

# Why do we need nitrogen?

Nitrogen is essential for all living things, this includes both plants and animals. Animals get nitrogen by eating plants and other animals.

Plants need nitrogen for growth. Plants get nitrogen from water and from the soil.

# Where do nitrates in groundwater come from

- ▶ According to a study by Dr. Byron Shaw in 1994 contributing sources of nitrates were broken into the following categories:
  - ▶ 90% from agricultural sources
  - ▶ 9% from septic systems
  - ▶ 1% lawns/other

# Manure

## Pro's

- ▶ Provides nitrogen necessary for crops/plant growth
- ▶ Increases organic matter in the soil, which reduces nitrate leaching
- ▶ Is a slow release of nitrogen

## Con's

- ▶ Expensive to properly store
- ▶ Potential for runoff if not incorporated
- ▶ Unpleasant odor to some people

# Commercial Nitrogen

## Pro's

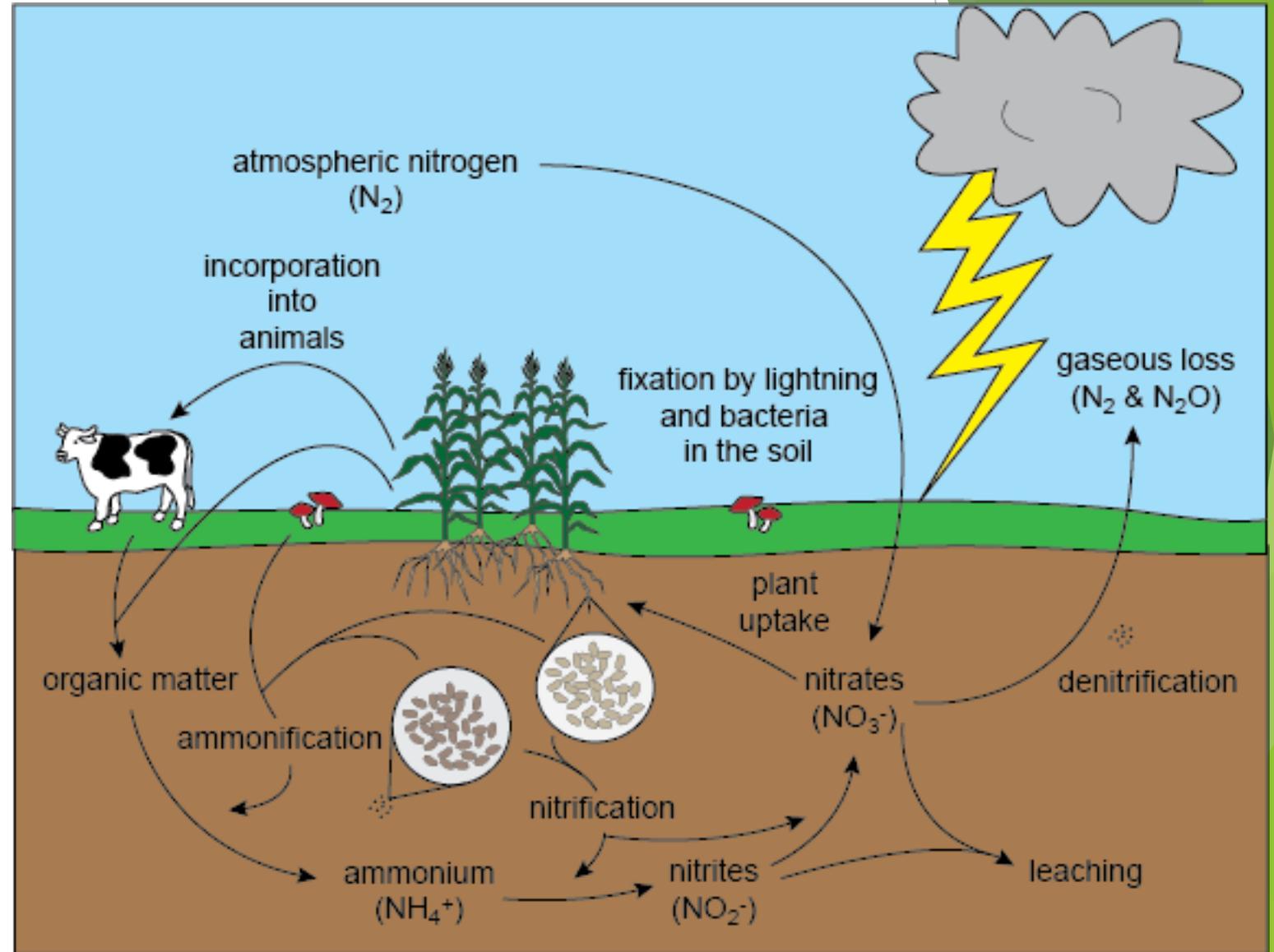
- ▶ Provides nitrogen necessary for crops/plant growth
- ▶ Nutrient is readily available for the crop

## Con's

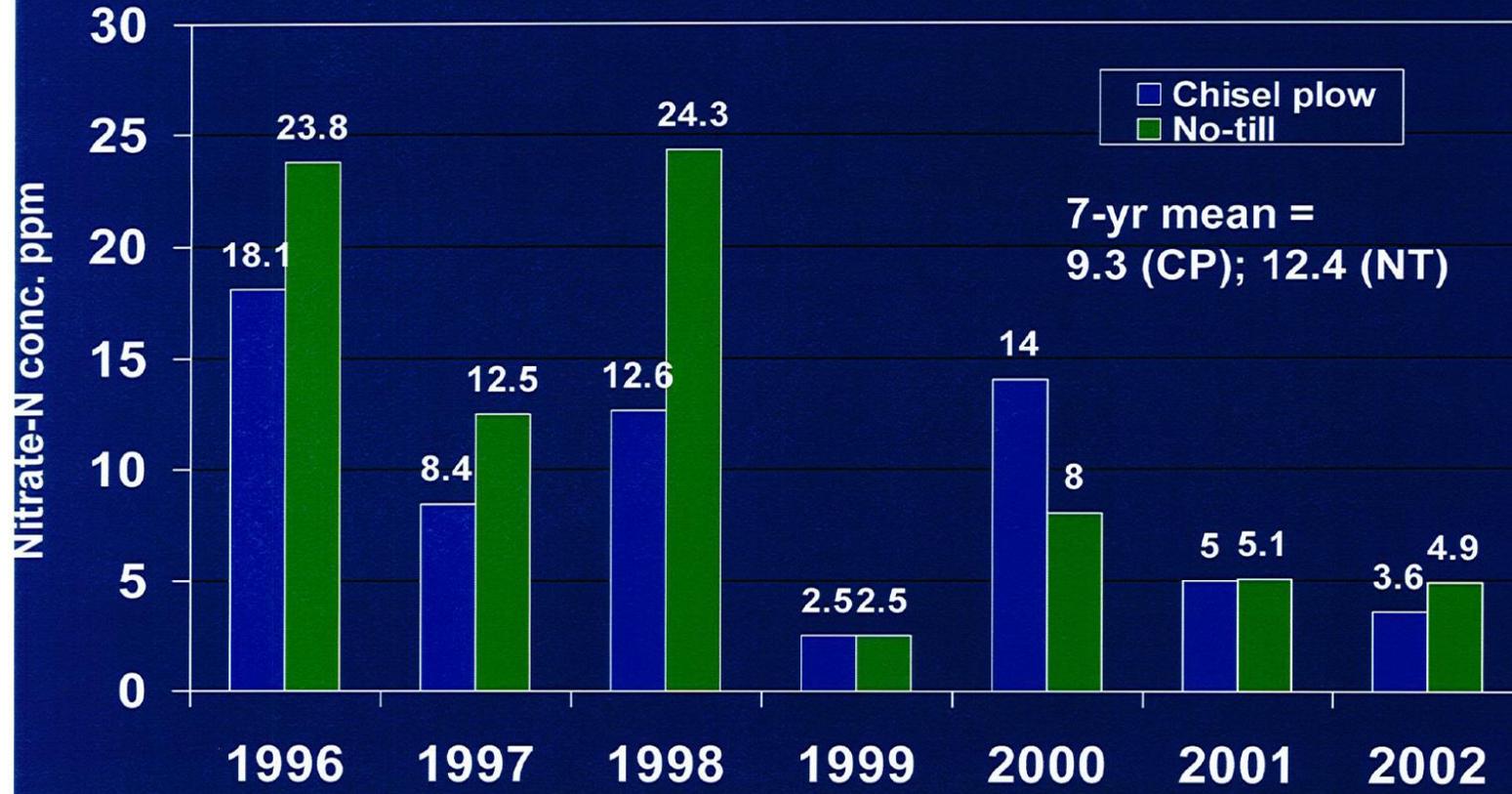
- ▶ It is expensive
- ▶ It can leach rapidly in sandy soil after intense rain events

# Goal of Nitrogen Application in Agriculture:

To keep nitrogen in the root zone of plants so that it is easily available for uptake by the plant.



# Mean annual flow weighted nitrate-N concentrations in leachate from corn fertilized with 160 lb N/a, 1996-2002



# Potential Ways to Limit Nitrogen inputs to groundwater

- ▶ Practices that are used to apply nitrogen
  - ▶ Certain type of landscapes/soil types
    - ▶ The 590 NM Standard does not allow fall applications of commercial nitrogen on sandy soils
    - ▶ The 590 NM Standard does not allow fall applications of manure on sandy soils until soil temperatures are below 50 degrees unless there is a growing crop

# Regulations Currently Addressing Nitrates in Agriculture

- ▶ **NR 151 - Agricultural Performance Standards**
  - ▶ Nutrient management - all farms must have a nutrient management plan; but that cannot be enforced unless they are offered cost share monies, have a manure storage facility, or participate in farmland preservation
    - ▶ No evidence to show NMP's reduce nitrates in GW
  - ▶ No stacking of manure on sandy soils
- ▶ **NR 243 - Nutrient Management Standards**
  - ▶ Design standards and management practices for CAFO's
  - ▶ The need for them to obtain permits from the state
  - ▶ The need for them to have nutrient management plans
  - ▶ No winter spreading of manure
  - ▶ Oversight for CAFO's is given to the DNR

# Regulations Currently Addressing Nitrates in Agriculture

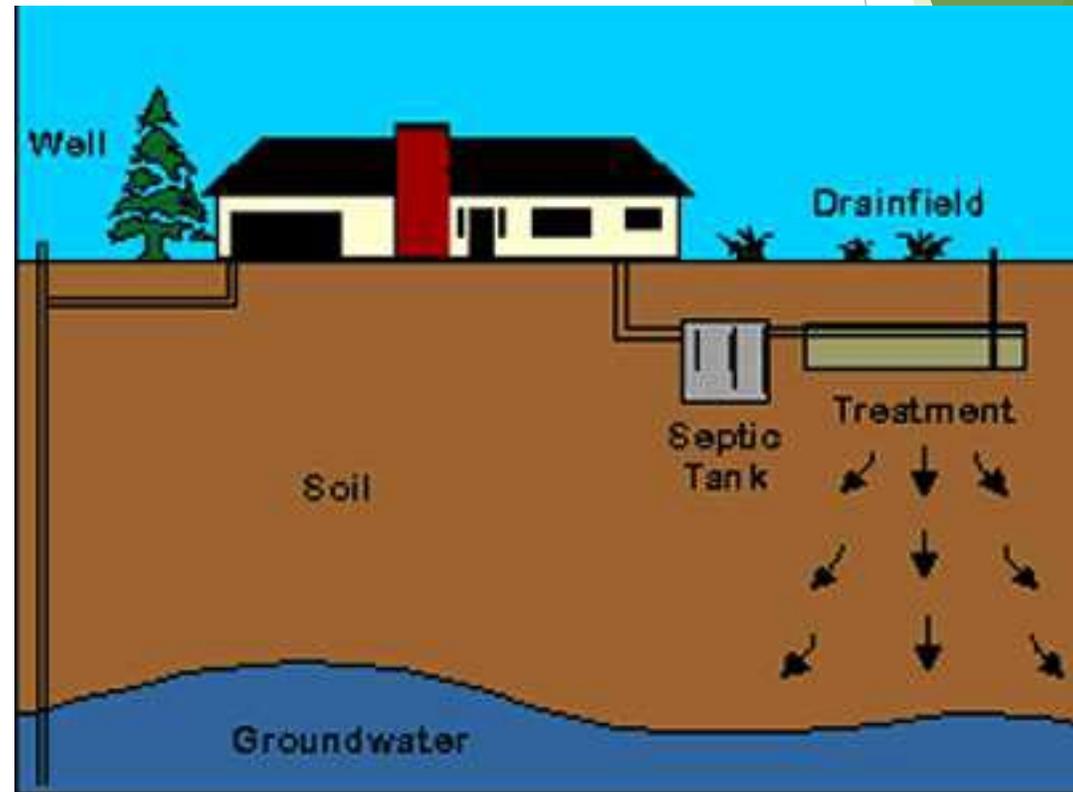
- ▶ **USDA NRCS Nutrient Management Standard 590**
  - ▶ Establishes the criteria and documentation requirements for a nutrient management plan
- ▶ **Portage County Zoning Ordinances**
  - ▶ Sets up permitted uses in each zoning district
- ▶ **Portage County Wellhead Protection Ordinance**
  - ▶ Limits the land uses within the wellhead protection areas
- ▶ **Animal Manure Storage Ordinance and Nutrient Management Standards**
  - ▶ Standards and permits for manure storage facility construction

# Regulatory Challenges

- ▶ Nitrogen is essential to agriculture, we do not have the authority to eliminate its use
- ▶ Restricting manure will increase use of commercial fertilizer, which increases nitrate leaching While regulating amounts of fertilizers applied may theoretically be possible in a NMP, it is impossible to know or enforce how much is actually applied
- ▶ County does not have authority to regulate pastures
- ▶ Because of the complexity and cost required to identify sources of nitrate contamination, the County should not require a person engaged in the land application of manure to: file a report; install monitoring wells; or restore groundwater quality
- ▶ Counties cannot regulate stricter than state statute
  - ▶ They need to be voluntary

# Septic Systems

Nitrogen is an output of traditional septic systems. Septic systems are designed to treat bacteria and pathogens, not necessarily to remove nutrients.



# How can we limit nitrate sources from septics?

- ▶ Additional treatment requirements on septics
- ▶ Spacing of septic systems
  - ▶ From each other
  - ▶ From water sources

# Regulations Currently Addressing Nitrates from Septics

- ▶ **NR 204 - Domestic Sewage Sludge Management**
  - ▶ Establish standards, monitors, record keeping, and reporting requirements for the use and disposal of sewage sludge and grit and screenings
- ▶ **NR 214 - Land Treatment of Industrial Liquid Wastes, By-Products Solids and Sludges**
  - ▶ Establish design and construction criteria for all land treatment systems that receives industrial wastes
  - ▶ Require DNR approval
- ▶ **NR 113 - Servicing Septic or Holding Tanks, Pumping Chambers, Grease Interceptors, Seepage Beds, Seepage Pits, Seepage Trenches, Privies, or Portable Restrooms**
  - ▶ Establish standards for servicing items listed above
  - ▶ Provide for use and disposal of wastewater from these sources
- ▶ **Portage County Private Sewage System Ordinance**
  - ▶ Standards for private septic systems and their maintenance

# Regulatory Challenges

- ▶ Counties cannot regulate stricter than state statute
- ▶ Additional requirements on septic treatment would have to be voluntary

# Lawns

You do not necessarily need to fertilize in order to have a lawn. If lawns are fertilized, any excess lawn fertilizer that is not taken up by the lawn will leach.

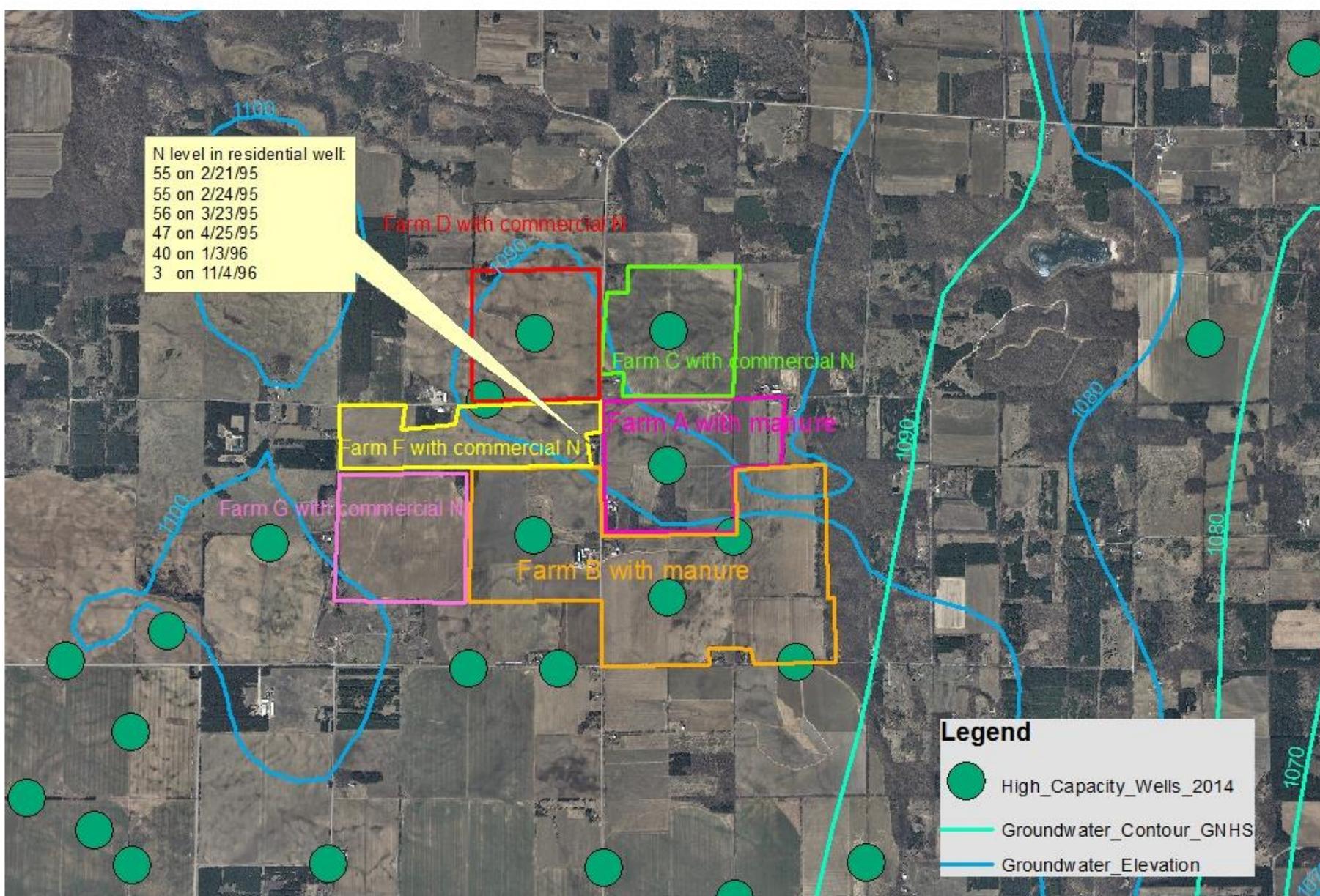


# How can we limit nitrate sources from lawns?

- ▶ Control the amount of nitrogen that is applied to lawns
  - ▶ It is not feasible to do this, because there is no way to be able to enforce this

# County staff couldn't identify any viable regulations in the ordinance proposed by the citizens of New Hope, here are alternatives

- ▶ Best Management Practices
  - ▶ Voluntarily implemented Agricultural Best Management Practices (See handouts)
  - ▶ Farmer Led Watershed Groups
  - ▶ Voluntary additional Septic System Treatment
- ▶ Information/Education/Outreach
- ▶ Evaluation and Assessment on practices that the County uses



- 1) Which landowner engaged in manure application should be required to file a report?
- 2) How much does the high cap well pumping influence GW gradient?
- 3) What is the protocol to document GW gradient to determine if/what manure has contributed to the contamination and how much will it cost to show "a preponderance of the evidence" in civil court?
- 4) What is the protocol when contamination decreases below the enforcement limit?
- 5) How are multiple sources of nitrates addressed? Is commercial fertilizer a source? How much is from the septic system?