



Addressing Groundwater Quality in Karst Regions

Davina Bonness

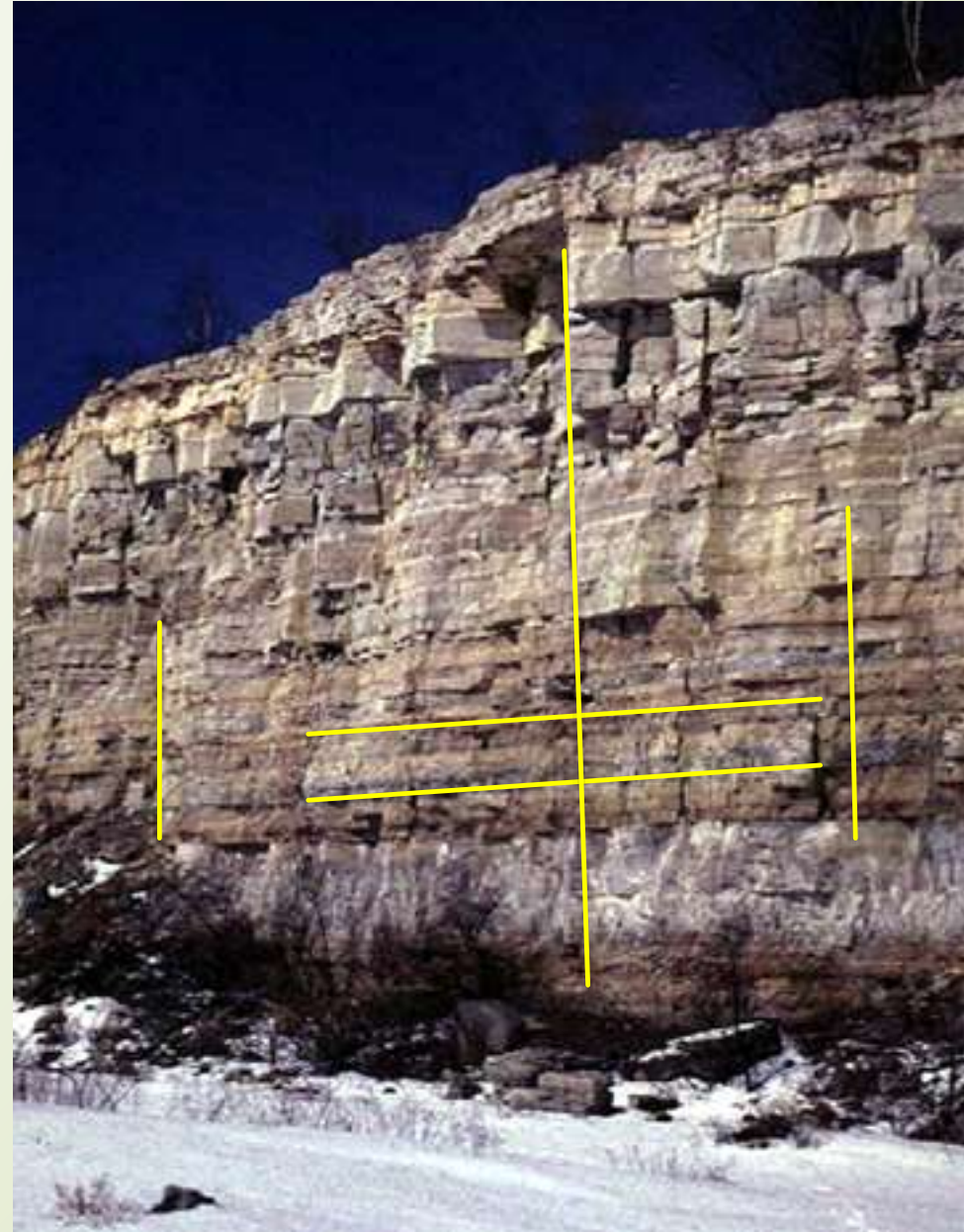
County Conservationist / Department Head

Kewaunee County Land & Water Conservation Department

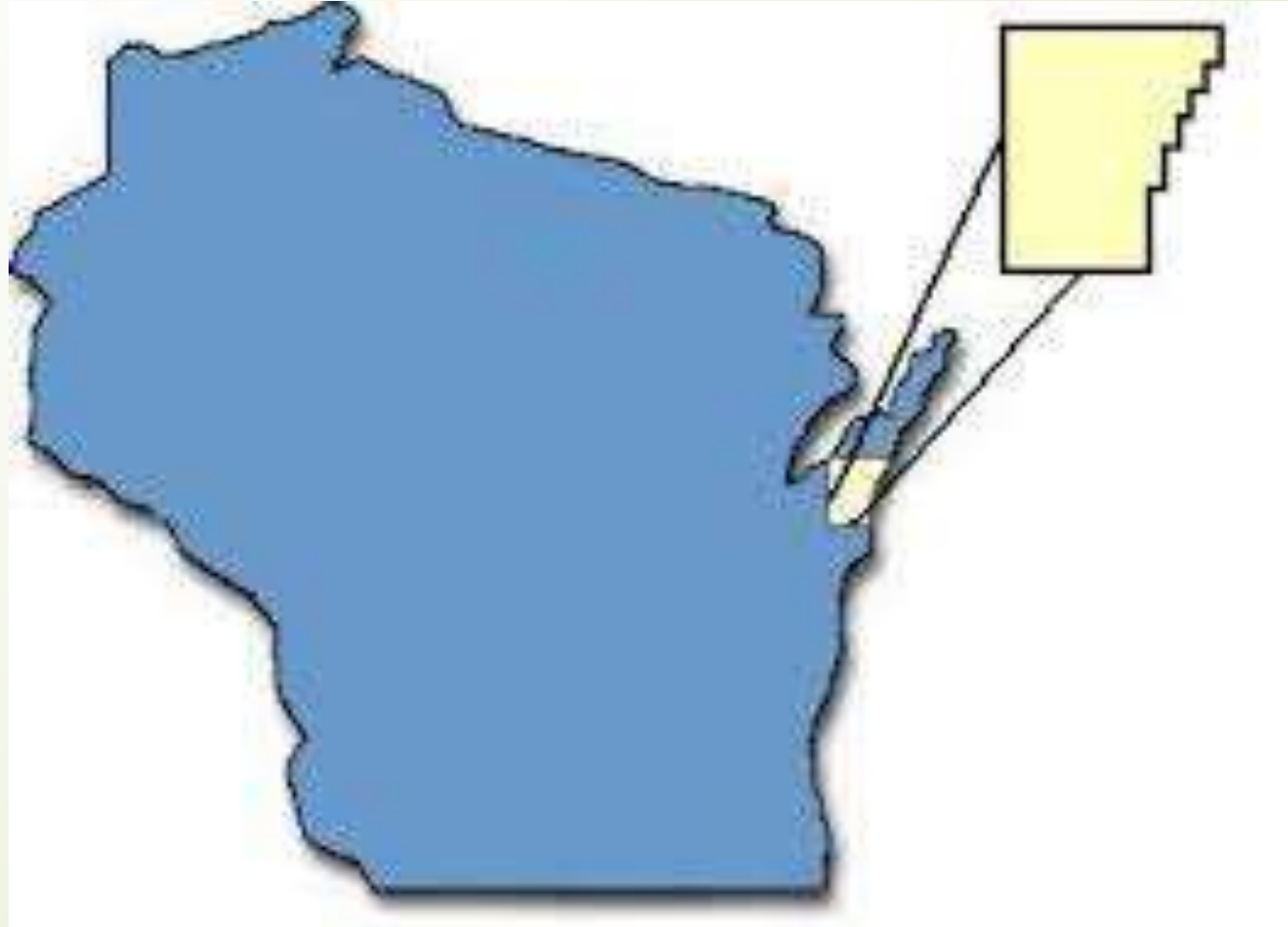


Silurian
Dolomite
In U.S

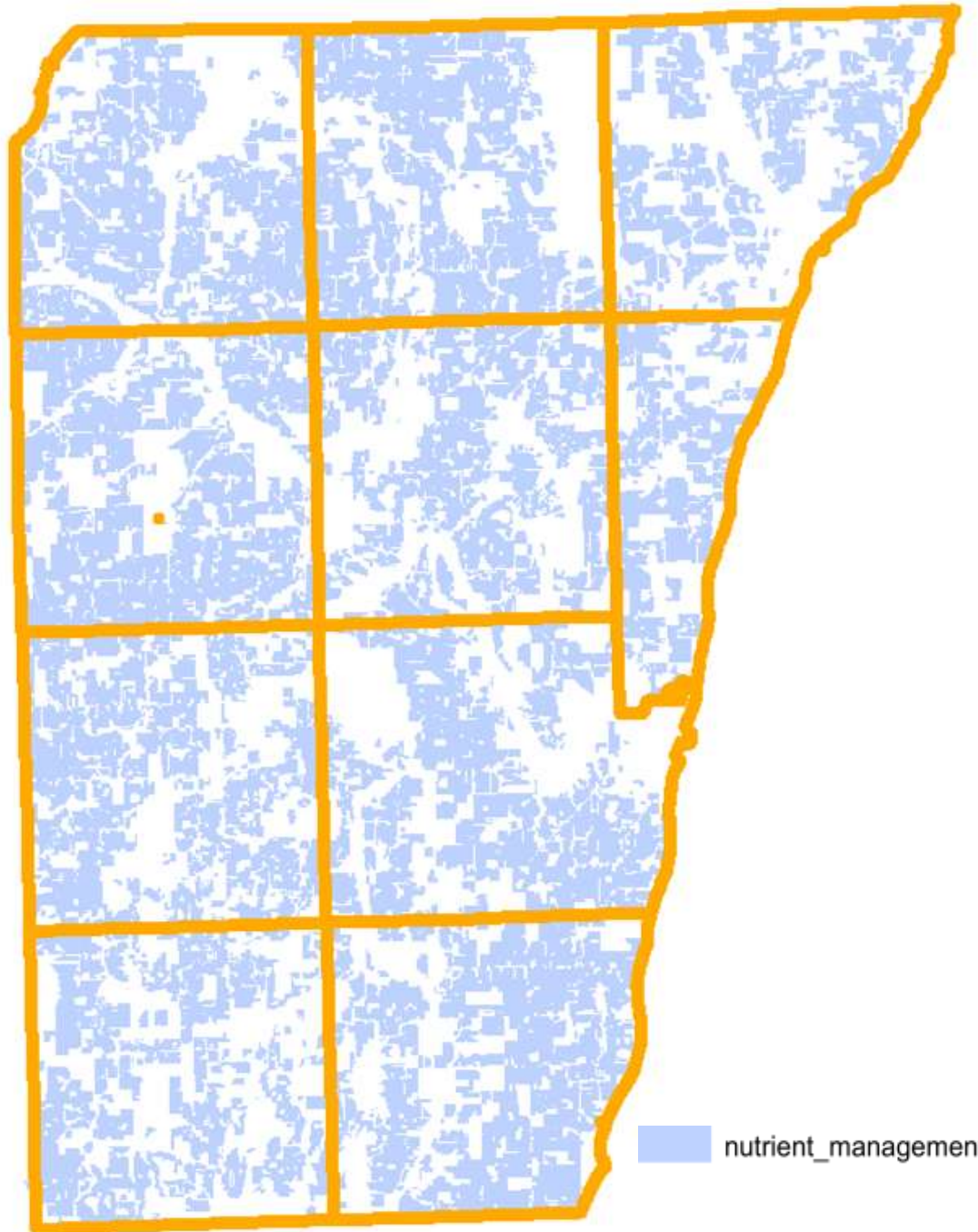
Silurian Dolomite Aquifer



Kewaunee County - Wisconsin



Kewaunee County Agriculture



Kewaunee County	
Livestock	
All Cattle and Calves (2016)	97,000

Number of Milk Cows (2013)	45,500
Milk Cow Herds (2016)	167

Wisconsin CAFO Operations Summary

County	Beef	Dairy
Kewaunee	1	15

Acres under Nutrient
Management (2016)
= >108,000

~ 750 Million Gallons
Annually

Kewaunee County Rural Sprawl

- 4822 septic systems in the county
- 540 holding tanks, 155 abandoned

Personal comm. Lee Luft, Kewaunee County Supervisor, March 7, 2017

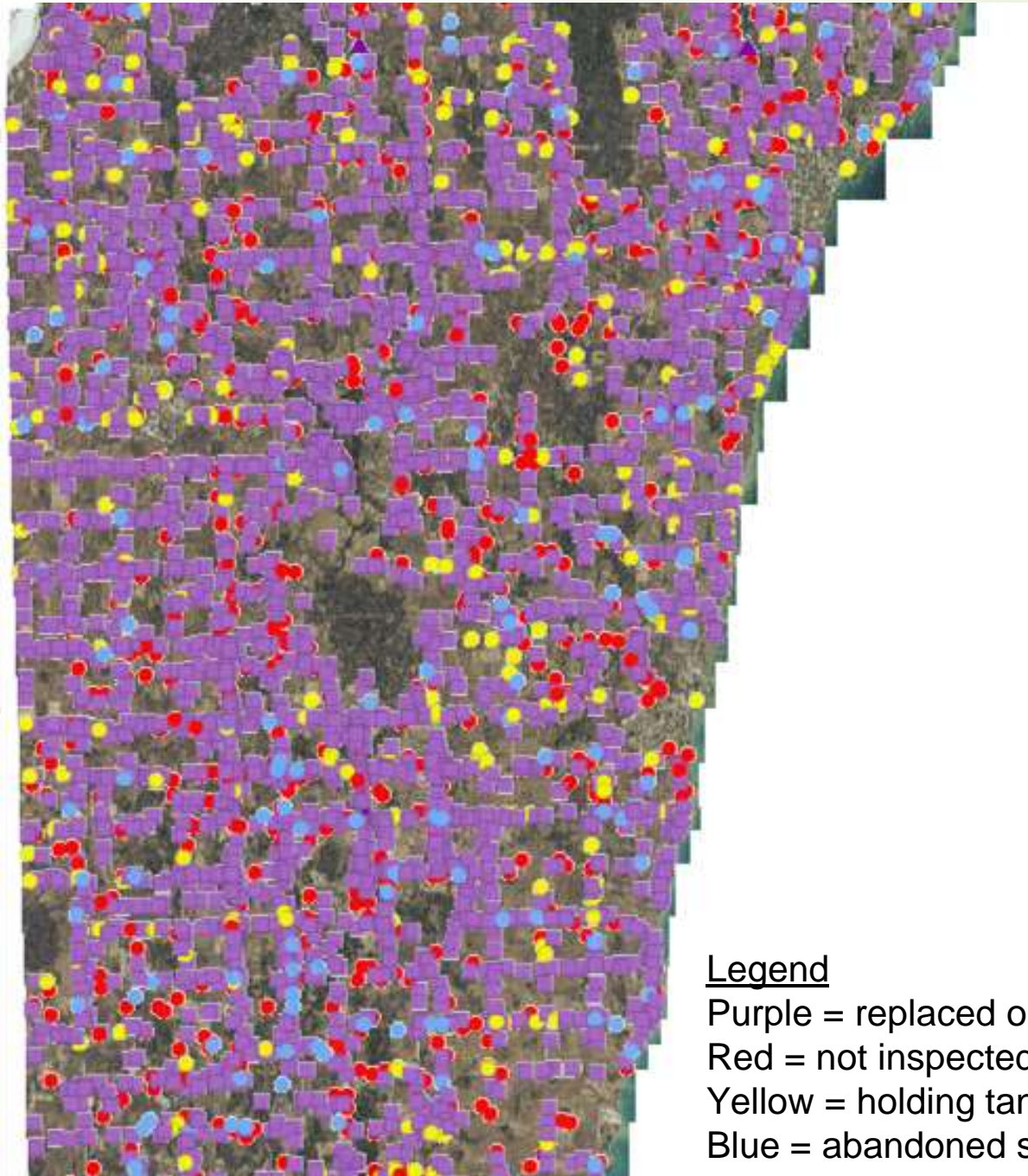
Legend

Purple = replaced or inspected

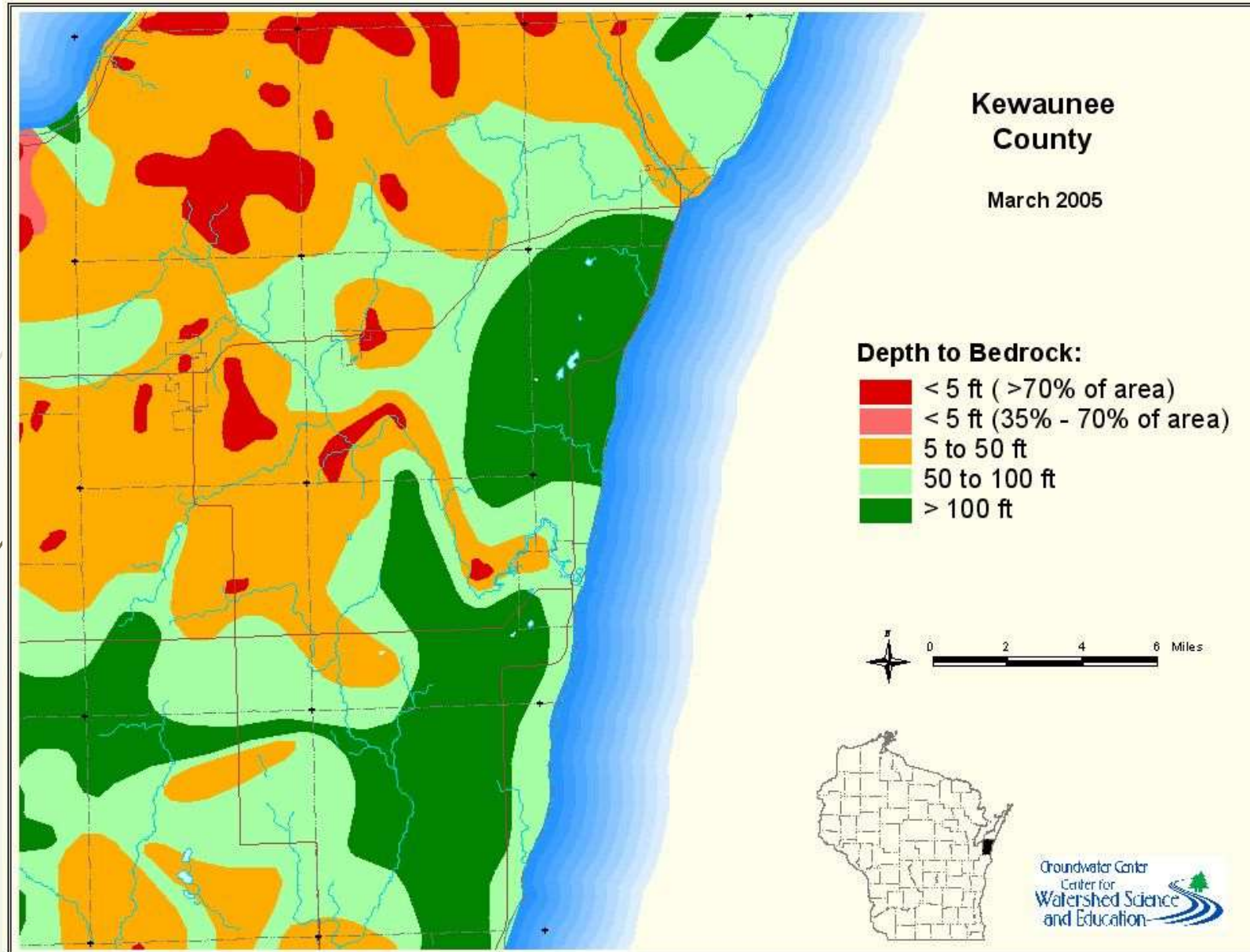
Red = not inspected

Yellow = holding tank

Blue = abandoned system



Shallow Karst Bedrock (Silurian Dolomite Aquifer)



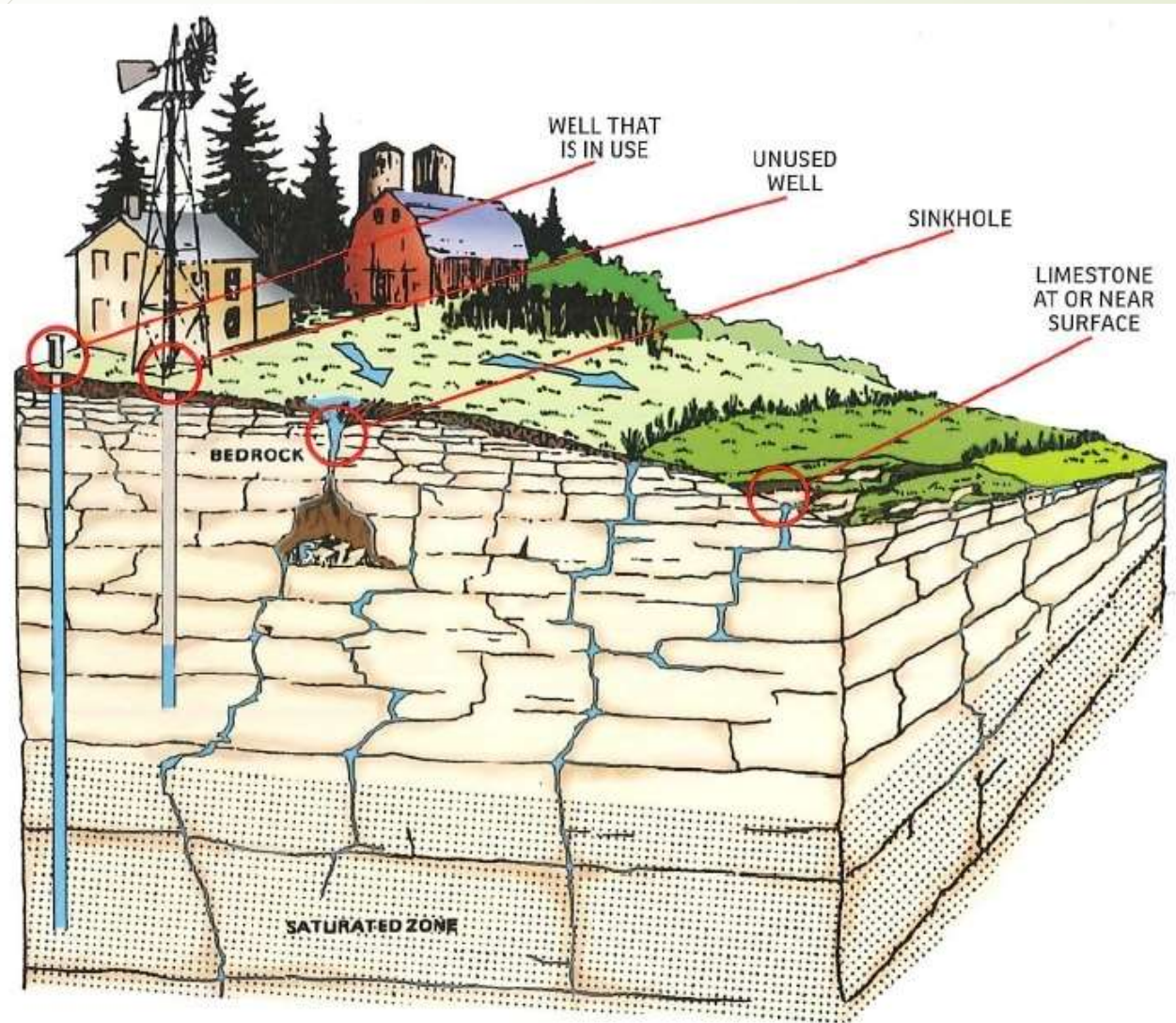
Thin Soils Over Creviced Bedrock: Fracture Traces



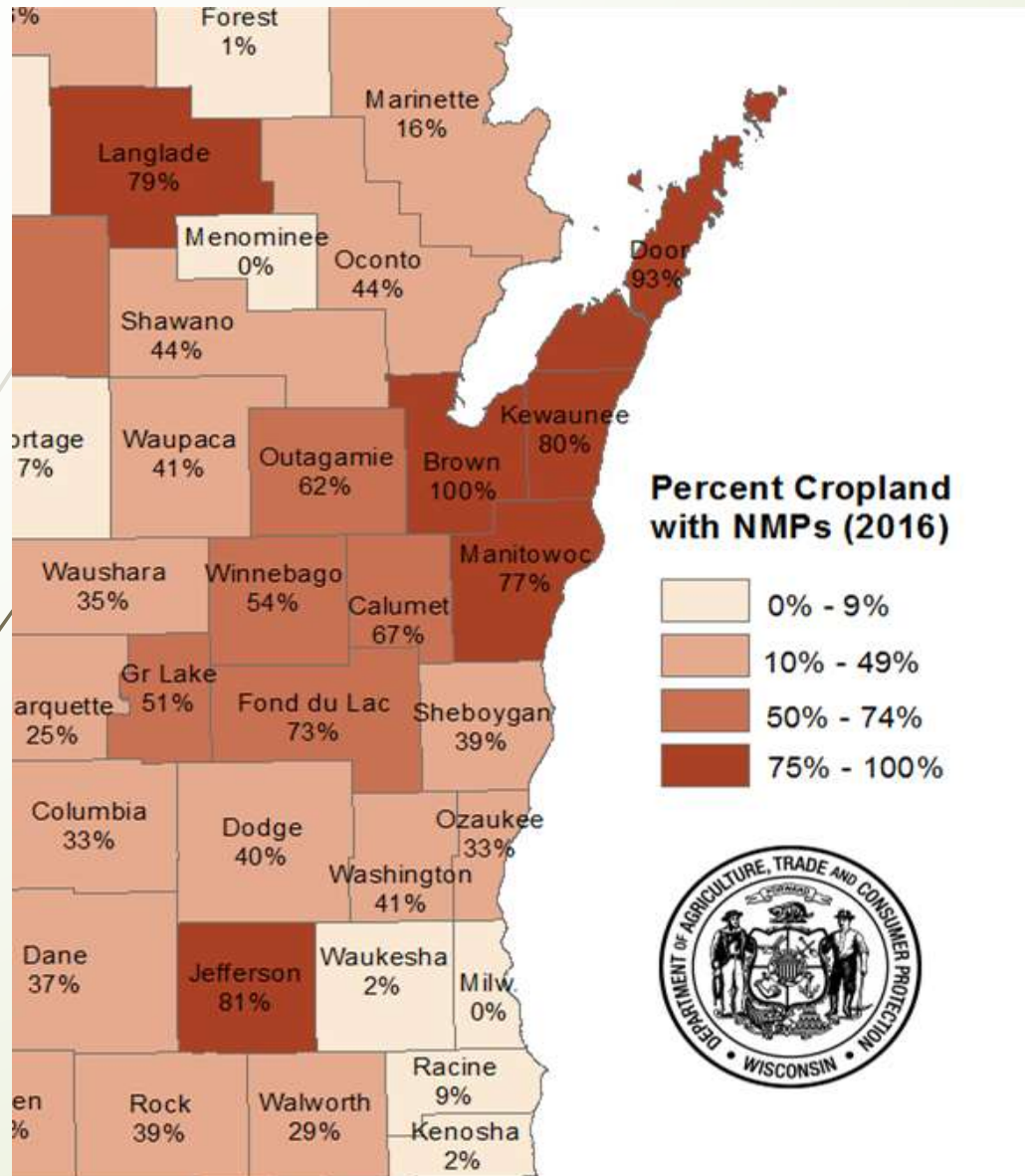
Sinkholes in Agricultural Fields



UltimatelyWhat We Do On The Surface Directly Impacts Our Groundwater



Implementation of Current WI State Standards Nutrient Management & NR151 Standards & Prohibitions:



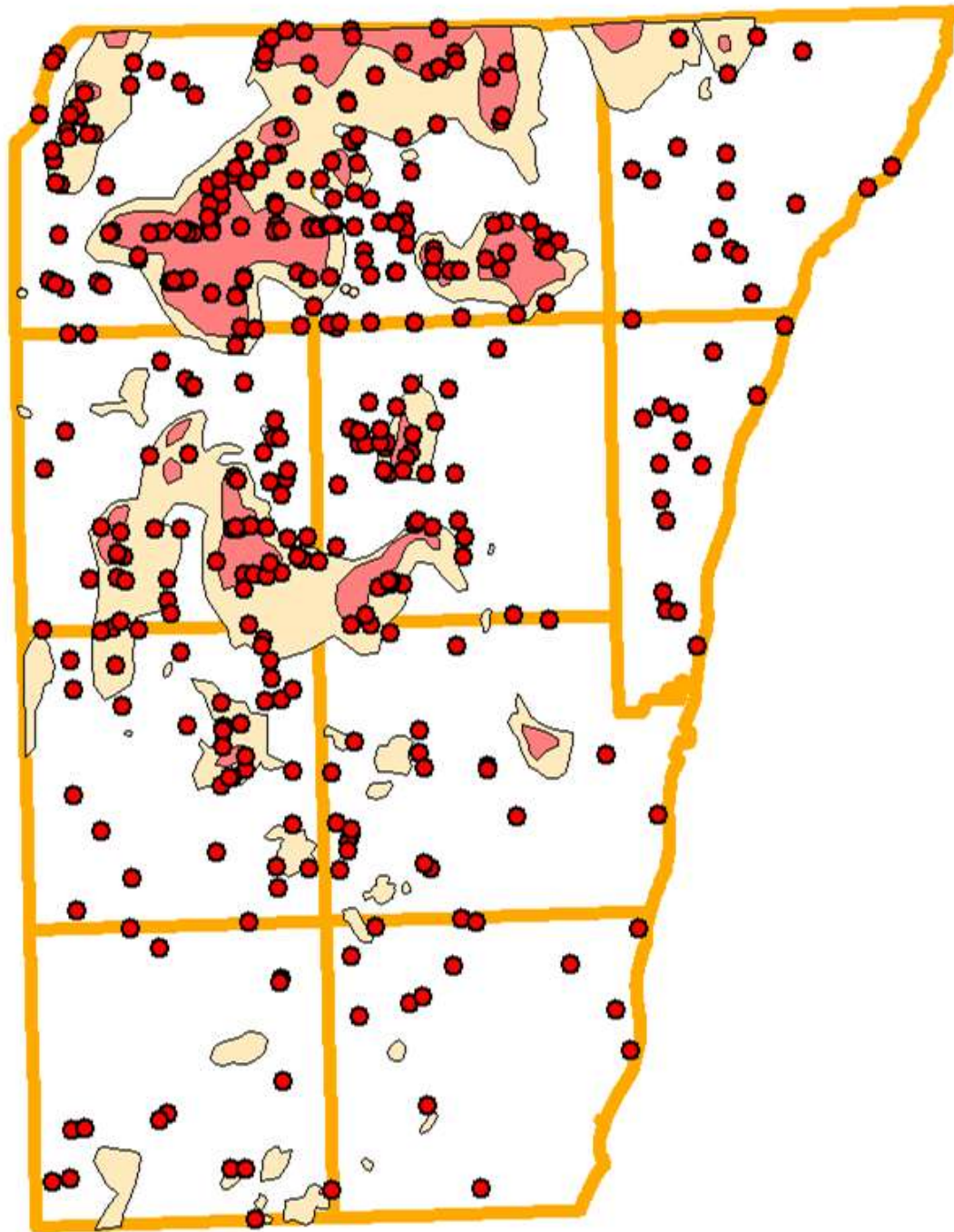
~80% of cropland acres in
Kewaunee County
and

NR 151 Walkover
~ 97,000 acres are in
compliance with state standards
& prohibitions

All farms are walked every 4
years for compliance

2004-2016: Well Testing Results: Private Testing

County Average
"Tested Wells" 30.39%



Legend

- 5_20FT_Bedrock
- Less than 5ft_Bedrock
- ! Unsafe
- ! Safe Wells

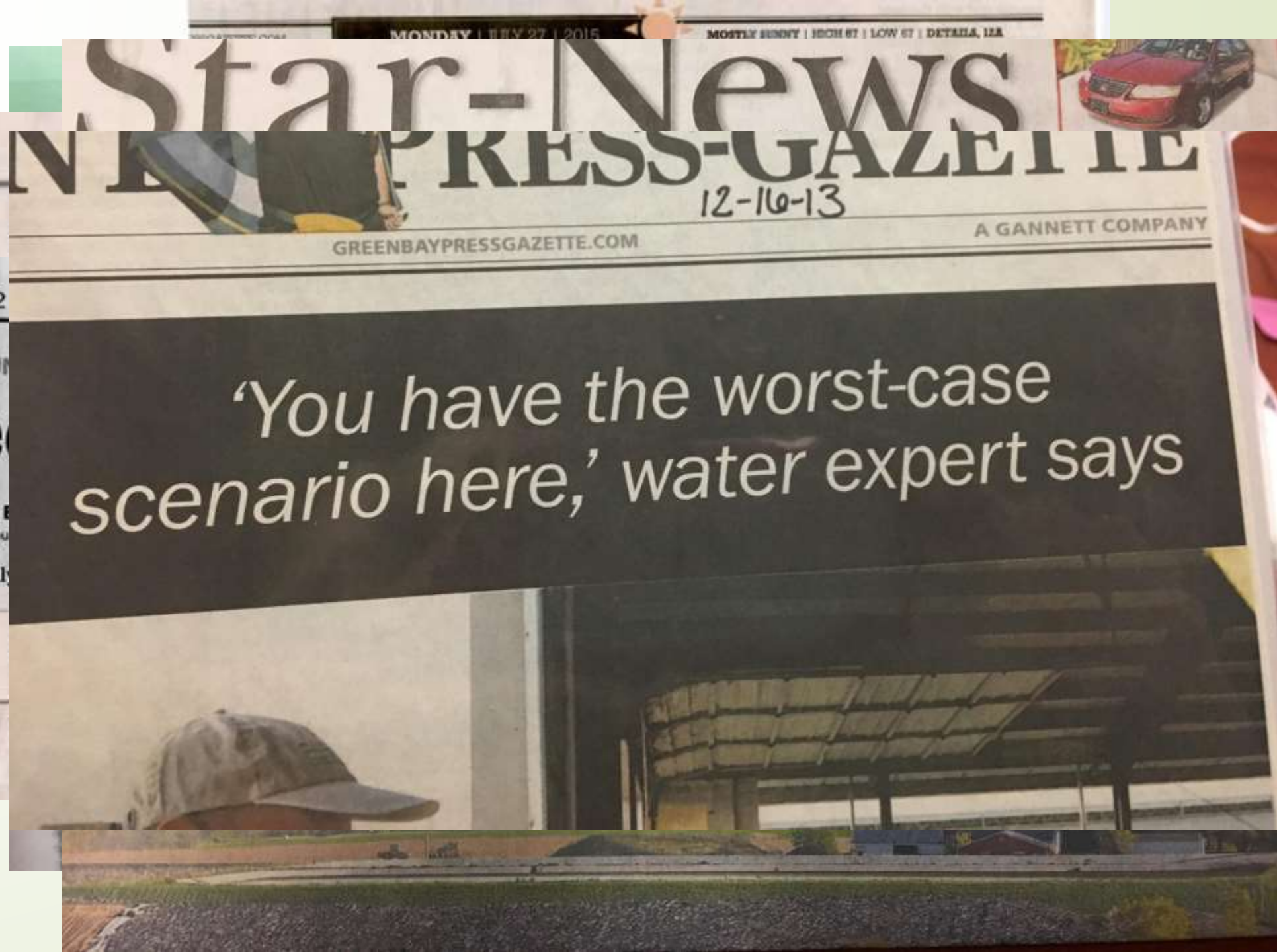


Clearly....

Current regulations
covering land application of wastes
are inadequate
for protecting human health
in the County's shallow soil depth to
carbonate bedrock landscapes.



Now....insert Public Pressure



Star-News

GREEN BAY PRESS-GAZETTE

12-16-13

GREENBAYPRESSGAZETTE.COM

A GANNETT COMPANY

'You have the worst-case scenario here,' water expert says

Page A2

KEWAUNEE

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By Alyssa E.
Kewaunee Cou

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Brown Water Events & Manure Spills

OCTOBER 2016



Manure Spills:

2016 – 14 (7 in October)


2015 – 8

2014 – 7



2014 --Public Health & Groundwater Protection Ordinance was drafted

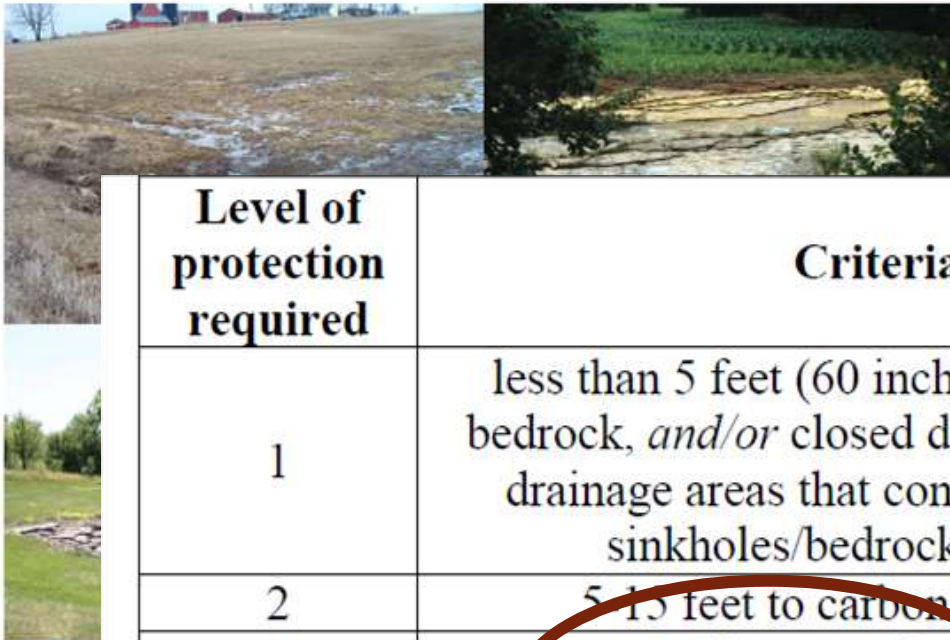
(1st & only County in Wisconsin)



Promote the public health, safety and
general welfare of the citizens of
Kewaunee County through proper land
use and management on
geographically vulnerable areas.

Final Report of the Northeast Wisconsin Karst Task Force

2007:
Karst Task Report



Level of protection required	Criteria	Relative vulnerability to contamination
1	less than 5 feet (60 inches) to carbonate bedrock, <i>and/or</i> closed depressions or any drainage areas that contribute water to sinkholes/bedrock openings	Extreme
2	5-15 feet to carbonate bedrock	High
3	>15-50 feet to carbonate bedrock	Significant
4	greater than 50 feet to carbonate bedrock	Moderate

Edited By: Kevin Erb and Ron Stieglitz



ORDINANCE NO. 173-9-14

KEWAUNEE COUNTY PUBLIC HEALTH AND GROUNDWATER PROTECTION ORDINANCE

THE KEWAUNEE COUNTY BOARD OF SUPERVISORS DO HEREBY ORDAIN AS FOLLOWS:

- 1 This ordinance is adopted under the authority granted by §§59.02, 59.03, 59.70 and 92.11 of the
- 2 Wisconsin Statutes.
- 3
- 4 The Kewaunee County Board of Supervisors, duly assembled this 23rd day of September 2014,
- 5 hereby adopt the Kewaunee County Public Health and Groundwater Protection Ordinance, as
- 6 fully set forth in the attachment hereto.
- 7
- 8 **Effective Date:** This ordinance shall take effect upon passage and publication.

Respectfully Submitted,

LAND AND WATER CONSERVATION COMMITTEE

Ron Paila
John P. Pichel
Bob Danfinkel

APPROVED AS TO FORM

Jeffrey R. Wisnicky
Corporation Counsel

FISCAL IMPACT STATEMENT:

	YES	NO	ABSENT	ABSTAIN
Benes, P.	✓			
Cravillion, D.	✓			
Garfinkel, R.	✓			
Haske, V.	✓			
Heidmann, B.	✓			
Heuer, R.	✓			
Jahnke, S.	✓			
Kirchman, L.	✓			
Luft, L.	✓			
Mastalir, J.	✓			
Paape, G.	✓			
Pagel, J.	✓			
Paider, R.	✓			
Reckelberg, G.	✓			
Romdenne, T.	✓			
Shillin, K.	✓			
Sinkula, L.	✓			
Tebon, K.	✓			
Wagner, C.	✓			
Weidner, R.	✓			
TOTALS	20	0	0	0

SEPTEMBER 2014

P

County Board OK's groundwater protection ordinance, 20-0

Next step is town-level referendums in spring

By Alyssa Bloechl
Kewaunee County Star-News

The Kewaunee County Board of Supervisors unanimously approved a Public Health and Groundwater Protection Ordinance on Sept. 23.

The 20-0 vote was greeted by applause from the gallery.

"This has been a lot of work by a lot of people," County Board Chairman Ron Heuer said. "We need to work together to promote agriculture. I don't want to see agriculture affected negatively. Neither do I want to see families being not protected."

He went on to say he believes the board has taken a big step forward, but there is still work to be done.

Twelve citizens approached the board with comments before the vote, including those for passing the ordinance and some who said it was written incompletely.

"I know that it is not thorough enough, I'm not sure if it was the right process, and I hope there is a better way," Algoma dairy farmer Randy Ebert said during comments.

He went on to say he thinks it is important to create long-term plans to support and guide farmers on this issue while local officials and communities change.

Judy Tremil, a former resident of Kewaunee County, told her story of the contamination and how she wanted to see the ordinance pass.

"My entire family was



PHOTOS BY ALYSSA BLOECHL/KEWAUNEE COUNTY STAR-NEWS

Dick Swanson advocates for the passage of the Kewaunee County public health and groundwater protection ordinance during the Sept. 23 County Board meeting. He placed two jugs of water, one brown and one clear (not necessarily from Kewaunee County wells), in front of Chairman Ron Heuer.



Algoma dairy farmer Randy Ebert addresses the Kewaunee County Board about his concerns regarding a new groundwater protection ordinance. He said it may have passed too quickly and suggested creating a more extensive plan with more guidance and support for farmers. The measure passed unanimously.

2004," Tremil said. "During litigation, part of our settlement with the farmer to ask for him simply to stop spreading liquid manure from months of Nov.

event, and not one well test came back unsafe with those restrictions in place."

Other local farmers approached the board look-

cleared up.

State Assembly candidate Joel Kitchens and state Senate candidate Dean DeBroux both made statements in favor of the

ties were submitted to the board prior to the meeting.

The board also discussed terms of the ordinance once a motion was on the floor. Both dates of land application and snow removal from farms were discussed, but no action was taken to amend the document.

This ordinance, the first of its kind, limits the spreading of manure and wastes on land 20 feet to bedrock during the time period of Jan. 1-April 15, when groundwater is recharging.

The next step is the ordinance will go to referendum during the spring 2015 election. Each town within Kewaunee County will have the chance to vote to adhere to the ordinance or not. If it passes, it would take effect in January 2016.

In other business before the County Board:

• Tracy Nollenberg was appointed to the position of Kewaunee County emergency management director.

• Laura Giddley gave the annual report for the Violence Intervention Project. She talked about what the program offers, citing that in 2013, 136 victims of domestic abuse and 73 of sexual abuse in Kewaunee County were served by their program. VIP is marking 25 years of service to the county this year.

• Appointments were made to the Local Emergency Planning Committee.

• A resolution passed 19-1 approving the collective bargaining agreement with the Kewaunee County Courthouse employees. There is no fiscal impact from this decision.

• A resolution passed 19-1 approving the colle-

BEFORE THE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Petition for Emergency Action Pursuant to
the Safe Drinking Water Act, 42 U.S.C. §300i,
to Protect the Citizens of Kewaunee County,
Wisconsin from Imminent and Substantial
Endangerment to Public Health Caused By
Nitrate and Bacteria Contamination of an
Underground Source of Drinking Water,
and Pursuant to the Comprehensive
Environmental Response, Compensation,
and Liability Act, 42 U.S.C. § 9604, and
Resource Conservation and Recovery Act,
42 U.S.C. § 6973

EPA Docket No. _____
October 22, 2014

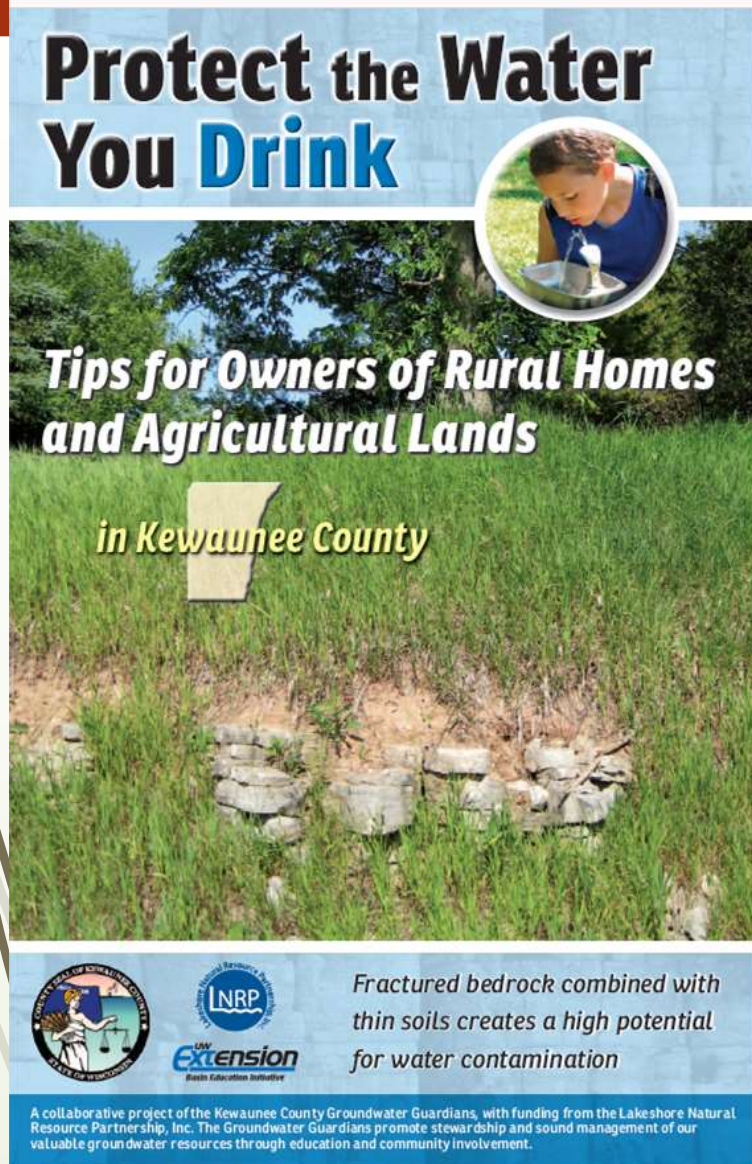
Submitted on Behalf of Petitioners Midwest Environmental Defense Center,
Environmental Integrity Project, Midwest Environmental Advocates, Clean Wisconsin,
Clean Water Action Council of Northeast Wisconsin, and Kewaunee CARES

October 2014: EPA Petition

Request that EPA invoke its emergency authority under section 1431 of the Safe Drinking Water Act, 42 U.S.C. § 300i, as well as to address the imminent and substantial endangerment to public health in Kewaunee County, Wisconsin from widespread and pervasive groundwater contamination from nitrate and bacteria

5 Petitioners

Education / Outreach (2014-2015)



Public, Environmental Groups & Farmers

April 7th, 2015

Kewaunee County Voters Decided:

MUNICIPALITY	Kewaunee COUNTY GROUNDWATER REFERENDUM	
	Yes	No
Town of Ahnapee	139	34
Town of		
Town of		
Town of		
Town of		
Town of		
Town of		
Town of		
Town of		
Town of		
Town of		
Village of		
Village of		
City of Algoma	423	48
City of Kewaunee	615	90
TOTALS	NO TOTAL...EACH MUNICIPALITY VOTES INDIVIDUALLY	NO TOTAL...EACH MUNICIPALITY VOTES INDIVIDUALLY

4,345 votes cast
3,614 voted "Yes"

**That is an 83% approval
among votes for
Groundwater Protection**

Became effective
January 1st - 2016

Door/Kewaunee Legislative Days

April 2015

ASKED... Protect the Public's Drinking Water in At-Risk Karst Geo-Region

Request State of Wisconsin: Develop and advance legislation revising WI Statutes 281.16 and WI Administrative Code NR 151 to authorize the development of agricultural nonpoint water quality standards and prohibitions unique to the **Karst Geo-Region** natural resource potential and limitations, to protect groundwater quality in areas of Door and Kewaunee Counties



**Citizen Petition for Corrective Action or Withdrawal of NPDES Program Delegation from
the State of Wisconsin**

October 20, 2015

Petitioners:

John Domino, Acting Chairman of Tarrant Lake Preservation Committee
Ronald Grasshoff, Friends of the Lower Wisconsin Riverway
Dean Hoegger, Clean Water Action Council of Northeast Wisconsin
William Iwen, Kewaunee Citizens Advocating Responsible Environmental Stewardship
Doug & Sherryl Jones, Friends of the Lower Wisconsin Riverway
Dave Marshall, Friends of the Lower Wisconsin Riverway
Cheryl Nenn, Milwaukee Riverkeeper
Allie Raven, member of the Bad River Band of Lake Superior Chippewa
April Stone Dahl, member of the Bad River Band of Lake Superior Chippewa
Elaine Swanson, People Empowered Protect the Land of Rosendale
Jim Swanson, Wisconsin Wildlife Federation
Nancy & Lynn Utesch, Kewaunee Citizens Advocating Responsible Environmental Stewardship
Jim Wagner, Clean Water Action Council of Northeast Wisconsin
Timm Zumm, Friends of the Lower Wisconsin Riverway

Filed by Petitioners' Representative, Midwest Environmental Advocates, Inc.

October 2015: EPA Petition

Petitioners request that the **EPA withdraw the authority of the Wisconsin Department of Natural Resources ("DNR") to administer the state-delegated National Pollutant Discharge Elimination System ("NPDES")** program if the DNR does not promptly correct permitting program deficiencies as outlined in this Petition.

14 Petitioners throughout Wisconsin

2015-2016: DNR Workgroups

Department of Natural Resources
Environmental Protection Agency
County Land & Water Conservation Departments
Small Farmers & Large Farmers
Custom Manure Applicators
Midwest Environmental Advocates
Certified Crop Advisors
Clean Water Action Council
DATCP (Dept Agriculture Trade & Consumer Protection
NRCS (Natural Resources Conservation Service)
County Board Members
Citizens of Kewaunee County
Zoning Department
Public Health
Kewaunee Cares
UW-Extension

Multi-Stakeholder
Groups



Short – Term Recommendations what can we do now!

- **DNR**

- Investigate streamlining the creation of Special Areas of Eligibility for Well Compensation in Kewaunee County.
- Use its authority under Chapter NR738 to provide emergency water supplies to well owners impacted by offsite livestock bacterial or Nitrate contamination in Kewaunee County.

- Numerous recommendations for the **State Legislature**

- **Local Groups / Citizens**

- Agricultural producers consider making emergency water supplies available to owners of wells impacted by livestock contamination.

- **Kewaunee County:**

- Develop protocol to immediately provide emergency drinking water for owners of wells impacted by offsite livestock contamination until safe water can be obtained
- Provide informational materials to county well owners that include easy-to-use contact information and maintenance checklists.



Compliance Recommendations:

- **DNR / County / EPA**

- Conduct more land application audits/oversight in sensitive areas.
- Additional EPA, DATCP, County, and NRCS staff may also be relevant to: More timely complaint response and enforcement.
- More stringent review of CAFO emergency land spreading variance by DNR.
- Targeted focus on proper well abandonment of non-compliant wells or wells no longer used. DNR
- Require all land applicators to have, at a minimum, on set of spreading restriction maps and written instructions present during manure applications.
- Additional EPA, DATCP, County, and NRCS staff may also be relevant to: Review nutrient management plans.

Sensitive Areas and Practices Workgroup – Bedrock Depth Recommendations - 04-25-2016

Bedrock Depth - 3-5 feet

Avoidance is the best practice to reduce the risk for groundwater contamination on soils 3-5 feet. The mitigation practices that follow reflect interim or intermediate steps that farmers can implement on a voluntary basis to reduce the risk.

Applying manure on soils with 36 inches or greater depth to bedrock is necessary for adequate pathogen reduction.

Some mitigation practices below focus on pathogen reduction and may have limited ability to reduce nitrate leaching to groundwater.

None of the mitigation practices below are meant to override meeting current performance standards (e.g., NR 151 and NR 243) or technical standards (e.g., NRCS 590) related to nutrient management or soil conservation.

3-5 feet to bedrock	Practices
	1. Follow standard practices for >2-20 feet to bedrock
	2. Use current NRCS and County bedrock depth maps and field verification to identify soils location. When possible, use direct measurement (e.g., test pit, probe, etc.) to verify depth to bedrock.
	3. Avoid manure application on these soils and apply on other available acres OR if avoidance not possible, implement all of the following mitigation practices:
	a. Limit liquid manure application rate to 13,500 gallons/week* and follow UW A2809 to determine total liquid manure application; use low application rate that is safe and practical and avoid hydraulic loading of soil * = weekly liquid manure application rate helps reduce groundwater pathogen risk but may not reduce nitrate loading/loss risk after application; following UW A2809 rates and methods can help avoid applying nitrogen above crop N need.
	b. For late summer and fall applications of manure and organic byproducts: <ul style="list-style-type: none">• Use established/growing perennial crops or cover crops as first priority for application.• When a crop is growing, such as perennial crops, overwintering crops, double crops and cover crops, use rates that will not smother these crops and limit N rates to those specified in UWEX A2809 or to 120 lbs/acre, whichever is less.

Loam

13,500 (1½ in.)



RESOLUTION NO. 39-01-2017

**A RESOLUTION IN SUPPORT OF THE DEPARTMENT OF NATURAL
RESOURCES GROUNDWATER COLLABORATION WORKGROUP
FINAL REPORT**

TO THE HONORABLE KEWAUNEE COUNTY BOARD OF SUPERVISORS:

1 **WHEREAS**, the Wisconsin DNR sponsored three workgroups; Short-term Solutions, Compliance,
2 and Best Management Practices / Sensitive Areas consisting of Kewaunee County agricultural
3 industry representatives, Wisconsin DNR and Department Agriculture Trade and Consumer
4 Protection staff, Kewaunee County Land & Water staff, Kewaunee County Health Department staff,
5 concerned citizens, County Board members, U.S. Environmental Protection Agency staff,
6 environmental group staff, and USDA Natural Resources Conservation Service Staff who all
7 participated fully in the discussions that led to the final recommendations; and
8

9 **WHEREAS**, within Kewaunee and Door Counties and some other counties, there are areas of
10 shallow soils over fractured bedrock and other areas where fractured bedrock is located at the
11 surface; and
12

13 **WHEREAS**, pollutants from agricultural fields, animal feeding operations or septic systems can
14 enter groundwater through these conduits (cracks) and be taken up in water wells, causing the
15 water to be unsafe for drinking and other household uses; and

Positive Momentum:

ATCP 50.04(3) (b) (10)

Wisconsin
Division
Bureau of
PO Box 1

Sec. 92.05(3)(k), W
ATCP 50.04(3) W

County name: Lincoln
Township (T_{ownship} N. S.): Lincoln

Name of qualified nutrient

Circle the planner's qualifi

1. NAICC-CPPCC
2. ASA-CCA
3. ASA-Professional Agr
4. SSSA-Soil Scientist
5. DATCP approved train
6. Other credentials app

Circle relevant

1. Are the fol

- a. Field locat
- b. Areas pro
perennial co
vegetation is
- c. Areas with
- d. Areas pro
Water Qual
perennial str
and not exce
contributing
Area whe



Inspection Checklist

f Other: _____

Farm Name: _____

Name: _____

SNOWING

DRY

OTHER: _____

OTHER: _____

NO

GROUNDWATER NONE

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Positive Momentum: Partnering

Increase Soil Health & Cover Crops

016)

coli positive

May 25, 2017)

p Launches
network in
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r-led
e Farms

Cover Crop Challenges, and several new projects for 2017.



Positive Momentum: Partnerships cont.

Ahnapee & Kewaunee River Watershed Conservation Plan

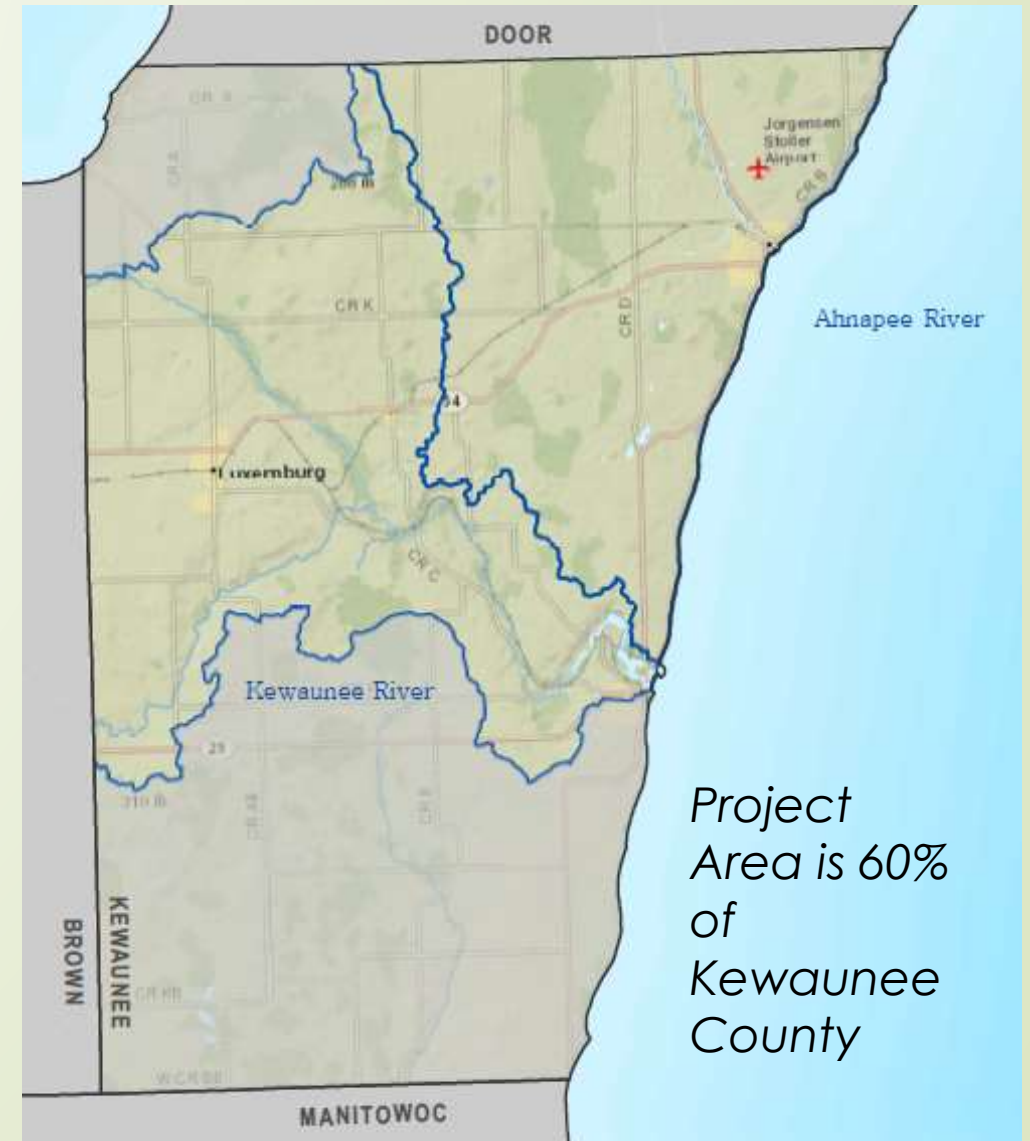
The Kewaunee watershed plan is the first in recent history for Wisconsin NRCS (i.e. within the past 10 years).

32

Final meeting on June 7th



United States Department of Agriculture



Project Area is 60% of Kewaunee County

Diverse Technical Advisory Group

County Administrator & County Board Chair
Land Conservation Committee
Large CAFO Owners
Small Dairy Farmer
University of Wisconsin -Green Bay Professor
WI Geological & Natural History Survey
UWEX Agricultural Agents
Microbiologist
Custom Manure Hauling
Certified Crop Advisors
Public Health Director
Groundwater Task Force
Farm Service Ag Farm Loan Manager
UWGB Natural & Applied Sciences
Department of Natural Resources (WDNR)
EPA Agriculture Advisor
NRCS & DATCP representatives
State Representative
Fish & Wildlife Services



United States Department of Agriculture

NR 151 Technical Advisory Committee

<http://dnr.wi.gov/topic/nonpoint/nr151strategy.html>

Department of Natural Resources
Environmental Protection Agency

WI Cattleman Association

WI. Farm Bureau

WI. Dairy Business Association

WI Clean Water Association

WI Rivers Association

Clean Water Action Council

Nature Conservancy

Natural Resources Conservation Association

Dept. Agricultural Trade & Consumer Protection

County Land & Water Conservation Staff

Small & Large Farmers

Milk-Source

Certified Crop Advisors

UW-Extension

UW-Oshkosh – Geology

Public Health

Multi-Stakeholder
Groups

WNDR: NR 151 Rule Revision Timeline

Fall 2016 - Spring 2017

- Tech. Advisory Committee (TAC)
- Preparation of proposed rule
- Solicitation of information for economic impact analysis



Spring 2017

- TAC meetings complete – **Complete!**
- NRB meeting for hearing authorization - open to public



Summer 2017

- Public hearings on proposed rule and economic impact analysis



--Currently waiting
for draft rule to be
released by WDNR

WDNR: NR 151 Rule Revision Timeline cont.

Fall 2017 - Winter 2018

- NRB meeting for adoption
- Rule approved by governor



Winter 2018

- Legislative review/hearings



Summer 2018

- Rule signed by DNR Secretary, rule published


Door/Kewaunee Legislative Days

April 2017

OUR ASK:

- To Support the New NR151 Standards and Prohibitions when they come before the Legislators for Door & Kewaunee County.
- And a Big Thank you for opening NR151





New “Draft” Ordinances by Kewaunee County

Introduced to County in
May 2017



Waste Irrigation Ordinance “DRAFT”

- “Low Pressure”
- Average Height 18” off ground
- Drop Nozzles
- GIS Data sent directly to LWCD
- If crop growing – must be under crop canopy
- No SPRAY, NO BIG GUNS

Currently 4 townships outright ban all irrigation

CURRENT APPLICATIONS

**No Growing Crops & Usually
During Spring & Fall
When Recharge is occurring**



NOZZLE HEIGHT

-less than 18" or below crop canopy



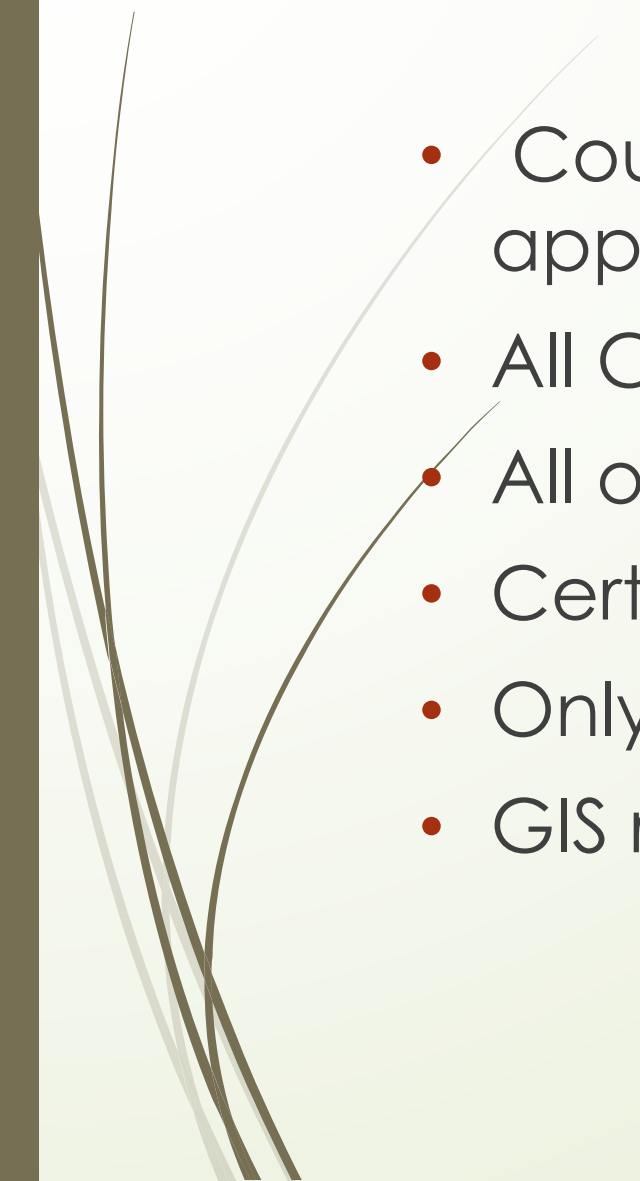
Now Can Spread Manure Applications over months when crops can use nutrients

L.P.I.C. Low Pressure In Canopy





Waste Hauler Certification “DRAFT”

- 
- County Permit required to transport, handle, store or apply manure
 - All Commercial and Private Haulers
 - All operations > 250 A.U ~1.6 million gallons manure
 - Certification / Educational Program Req.
 - Only Liquid manure applicators
 - GIS real time data to our office



Where are we at now?

- Waiting for NR151 draft language / public hearings
 - Soil health, Soil Quality, and Cover Crops
 - Draft Local Ordinances (Irrigation / Hauler Certification)
 - Continue to work with Federal & State Agencies as well as our Congressman and Representatives
 - Continue to work with our farmers and our landowners on conservation
- 



What Have we Learned?

- Getting everyone to the table for open “respectful” conversations
- Stop the “Misinformation”
- Work together “Same Table”
- Field Days .. For farmers and for the public ... EDUCATION
- Listen:
 - What is the person really saying?
 - What is their objective or **fear**?
- Research the Problem ... Facts / Documentation...no Opinion
- Keep pushing and get your State Legislatives involved....you need policymakers.



Thank You!



Questions?