

More potential projects:

- Edgar—irrigation wells in well head protection area
- Hastings—existing municipal wells-nitrate and uranium—see if they can salvage because the nitrates are high in some areas and low in others. Locate the source and isolate
- Glenvil-nitrates
- York-nitrates
- Laurel-Selenium
- Aurora-nitrates
- Elgin-nitrate
- Wauneta-nitrates

Towns interested in decommissioning

- Mead—waste water lagoon—failure to get detailed information. Clay affected the process
- Ithica- Salt water intrusion
- Brainard--Selenium

Closed Loop rehab

(see slide)

End Game

- The end results will provide answers to NRD's, PWS, GW Irrigation users, water well contractors with information for:
    - Providing protection for public health

- Prevent further degradation of the groundwater
- Developing Best Management Practices (BMP) for areas susceptible to GW pollution
- Restoring the natural protection provided by sealing of the annular space

Just getting into this stuff…hopefully be able to implement more in the future.
No questions during this session.

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**Implementing On-the-ground BMPs for Nitrates—Courtney Woodman, Water Resources Technician, Upper Big Blue Natural Resources District**
**Jason Moudry, Water Programs Specialist, Lower Loup NRD**

Hastings as a case study:

- Join All Interested Parties
  - Key: Communication and Cooperation
    - Adams County
    - Department of Health
    - UNL Extension
    - City of Hastings
    - Rural Residents
    - Urban Residents
    - Hastings Utilities
    - Little Blue and Upper Blue NRD
- An evolution of BMPs through focus groups
  - Everyone has an idea, opinion, or different perspective—need to utilize it all
- Goals:
  - Open the lines of communication between all interested parties
  - Research and develop baseline data
  - Prioritize and manage issues that arise from data analysis
- Discussing the Issues: Hastings Wellhead Protection Committee—opening up the lines of communication
  - A public working group
    - What is the problem?
    - How did it escalate?
    - How to resolve the problem?
  - Conclusion was that we need more data
- Hasting wellhead technical committee
  - Research and develop baseline data
  - Primary group responsible for data collection and analysis
  - Provide support to the Hastings Wellhead Protection Committee
- Data and resources: maps, reports
  - 2010 – 586 samples
  - 2011 – 292 samples
  - 2012 – 138 samples
  - 2013 - ~80 samples
  - 2010-2012 All samples were analyzed for farm chemicals, heavy metals, gross alpha, uranium, and nitrate

    - 2013 All samples analyzed for heavy metals, gross alpha, uranium and nitrate
- Goals:
    - Prioritize and manage issues that arise from data analysis
    - Create a nitrate management plan
- Need to create nitrate management plan
    - Irrigation management, soil nutrient analysis, fertilizer application rates, training course.
    - Incorporate urban regulations as well as: Training courses and reporting
        - There was a lot of finger-pointing going on
            - Feedlot, urban, farmers, etc.
            - But everyone has the responsibility to clean it up.
- Each respective board reviewed drafts throughout the process
    - Responsibilities were divided
        - Little Blue NRD—training
        - Upper Big Blue NRD—reporting
        - Hastings Utilities—Urban requirements
    - The technical Committee remained active throughout the process to provide support—data and resources
- Present to the public
    - Public hearing information
        - Frequently asked questions, rules and regs, contact info, cost-share programs available
- Conclusion:
    - Be united—overseeing boards and data behind you—pointing fingers does not help
    - Information and education tools are necessary—use available media outlets—cable access, newspapers, radio, etc.
    - Put your ducks in a row—present concepts before the hearing
        - Informational period before hearing, but make sure people know that this is not the time to present their opinions if they want them recorded. That is what the hearing is for.
        - Breaking point: if we don't do something, someone from Lincoln is going to tell us what we have to do—also farmers talking to farmers…didn't have a board of strangers talking to them.

**Jason Moudry—Lower Loup NRD:**

Some of the grants working with several communities across the whole district:

- Some of the areas in this district are heavily farmed
- All or part of 16 communities
- Many wellhead protection areas are going into the farmland (out of their jurisdictions) and they are not coming to the NRD for help
- Phase III Management Area
    - Area 28
        - Subject to additional requirements for nitrogen
        - Management that the rest of the areas are not.

        - Examples:
            - No fall fertilizer
            - Soil and water sampling
            - Reporting
            - (NEW) Recommended for next year: Water meters for the management of water application for water quality purposes
                - Calculate application of nitrogen already in the water
                - Help to prevent over irrigation to avoid leaching
- NDEQ 319 Funding Source
    - Collect vadose zone nitrate information
    - Investigate the groundwater aquifers
    - Information and education
    - Wellhead protection management plans
- Vadose zone sampling—giddings probe
    - 1000 samples total
    - In 2011 did 38 sites—show where you might have a buildup of nitrates.
        - Go to same sites later to see progress
- Investigate the groundwater aquifers
    - Sampling
        - Water for nitrates—hydrolab
            - Includes irrigation, domestic, and livestock wells
    - Isotope testing and age dating
- Area 28—commercial fertilizers or animal waste? Area 28 is very sandy where it might be leaching very quickly
    - All but one or two was commercial fertilizers
- Age dating: use techniques to get a relative age of the water—most came back as modern (shallow aquifer). Something that has come from modern farming practices.
- Information and education
    - Public water supply meetings
        - NE Rural Water Association
        - Individual area results
        - Newsletters and radio spots
- Wellhead protection management plans
    - No new irrigated acres inside WHPA
        - Includes transfers
- Well abandonment—close the wells (100% cost share with NRD)
- Agricultural Side
    - Encourage use of nitrogen calculators—UNL calculator accounts for soil texture, soil organic matter, manure application and gives additional nitrogen credit for the next three years, accounts for timing
    - Evaluate expected yield accuracy—5 year average plus 5%
    - Conversion from flood to sprinkler
    - Crop rotation and cover crops
        - Utilize excess nitrogen in the soil
        - Can also serve as nitrogen sink
    - Nitrogen timing

        - Anything after March 1st of the planting year
        - Split applications
        - Give the crop the nitrogen when it needs it.
    - New technologies
        - Precision agriculture and variable rate technologies
        - Nitrogen inhibitors—controlled release fertilizers
    - Irrigation scheduling
    - Manure management
        - Must be applied to NRD certified irrigated ground
        - Any changes to application method must be noted
    - Use of flow meters for water quality
        - By December 31 of 2016
        - Includes all high capacity wells . 50 gpm
        - 100% cost share right now…will go down as time passes so better to get them in now.
    - Lysimeter
        - Below the root zone, as water percolates through—recharge monitor
- Area 28 recommendations (see slide)
    - Use of flowmeters for water quality
- By December 31st of 2016
- Includes all high capacity wells > 50 gpm

**Questions from this session:**

How does the use of flow meters help water quality?

- not flushing the nitrates through the system when you are using less water. If you limit the amount of water you're putting on, less amount of nitrates in the aquifer.

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**Next Steps: Roundtable**

What can communities do to manage their nitrate issues?
Fred Armknecht—Water Operator—Village of Johnson
Ryan Chapman—Wellhead Protection Program—Nebraska Dept. of Environmental Quality
Dave Hunter—General Manager—City of Auburn—Board of Public Works
Rebecca Ohrtman—Source Water Protection Program—Iowa Dept. of Natural Resources

- What are the biggest barriers you have run into when trying to address nitrate issues?
    - Ryan—the resources issues—personnel—not addressing the problem until it's too late. Getting on the ball about getting something done.
    - Rebecca—Identifying the source of the problem—was it a spill, coming from non-point sources? Takes the right people working with the community. Takes a lot of resources to get this done
    - Fred—started out with 3 ppm and 26 years later 5.8 ppm. Has stabilized since quarterly reporting hit at 5 ppm. Safe now, but what about the future? The barrier is the constant scare of happening again.
    - Dave—small communities—not proactive and frugal with monetary resources. Elected officials need to learn to become more proactive…also figuring out where the dollars are coming from
- What are your ideas or things you have tried to get around these barriers

    - Dave—education process…but hit the brick wall again. Have to stay with it and keep banging the drum. If you leave a gap you lose ground or have to start over
    - Fred—Talk to neighboring communities and different people and keep accurate records
    - Rebecca—In Iowa—pilot projects with communities with 7-9m/L—deployed a team of groundwater site investigator and continued to monitor wells. After so much time, continued to monitor, but worked to figure out if they were coming from point sources or non-point sources…worked to install the right practices.
        - Identified what was going on in that area (commercial fertilizer and manure) work with communities to find resources through different funding sources…putting in CRP if you're looking at non-point source. Point source find the source and have that guilty party clean it up.
    - Ryan—Getting past those time constraints is bug the folks that need to be bugged. If they hear from you enough, hopefully they will act. Get some boots on the ground and get help out there.
- What can we do together as a group of water professionals to be better prepared or help break down barriers?
    - Fred—be aware of what's going on in your community. What the other communities are doing—talk to farmers…Communicate!
    - Dave—working together more. We sometimes isolate, but we need to work closer together and communicate more. Contact one another when you know things are also affecting their communities. We are in this together…bigger issue than individual communities.
    - Ryan—wellhead protection network—education committee and one of the tasks is to work on training materials that as a network we could go out and train other communities on how to do this. Training people to give presentations and help them educate their own communities.
    - Rebecca—every community is different. Bringing in all the actors and identify the source. Then we can figure out a plan. Start off with the facts too—let people know the basics…why are nitrates bad. A brochure to let the landowner know what is at risk and why they should care about not contributing to the problem. Water operators like these brochures to give out to landowners. Every community will have different needs.
- Do decision makers realize the potential financial consequences of nitrates?
    - Rebecca—do they really realize what's going on? At the funding level it's really not seen…but at the local level once it's explained then it becomes a reality. Many communities can't afford the cost to fix these problems. Communities realize it, but only after the costs are explained to them. Usually when it's too late
    - Fred—Community leads should come to meetings like this so they can see firsthand what's going on and how much this is going to cost if preventative actions aren't taken. Maybe let them know this is something they are going to have to save for if they don't take care of it now. They would probably become more involved if they knew more.
    - Dave—most of them (not all) don't realize that being proactive can save money. It's always a reactive situation. In Auburn water rates went from $15-$35 a

month. If you don't charge what it costs for the services, you are going to be hurting in the long run. The grants are not out there…until it's too late.

- Ryan—Not a whole lot of decision makers realize the depth of the problem. This is why we're are trying to get the word out. If we can have folks helping to get the word out it might motivate the decision makers.

**Audience questions:**

1. How would you go about bringing someone in to talk to the board (it seems like the board will respect an outside opinion instead of the people that they've been working with)
    a. Call Ryan or DEQ and they will try to get someone out there. Make a trade—you talk to my board, I'll talk to yours.
        i. Working together and communicating between communities. Open up the lines of communication