



Overview of Management Efforts by Dept. of LCFM to Limit NO₃- Contributions to Groundwater from Agricultural Sources

**December 7, 2021
Town of Wheaton Plan Commission**

**K. Klingberg & D. Masterpole
LCFM Staff**



7.3 Groundwater Management Objectives

For the purpose of this plan, the resource management objectives for groundwater in Chippewa County are established as follows:

Objective 1

Manage concentrations of contaminants in groundwater aquifers to pursue Preventative Action Limits (PAL), as established in Wisconsin Admin. Code NR 140.

Reduce or reverse the rate of increase in $\text{NO}_3\text{-N}$ concentrations as measured in groundwater, using a defined network of domestic wells, established as the “Chippewa County Groundwater Monitoring Index”.



Chippewa County Land & Water Resource Management Plan, 2019 – 2023; Pg 40.

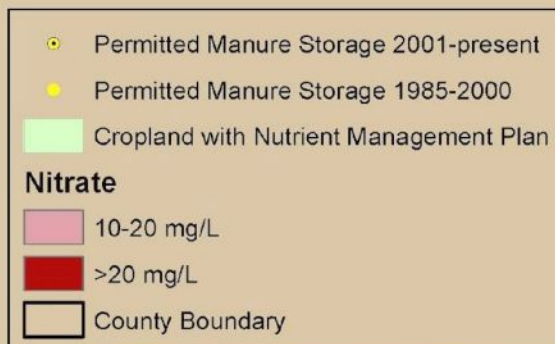
Chippewa County Land & Water
Resource Management Plan

2019 - 2023

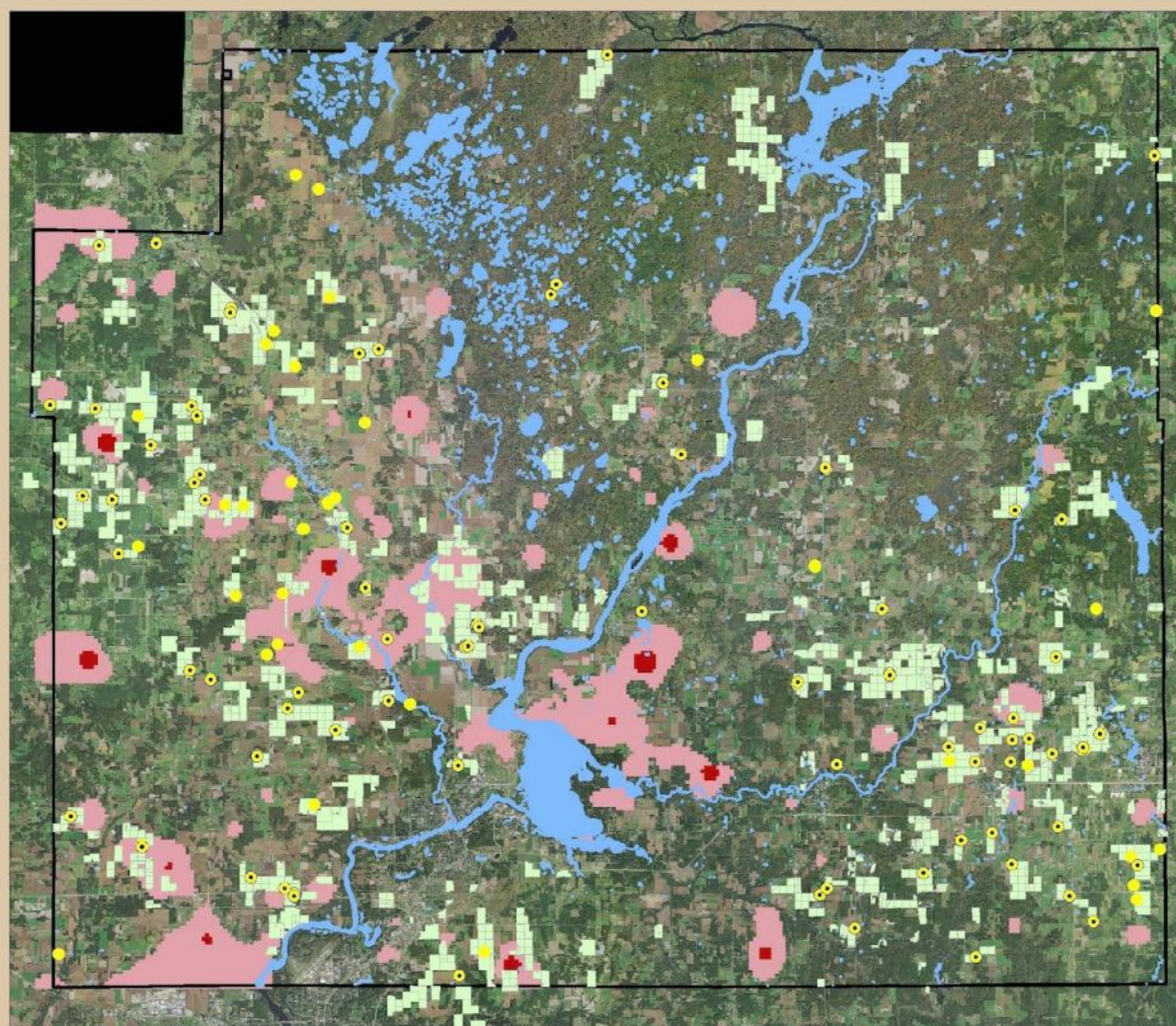


2016 Groundwater Study: 744 wells from representative geology and aquifers. Basis for 2022 Groundwater Study

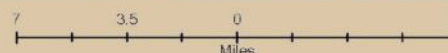
Groundwater Nitrate Concentrations that Exceed 10 mg/L in Proximity to Permitted Manure Storage Structures & Associated Cropland with a Nutrient Management Plan



Source: Nitrate information provided by K. Masarik, 2016 UWSP Groundwater Study



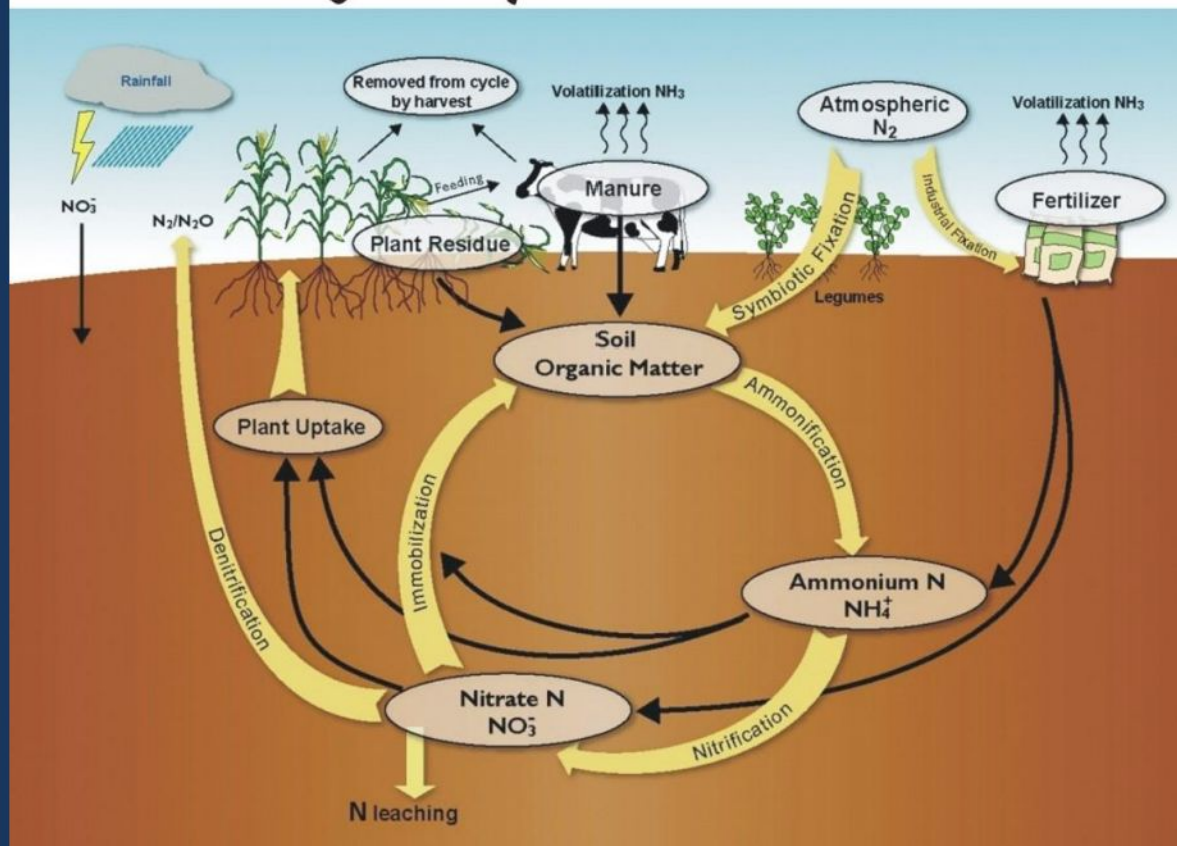
1 in = 4 miles



Aerial Photo 2015



The Nitrogen Cycle



Agricultural sources of nitrogen: Livestock manure, Commercial fertilizer, Rotated legume hay.

All cycle toward becoming nitrate N (crop available, and leachable)



Nutrient Management

- 4Rs
- Nutrient type
- Application rate
- Application timing
- Placement & positioning of nutrient material

Soil and Water Conservation

- Tolerable soil loss
- Phosphorus management
- Tillage and surface residue management
- Waterways
- Soil type (permeable / sandy soils)

Dept. of Land Conservation & Forest Management



The LCFM has a “client-list” of 100 farms that are obligated to provide annual Nutrient Management Plans.

Re: Animal waste, NR 151, Farmland Preservation, etc

Clark
Taylor Co.

2021 Nutrient Management Plan Quality Assurance Review		Chippewa County Land Conservation and Forest Management		
Farm Name, Operator & Crop Acres	[Redacted] / 5,238 Ac	Ag Performance Standards	Current Date NR151 Walkover: Dec. 3, 2008	Current Date NR151 Signature:
NMP Requirement Program & Tier	Storage Ordinance 2 CAFO	Plan format	SnapPlus or Other (specify): Pdf Reports	
Qualified Planner Name & Company	Kyle Gouin, Nutrient Advisers West Point, NE	Planner CCA or farmer training date	625 589	
LCFM Review Staff	Kevan Klingbeers	Plan provided to LCFM	(Y) or N	
Review Date	6-7-21	Plan meets NRCS 590 standard specs	Y or (N)	
Nutrient Management Plan Required Components	Meets NRCS 590 Specifications	Corrective Action Needed	Missing	Comments
590 checklist, signed by qualified planner and farmer.	*			Along w/ Checklist, This Plan has a 2021 narrative that nicely explains NMP components and farm management.
Field maps with corresponding field numbers.	✓			• List of farms, owners and field boundaries - Very helpful.
Nutrient spreading restriction maps (spatial, seasonal, water quality).	✓			
Soil sampling and lab analysis results.		✓		# Numerous fields (1,391 Acres) are present in plan with Placeholder Soil test values. Need Schedule. 90% N regime.
Field nutrient application budgets including manure and legume credits.	✓			N is allocated to numerous cornfields and +20 - +40 above UW Rec. Good Documentation
Livestock baseline accounting of animal numbers, manure volume produced and acreage adequacy to utilize manure nutrients.	3,647 Animal Units Plan shows 5,163 spreadable acres and 1,711 acres spread. ✓			water this
Livestock manure winter spreading plan. Id winter spreadable fields.	✓			Plan defines only growing season manure application. No winter manure planned. In event of necessity, a number of fields are identified.
Field documentation of crop management, soils, slope, and surface water proximity to show acceptable soil loss and Phosphorus Index values.	✓			

NR151P Administrative Policy and Procedures/Annual QA Review Worksheet

Summer 2021

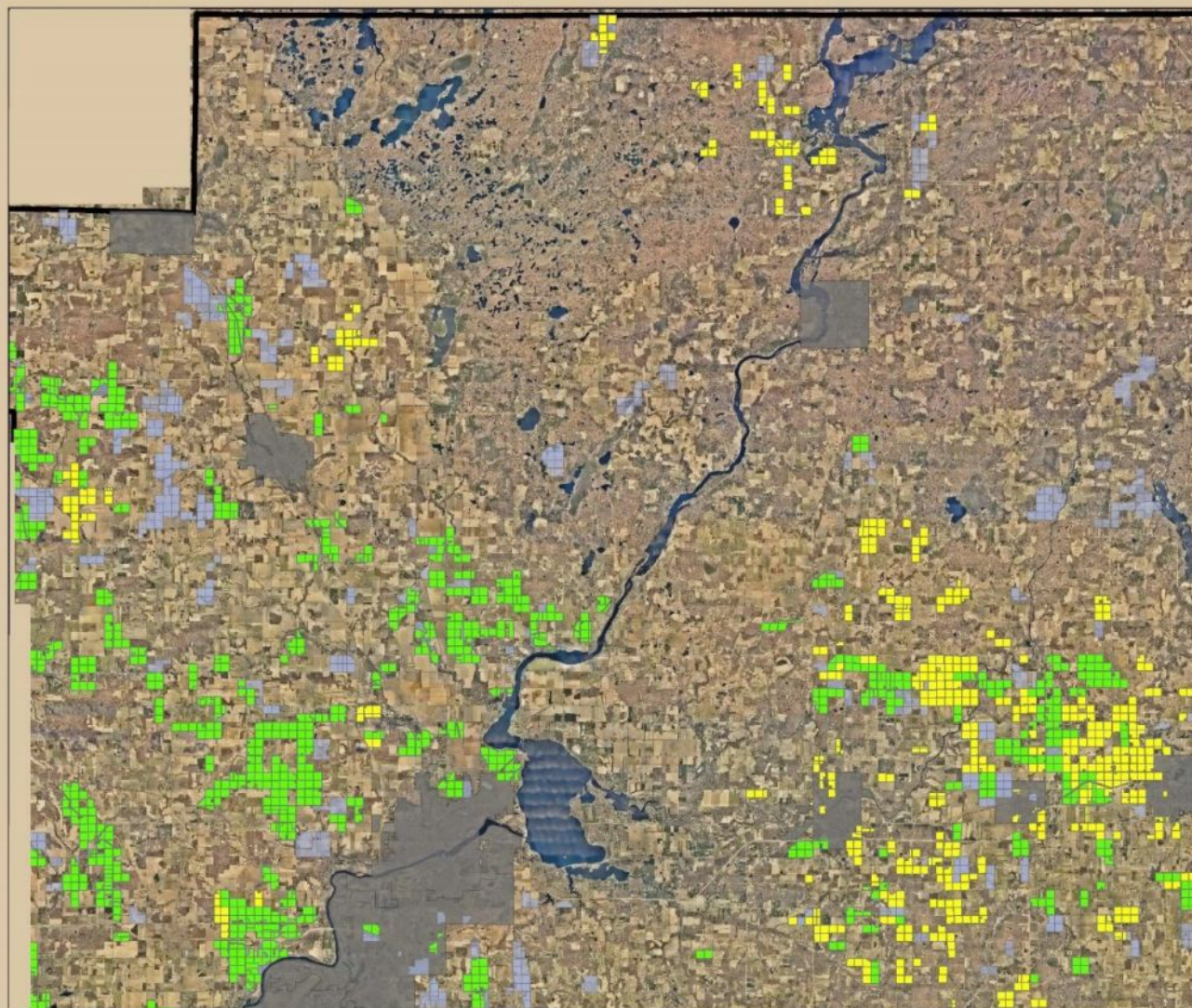
LCFM reviewed all NMPs provided as a Quality Review

Feedback to farmer and consultants

2021 Nutrient Management Plans: Reviewed to Determine Compliance with 590 Nutrient Management Plan Specifications

Parcels Operated and Reviewed for Compliance with the 590 Standard

- Compliant with 590 Specifications
- Non-Compliant with 590 Specifications
- Historical NMP Acres
- CITY
- VILLAGE
- County Boundary



Date: 10/14/2021

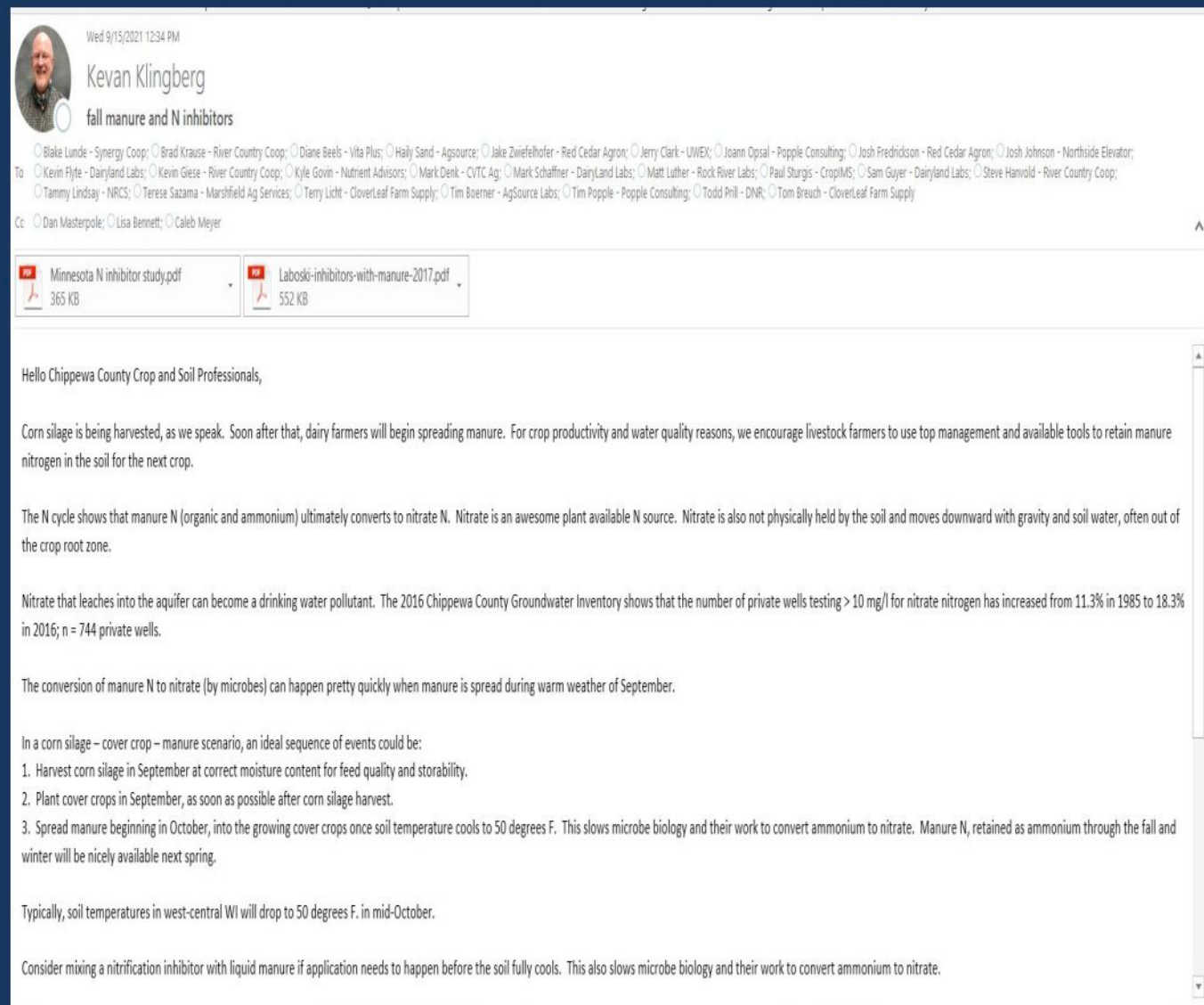
0 1.75 3.5 7 Miles

H:\AG\NMP\Maps\Operated parcels 2021 compliance.mxd

Dept. of Land Conservation & Forest Management



LCFM has
developed a
communication
loop with
Certified Crop
Advisors
(consultants)
serving
Chippewa
County Farmers



Routine emails sent out to discuss pertinent crop & soil management, soil & water conservation, and resource & water quality stewardship

LCFM targeted fall 2021 cover crop practice and cost share to sandy soil cropland that also receives manure

Fall 2021: verified planting and conferred with farmers on 400+ acres



LCFM responds to manure application complaints



Site visit and documentation. Work with farmer to understand event. Develop remedy

In this case, agreement was to plant winter rye for ground cover and to assimilate nutrients.

Dept. of Land Conservation & Forest Management



LCFM conducts NR 151 cropland evaluations,
often as a precursor to facilities improvement / expansion



2021 : 5 + farms. Evaluate facilities and cropland

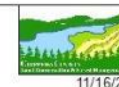
8,000 + acres of cropland documented and discussed with farmers

LCFM Outreach

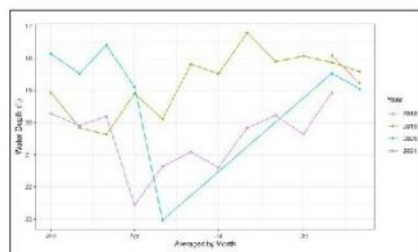
1. Winter on-line training for groundwater quality and aquifer characteristics
2. Summer field day discussing groundwater quality and N management on sandy soils
3. Deployed 2 remote weather stations, daily climate values made available.



Components of the Chippewa County Groundwater Inventory



Groundwater Levels

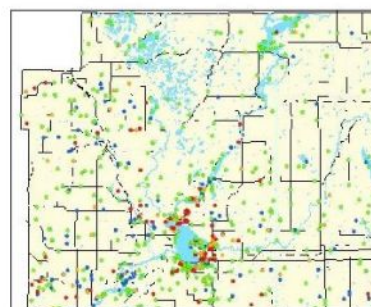


Historic Benchmark Monitoring
Single Well Monitoring Point
(USGS 1967 - Present)

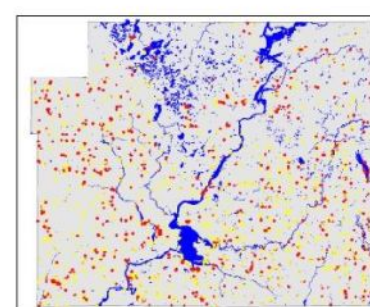
Groundwater Chemistry



UWSP Nitrate (NO₃-N) Annual 2021 Quality Index



Ongoing Statewide Nitrate (NO₃-N) Monitoring
of New & Repaired Wells (DNR 11/1/10 - 5/1/21)



Periodic Benchmark Inventories
(WGNHS/UWSP 1985, 2007, 2016, 2022)

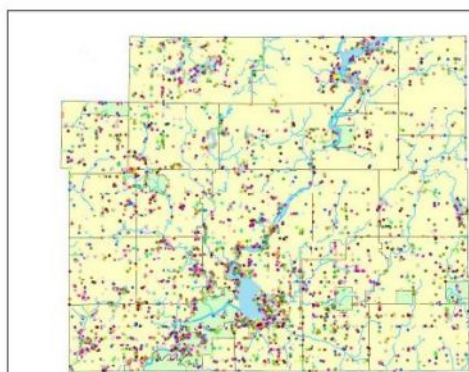
Parameters Tested: pH, NO₃-N, Cl,
& Conductivity

Metals & Metabolites of Pesticides,
Artificial Sweeteners, Pharmaceuticals,
Other Compounds

Subsurface Geology & Groundwater Physical Characteristics

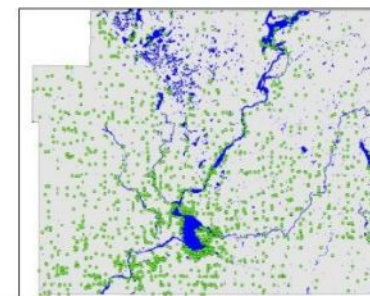


Continuous Groundwater Elevation
Monitoring "WellIntell" Well Network
(USGS/WGNHS 2016 - Present)



County-Wide Well Permits & Well Construction Logs
(LCFM/P&Z 1989 - Present)

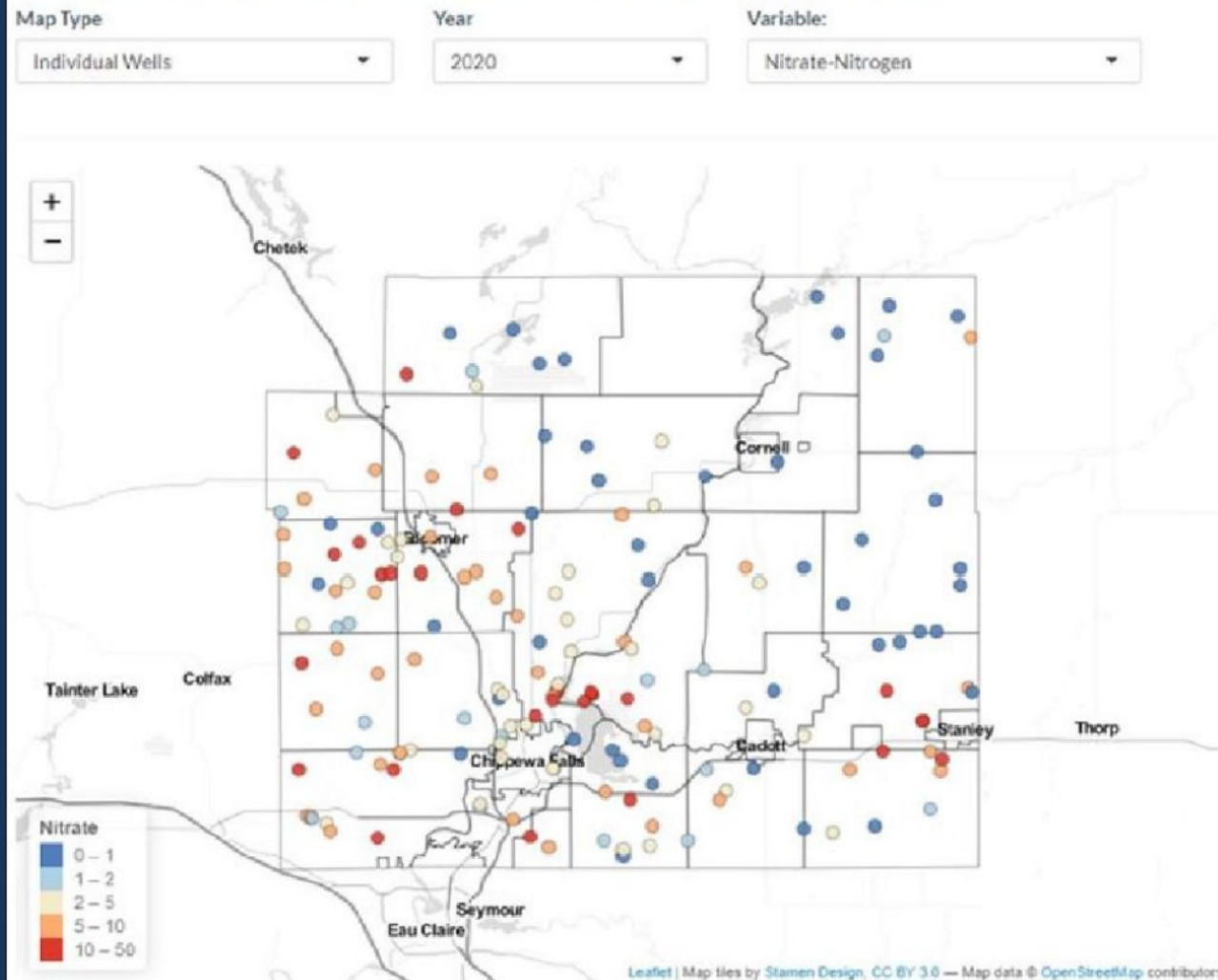
Provides information to characterize geology & hydrogeology including; well construction & aquifer characteristics,
water table elevation, and the direction and rate of groundwater flow



Ongoing Nitrate (NO₃-N) Monitoring of Domestic Wells
(LCFM 1989 - Present)

H:/Pub/Well Permit Mapper3/Chippewa Co. Water Info. Map 2021

Chippewa County Well Water Monitoring Project



UWSP Nitrate (NO₃-N)
Annual 2021 Quality
Index

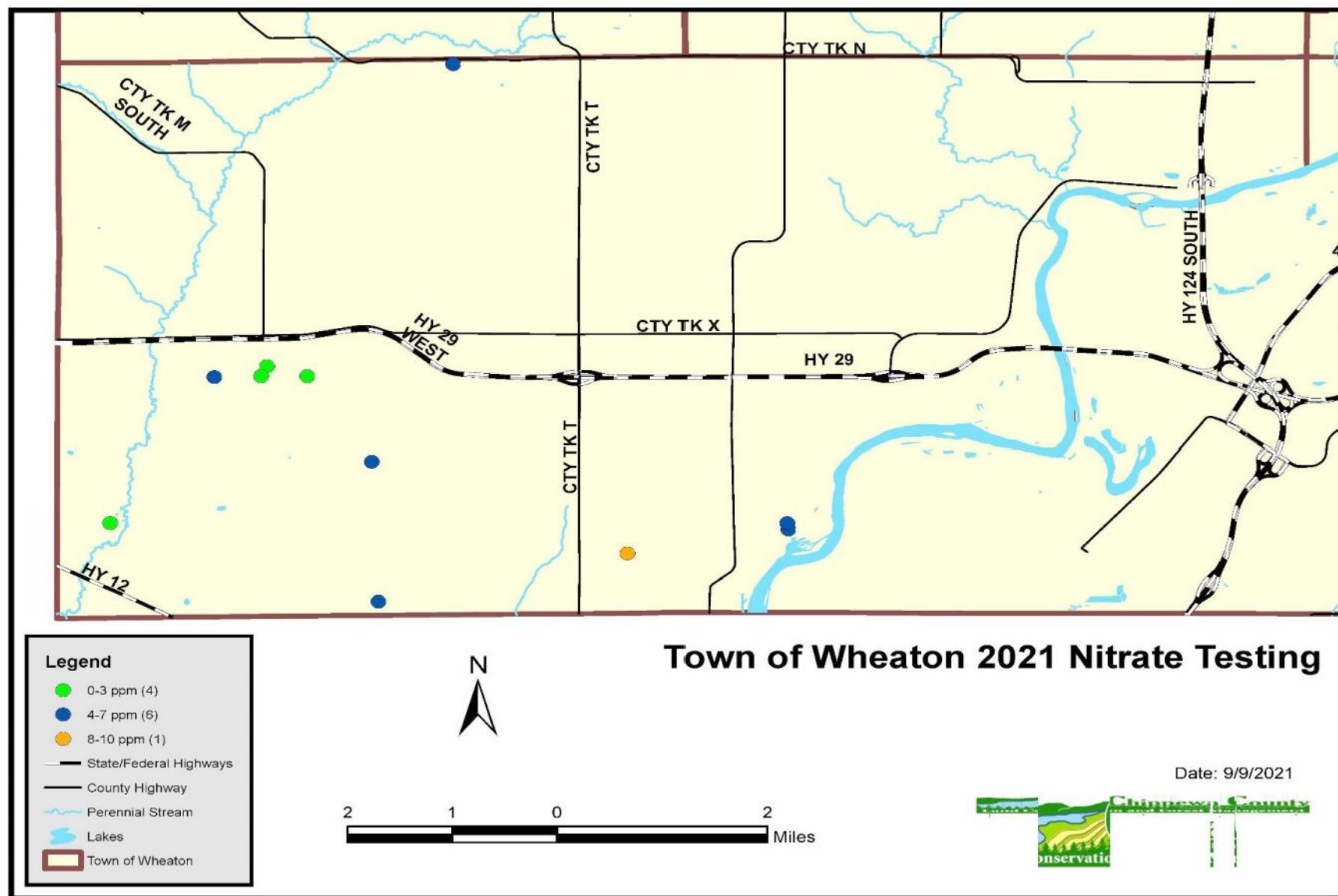


Extension
UNIVERSITY OF WISCONSIN-MADISON



Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin-Stevens Point

Created by: Grant Moser, Jennifer Dierauer, Abby Johnson, and Kevin Masarik
Center for Watershed Science and Education in partnership with Chippewa County
Last modified: March 30, 2021 . [Contact us for questions](#)





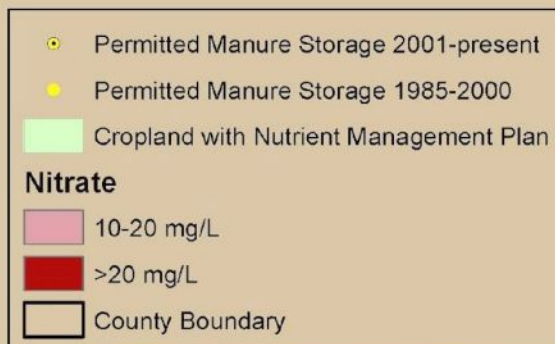
2022 Chippewa County Nitrate Occurrence and Source Investigation (Chippewa Co. LCFM & UWSP)

Proposed Objectives:

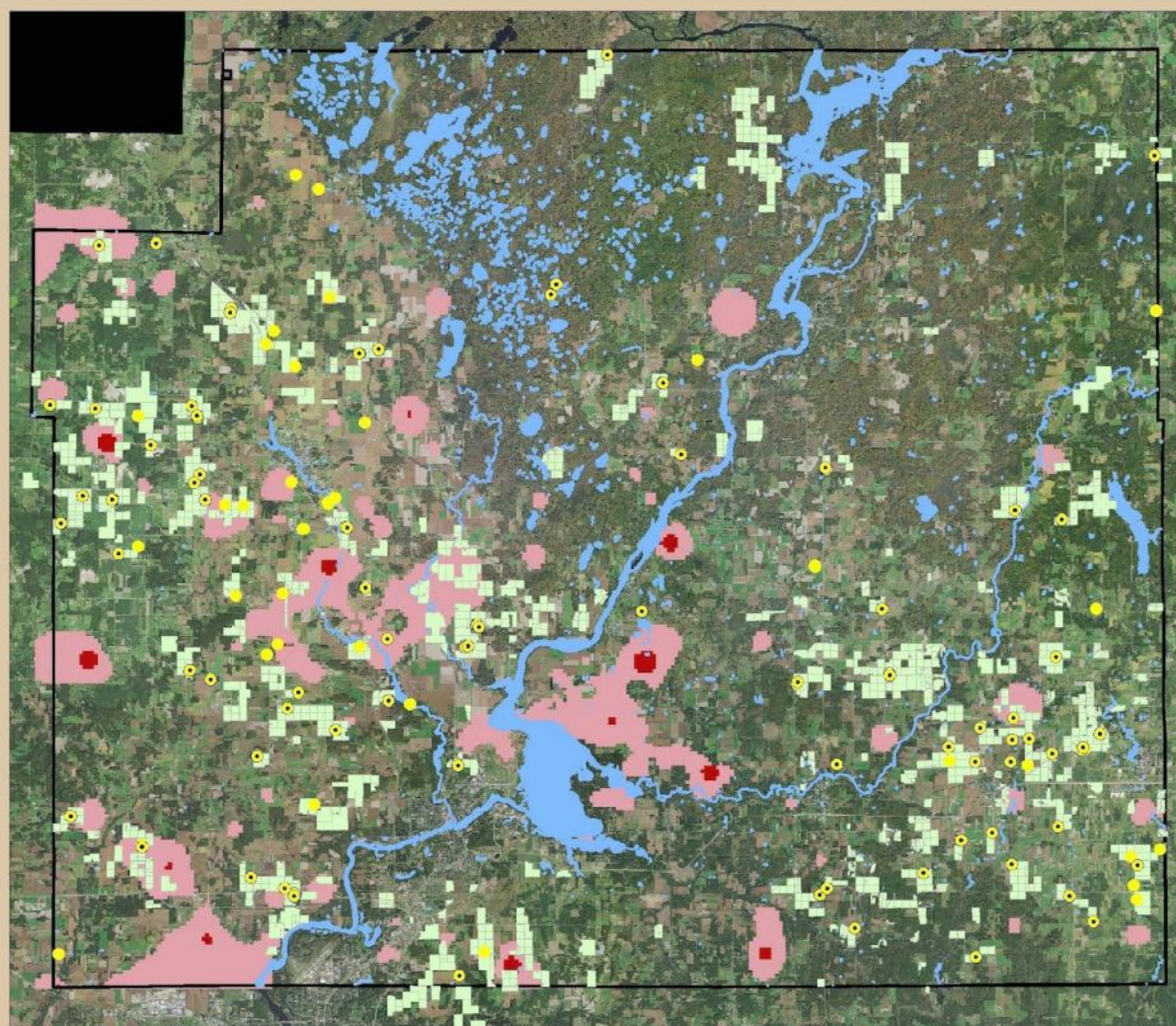
- Expand testing in areas of high nitrate concentrations to collect more detailed data on the extent and sources of nitrate contamination
- Learn more about emerging contaminants
- Provide information useful to future groundwater management decisions & focusing of outreach efforts to rural well owners

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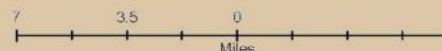


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Aerial Photo 2015

1 in = 4 miles





2022 Chippewa County Nitrate Occurrence and Source Investigation

Project Design

- A total of 200 private wells from grids with a predicted nitrate-N concentration greater than 5 mg/L will be selected & analyzed for nitrate-nitrogen, chloride, alkalinity, pH, total hardness and conductivity
- 50 of the 200 will be analyzed for additional parameters (ag. tracers, pharmaceuticals)
- 25 wells will be selected for PFA's



We would be pleased to address any questions.