

Kewaunee County Land and Water Conservation Regularly Scheduled Committee Meeting
Kewaunee County Fairgrounds Office September 9, 2014 9:00 AM

2014-2016 Kewaunee County Land and Water Conservation Committee (LWCC) Members:

John Pagel – Chair (County Board member)
Ron Paider – Vice Chair (County Board member)
Lee Luft – Secretary (County Board member)
Bob Garfinkel – Committee Member (County Board Member)
Andy Wallander – County Conservationist
Clark Reimer (USDA Farm Service Agency Representative)
Aerica Bjorstrom – UW Extension Agricultural Agent

Kewaunee County Land and Water Conservation (LWCD) Staff:

Andy Wallander – County Conservationist
Davina Bonness – Conservationist - Water Quality Specialist
Paul Fredrich – Conservationist - Soils Specialist
Theresa Albrecht – Program Specialist
Theresa Marcusen – LWCD Secretary

Cooperating Agency Members from the United States Department of Agriculture (USDA):

Joe Johnson -USDA Natural Resources Conservation Service District Conservationist
Aerica Bjorstrom - UW Extension Agricultural Agent
Brian Maedke – USDA Animal and Plant Health Inspection Service (APHIS) *Attends as appropriate.*

1) Call to Order: Meeting called to order at 9:00 AM by Chairman John Pagel

2) Roll Call: Committee Members present: John Pagel, Ron Paider, Lee Luft, Bob Garfinkel, Clark Reimer. LWCD and Cooperating Agency Staff present: Andy Wallander. Davina Bonness and Paul Fredrich were present.

3) Approval/Repair of Agenda: Motion to accept the September 14th agenda as presented was made by Ron Paider and seconded by Bob Garfinkel. Committee vote was unanimous in favor of the motion.

4) Correspondence: There was no correspondence regarding the regularly scheduled meeting of the Land and Water Conservation Committee.

5) Public Comments regarding the regularly scheduled Land and Water Conservation Meeting: There were no public comments.

6) Department Reports:

- a) **Animal Waste Storage Permits:** Year to date, 5 waste storage permits have been issued with \$5,300.00 collected for these 5 permits. This compares with 11 permits issued in 2011, 16 permits in 2012 and 8 permits in 2013.
- b) **Farmland Preservation/Standards and Prohibitions Walkovers:** Andy Wallander reported improved farmland preservation compliance and progress in achieving the goal of reduced erosion on area farms.
- c) **Land and Water Resource Management Plan Extension Request to State of Wisconsin Land and Water Conservation Board:** Andy Wallander reviewed the 2015 through 2019 Land and Water Resource Management Plan Extension Request and Annual Work Plan with its emphasis on protecting local surface and groundwater using NR151 nonpoint source pollution control standards and Farmland Preservation programs and local ordinances. A motion to approve the 2015 through 2019 Land and Water Resource Management Plan Extension Request and Annual Work Plan was made by Lee Luft and Seconded by Ron Paider. Committee vote was unanimous in favor of approving the 2015-2019 Extension Request and Work Plan.
- d) **2015 Proposed Land and Water Conservation Department Budget:** Andy Wallander conducted a line-by-line review of the proposed 2015 L&WCD budget. Andy also reviewed a version of the L&WCD budget with a five (5) percent cost reduction from the 2014 budget. To achieve a 5% cost savings the department would have to cut ALL training,

memberships, all machinery maintenance and repair and all membership dues as well as cut 283 total staff hours. The Land and Water Conservation Committee understood that the nature of these cuts in “discretionary” spending would be devastating to a department charged with one of Kewaunee County’s most critical issues (improved ground and surface water quality). Following a number of questions from the committee and Andy’s responses, a motion to approve the 2015 L&WCD budget was made by Lee Luft and seconded by Ron Paider. This motion states, “Given the importance of its mission and the importance of on-going well testing to that mission, the Land and Water Conservation Committee moves to approve the 2015 L&WCD budget with the addition of \$6,000 in spending for well testing and with the understanding that there may be an entry error on the current cost of the L&WCD telephone charges that will need to be amended and with the understanding that the expected costs for health and dental insurance are as yet undetermined.” Committee vote was unanimous in favor of this motion.

e) **Cost-Share Agreements.** No new cost-share agreements were reported at this meeting.

7) Cooperating Agency Reports: No cooperating agency reports were presented at this meeting.

Resolutions: No action was taken on resolutions by the Committee at this meeting.

Review of Cost Sharing Agreements: There were no cost-sharing agreements presented to the Committee at this meeting.

Travel Authorizations: There were no travel authorizations presented at this meeting.

Next Meeting Dates: Next regularly scheduled KCLWCC Meeting date is as follows: October 21st at 9:00 AM at the Kewaunee Co. Fairgrounds offices of the KCLWCD.

Approval of Bills: A motion to approve all bills as presented was made by Ron Paider and seconded by Bob Garfinkel. Committee vote was unanimous in favor of this motion.

Recess: A motion to recess the Land and Water Conservation meeting was made at 10:35 PM by Lee Luft and Seconded by Bob Garfinkel. The motion passed unanimously. The Land and Water Conservation Committee scheduled to reconvene at 12:30 PM to hear public comment on the proposed Public Health and Groundwater Protection ordinance.

Re-convene: Chairman Pagel reconvened the September 14th Land and Water Conservation Committee meeting at 12:34 PM for the purpose of taking public comment on the proposed Public Health and Groundwater Protection ordinance.

Andy Wallander provided an overview of the key provisions of the Public Health and Groundwater Protection ordinance for all in attendance.

Those in attendance who wished to speak were asked to fill out a form so that their names could be announced by the Land and Water Conservation Committee secretary. A time limit of 3 minutes was established by the committee for each speaker to allow adequate time for all who wished to address the Land and Water Conservation Committee to do so. At approximately 12:50 PM the Public Comment portion of the meeting began. A list of those who spoke either in favor of the ordinance or who were opposed follows below:

Opposed: The following citizen spoke in opposition to the proposed ordinance.

Paul Wallace Jr. representing Wallace Dairy Farm (a 100 cow farm) spoke regarding his concern about prohibiting land spreading over shallow soils during the January 1 through April 15th time frame as the Wallace farm hauls manure daily and some may be spread over shallow soils. Mr. Wallace then indicated that due to Andy Wallander’s presentation he was now aware that the Land and Water Conservation Committee could alter the time frame of the spreading ban or consider exceptions for specific operations that would otherwise have difficulty in meeting the provisions of the proposed ordinance. Mr. Wallace indicated he was less concerned after hearing about the possibility of providing exceptions in the case of specific farm operations. Note: For the purposes of these meeting minutes the Land and Water Conservation Committee secretary listed this comment as in opposition to the ordinance even though the initial concerns of Mr. Wallace may have been addressed during the meeting.

In Favor: The following citizens spoke in favor of the proposed ordinance. This list is not necessarily in the order the requests to speak were received or the order in which they spoke.

Susan Sandstrom and her husband, representing themselves: Ms. Sandstrom introduced herself and her husband as healthcare professionals and support the proposed ordinance on the grounds that it will help improve water quality and thereby health for Kewaunee County citizens and for the next generation(s).

Pat Schoenbeck representing herself: Ms. Schoenbeck indicated her support for the 20 foot depth to bedrock provision in the proposed ordinance and said that the "time has come" for action on a serious public health concern. She indicated we are all responsible for water quality and that we must exercise local control to achieve it.

Sandy Winnemueller representing herself: Ms. Winnemueller supported the proposed ordinance as it would give the most vulnerable lands more time to filter land applications and result in cleaner water for all Kewaunee County citizens.

Laura Menefee representing the 15,000 Wisconsin members and 200 Kewaunee County members of the Sierra Club as well as the Wisconsin John Muir Chapter spoke in favor of the proposed ordinance and provided written comments which will be attached to these minutes.

Lynda Cochart representing herself and family: Spoke in favor of the proposed ordinance and of the need for clean, safe, usable water. Lynda related her experience in having to live without clean water and how something we take for granted (clean water) can become so precious when you don't have it.

Bill Iwen representing himself spoke in favor of the proposed ordinance as a good first step in dealing with a major health risk and a significant quality of life issue here in Kewaunee County.

Dean Hoegger representing the Kewaunee members of the Clean Water Action Council (40 members) spoke in favor of the proposed ordinance as a very good first step in addressing a significant health risk here in Kewaunee County.

Jesse Jerabek representing himself and "others in the Township of Lincoln" spoke in favor of the proposed ordinance as part of positive legacy for the children of Kewaunee County. Jesse indicated farming is good but farmers must use safe, environmentally sound practices and be proactive in protecting our water and our health.

Jodi Parins representing herself spoke in favor of the proposed ordinance as a first step in protecting public safety. Jodi indicated she felt the greatest impact of this ordinance would be on a few larger (CAFOs) farms in Lincoln and Red River Townships and that these farms may feel some economic impact but that this effort was necessary to preserve the health and wellbeing of all Kewaunee citizens.

Mick Sagrillo representing the Town of Lincoln Plan Commission noted that the Wisconsin DNR's nutrient management plans exist primarily to help maximize crop yields and only secondarily deal with ground and surface water impacts from land spreading. Mick asked the Land and Water Conservation Committee to pass the ordinance onto the full County Board as written and in turn, the hope is that the County Board would vote to give Lincoln township residents the opportunity to vote on the ordinance. Mick noted that the Lincoln Town Board has already approved a resolution in support of the Public Health and Groundwater Protection ordinance. A copy of the Lincoln Town Board's resolution in support of the Public Health and Groundwater Protection ordinance will be attached to these minutes as will Mick Sagrillo's written statement on behalf of the Lincoln Town Plan Commission.

Mary West representing herself and her spouse asked the Land and Water Conservation Committee to think about the impact our current groundwater problems will have on the health and safety of future generations and to pass the proposed ordinance onto the County Board without change.

Dick Swanson representing himself felt that Kewaunee County already has a serious groundwater contamination issue and he warned that "more cows are coming". Dick wants our community to be prepared for additional herd sizes and he is concerned that too much of the manure generated today ends up in our ground and surface waters and that greater herd size will only intensify the problems we face.

Susan Davie representing herself indicated to the Land and Water Conservation Committee that she resides in Red River Township and that well testing results in that Township have been steadily getting worse such that Red River now has the highest well

contamination rate of all Kewaunee County townships for those wells that have been tested. Susan spoke in favor of the proposed ordinance as a good first step in dealing with the worsening issues in Red River.

Joe Musial representing "Environmental Stewardship in Algoma" spoke in support of the ordinance but he expressed his concern about the public relations problems that can occur when public discussion of our water problems becomes so widespread. He asks the farming community to use "good sense" in applying liquid manure and to consider their neighbors and our environment before applying large quantities of manure.

Brian Hansen submitted a written statement which is attached. Brian also spoke to the Land and Water Conservation Committee about the lack of CAFOs on Washington Island and the fact that Washington Island has very little ground or surface water contamination.

Doree Stein representing herself indicated that she is now a resident of Pierce Township and that she is concerned about the endocrine disrupters that occur in samples of liquid manure and how these endocrine disrupters negatively impact human health.

Dr. Bill Faller representing himself spoke about his land and how a pond on his property near Krok Road has turned brown with runoff from the recent rains. A small tributary from Dr. Faller's pond runs into the East Twin River. Dr. Faller blames fields that do not have any type of cover crop for contributing to the runoff problems and contamination. Dr. Faller has taken before and after rain water quality samples and will provide the results of his testing to the Land and Water Conservation Committee.

Judy Tremel representing herself spoke about the experience she and her family had when they were exposed to e. coli in their drinking water shortly after a rain event that brought runoff to the area around their well head. She described her family's illness and the "total lack" of State or County support in helping her family deal with this serious health issue.

Nancy Utesch representing herself spoke about the moral imperative of passing this ordinance as written as a good first step in dealing with the water contamination threat in Kewaunee County.

Dale Goodner, Mary Goodner provided a written statement that will be attached to these minutes. Dale spoke to the Land and Water Conservation Committee about his experiences as a young man in helping with a trout stream improvement project on the Scarboro Creek and how when he returned years later he found the Scarboro Creek and many other waterways in Kewaunee County choked with sediment and virtually devoid of fish. Dale feels we can do a much better job in protecting our environment.

Lynn Utesch representing himself spoke in favor of the ordinance and its current 20 foot surface to bedrock provision as a good first step in dealing with the growing health concerns of contaminated surface and ground waters in Kewaunee County. Lynn noted he is a farmer raising beef cattle in Pierce Township.

Note: There are SEVEN additional letters written in support of the proposed Public Health and Groundwater Protection Ordinance attachments to these minutes.

1. Mark Borchardt Ph.D. USDA Agricultural Research Service regarding well testing results for Kewaunee County
2. Ronald D. Stieglitz, Professor Emeritus, University of Wisconsin – Green Bay writing in support of the proposed ordinance.
3. Don Niles, Dairy Dreams writing with a concern about hauling snow from feed pads in winter months.
4. Michael Dovichi, P.G. writing in support of the proposed ordinance.
5. Maureen Muldoon, Professor of Geology, University of Wisconsin – Oshkosh writing in support of the proposed ordinance.
6. State of Wisconsin Senator, Dave Hansen writing in support of the proposed ordinance.
7. Andy Wallander, Kewaunee County Conservationist writing with further information regarding the proposed ordinance.

Adjournment: A motion to adjourn the meeting at 1:45 PM was made by Ron Paider and seconded by Lee Luft. Motion carried unanimously.

Lee Luft

From: DON HAMMES <sierra@sierraclub.org>
Sent: Saturday, September 13, 2014 10:54 AM
To: wallanda@kewauneeeco.org
Subject: Please Support the Kewaunee County Groundwater Ordinance!

Sep 13, 2014

Mr Andy Wallander
WI

Dear Mr Wallander,

I am writing you to voice my concern about improper waste spreading and its impacts on drinking water safety and the quality of our lakes, rivers and streams. Most Wisconsinites rely on groundwater to supply their drinking water. This water also sustains many of our farms, businesses and industries. Improper waste spreading, especially in sensitive "karst" regions like those found in Kewaunee County can travel through cracks and sinkholes to cause widespread water contamination. This has already led to serious illness, well contamination, and degradation of aquatic habitats.

To ensure groundwater in Kewaunee County is safe to drink, I'm writing to urge you to support the pending ordinance which would prohibit the unconfined stockpiling and / or land application of wastes on land areas within Kewaunee County having soil depths to fractured carbonate bedrock of 20 feet or less between January 1st and April 15th, unless an exemption is granted through the Kewaunee County Land and Water Conservation Committee.

This is a serious problem that requires swift action. This is why I am urging you to support the Kewaunee County groundwater protection ordinance. Thanks for your consideration of this important matter.

Sincerely,

N/A DON HAMMES
3507 Valley Ridge Rd
Middleton, WI 53562-1225
(608) 836-1205

Dear Public Officials of Kewaunee County-

September 10, 2014

I am writing in support of the proposed Public Health and Groundwater Protection Ordinance.

As an avid kayaker and resident of the town of Montpelier that drinks and baths from a well I am encouraged by the well spoken and informative hearing that happened Tuesday at the Fairgrounds. I am thankful that the Kewaunee County Land and Water Conservation Committee hosted such an event and I am hopeful this ordinance will move forward in a timely manner to make it to township-based referendum this November.

Not to repeat what others said at the Fairgrounds event. Another good reason to move forward with such an ordinance is that climate scientists believe our weather is most likely in the following decades to have 1) more frequent heavy precipitation events, 2) increased precipitation, especially during winter-spring and 3) shorter snow season, with less snowfall and snow depth according to the Center for Climate Research U of Wisconsin Madison Climate Change Projections. This represents a more challenging environment to current practices of land spreading of waste from dairy operations.

Worth repeating is that this is a community challenge that will be most successfully met with all parties participating. The stakes are too high to create a sacrifice zone. Lake Michigan's majesty and its service to the region as a water supply and tourist destination as well as peoples homes and the water they use as well as the investments they have made on their property represent critically important stakeholders.

This is a heartening start to a challenging local issue we have avoided too long.

Thanks for your service-

Sincerely- John Hermanson
E 110 Shefchik Rd.
Luxemburg, WI. 54217
845-5479

Written Comments on Proposed Public Health and Groundwater Protection Ordinance for September 9th, 2014 Public Hearing.

Submitted by Andy Wallander, County Conservationist

This ordinance was developed keeping the Precautionary Principal in mind. The Precautionary Principal states that *"when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not yet fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof."*

First off, please consider that the time period specified this ordinance, January 1st through April 15th, is only $\frac{1}{2}$ months. It is not during the active growing season. It is during the period of the year when the least amount of soil attenuation (i.e. biological, chemical and physical "filtering") is taking place as far as available groundwater contaminants are concerned. It is likely the most significant groundwater recharge period of the year.

Second, if the ordinance is adopted as is, specifying areas that contain soil depths of 20 feet or less to bedrock, it will affect approximately 15% of the total land area of the County. Actual cropland acres being only a part of that 15%.

With that said, I believe the original proposed depth to bedrock of 5 feet or less, from solely an ordinance administration standpoint, could be seen as a more easily defensible and workable figure if challenged or there are future requests for variances. At the 5 feet to bedrock depth, only approximately 5% of the County's land area would be affected under the ordinance, with actual cropland acres being only a part of that 5%. However, from solely a groundwater quality protection standpoint, I agree that it can be argued that 20 feet is better than 5 feet. Also, it is in the areas that are 20 feet or less to bedrock where we find our greatest concentration of sinkholes, Karst features, and surface expressions of fractured bedrock beneath the surface (i.e. fracture traces).

I have been talking with the University of Wisconsin at Green Bay and the Wisconsin Geologic and Natural History Survey regarding obtaining more precise and accurate depth to bedrock data for the County in general. The LWCD will be sharing our GIS well driller's log information layer with them so that they can help us develop a more precise contour map depicting bedrock depths.

One of the main arguments against adopting this ordinance will be that *"all of the science isn't in yet"*. The problem very often is that long before "enough" of the science does come in, the harm has already been done. I believe there is enough science and research out there, pertaining to the contamination of groundwater from land spreading of wastes in areas known to contain fractured Silurian bedrock east of the Niagara Escarpment, that not taking some sort of preventive action, such as adopting an ordinance such as this, would verge on negligence. Keep in mind, science does not provide us with 100% surety, rather, it ongoing provides guidance for wise and prudent decision making.

Another argument against the adoption of this ordinance will likely be that *"it exceeds current state agricultural standards and prohibitions"*. I do not believe this to be the case. In situations where this ordinance were to apply to wastes from animals, the current "high hazard period" of February 1st through March 31st, which is currently applicable only to those farms operating under a Wisconsin Pollutant Discharge Elimination System (WPDES) permit, pertains to surface runoff and its effects on surface water quality. It is silent as applying to groundwater quality protection. It is my understanding that research done to establish this particular time period was focused on lessening the impacts of runoff from early-

spring applications of animal wastes to nearby surface waters. Once again, silent on groundwater quality protection. Also, the temporary, unconfined stockpiling of wastes during this 4 ½ month time period, in situations where it could pertain to wastes from animals, would be following the same restrictions currently found in the USDA NRCS standard covering the temporary, unconfined stacking of manure already adopted by the State of Wisconsin.

One other argument that may be brought up is that this ordinance specifically *"targets agriculture"*. This ordinance is resource specific and land-use based. It seeks to regulate the land application and unconfined stockpiling of septage, sewage sludge, sludge, biosolids, industrial wastewater, animal wastes, or any combination of these materials, in Kewaunee County on vulnerable shallow to bedrock soils during only a 4 ½ month portion of the year. In Kewaunee County, unless you are drinking bottled water, you are drinking groundwater. Groundwater is considered, by law, to be public "waters of the state". That means it is a public resource, and it should not contain high levels of contaminants such as nitrate, bacteria, viruses or other pathogens in the first place. Wells that are tested can be looked at as year-round groundwater quality monitoring wells. If contaminants are showing up in wells, the groundwater source is being contaminated. In our County the most widespread likely source of available groundwater contaminants comes from waste products applied to the land in shallow bedrock areas. Regulating these applications will provide us with the most protection and prevention "bang for our buck".

"We will be forcing other counties to take our wastes" will likely be another argument made against adopting this ordinance. This proposed ordinance was written with the intent of helping to prevent and minimize contamination of our groundwater resources utilized for drinking water by citizens of Kewaunee County. As groundwater aquifers do not respect municipal boundaries, the adjacent towns and counties bordering the areas this ordinance will affect will likely also derive some indirect groundwater quality protection benefit as well. As always, adjacent counties will have to decide for themselves the level of groundwater protection activities they wish to put in place in their respective counties.

Regarding the administration of this ordinance, my intent was as follows. I do not think the Land and Water Conservation Department should not be handing out citations "left and right" immediately after this ordinance goes into effect. If an ordinance successfully accomplishes what it was intended to accomplish, there should be little need to issue citations. The Committee should also periodically discuss, review, and possibly update, the citation amount levels stated in the Ordinance.

As with any ordinance or regulation, there should be a corresponding "policy" for administration. This is something that the Department and Committee should jointly develop. To start with, I believe the following policies should be followed in the administration of the ordinance. Additional policies will, no doubt, need to be developed over time.

- Before the ordinance requirements apply to a specific landowner or operator, the affected owner and operator of land to which this ordinance applies will be provided, through the mail or in person, with a color, section-level air-photo/map clearly depicting applicable property boundaries and areas covered under the ordinance, along with a copy of the ordinance and reference materials. An explanation document provided along with this information packet will inform the landowner or operator of who they can call at the Department if they have any questions regarding the maps, ordinance or reference material.

- If the Department, while working jointly with a landowner or operator, determines that there is no way the landowner or operator can currently comply with either the land application requirements, or unconfined stockpiling requirements of the ordinance, the issuance of a citation could be temporarily waived by the Land and Water Conservation Committee as long as the landowner or operator was cooperating with the Department in planning, designing, and/or applying for cost-share grant funding toward, establishing an appropriate solution.
- Whatever depth to bedrock map is utilized in the ordinance, either 5 feet or 20 feet, it should be reviewed and revised by the Department and Committee as new, more precise depth to bedrock data becomes available.
- In most cases, an initial ordinance violation, should only result in a written notice of violation from the Department.

-Andy Wallander, County Conservationist

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It has been said that those who fail to understand history are forced to relive it again. That is why last time I talked to this group I spoke about why our forefathers left Europe and came here. The water, air, and soil had become so polluted that it could not sustain a quality life. They were seeking clean water, clean air, sound soils which they no longer had in Europe. So they left Europe for America and Wisconsin and Kewaunee County. Starting with these elements they built all that you see here in this Kewaunee County. And if we do not maintain these principles everything around us in this county will begin to fail just as it did in Europe. So even if you do or do not have an agriculture based life it will affect you through secondary processes failing eventually. There is no New American to move to so we must correct the situation.

Today at a meeting I had a woman and her daughter speak to me about a trip to a third world country in Africa. The place they stayed was on the banks of the second deepest fresh water lake in the world. It was so polluted there was no life in it. It was unsafe to walk in it. The few wells they had were polluted. The stream whose source was a mountain near where they were missionaries was also polluted when it reached the lake. She had to drink bottled water. She had to wash one day with a only a 20 ounce bottle of drinking water because drinking water was so valuable. Sounds to me we have nearly reached this point in Kewaunee County. The question is are we at 2.5 on the 3 point scale.

This summer I had the privilege to visit Washington Island and the Schoolhouse beach which is a rock beach like the one I have. You can see the bottom of the beach ten feet out and ten feet deep. I could not see my own feet on my stone beach in ankle deep water if I so dared to walk into the water. There I learned that W.I. has no municipal sewage treating plant. It is unclear just how they are handling the sewage other than the use of septic tanks. The gray water may be spread on land or it may be taken off the island to be treated elsewhere. Two things are clear: There are no closed beaches due to pollution and there are no polluted wells.

This makes W.I. A great opportunity for comparison. They are very close to this area. They have the same karst soil type as Kewaunee county. They are surrounded by the same lake. They have the same geese, gulls, and raccoons, rabbits and vultures yet no pollution of water in wells or beaches. The human concentration is comparable to Lincoln township during the winter months and has a greater population concentration in the summer months. What they do not have that this county does have is Concentrated Animal Feeding Operations.

I want to remind this committee that we do not have to prove the source of pollution. Just like you do not have to prove a person guilty of a crime and sentence him to prison or even death. Our legal system provides for this situation. It is called circumstantial evidence. So using circumstantial evidence, if it walks like a duck, has web feet like a duck, flies like a duck, has feathers like an duck and quacks like a duck you can be pretty sure come to the conclusion that it is not a dog and that it is a duck. Likewise with the source of pollution. You do not have to prove the exact site of origin.

A handwritten signature in cursive script that reads "Eric Hansen". The signature is written in dark ink and is positioned in the lower right quadrant of the page.

Land and Water Conservation Committee
Dear Committee Members:

9 September 2014

PLEASE do NOT permit aerial spraying of liquid effluents.

Before setting up the means to handle still more cows, lets slow down and let the Land and Water Conservation Committee do their job properly. The subject, after all, is not cows... but rather environmental and public health.

This should start with a review of photographs and testimonials of the state of land and water as it looks and smells today, along with any available results of air and water testing. It's also instructive to compare current conditions to what it was just a couple decades ago before the advent of concentrated animal factories. We need to look objectively... and define the problems and challenges... if we are to come up with reasonable and workable solutions. Status quo is unacceptable. Issues with water, soil, and air, indicate we may be well beyond this land's carrying capacity for cows.

- * In 1964 I was part of crew of high school kids doing trout stream improvement in the Scarboro, under direction of DNR experts. The water was clear. Up on top of the watershed, we also helped participating farmers set elevations for doing contour farming. The idea was to keep soil out of streams and rivers, particularly during rain events. After all, it can take a thousand years to create a single inch of living soil.
- * We envisioned a 21st century in which Kewaunee County would be a mecca for fly fishing. Apparently our youthful optimism was premature.
- * I took a job out of state and was gone for 3 1/2 decades. Upon returning I find the change in water quality appalling. I have photographed streams and rivers throughout the summer and have found no time in which water is clear. The only thing that's clear... is that something has gone very very wrong.
- * We support dairy. My grandfather grew up on a dairy farm near Champion. My grandmother hailed from a dairy farm near Prairie Farm in western Wisconsin. They built America's Dairy Land through what was then called "farming." Today we call it organic farming.
- * When I left Wisconsin there were over 50,000 family dairy farms, now there are barely 11,000. This loss of family farms and of my grandparents' kind of farming is another kind of erosion. It's a loss of expertise, knowledge, aesthetics, and sustainability.
- * I know from experience we can do better... a lot better. Land and water conservation implies that health... both environmental and public... has to be priority 1.

Thank you,

Dale and Mary Goodner
Algoma, WI 54201

dhgoodner@gmail.com 487-8094

To: John Pagel, Chairman of Kewaunee County Soil and Water Committee

From: Don Niles, Dairy Dreams LLC

RE: Proposed ordinance

Chairman Pagel, I would appreciate a chance to have my concern shared with your committee as they deliberate on the proposed ordinance before them.

My concern has to do with the fact that the ordinance could be interpreted to prevent the hauling of snow from our dairy's feed pad in the winter. As you know, modern dairies are now being required to collect or treat the leachate that leaves our feed storage area. This is a relatively new restriction. Historically no dairies were required to do this, and still today many smaller dairies are not. As we develop our facilities and protocols to contain leachate we are learning a lot. One thing we have learned is that a large amount of discharge from the feed pad will occur with the spring thaw. Much of the water escaping from the pad will be snow melt, which obviously creates no danger to our surrounding environment. The extra water from the snow melt does, however, tend to flood out the VTA area, at a time it is still largely dormant and sensitive. A best management practice that allows us to protect our VTA is the spreading of snow, including some blown in feed residue, onto preapproved fields. Any feed residue in the snow will be very similar to the crop residue left in the field at the end of harvest. I have been assured by Andy Wallander that he did not intend for this ordinance to prevent the hauling of snow as I have described. Since Andy will no longer be here I would appreciate having the ordinance clearly state that the hauling of snow containing feed residue, to preapproved fields, between 1/1 and 4/15 is not prevented by this ordinance.

Lee Luft

From: Laurie Schetter <Laurie.Schetter@greenstonefcs.com>
Sent: Wednesday, September 10, 2014 2:47 PM
To: wallanda@kewauneeco.org; John Pagel
Subject: Written Comment on the proposed Kew Cty Manure Ord

Hi Andy

I have comment to make on the proposed Manure Ordinance in regard to the date of the restriction. I believe that the 4/15 date is to limiting. Typically, farming is not done by the calendar, but rather by the weather. That being said, I believe that the best practices for manure application is based on the soil conditions as opposed to the calendar date. Soil conditions is a much better method such as restriction of application on frozen vs thawed ground, restricted on saturated ground after heavy rain vs dry ground, etc. Granted this is more subjective, however it is much better than a date. Spring 2014 may have been an example of frozen ground after 4/15, as well as some areas with heavy saturation. On the converse side, some years, manure application, tillage and planting can be well under way prior to 4/15.

If a smaller producer has a large portion of his tillable acres in the 5 to 20 foot of soil, the 4/15 date could be putting him at a very economical disadvantage.

I would suggest considering an earlier date, such as 3/15, or in my mind the better choice is to utilize a determination based on soil condition regardless of the date.

Please submit this email as a written submission.
Thank you!

Laurie

Laurie Schetter
Sr. Financial Services Officer

GreenStone Farm Credit Services
4400 Calumet Ave. Suite 102
Manitowoc, WI 54220

Laurie.schetter@greenstonefcs.com
Office 920-682-5792 Ext. 05258
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Cell 920-309-0098

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Statement on the vulnerability of fractured limestone aquifers to contamination by microbial pathogens
Mark Borchardt, Ph.D.
USDA Agricultural Research Service

It is well established in the scientific literature that the type of hydrogeologic setting found in Kewaunee County, fractured limestone overlain with shallow soils, is highly vulnerable to contamination by the types of pathogenic microorganisms found in wastewater from humans and livestock. A recent review showed 26.2% of the waterborne disease outbreaks reported in the United States between 1971 and 2008 were associated with groundwater from karst limestone bedrock (Wallender et al. 2013).

My research team has conducted two studies related to pathogens in the fractured limestone aquifer of northeastern Wisconsin. The first involved a disease outbreak at a restaurant in Door County in 2007 (Borchardt et al. 2011). Six people were hospitalized and 229 people were afflicted. The cause of the outbreak was discovered to be a human norovirus in the restaurant's well water that had originated from the restaurant's new septic system. A dye trace test showed septage was moving to the well from a broken fitting on one of the septic tanks and from the septic system infiltration field 188 meters from the well. The times-of-travel from the fitting and infiltration field to the well were very rapid, only 6 days and 15 days, respectively, not nearly enough time for the norovirus to become inactivated.

In the second study, my research team and collaborators from the University of Wisconsin – Oshkosh, and US Geological Survey Wisconsin Water Science Center sampled 10 household wells in Kewaunee County the last week of May, 2014.

Tests were performed for four groups of microorganisms in groundwater: 1) Human viruses and bacteria that are only found in human wastewater; 2) Bovine viruses and bacteria that are only found in cattle manure; 3) Disease-causing bacteria and protozoa that are found in both human wastewater and cattle manure; 4) Microorganisms that do not cause disease, but finding them in a well indicates there is a fast route for water to travel from the surface to groundwater. It is important to note the tests used to detect human wastewater and cattle manure are very specific. When the tests are positive there is no ambiguity about the fecal source.

In interpreting the pilot study results it is important to keep in mind each well was sampled only once. This means the conditions at the time the sample was collected can be reported, but no conclusions can be made about the severity or frequency of contamination.

Summary of Results

- 1) Among the 10 wells samples, 7 (70%) were positive for microbial contaminants. For a one-time sample of groundwater this is a very high contamination rate.
- 2) Three wells (30%) had definite evidence of contamination from human wastewater.
- 3) Three wells (30%) had definite evidence of cattle manure contamination.
- 4) Only one well was positive for the conventional indicators of water sanitary quality, total coliform and *E. coli*.
- 5) Four wells had evidence of contamination of *Salmonella* bacteria and one well was positive for the bacterium *Campylobacter jejuni*. The sources of these bacteria are unknown; they could be humans, livestock, poultry, wild birds or other wild animals. These bacteria can cause severe illness in humans. However, only genetic tests were performed for this pilot study and these tests cannot distinguish live from dead bacteria. Therefore it is not possible to make any conclusions about health risks.

References

Borchardt MA, Bradbury KR, Alexander EC, Archer J, Braatz L, Forest B, Kolberg R, Olson C, and Spencer SK. 2011. Norovirus outbreak caused by a new septic system in a dolomite aquifer. *Ground Water*, 49:85-97.

Wallender EK, Ailes EC, Yoder JS, Roberts VA, and Brunkard JM. 2013. Contributing factors to disease outbreaks associated with untreated groundwater. *Groundwater*, doi: 10.1111/gwat.12121

September 9, 2014

We all know that the Department of Natural Resources rules for nutrient applications to crops are a political compromise aimed at maximizing crop yields while trying, at least somewhat, to control surface water runoff. The rules were not created with groundwater in mind. Nor were the rules developed with shallow soils over bedrock in mind, the situation that we have in parts of Kewaunee County.

We have the science that establishes that winter spreading of wastes of any kind exacerbate groundwater contamination. By now, I hope you are at least familiar with the Karst Task Force Report, and the Groundwater Coordinating Council's annual reports to the state legislature highlighting groundwater contamination due to land spreading of wastes, especially when the ground is frozen. And you should be familiar with the most recent report, *Investigating Inter-annual Variability of Well Water Quality in Lincoln Township*, conducted by our own Davina Bonness and Kevin Masarik, University of Wisconsin-Stevens Point, on the year-long well testing done in our township. I am requesting that this paper be made part of my testimony. All of these reports, plus many others, highlight the poor attenuation of nutrients by shallow soils over karst bedrock.

Lincoln Township has a serious groundwater pollution problem characterized as being akin to a "third world country" by Dr. Mark Borchardt, Research Microbiologist for the United States Department of Agriculture. Dr. Borchardt, along with Dr. Maureen Muldoon of the University of Wisconsin-Oshkosh, and Dr. Randall Hunt and Laura Hubbard of the United States Geological Service Wisconsin Water Science Center, conducted microbial and viral contamination sampling of ten wells in Lincoln and Red River Townships in May of this year. "Seven of the ten tested positive for microbial contaminants. For a one-time sample of groundwater, this is a very high contamination rate." A copy of Dr. Borchardt's letter is attached to this testimony.

At their September 2, 2014 board meeting, the Town of Lincoln Board of Supervisors passed a resolution supporting the proposed Public Health and Groundwater Protection Ordinance. I am submitting a copy of that resolution to this testimony as well.

The proposed ordinance you are considering is not the "law of the land" until townships have approved it by referendum for their jurisdictions only. At the very least, give us the opportunity to hold a referendum to decide if this is something that we want in our township.

Thank you for your consideration.



Mick Sagrillo
Chair, Plan Commission
Town of Lincoln, Kewaunee County, WI

Town on Lincoln, Kewaunee County, Wisconsin

**Resolution Supporting the Kewaunee County Land and Water
Conservation Department and Committee's
Proposed Public Health and Groundwater Protection Ordinance**

Resolution # 09022014

WHEREAS, the residents of the Town of Lincoln depend of private wells for their household, farm, and business needs; and

WHEREAS, Lincoln Township is known to have considerable fractured, Karst bedrock underlying the soils in our Township; and

WHEREAS, it is well understood that such shallow soils with fractured bedrock do not have the filtering capacity of deeper soils that may prevent the contamination of the very groundwater that people depend upon; and

WHEREAS, the Kewaunee County Land and Water Conservation Department Well Testing Program has revealed that over 50% of the wells tested in Lincoln Township have failed for either nitrate or coliform contamination, or both; and

WHEREAS, land use practices above shallow soil depth Karst aquifers, including the land application of wastes, are known to provide contaminants, including nitrogen, bacteria, viruses, and other substances capable of causing serious illness to humans, that percolate down through the soil into the groundwater during the process of groundwater recharge; and

WHEREAS, Andy Wallander, Kewaunee County Land and Water Conservationist, presented information to the Kewaunee County Board in August, 2013, about possible sources of groundwater contamination due to the thin soils and fractured bedrock in Kewaunee County; and

WHEREAS, the Kewaunee County Board of Supervisors authorized the Land and Water Conservation Department to assemble a knowledgeable working group, research possible groundwater contamination sources in Kewaunee County, and draft such regulations as deemed necessary to mitigate some of the sources of groundwater contamination in Kewaunee County; and

WHEREAS, as a result of the working group's insight and input, Kewaunee County Conservationist Andy Wallander proposed to the Kewaunee County Land and Water Conservation Committee an ordinance designed to minimize groundwater contamination during the spring recharge period by restricting the application of all wastes to landscapes having a minimum of 5 feet to bedrock, but ideally less than 20

feet to bedrock, during the time period of January 1st through April 15th based on scientific findings of fact; and,

WHEREAS, the Kewaunee County Land and Water Conservation Committee discussed and approved the proposed Public Health and Groundwater Protection Ordinance to landscapes with 20 feet or less of soil to bedrock by a vote of 5 to 0 at their August 12th meeting and sent the proposed ordinance on to public hearing;

NOW, BE IT RESOLVED by the Board of Supervisors of the Town of Lincoln, Kewaunee County, Wisconsin, that the Board of Supervisors fully supports the said recommendations of County Conservationist Andy Wallander and the Kewaunee County Land and Water Conservation Committee in the proposed Public Health and Groundwater Protection Ordinance with its restrictions on spreading wastes between January 1st and April 15th to landscapes having 20 feet or less soil to bedrock; and

BE IT FURTHER RESOLVED, that the Board of Supervisors of the Town of Lincoln, Kewaunee County, Wisconsin, urges the Kewaunee County Board of Supervisors to vote to adopt the said proposed Public Health and Groundwater Protection Ordinance with its restrictions on spreading wastes between January 1st and April 15th to landscapes having 20 feet or less soil to bedrock.

Approved by a vote of 2 for and 0 against on this 2 day of

September, 2014

present

Chairman

Cory Cochart

Cory Cochart

Supervisor #1

Nick Cochart

Nick Cochart

present

Supervisor #2

Jesse Jerabek

Jesse Jerabek

September 7, 2014

To: Mr. Andy Wallander
From: Michael Dovichi, P.G.
Subject: Proposed Manure Spreading Ordinance

Though I have been aware that Kewaunee County was working on a manure spreading ordinance I had not been following the progress of the Land and Water Conservation Committee until recently. I am a Professional Geologist in the state of Wisconsin and have lived and worked in Kewaunee County for the last 39 years. I also own 80 acres in the town of Ahnapee that are actively farmed and I have a private well at my residence. As a result, I have a strong interest in the efforts of the Land and Water Conservation Department to protect our groundwater.

I have reviewed the proposed manure spreading ordinance and view it as a reasonable first step in providing a degree of control over when and where manure can be spread. I trust that the current County Board sees the wisdom in taking this action now with the understanding that money must be provided to the Land and Water Department to study the effectiveness of the ordinance in protecting groundwater. Modifications to the ordinance can be done when data shows how well the ordinance is working.

It is disappointing to read that some members of the farming community are discussing opposition to any ordinance controlling manure spreading. It is also disappointing (though not unexpected considering the current political atmosphere in Madison), that the DNR has not come out with strong support of the proposed ordinance. I have worked for and with the DNR throughout my career and know firsthand that the department can be very effective in preventing pollution if there is a bureaucratic will for action.

Please don't waver in your efforts, the county cannot afford contaminated ground and surface waters.

September 4, 2014

Andy Wallander, County Conservationist
Kewaunee County Land & Water Conservation Department
625 Third Street
Luxemburg, WI 54217

Dear Mr. Wallander,

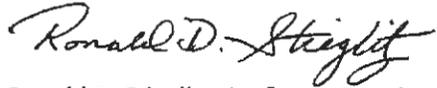
I have reviewed the proposed Kewaunee County Public Health and Groundwater Protection Ordinance and I strongly support the content and the intent of the proposed ordinance. While questions of detail may remain to be worked out with a range of stakeholders, adoption of such an ordinance will serve to better protect both groundwater quality and the public health.

There is a long history of research and monitoring of the geology and groundwater systems of eastern Wisconsin that extends over more than 30 years. It is clear that groundwater in the fractured, and sometime karstic, dolostone aquifer is particularly vulnerable to the effects of surface activities even when those activities are conducted in accordance with best management practices and existing ordinances and regulations. Over that time frame, numerous programs were initiated and actions taken to understand and protect the environment and the public health. For example the former Wisconsin Fund Priority Watershed Program, groundwater regulations including NR 140, pesticide prohibition zones, and Nutrient Management Plans. In spite of these and a much longer list, water wells continue to be adversely affected as evidenced by the monitoring results reported in the proposed ordinance and from other area counties.

Arguments that center on "all the science is not available yet" or "the maps are not detailed enough" are not very persuasive. If that were true then almost none of the existing regulations and ordinances should have been adopted. For instance, minimum well casing requirements for private water wells have been in place for many years although there is no investigation to determine whether or not the specific site is fractured in the subsurface prior to drilling. Should we not treat disease until we are certain that all procedures and drugs are 100% effective and all side effects benign? Soils, geologic, and depth to bedrock maps supplemented with field observations by county staff and other professionals provide a sound and useable framework that can be modified as more data are collected. Provisions for appeals and exemptions provide ways to refine application of the proposed ordinance and to improve the understanding of geological conditions at specific locations.

In conclusion, the proposed ordinance is a reasonable and prudent additional step in the ongoing efforts to ensure groundwater quality and thereby protect the citizen of Kewaunee County.

Sincerely,

A handwritten signature in cursive script that reads "Ronald D. Stieglitz".

Ronald D. Stieglitz, Professor Emeritus
University of Wisconsin – Green Bay
3361 Nautical Ave.
Green Bay, WI 54311
Wisconsin Professional Geologist #425 -13

Statement from Sen. Dave Hansen on a proposed Public Health and Groundwater Protection Ordinance for Kewaunee County

There has been a growing body of scientific evidence that unregulated disposal of animal waste is a threat to Wisconsin's groundwater and waterways. Protecting our sources of drinking water should be a priority throughout the state; however the geological makeup of Kewaunee County makes it even more at risk.

I have proposed legislation at the state level which would have required the Department of Natural Resources to promulgate rules which would limit pollution of groundwater caused by the spreading of any kind of waste, applicable to certain areas with carbonate bedrock which would be susceptible to groundwater contamination. The legislation failed to garner bi-partisan support.

I support this proposed ordinance as it would allow the citizens of Kewaunee County to decide for themselves whether the storage and spreading of waste should be more regulated.

Sierra Club - John Muir Chapter
222 South Hamilton Street, Suite 1, Madison, Wisconsin 53703-3201
Telephone: (608) 256-0565 Fax (608) 256-4562
E-mail: john.muir.chapter@sierraclub.org Website: wisconsin.sierraclub.org

September 9, 2014

The Sierra Club – John Muir Chapter thanks the Kewaunee County Land and Water Committee for the opportunity to speak today in support of the important public health and groundwater protection ordinance under consideration. My name is Laura Menefee, and I am here today as a citizen of Sturgeon Bay and a member of the Sierra Club – John Muir Chapter’s Executive Committee, speaking on behalf of our 15,000 members and supporters throughout Wisconsin, including over 200 in Kewaunee County.

One of our Chapter’s main priorities is protecting our state’s rich water resources, including Great Lakes Michigan and Superior, the Mississippi River, and our over 15,000 inland lakes and 12,600 rivers and streams. Clean water is essential for providing drinking water, and it’s also essential for sustaining our farms and key industries like tourism and the swimming, fishing, and paddling opportunities that define our way of life in Wisconsin. The ordinance under consideration in Kewaunee County will help ensure that these opportunities will be available in the future, and reduce the number of beach closings, algal filled lakes, and fish kills that result from improper waste spreading and spills.

The Sierra Club – John Muir Chapter has long supported special regulations for waste spreading in Kewaunee County and other areas in Northeastern Wisconsin known to be particularly vulnerable to aquifer contamination due to their karst geology. Improper waste spreading in these limestone-based areas is especially risky, because large amounts of manure can travel through cracks, caverns, underground streams, and sinkholes to cause widespread water contamination. The current proposal to restrict stockpiling or land application of wastes on land areas within Kewaunee County having soil depths to fractured carbonate bedrock of 20 feet or less between January 1st and April 15th has the potential to protect sensitive aquatic habitats and prevent a public health crisis. It also allows for an exemption to the restriction if absolutely needed and deemed appropriate by those of you serving on the Land and Water Conservation Committee.

Wisconsin now has at least 263 permitted Confined Animal Feeding Operations, which contributed to 1,049,700 gallons of manure spilling in 2013, the highest amount in seven years. In addition, phosphorus pollution resulting from agricultural runoff is responsible for a growing dead zone that starts north of Green Bay and extends for 30 miles. The number of hypoxic days in this area has increased from 4 in 1990 to 43 days in 2011. This ordinance, while not a silver bullet, is an important first step in addressing this urgent, growing problem. For all these reasons and more we urge you to support Kewaunee County’s ordinance to protect drinking water in this vulnerable karst region of Wisconsin. Thanks again for your consideration and for allowing me to speak to your committee today.



September 8, 2014

To: Andy Wallander
Kewaunee County Land & Water Conservation Department

From: Maureen Muldoon
Professor of Geology, UW Oshkosh

RE: proposed Public Health and Groundwater Protection Ordinance

I am writing in **support** of the proposed Public Health and Groundwater Protection Ordinance. I wish I could attend the public hearing on Tuesday, September 9th; but unfortunately my class schedule prevents me from doing so.

In the following memo, I outline the reasons for my support of this ordinance and try to address concerns that action should be delayed until the hydrogeology of the area is better characterized.

Reasons for Support:

I have been studying the hydrogeology of the Silurian dolomite aquifer in northeastern Wisconsin for over 25 years. While much of my early work was conducted in Door County (where soils are typically less than 5-ft thick), more recent research has been based in areas that have thicker soil cover (7 to 18 ft). One project, conducted in Brown, Kewaunee, Calumet and Manitowoc Counties; assessed seasonal variations in recharge and water quality in the Silurian aquifer in (Muldoon and Bradbury, 2010). A recent pilot project sampled ten private wells in Kewaunee County for four groups of microorganisms in groundwater (Borchardt and others, unpublished data, 2014).

Past research supports the following conclusions concerning the hydrogeology of the Silurian dolomite aquifer in northeastern Wisconsin.

- Flow in this aquifer is characterized by rapid downward flow in vertical fracture network and rapid horizontal flow along bedding-plane parallel fractures (10's to 100's of feet per day).
- Recharge to the aquifer (flow of water from ground surface to the water table) is also rapid and there is little to no attenuation of contaminants within the aquifer.
- The project "Assessing Seasonal Variations in Recharge and Water Quality in the Silurian Aquifer in Areas with Thicker Soil Cover" (Muldoon and Bradbury, 2010) determined that, even in areas with 7 to 18 feet of soil cover, low-conductivity recharge water penetrated into the saturated zone within a day or two of the recharge event (rainfall or snowmelt). They recommended that "*Resource managers should consider the timing of*

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COLLEGE OF LETTERS AND SCIENCE • UNIVERSITY OF WISCONSIN OSHKOSH
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recharge events when developing best management practices for the application of animal wastes and sewage sludge. The fact that recharge water reaches the saturated zone very rapidly and that significant recharge occurs from December to April suggests that manure and sewerage sludge applied during the winter months has the potential to carry pathogens to the aquifer very rapidly.”

Existing water-quality data support the following conclusions.

- Areas in northeast Wisconsin with elevated nitrate values and bacteriological exceedances are not randomly distributed across the landscape. Rather they correlate with areas where thin, permeable soils overlie the fractured dolomite aquifer (NE WI Karst Task Force Report).

- Data from county-wide sampling programs conducted by the Kewaunee County Land and Water Conservation Department indicate that approximately 30% of the wells sampled throughout the County, were not safe for human consumption due to presence of bacteria and/or nitrates above the drinking water standard. In addition, the Towns of Lincoln and Red River, both areas where shallow soils are more common, had over 40% of well sampled were not safe for human consumption (proposed ordinance).

- A recent sampling project in the Town of Lincoln (Bonness and Masarik, 2014) looked at water quality variations in ten domestic wells over the course of a year; six of the wells has an average nitrate-N concentration greater than the drinking water standard of 10 mg/l. They also noted the following: *“The degree to which nutrient management has been implemented around these wells (89% of cropland acres) is extensive; Kewaunee County is second (by percent of crop acres) in the state for implementation of crop acres with a nutrient management plan (GCC, 2013). The extent to which nutrient management plans are being followed could not be verified; unless information exists to show otherwise we assume here that they are an accurate representation of what is taking place on the landscape. As a result, we have to conclude that the elevated concentrations of nitrate in these ten wells are a result of acceptable agricultural management practices and not the result of gross mismanagement or negligence.”* (Emphasis mine)

- Researchers from USDA- Agricultural Research Service, University of Wisconsin–Oshkosh, and US Geological Survey Wisconsin Water Science Center sampled 10 household wells in Kewaunee County the last week of May, 2014. Real time quantitative reverse transcription-polymerase chain reaction (RT-PCR) methods were used to determine the virus genome concentrations for both bovine-specific and human-specific viruses. In addition, samples were analyzed for pepper mild mottled virus (indicative of contamination from ground surface), bovine bacteroides, and zoonotic pathogenic bacteria that can be derived from either human or bovine fecal waste: enterohemorrhagic *E. coli*, *Salmonella* species, and *Campylobacter jejuni*.

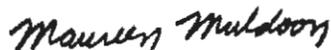
Results indicate that seven of the ten sampled wells were positive for fecal contamination. Two wells contained human-specific viruses, two contained bovine-specific viruses, one

well contained both virus types, and one well was positive for bovine bacteroides. Five of the wells contained either *Salmonella* or *C. jejuni* which is concerning in terms of human health.

Reasons for proceeding with the ordinance

Based on the above hydrogeologic research and existing water-quality data it is clear that current management strategies are not adequate to protect groundwater in Kewaunee County. The proposed time frame for prohibiting manure applications (December to April) is in agreement with the main recharge periods and time of increased aquifer vulnerability noted by Muldoon and Bradbury (2010). The suggested depth to rock criterion of 20 feet is also supported by research. While it would be nice to have more-detailed maps of the depth to rock within the county, it is also important to note that there is uncertainty in any geologic map. Uncertainty in the resource data is not an adequate reason for not proceeding with the ordinance. If the county chooses to do so, it can invest the time and funding to generate improved maps of depth to rock. Mauel and Madison (2013) outline procedures for mapping depth to rock over the Silurian aquifer.

Sincerely,



Maureen Muldoon

WI Professional Geologist (790-013), WI Professional Hydrologist.(100-111)

Prof of Geology, UW-Oshkosh

920-424-4461, muldoon@uwosh.edu

Attachments:

•2-page summary of the report: "*Assessing Seasonal Variations in Recharge and Water Quality in the Silurian Aquifer in Areas with Thicker Soil Cover*" (Muldoon and Bradbury, 2010)

•Results Statement and Summary Table of Results from the Sampling conducted by Borchardt and others, 2014

References:

Bonness, D. and K. Masarik, 2014. Investigating Intra-annual Variability of Well Water Quality in Lincoln Township.

Mauel, S., D. Frame and F. Madison, 2013. Mapping Bedrock: Models and field tools to identify loss potential in vulnerable landscapes:UW-Extension, Discovery Farms, 19 pg.

Muldoon, M.A. and K.R. Bradbury, 2010. Assessing Seasonal Variations in Recharge and Water Quality in the Silurian Aquifer in Areas with Thicker Soil Cover: Final Report to the Wisconsin Department of Natural Resources, 45 p.

ASSESSING SEASONAL VARIATIONS IN RECHARGE AND WATER QUALITY IN THE SILURIAN AQUIFER IN AREAS WITH THICKER SOIL COVER

Principal Investigators: Dr. Maureen A. Muldoon, Dept of Geology, University of Wisconsin-Oshkosh; Dr. Kenneth R. Bradbury, Research Hydrogeologist/Professor, Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension

Period of Contract: 7/1/2007-8/31/2008

Objectives:

The goal of this project was to gain an understanding of seasonal variations in recharge, the timing of recharge events, and the resulting water-quality variations in the Silurian dolomite aquifer in areas with 10 feet or more of surficial sediment.

Background/Need:

The fractured Silurian dolomite aquifer is an important, but vulnerable, source of drinking water in northeast Wisconsin. Well contamination events in the Town of Morrison in Brown County (Green Bay Press Gazette, Feb 8, 2006) and Cooperstown in Manitowoc County (Green Bay Press Gazette, May 12, 2008) refocused public attention on the aquifer's susceptibility to contamination. In both events, it appears that manure-contaminated recharge impacted several domestic wells completed in the underlying dolomite aquifer. While these events generated media attention, they are not isolated incidents. Historically, "brown-water" events during spring have been noted in several other counties underlain by the Silurian aquifer – specifically in Door, Calumet, Kewaunee and Manitowoc Counties. In response to these events, Kevin Erb of UW-Extension organized a Northeast Wisconsin Karst Task Force that was charged with developing recommendations for best management practices (BMPs) that would help minimize groundwater contamination in areas underlain by shallow carbonate aquifers with specific attention to BMPs relating to the storage and application of animal wastes.

Previous work in Door County, where soils are typically less than five feet thick, has demonstrated that recharge to the dolomite aquifer can be exceedingly rapid and there was general agreement that the aquifer underlying the Door Peninsula is vulnerable to contamination. Deliberations of the Karst Task Force revealed that there was less consensus on the relative vulnerability of the aquifer in places where the soils were thicker (greater than 5 feet, but less than 50 feet). In reviewing the literature, we were able to locate few field studies of recharge variability in areas where these thicker soils occur over the dolomite aquifer. The need for field data in such settings motivated this study.

Methods:

We installed shallow bedrock wells using air-rotary methods at sites in four counties (Brown, Calumet, Kewaunee, and Manitowoc) where the Silurian aquifer was the uppermost bedrock aquifer and soil was greater than 10 feet thick. All wells were located at the edge of agricultural fields where manure or sewage sludge was being applied. Wells were sited to avoid interference from septic systems. Geophysical logs were used to identify high-permeability bedding-plane

fractures. Water levels and water temperature were recorded every 30 minutes using Solinst Leveloggers™. Each of the wells was also instrumented with a downhole temperature/conductivity probe placed adjacent to a major horizontal fracture. Probes were connected to a surface datalogger that was programmed to record hourly average values. All wells were sampled approximately monthly for nitrate-nitrogen, chloride, and dissolved phosphorus during the period September 2007 to August 2008. Samples were collected by lowering a submersible Grundfos sampling pump into the well to a point opposite the major bedding-plane-parallel fracture penetrated by that well.

Results & Conclusions:

This study documented variations in water levels, fluid temperature and electrical conductivity, and selected water-quality parameters in four wells completed in the Silurian dolomite aquifer. The data collected provide a better understanding of seasonal variations in recharge and the resulting water-quality variations in the aquifer in areas with ~10 to 20 feet of surficial sediment.

Water levels in all four monitoring wells show rapid responses to episodic recharge events throughout the year. Most recharge occurred following snow melt and large rainfall events in the early spring. However, significant recharge also occurred in autumn, winter, and summer. The response to recharge seems to be a function of the thickness and texture of the unconsolidated material. Water-table depth does not seem to be an important control on the response to recharge.

In all wells, rapid drops in fluid conductivity in response to recharge indicate that low-conductivity recharge water penetrated into the saturated zone within a day or two of the recharge event. Water from all four wells contained elevated nitrate-nitrogen and chloride. Average nitrate-nitrogen values in three of the wells exceed the drinking water standard of 10 mg/L and all wells exceeded nitrate standard at some time during year. Chloride values are elevated in all wells. Phosphorus values are elevated in the two shallow wells, but not in the deeper wells. Elevated nitrate and chloride values suggest that land-use activities are affecting water quality in all wells.

Recommendations/Implications:

This study indicates that, even in areas with 10 to 20 feet of soil cover, the Silurian dolomite aquifer is exceedingly vulnerable to contamination from activities at the land surface. Resource managers should consider the timing of recharge events when developing best management practices for the application of animal wastes and sewage sludge. The fact that recharge water reaches the saturated zone very rapidly and that significant recharge occurs from December to April suggests that manure and sewerage sludge applied during the winter months has the potential to carry pathogens to the aquifer very rapidly.

Availability of report

WDNR, WGNHS

Key Words:

Recharge, fractured carbonates, water-quality

Researchers from USDA- Agricultural Research Service, University of Wisconsin – Oshkosh, and US Geological Survey Wisconsin Water Science Center sampled 10 household wells in Kewaunee County the last week of May, 2014.

The purpose of this sampling is to gather preliminary information for a research proposal to the Wisconsin Groundwater Coordinating Council. The long-term goal of the research is twofold: 1) Quantify the levels of viruses, bacteria, and protozoa from human wastewater and cattle manure in groundwater in northeastern Wisconsin; 2) Identify management practices for septic systems and manure application that minimize groundwater contamination from these sources.

Tests were performed for four groups of microorganisms in groundwater: 1) Human viruses and bacteria that are only found in human wastewater; 2) Bovine viruses and bacteria that are only found in cattle manure; 3) Disease-causing bacteria and protozoa that are found in both human wastewater and cattle manure; 4) Microorganisms that do not cause disease, but finding them in a well indicates there is a fast route for water to travel from the surface to groundwater.

In interpreting the pilot study results it is important to keep in mind each well was sampled only once. This means the conditions at the time the sample was collected can be reported, but no conclusions can be made about the severity or frequency of contamination. In the fractured bedrock of northeastern Wisconsin water contamination can appear and disappear very quickly. In addition, the contamination source, human or livestock, can change with time, depending on the volume of wastewater and manure near the well, the number of infections from these microorganisms in humans and cattle, and weather conditions. The full study will address these questions.

Summary of Results

- 1) Among the 10 wells samples, 7 (70%) were positive for microbial contaminants. For a one-time sample of groundwater this is a very high contamination rate.
- 2) Three wells (30%) had definite evidence of contamination from human wastewater.
- 3) Three wells (30%) had definite evidence of cattle manure contamination.
- 4) Only one well was positive for the conventional indicators of water sanitary quality, total coliform and E. coli.
- 5) Four wells had evidence of contamination of *Salmonella* bacteria and one well was positive for the bacterium *Campylobacter jejuni*. The sources of these bacteria are unknown; they could be humans, livestock, poultry, wild birds or other wild animals. These bacteria can cause severe illness in humans. However, only genetic tests were performed for this pilot study and these tests cannot distinguish live from dead bacteria. Therefore it is not possible to make any conclusions about health risks.

It is important to note the tests used to detect human wastewater and cattle manure are very specific. When the tests are positive there is no ambiguity about the fecal source. These tests are well established in the scientific literature and have been used in research studies for years. The tests are used less often by commercial laboratories because they are highly technical and expensive.

Researcher names and affiliations

Mark A. Borchardt, Ph.D.
Research Microbiologist, USDA-ARS

Susan Spencer

Microbiologist, USDA-ARS

Maureen Muldoon, Ph.D.
Professor of Geology, UW-Oshkosh

Randall Hunt, Ph.D.
Research Hydrogeologist
USGS Wisconsin Water Science Center

Laura Hubbard
Hydrologist
USGS Wisconsin Water Science Center

12 Aug 14

Dear Land and Water Conservation Committee (Kewaunee Co. Board):

A couple of years ago, we needed a new well at my in-laws' cabin near Crivitz. Our old sand point (intake) was at about 26 feet and kept clogging. Our neighbors on both sides have septic drainage fields, and spend a lot of time there, which implies a considerable quantity of "nutrients" would be poised over our drinking water. Twenty feet from that waste accumulation to our water source didn't seem like enough so I asked the well driller for his professional opinion. He said 20 feet of soil was adequate to filter out contaminants, we were at 26, so he figured we'd been safe. Protecting water comes under the heading of "No Brainer." The new well is at 46 feet.

In Kewaunee County the principle is the same, but the potential for impact on ground and surface water (and air quality) is vastly greater. Concentrating non-migratory animals is unnatural and fundamentally problematic. Food has to be shipped in from far and wide. Diseases spread much more readily. What's even worse is the need to dispose of immense and ever accumulating quantities of effluents: manure, medications, chemicals, and hormones. Calling it "nutrient management" doesn't lessen the problem any more than calling malignant cancer a medical condition lessens its impact.

I can not imagine how anybody would seriously consider dumping hundreds of thousands of gallons of liquid manure and effluents over the landscape, much less over bedrock covered by a mere 5 feet of soil. The impact on ground water, neighbors' wells, and surface water would be unavoidable. We can't all live upstream... Tainted ground water, for all practical purposes could be a permanent loss. This cannot be permitted. 20 foot minimum of soil should be just one of many requirements regulating the spreading of effluents. To ere on the safe side, it may take a lot more than 20 feet to protect our precious ground water.

As Dick Swanson said... the problem is simply too many cows on too little land. This unsustainable practice may maximize wealth for a few share holders, but it's at the expense of the true wealth of Kewaunee County... transparent trout streams, refreshing pure well water, clear fresh air, diverse wildlife, clean waves lapping the shining shores of Lake Michigan... and modest sustainable family farms. Other impacts range from increased exposure to virulent pathogens to deterioration of rural roads.

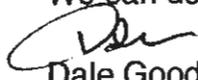
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We returned to the area 4 years ago (after 34 years out of state). What we have discovered is shocking. I've listened to the impassioned pleas of Kewaunee County tax payers, who only want a safe healthy place to raise their children. I've heard business owners express their fears of declining customer base. I've read the road signs that state a preference for family farms over animal factories. I've even heard some say these signs drive away tourism. The signs are merely stating the obvious. Contaminated water, air, and soils repel tourists.

I have a hunch that 20 feet of soil is inadequate to safely handle the current load. But let's at least cap it at 20 for now... and also cap the number of cows being crowded into Kewaunee County, until we better understand what we're doing to this land.

In 1964 I was privileged to work on a conservation crew at Scarboro Creek. We felt we had accomplished something that summer that was worthwhile and lasting. I imagined the year 2000... fishermen converging on Kewaunee County for the excellent fly fishing in some of Wisconsin's finest trout streams, surrounded by picturesque dairy farms with cows grazing in green meadows. I'm afraid we naive high school biology students had underestimated the power of the almighty dollar.

We can do better... we have to, for our own sake, and that of posterity.


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