

# Using Habitat to Protect Our Water

Remsen Source Water Protection Project

&

Pheasants Forever



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# SOURCE WATER PROTECTION PARTNERSHIP

- Remsen SWP Community Planning Team
- Remsen Utilities Board and City Council
- Plymouth County USDA-NRCS
- Sioux Rivers RC&D
- IDNR SWP Program & Contaminated Sites staff
- IDNR SRF Funds
- State Watershed Improvement Review Board
- USDA-ARS
- Plymouth County PF Chapter**

# WHAT IS SOURCE WATER?

- It is where your drinking water is pulled from – the “source” of your drinking water
- Shallow wells are the most susceptible to contaminants that can cause health concerns
- contaminant applied or spilled on the ground surface can infiltrate to source water – such as: petroleum, fertilizer, pesticides, paint, etc..

# SWP – WHY WE CARE



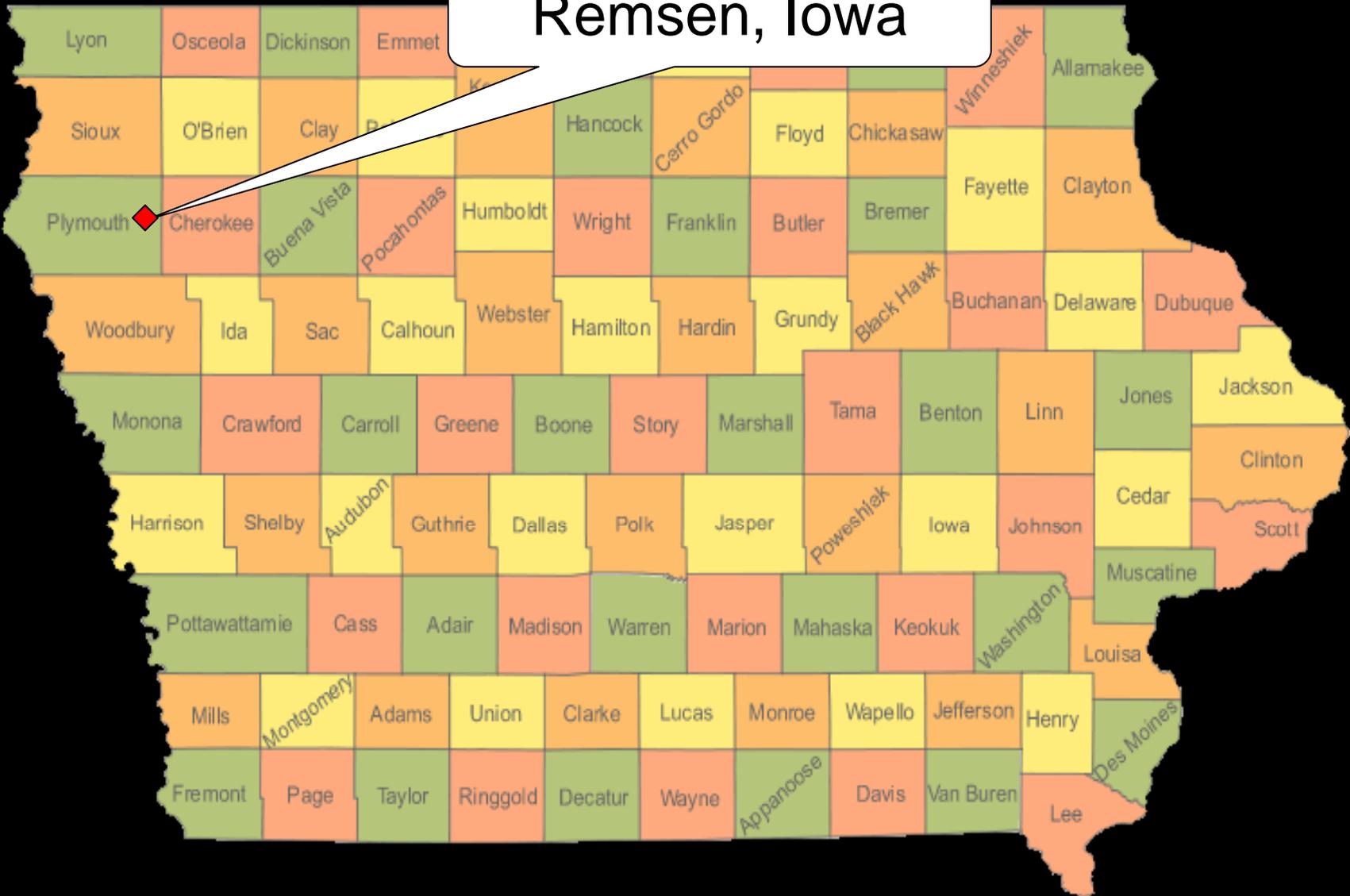
# WHAT IS SWP & HOW DOES IT WORK?

- A susceptible Community Water Supply coordinates a community SWP planning team – comprised of city, rural, county, state and federal participants
- A SWP groundwater investigation is conducted to ID: PS or NPS focus area
- The “Team” utilizes the GW investigation to prioritize the susceptible area & then devises a plan for implementing BMP’s & confirm resources

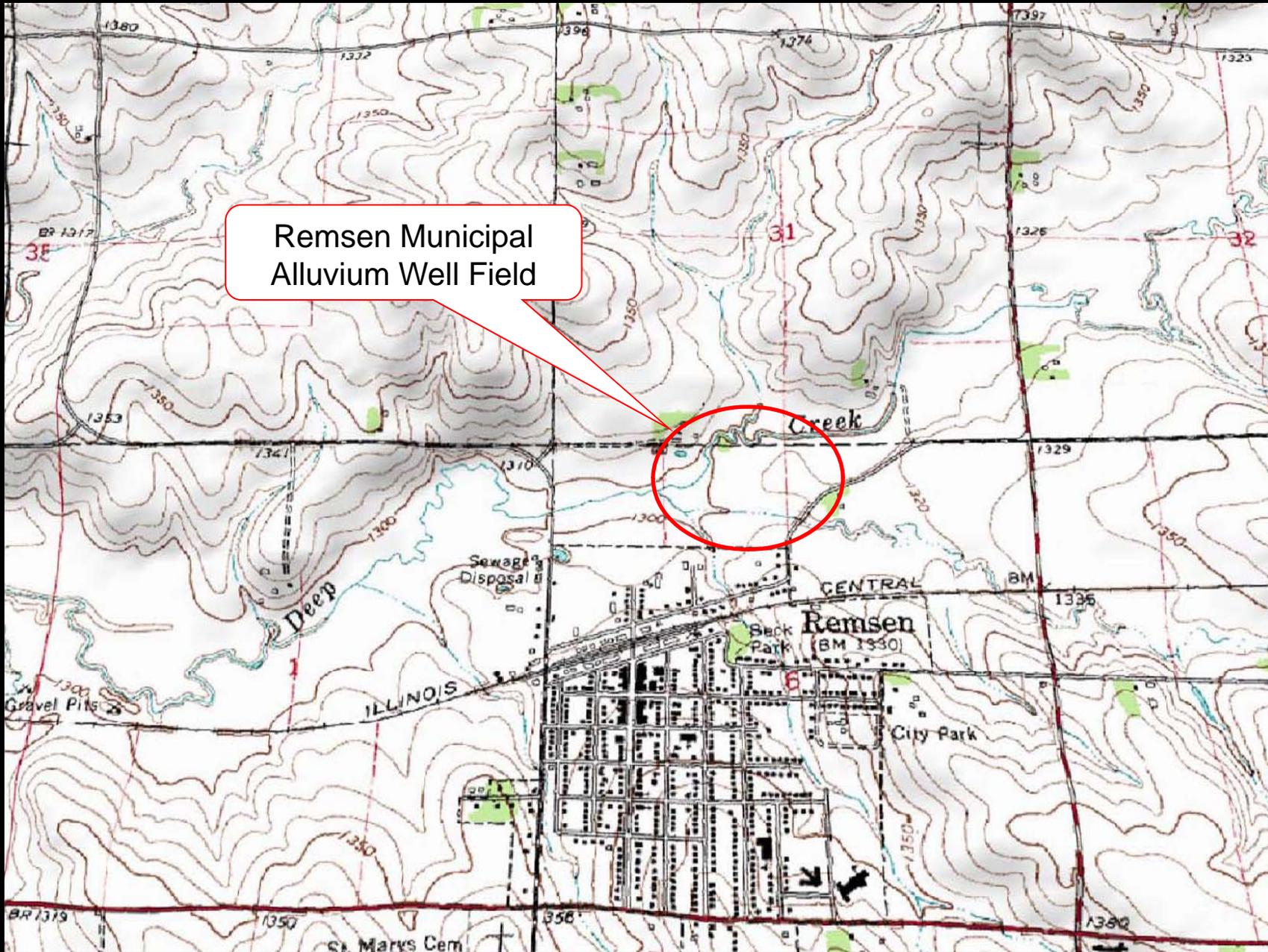
Give An Example How It Works...



Remsen, Iowa



Remsen Municipal  
Alluvium Well Field



# Iowa DNR Objectives For The Remsen, Iowa Site

- Identify potential source area(s) for the high nitrate levels found in Municipal Well No.8.
- Determine why Wells No. 3, 5 and 6 do not have the same nitrate levels.
- Identify groundwater flow paths for the Deep Creek alluvium system.

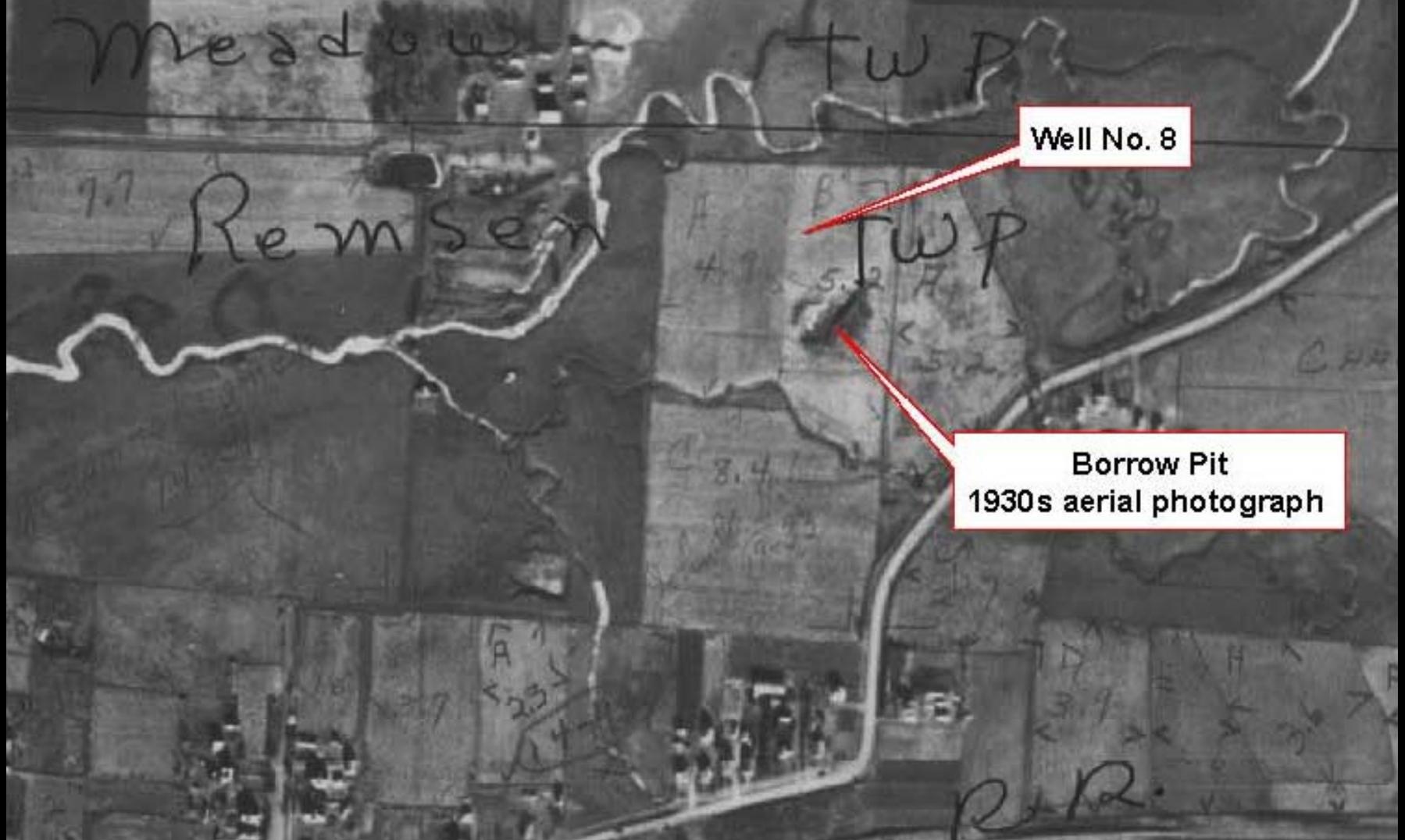
# Remsen Shallow Well Locations



# Potential Areas of Concern

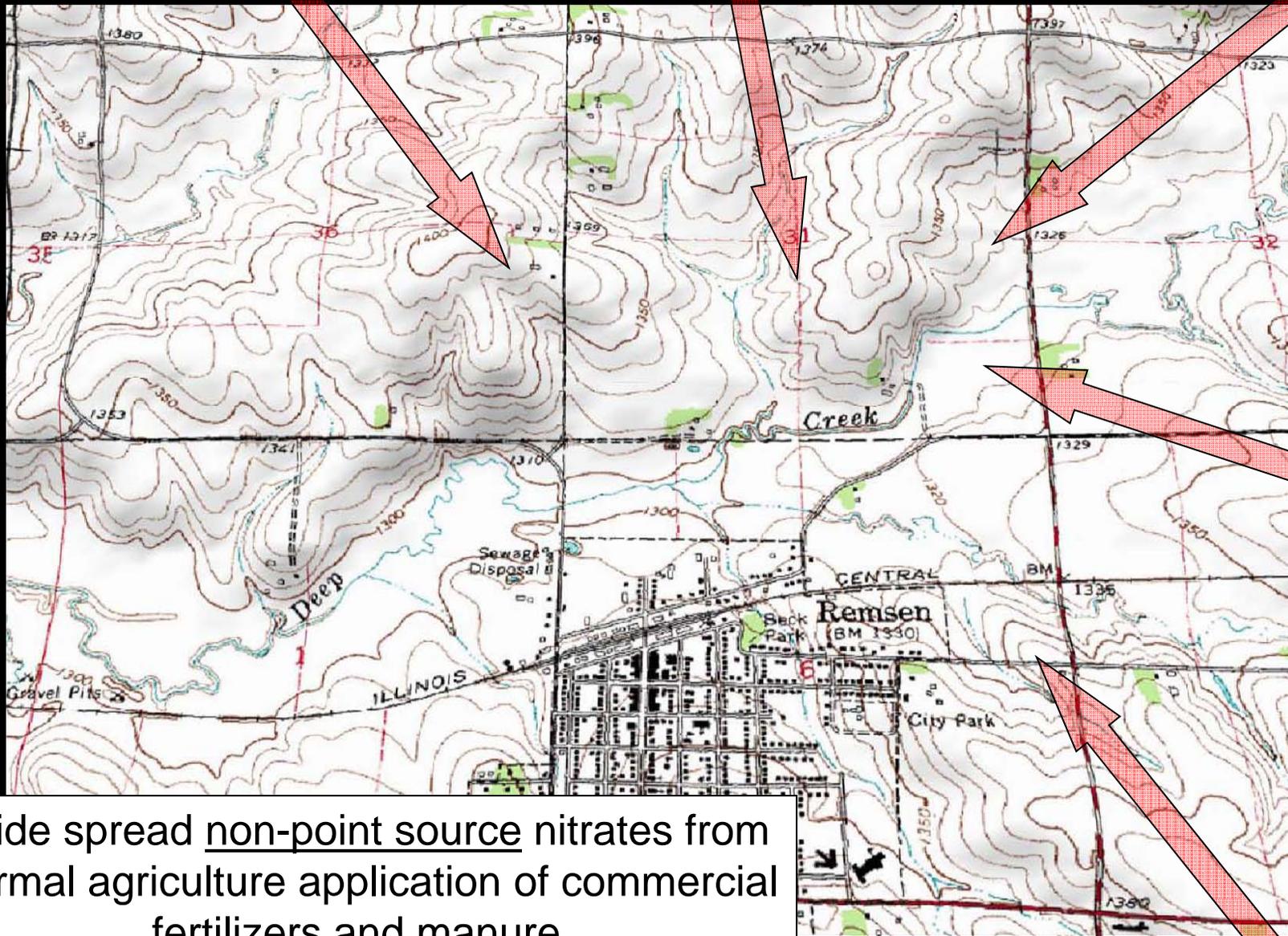


Possible point source nitrate contamination  
from former waste disposal areas.

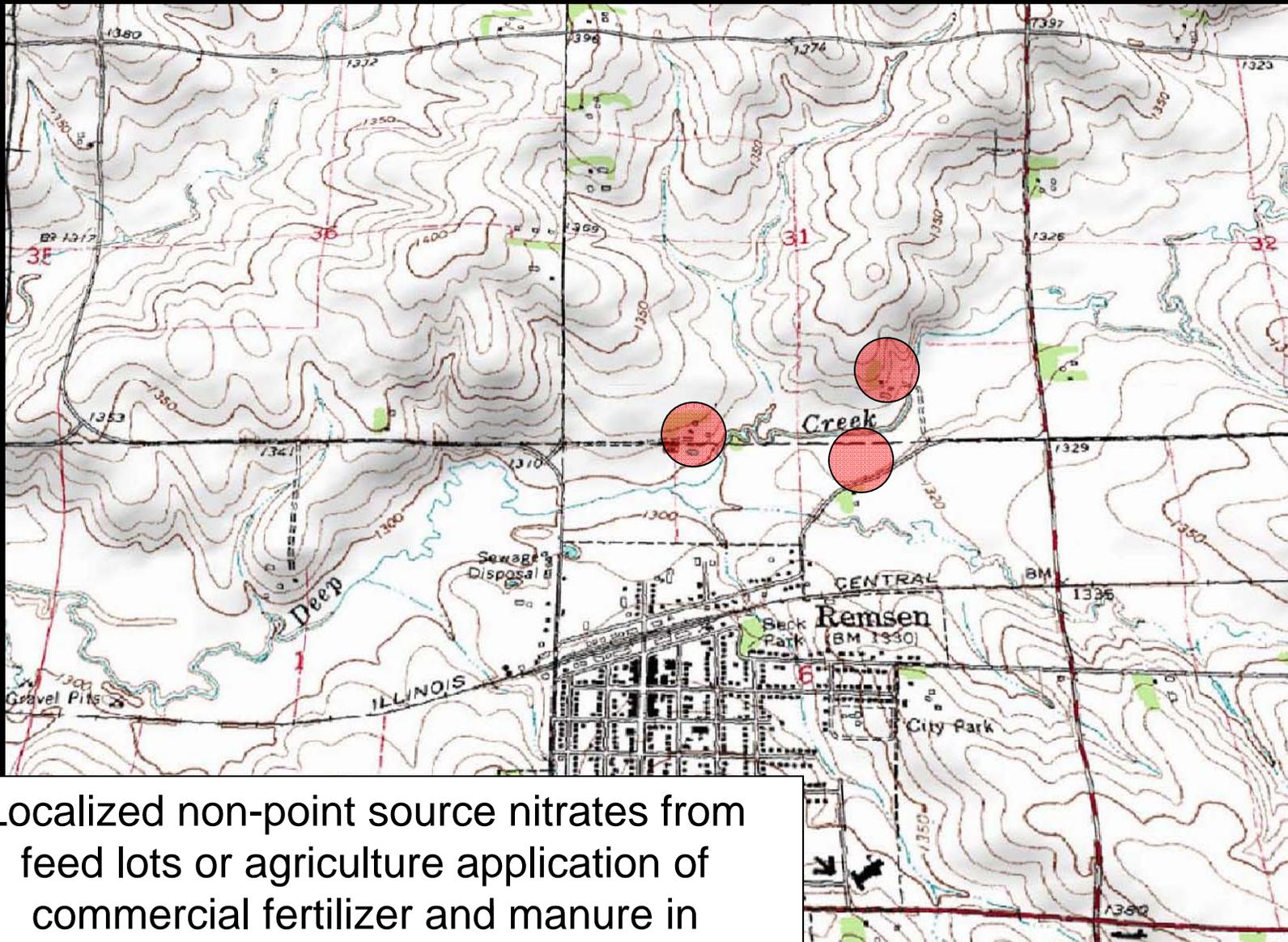


Well No. 8

Borrow Pit  
1930s aerial photograph

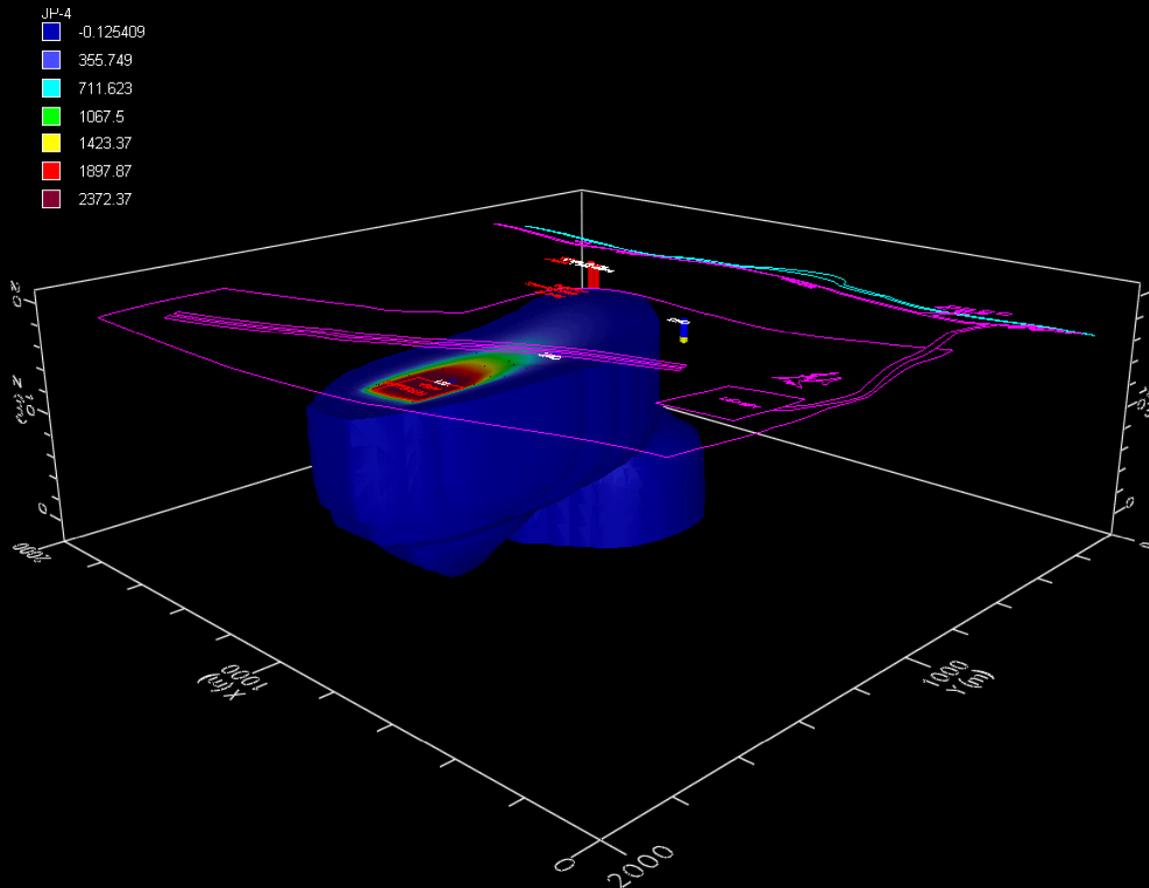


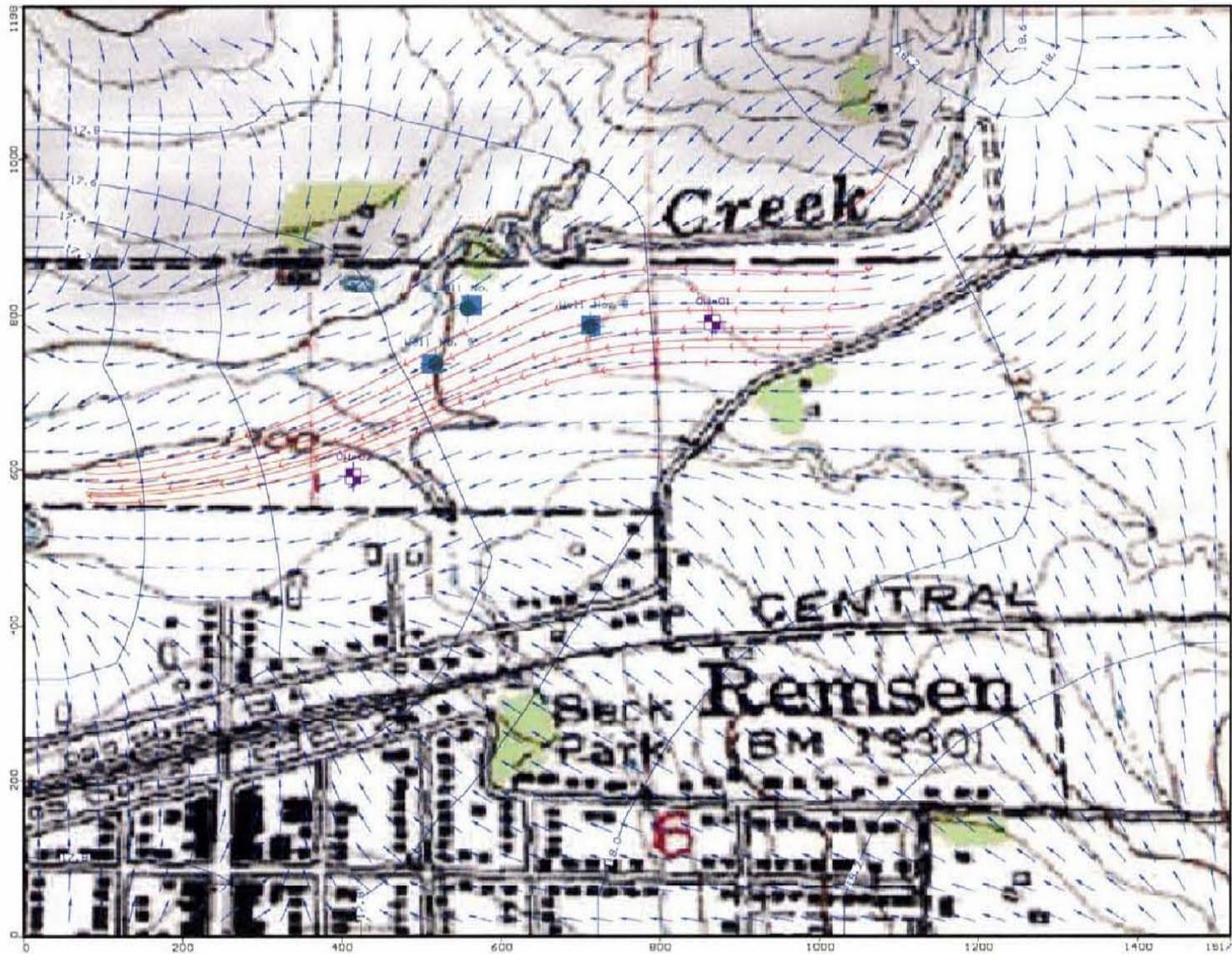
Wide spread non-point source nitrates from normal agriculture application of commercial fertilizers and manure.



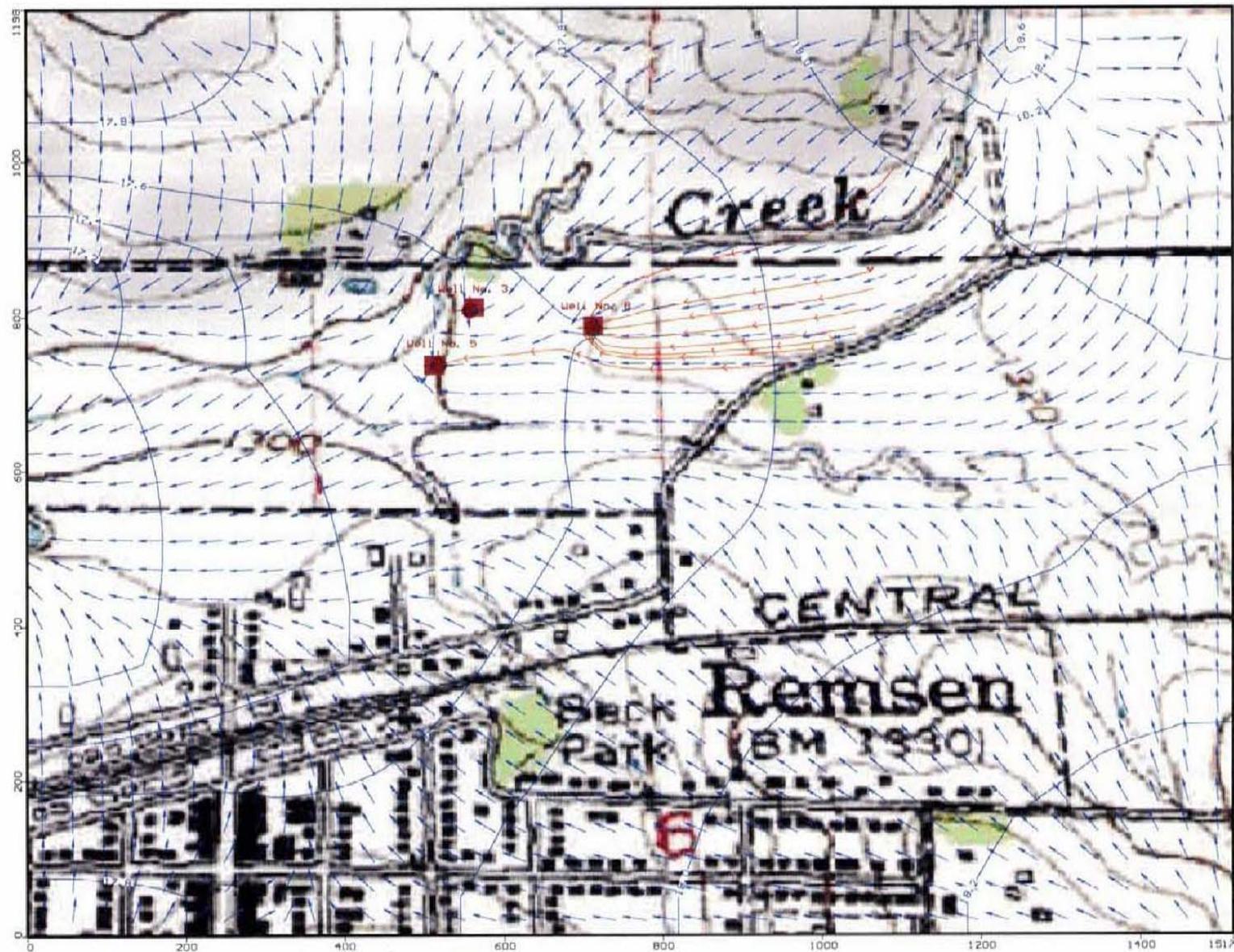
Localized non-point source nitrates from feed lots or agriculture application of commercial fertilizer and manure in sensitive areas.

# Alluvium Aquifer Modeling With Visual MODFLOW Three Dimensional Groundwater Flow and Transportation Modeling





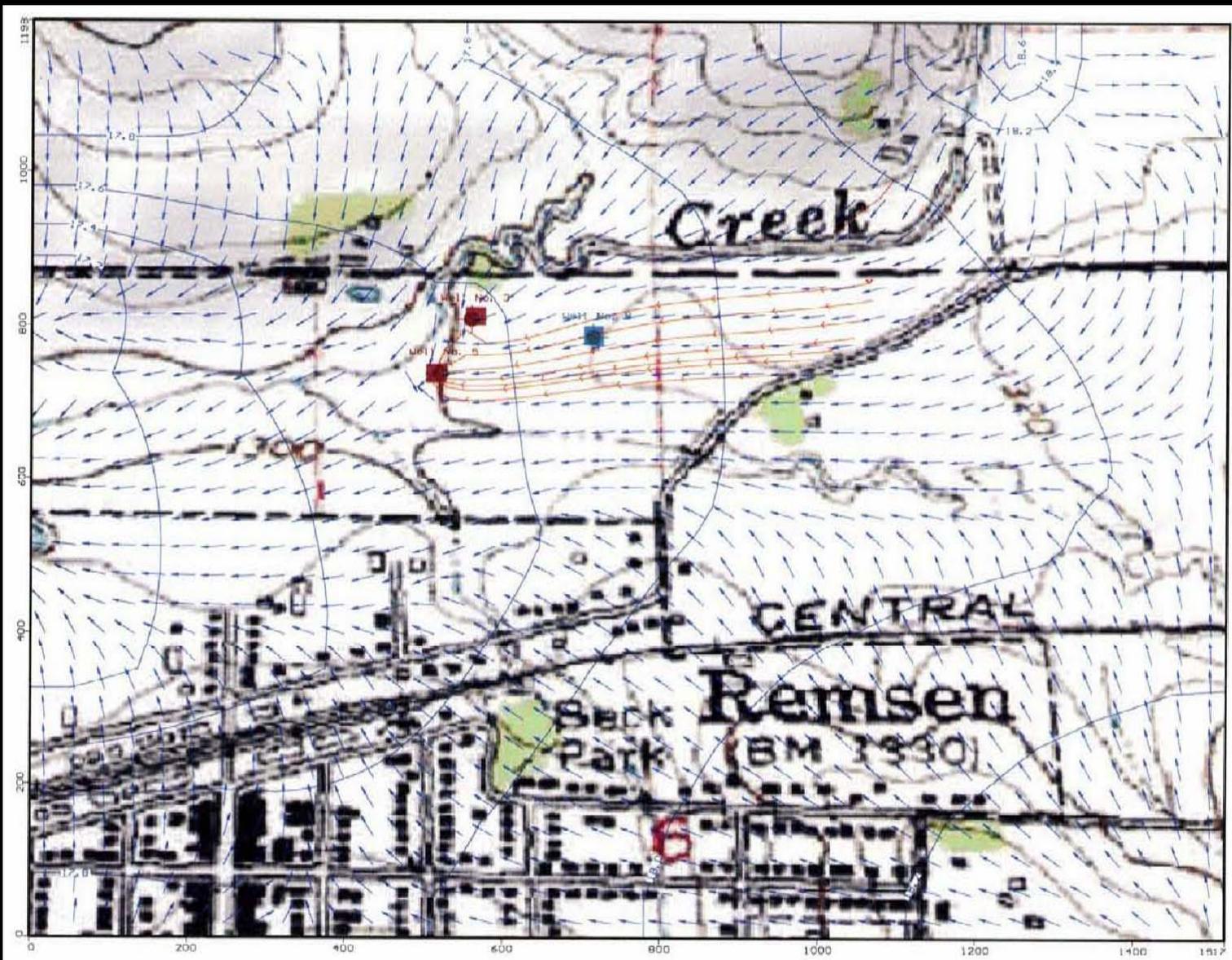
**Figure 4**  
**All Wells Off (Steady State)**  
 ← Modeled Groundwater Flow Direction  
 ← Modeled Contaminant Flow Direction



**Figure 5**

**All Wells On (Steady State)**

- ← Modeled Groundwater Flow Direction
- ← Modeled Contaminant Flow Direction



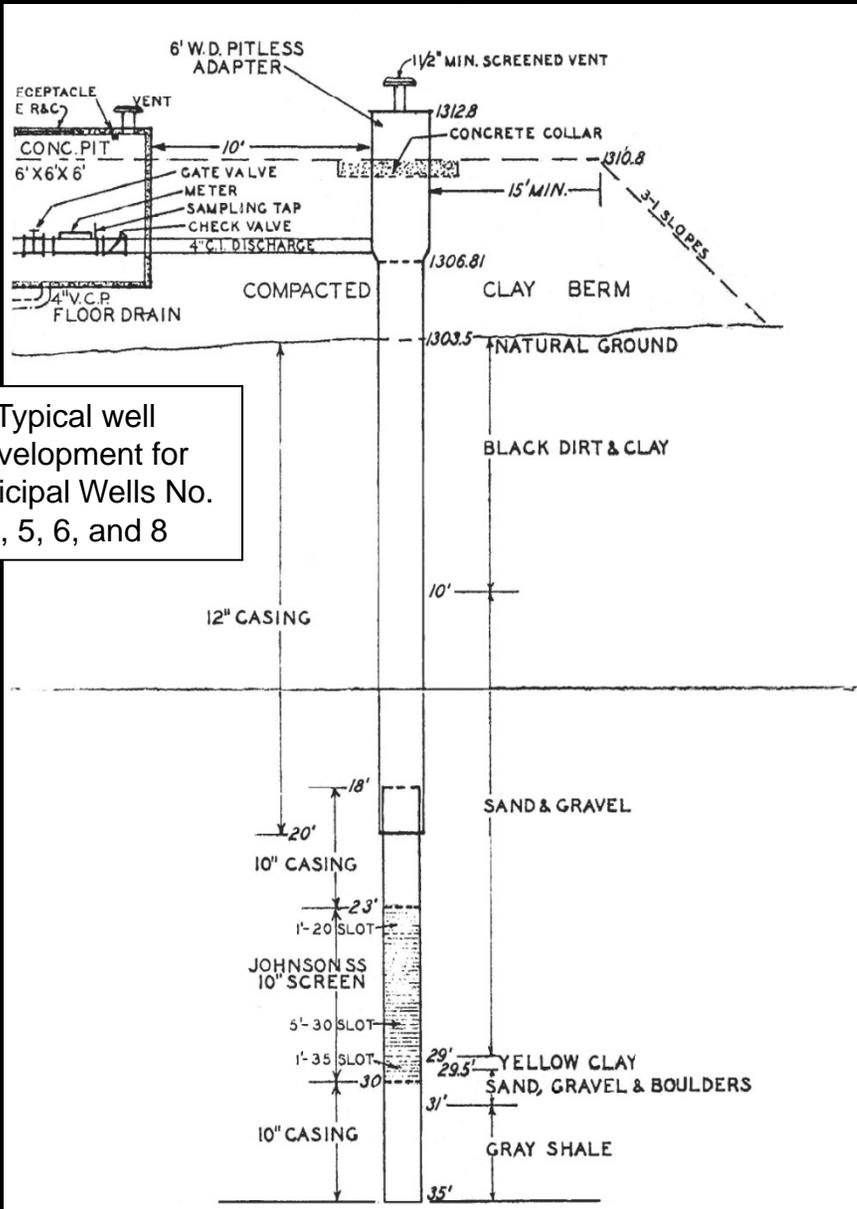
**Figure 9**

**Wells 3 And 5 On (Steady State)**

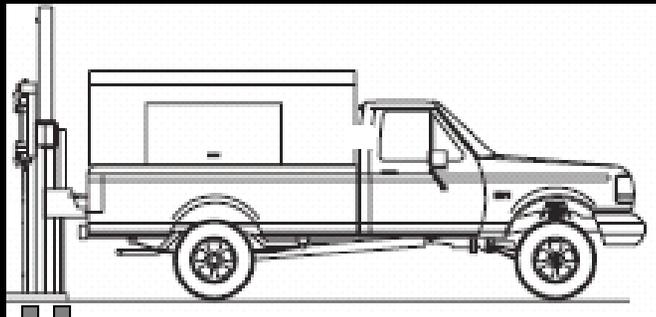
- ← Modeled Groundwater Flow Direction
- ← Modeled Contaminant Flow Direction

# Iowa DNR Groundwater Sampling





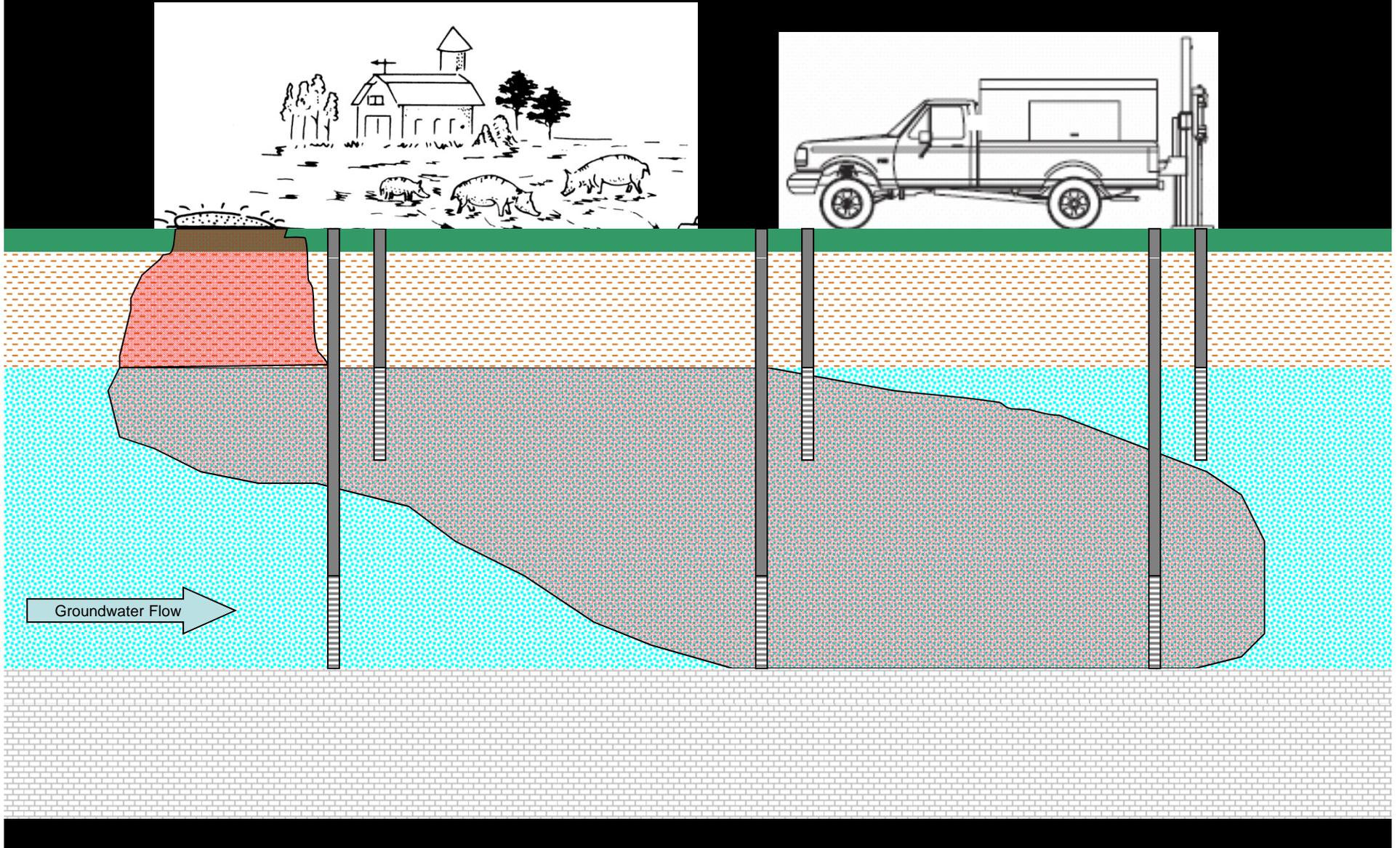
Typical well development for Municipal Wells No. 3, 5, 6, and 8

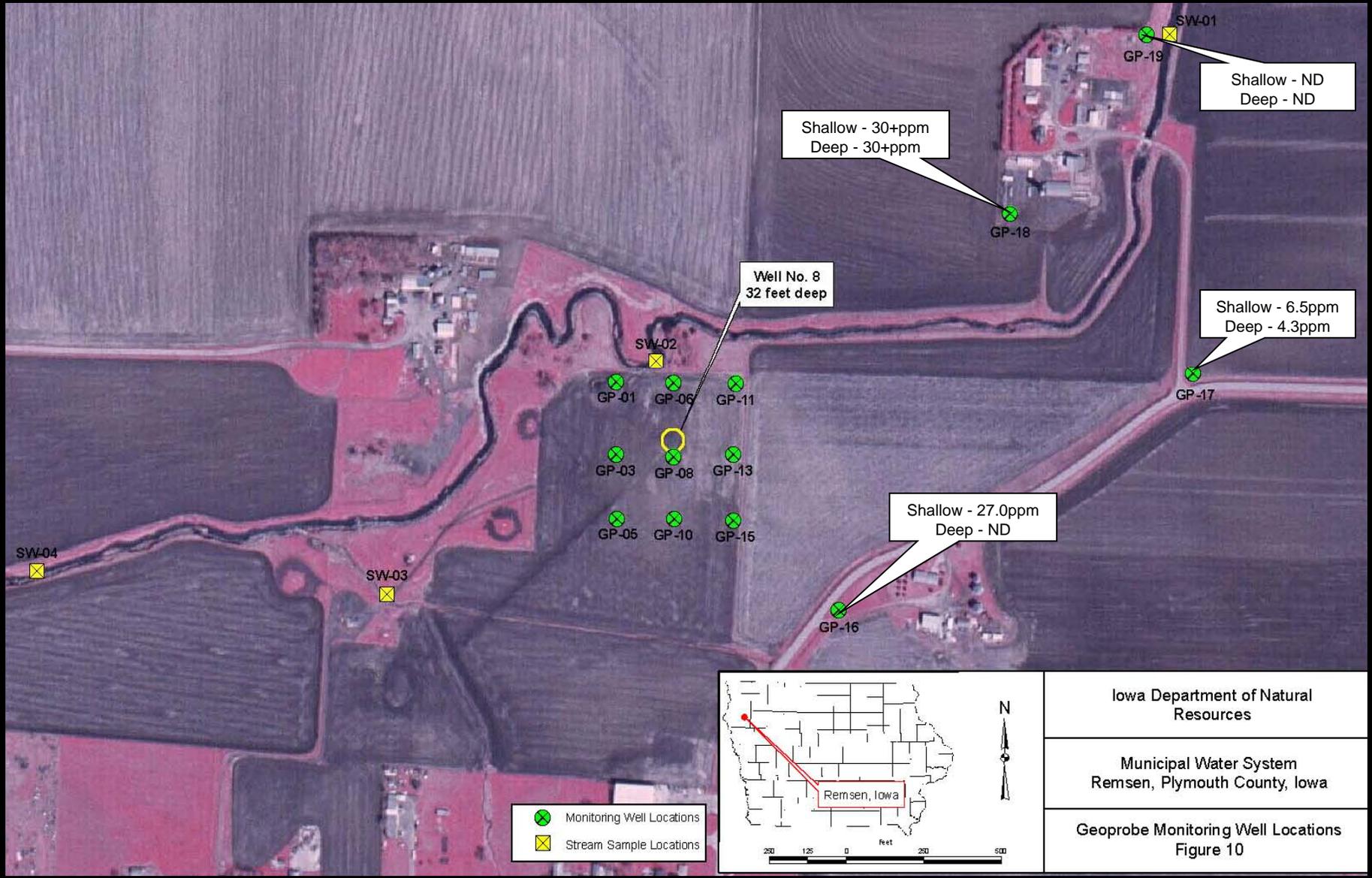


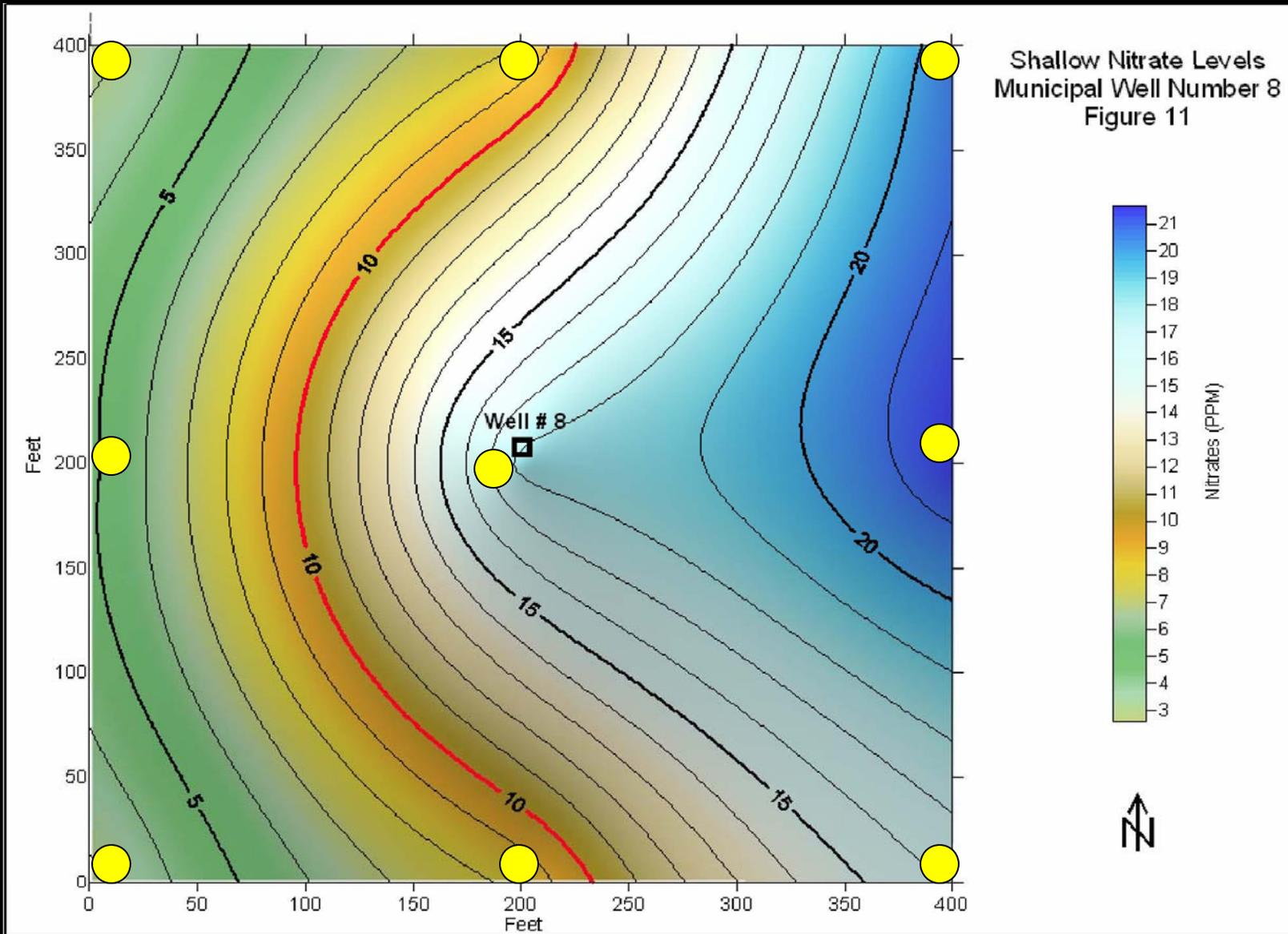
Shallow samples collected from the top of the sand and gravel aquifer. Screen placed 16 to 20 feet below the surface.

Deep samples collected from the bottom of the sand and gravel aquifer. Screen placed 28 to 32 feet below the surface.

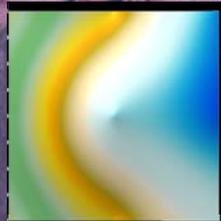
Why we used split level sampling (nested wells).

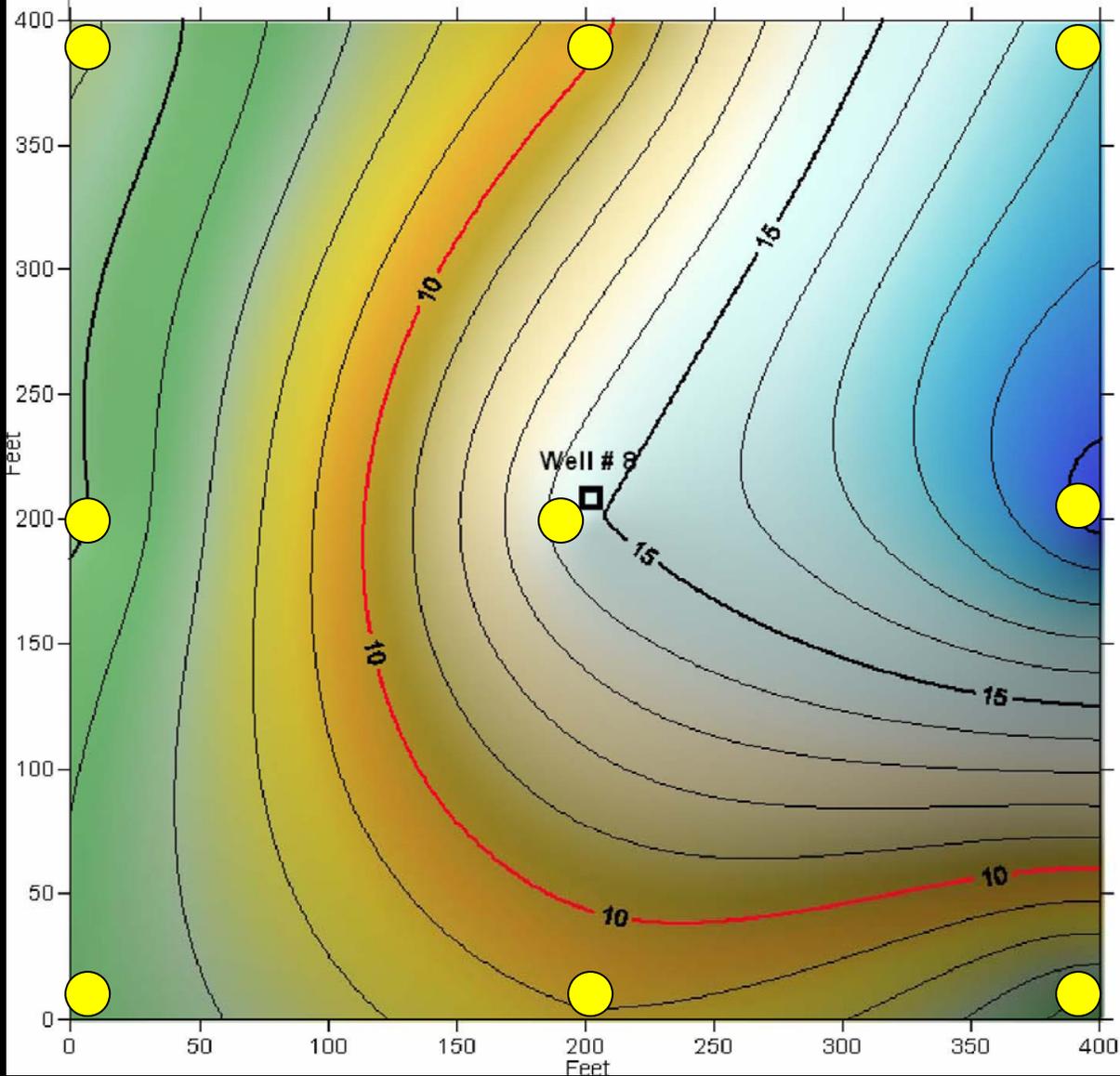




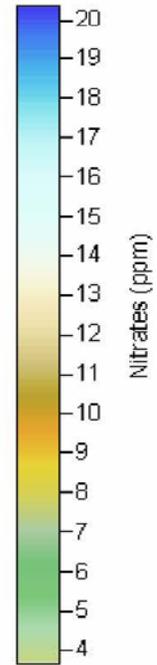


Shallow Nitrate Levels  
(16 to 20 Feet Deep)

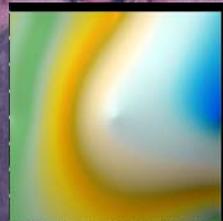




Deep Nitrate Levels  
Municipal Well Number 8  
Figure 12



Deep Nitrate Levels  
(28 to 32 Feet Deep)



The close proximity of two feed lots may also be contributing to the nitrate levels.

Potential source area for the nitrates found in Municipal Well No.8 appears to be from application of commercial fertilizer **and** manure in a sensitive area.

Potential migration pathway without well No.8

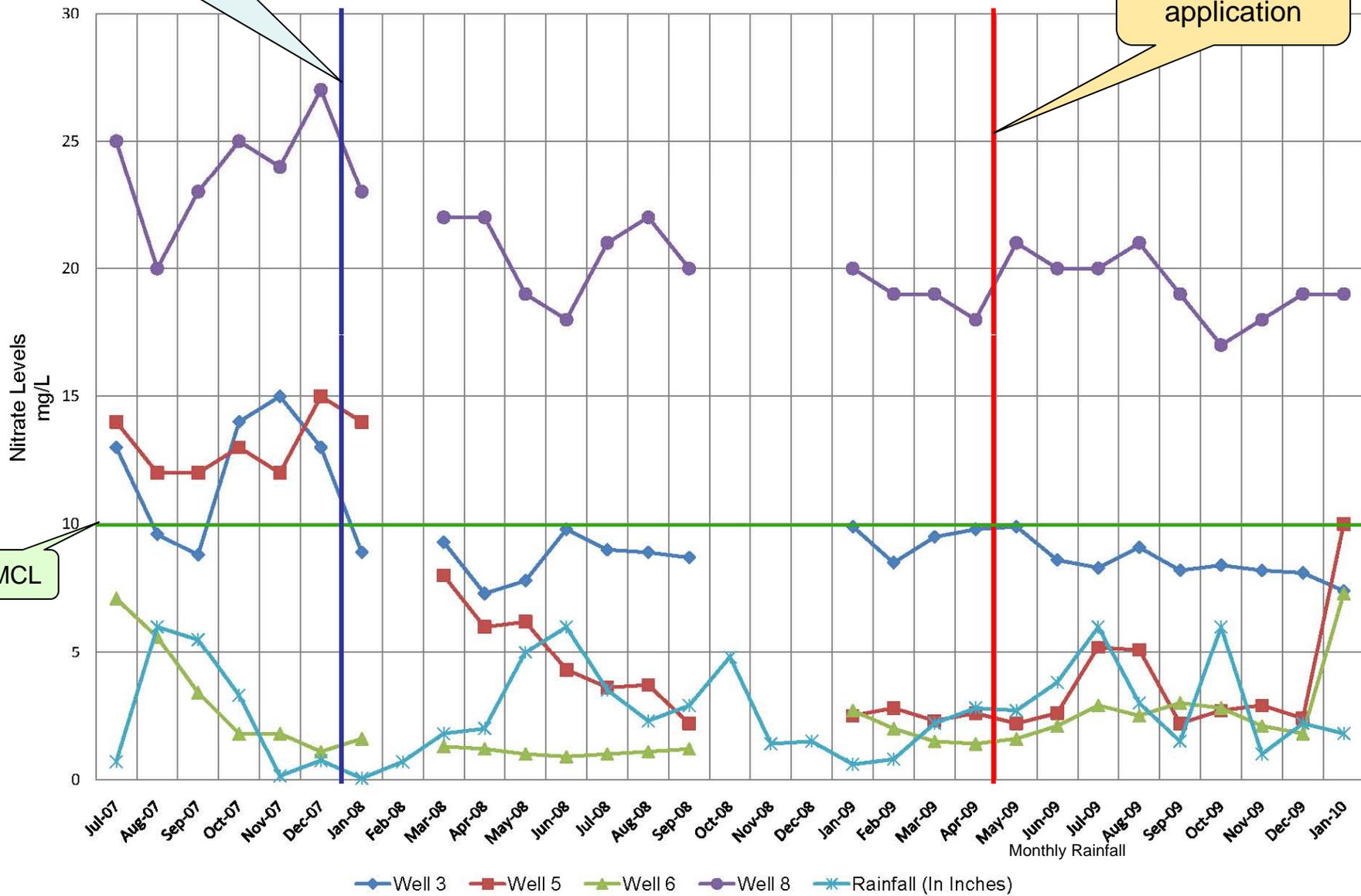
Because of Municipal Well No.8s unique position and pumping rate most of the nitrate contamination is captured.

# Remsen Municipal Water Supply Wells No. 3, 5, 6, and 8

SWP process started

Last fertilizer application

MCL





407 lb  
nitrate-  
N/Acre/Ft



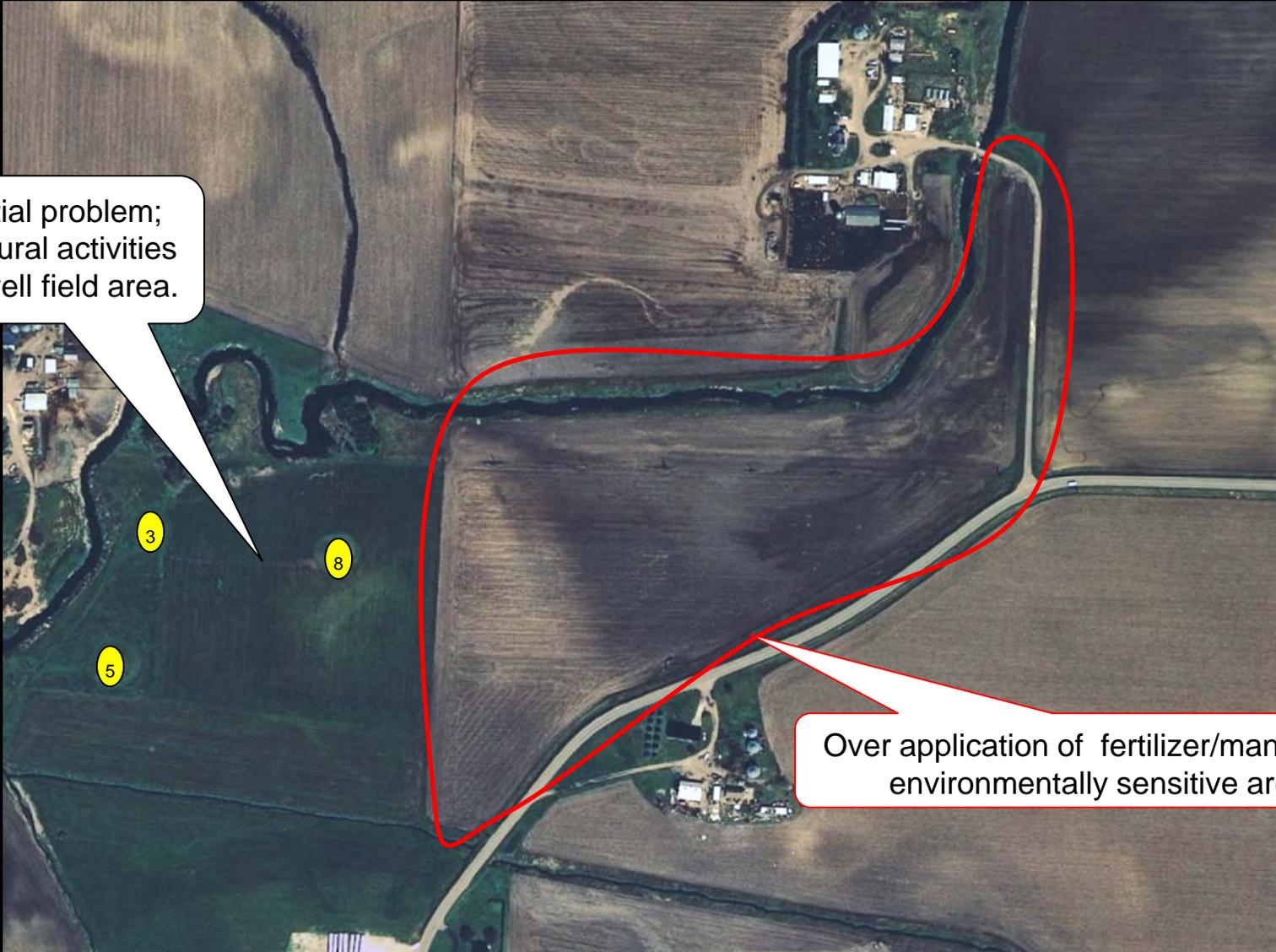
570 lb  
nitrate-  
N/Acre/Ft



665 lb  
nitrate-  
N/Acre/Ft



# Problem Identified



Potential problem;  
agricultural activities  
in the well field area.

Over application of fertilizer/manure in a  
environmentally sensitive area.

# How to Solve the Problem

## USE THE SWP PARTNERSHIP

Remsen SWP Community Planning Team

Remsen Utilities Board and City Council

Plymouth County USDA-NRCS

Sioux Rivers RC&D

IDNR SWP Program & Contaminated Sites staff

IDNR SRF Funds

State Watershed Improvement Review Board (WIRB)

USDA-ARS

Plymouth County PF Chapter

# The Big Three

What made all the pieces fall together

SRF - Clean Water State Revolving Fund Program:

Action: Loan to purchase 35.34 acres west of well field

Time to commitment: **4 Months**

WIRB - Watershed Improvement Review Board:

Action: Grant to purchase 21.1 acres east of well field

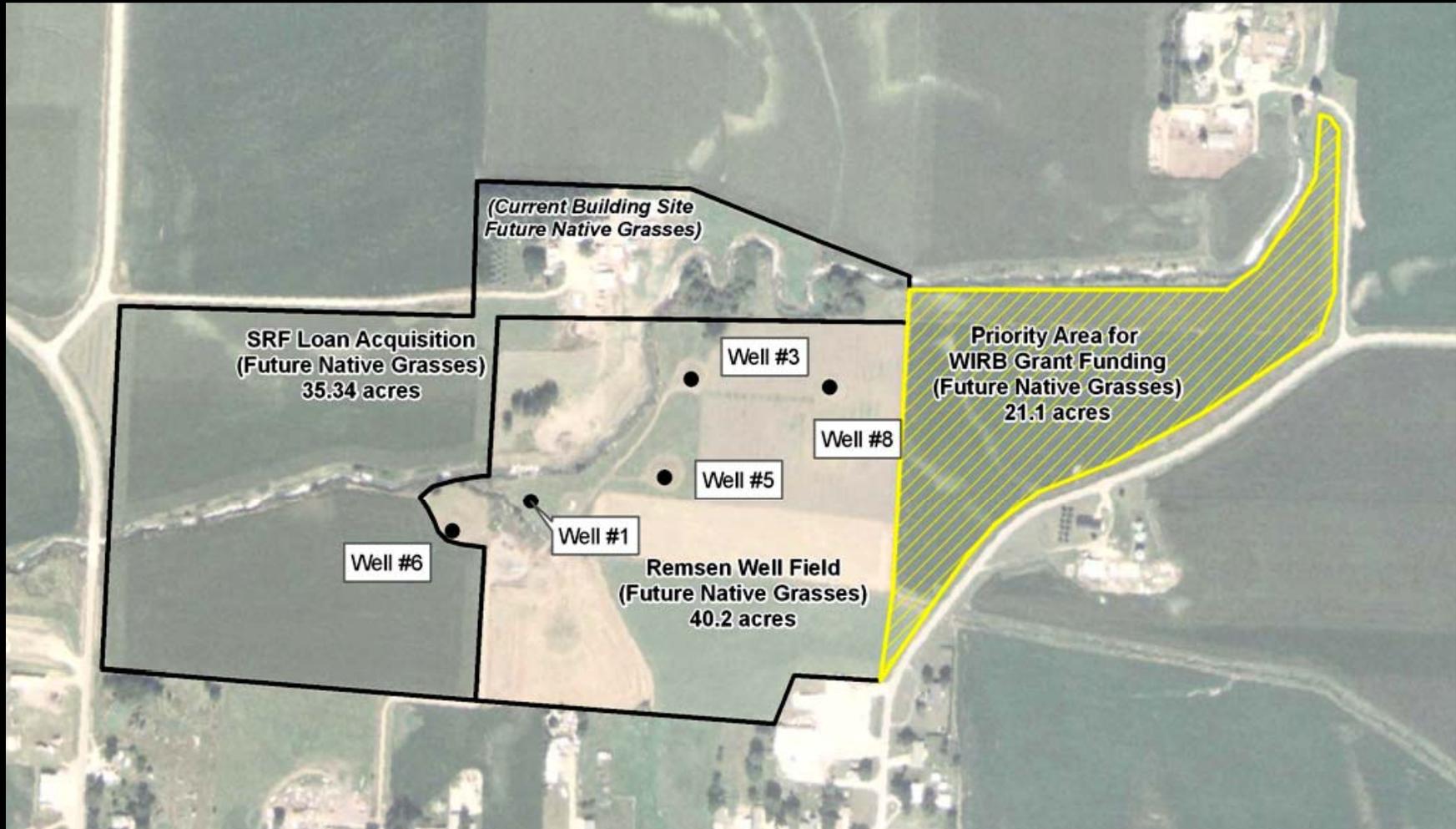
Time to commitment: **3 Months**

Pheasants Forever:

Action: Prepare seedbed and plant native grasses

Time to commitment: **MINUTES!!!!**

# Land Acquisition

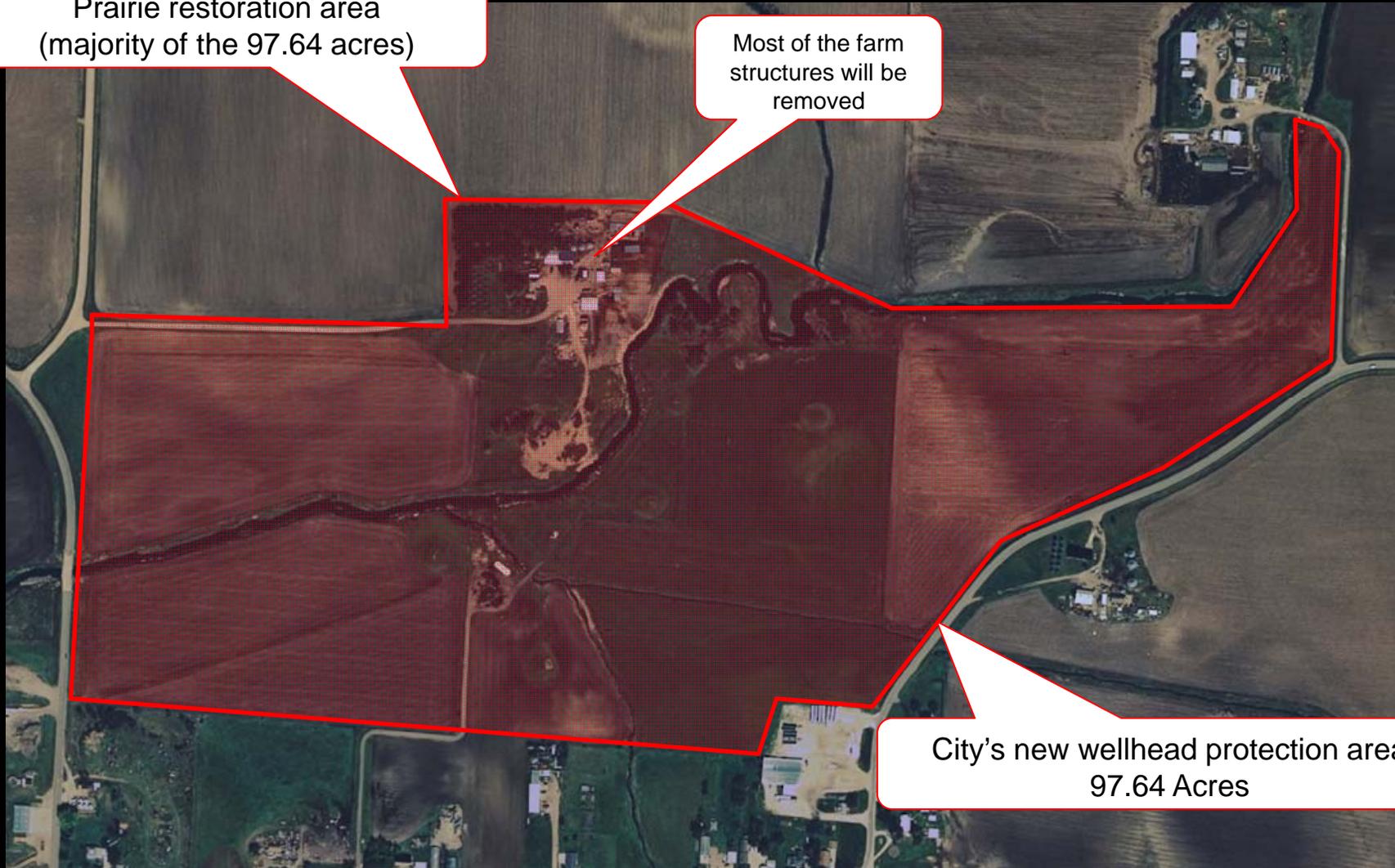


# Pheasants Forever Plymouth County, Iowa Chapter

Prairie restoration area  
(majority of the 97.64 acres)

Most of the farm  
structures will be  
removed

City's new wellhead protection area  
97.64 Acres



# Site Preparation



Fence and structure  
removal  
(Completed by City of  
Remsen)



Early spring 2009

# Seedbed Preparation

(Completed by Pheasants Forever)

Spring 2009





Spring 2009

# Seeding and Signage

(Completed by Pheasants Forever)



# Long Term Maintenance

(To be completed by City of Remsen)

Demolition of  
farmyard  
structures  
and debris  
removal.



Mowing weeds  
until prairie is  
established  
(two to three  
times a year)

It Takes  
Time.....



*THANK YOU PHEASANTS FOREVER!*



# Questions?



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