Status of Nitrate Issue in Rock County

- Collection of Nitrate Data
- Nitrate Monitoring Trends
- Rock County Nitrate Risk Tracking Tool
- Formation of a Nitrate Work Group
Nitrates in Wisconsin

Map from Bruce Rheineck - WDNR
Collection of Nitrate Data

* Municipal Well Impacts

* Transient Non-Community Well sampling
  ◦ 150 public wells tested annually for nitrates
  ◦ Costly well replacements

* Private Well Testing at Rock County Public Health Lab
  ◦ Approximately 800 wells tested annually for nitrates
  ◦ Over 30% exceed 10 ppm

* Targeted “Town Sampling Programs”
  ◦ Fill in gaps in data
  ◦ Increased Participation rates
Nitrate Indicator Well Trends

Nitrate in Groundwater
23 Year Trend in Rock County
"Indicator" Transient Non-Community Wells (N=79)
IMPLEMENTING A GROUNDWATER NITRATE RISK TRACKING TOOL IN ROCK COUNTY

A TAKING ACTION WITH DATA GRANTEE PROJECT

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BACKGROUND
Elevated nitrates in drinking water can lead to methemoglobinemia, or “blue baby syndrome” and can potentially increase the risk of certain cancers. In Rock County, more than 30% of private wells exceed the health advisory level for nitrates.

PROJECT OVERVIEW
This project is designed to identify and evaluate the main sources of nitrates in the groundwater and utilize Geographic Information Systems (GIS) to map the areas of highest nitrate risk. Some of the Nitrate Risk inputs include:
- USDA satellite land cover data used identify high N impact crops.
- Soil survey characteristics used to identify highly susceptible areas
- Irrigated lands delineated
- Septic system densities mapped

MAIN RISK FACTORS FOR NITRATE IN GROUNDWATER

OUR IMPACT

- Project was a factor in creation of a county-wide Nitrate Work Group consisting of key agencies and the agricultural industry.
- Four key partnerships built with Land Conservation, Planning Department, UW-Extension, and UW-Whitewater.

NEXT STEPS
In the final three months of the grant, we plan to:
- Finalize/calibrate GIS Risk Tool
- Place Nitrate Risk Tool on website for public use.
- Share outcomes with community partners.
- Work with newly formed Rock County Nitrate Work Group to evaluate long-term solutions.
Land Cover Classification

- Nitrogen fertilizer and leaching rates values were averaged throughout a 5-year time frame.

- Values ranged from 0 to 53 lbs of Nitrogen per Acre with areas in red representing the highest concentration.

National Ag Statistic Service NASS Crop Data Layer
Septic System Density Analysis

- The septic system density was represented by \( \frac{1}{4} \) by \( \frac{1}{4} \) county sections.

- The number of septic systems with an area was multiplied by 20 to represent the nitrogen leaching and then divided by the total area to determine potential pound leached per acreage.

- Values ranged from 0 to 13.5 lbs/per acre with areas in red representing the highest concentration of septic systems.
Soil Analysis/Leaching Potential

- Most of Rock county has a B soil group
  - Dark Blue ➜ Soil Group A
  - Brown ➜ Soil Group B
  - Purple ➜ Soil Group C
  - Green ➜ Soil Group D
  - Light Blue ➜ Water

- Each soil class was designated a multiplier for potential nitrate leaching.

- Soil Type A
  - Multiplier of 1.3
- Soil Type B
  - Multiplier of 1.1
- Soil Type C
  - Multiplier of 0.9
- Soil Type D
  - Multiplier of 0.7
Irrigation

Top photo shows the multiplier ratings of 1 for blue (non-irrigated) and 1.15 for green (irrigated)

The multiplier of 1.15 represents a 15% increase in leaching potential which would represent an efficient irrigation program.

Bottom photo shows crop irrigation, highest values are in red indicating a large amount of water being used for those fields
Nitrate Risk in Groundwater throughout Rock County

All four factors were compiled together to identify areas of possible high Nitrate contamination.

The total sum of potential Nitrogen leached was multiplied by the soil and irrigation
Potential Risk of Nitrates in Groundwater
Rock County, Wisconsin

Nitrogen Leached
Pounds per Acre

This map illustrates the potential areas susceptible to the nitrate contamination throughout Rock County, Wisconsin. This takes into consideration the landuse, the permeability of the soil, irrigation practices, and septic system density throughout the county.

Soil Survey Geographic Database, 2007
United States Department of Agriculture, 2012 - 2016
Wisconsin DNR, 2011 - 2015
Health Department Record of Septic Systems, 2017

Public Health

David Koledzijski
May 2nd, 2016
Rock County Nitrate Work Group

WHY WAS IT FORMED?

- Data was turned into a ‘need for action’
- Relationships built between county agencies
- There is a strong ‘farmer led’ initiative

- 12 person group appointed by Rock County Board of Supervisors
- Diverse Representation with strong Ag community presence
- Formed in June 2017, expected to be renewed until 2020 or beyond
The Rock County Groundwater Nitrate Workgroup will analyze existing groundwater nitrate data, evaluate known best management practices to reduce nitrate leaching, and provide practical recommendations on short-term and long term methods to improve groundwater nitrate quality.
NITRATE BMP DEMO AREAS

- Identify Potential BMP Groundwater Areas (2017)
  - geology, groundwater impacts, availability of indicator wells
  - Work with Wisc Natural History and Geologic Survey

- Obtain Landowner Cooperation (Winter 2018)
  - Farm community support
  - Grower incentives fund

- Collect Historic and Baseline nitrate and cropping data (2018)

- Implement ‘Farmer-Led’ BMP practices (Fall 2018 to 2020 and longer)
  - Cover crops
  - Fertilizer sources
  - Application timing
  - Nitrogen crediting
  - Irrigation scheduling
  - Variable rate applications
  - Crop Rotations
  - Soil Testing
  - Tissue testing
  - Realistic yield goals
  - Tillage practices
Status of Nitrates in Rock County Groundwater

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