

**Southern Region Extension Water Quality Meeting**

**Nutrient Management Basics  
The Georgia Perspective**

**Dr. Mark Risse & Tommy Bass**

**The University of Georgia**

**Cooperative Extension Service**



# Agenda

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Why nutrient management

What is a NMP?

Components of a Plan

Tools available

Georgia Program and Extension's Role



# We don't just win SEC titles!



# Environmental Benefits of Manure: Why?



Commercial fertilizer

vs.



Manure

- Manure contains organic carbon.
- Less runoff, erosion, and nutrient losses when done properly.

# Importance of CNMP's

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“EPA, working jointly with USDA NRCS, has determined that the most effective way for all AFO's to minimize water quality and public health risks is to develop and implement ... Comprehensive Nutrient Management Plans.”

**US EPA Guidance Manual for NPDES Permit for Concentrated Animal Feeding Operation**

# Why Focus on Nutrient Management?



# Water Quality Contaminants in Manure

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## Possible Pollutants

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## Environmental Risk

1) *Nitrate-N*

*Health*

2) *Ammonia-N*

*Fish Kills*

3) *Phosphorus*

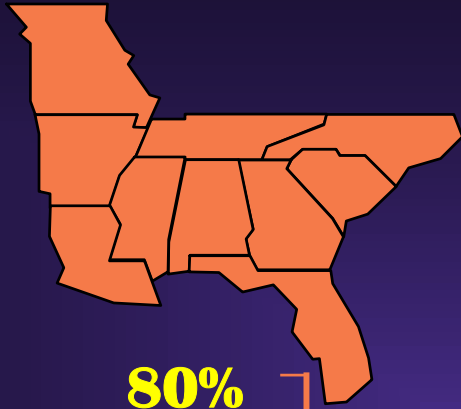
*Eutrophication*

4) Pathogens

Health

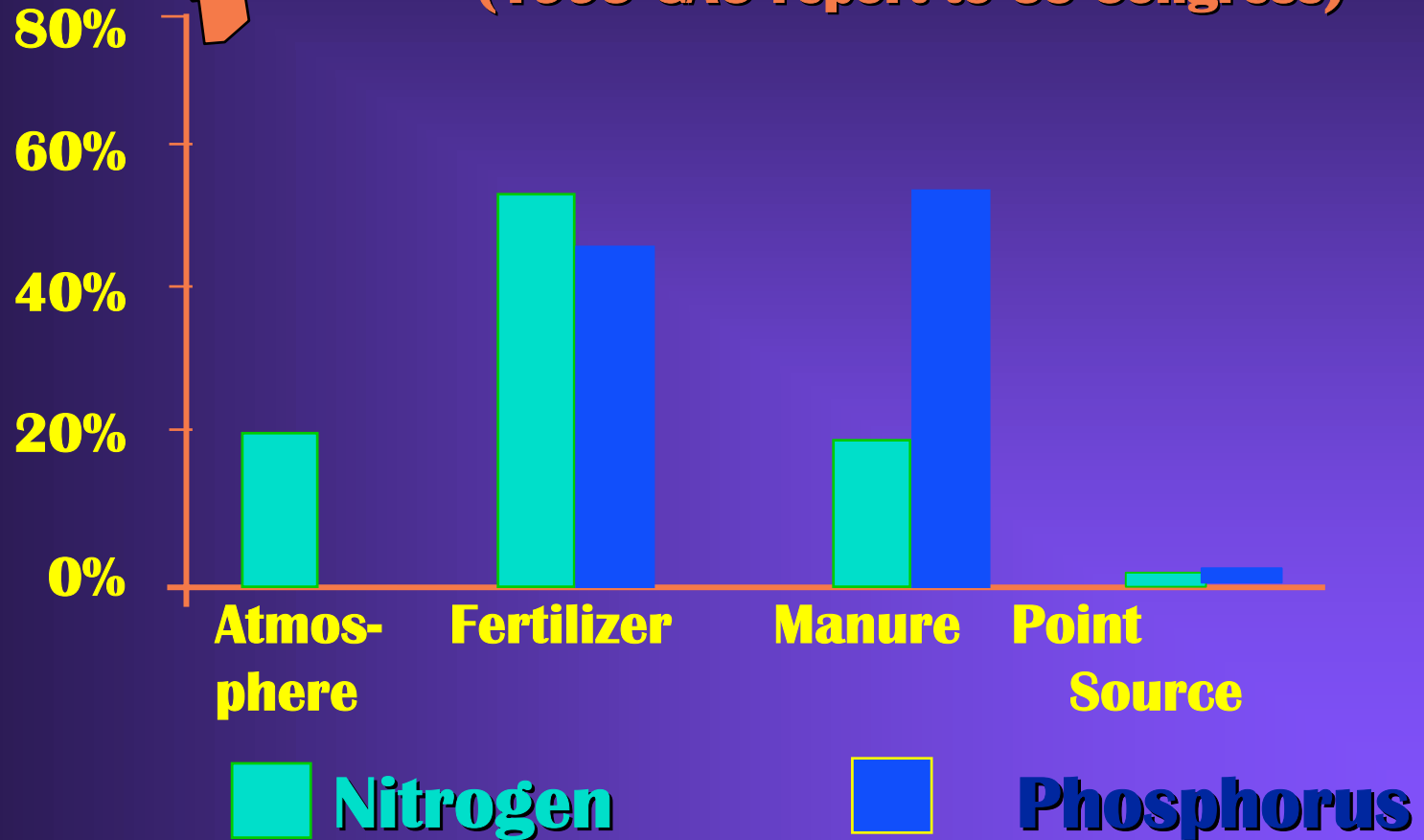
5) Organic Matter

Oxygen Depletion



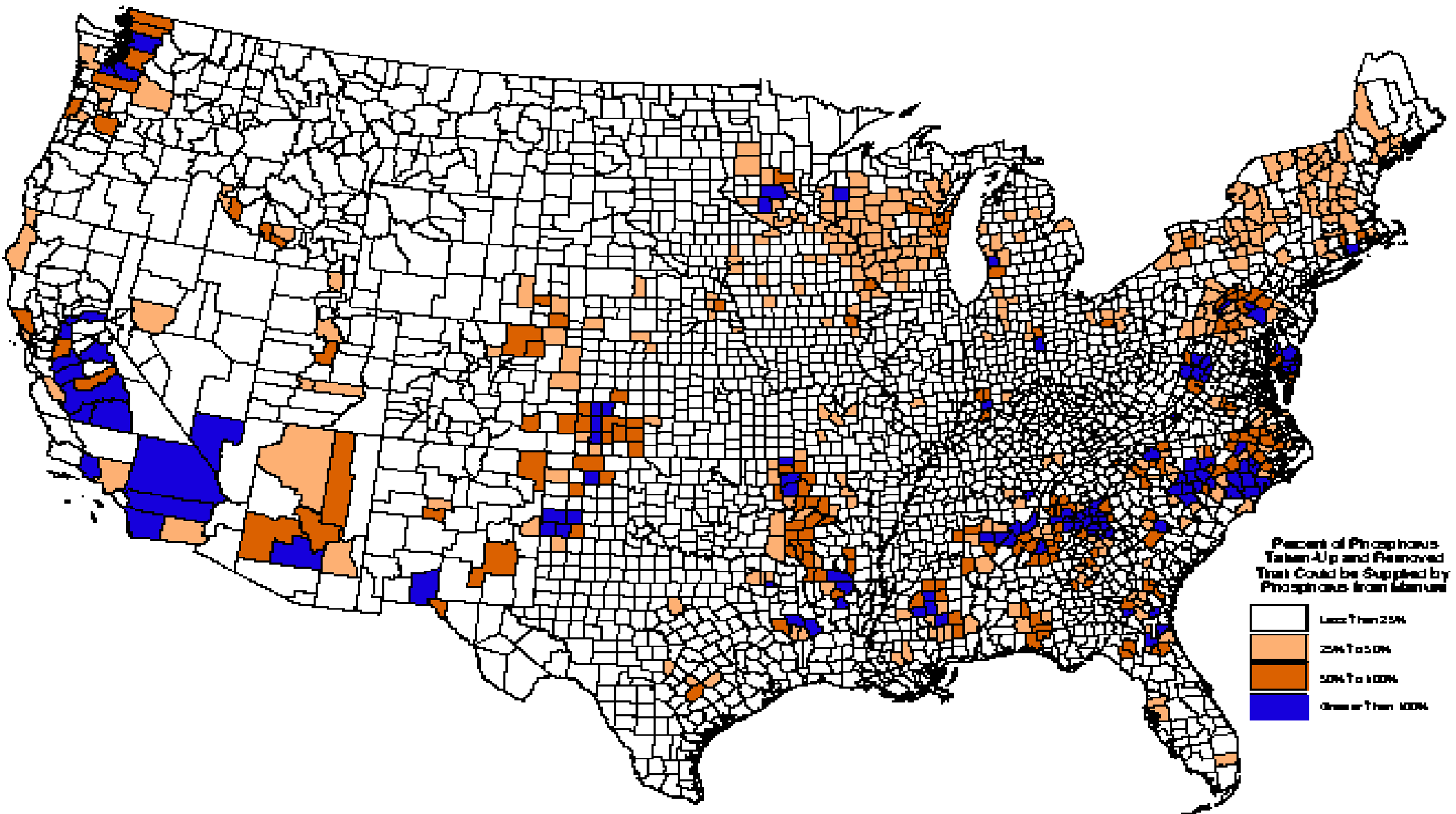
# Sources of N & P To Watersheds in Southern US

(1995 GAO report to US Congress)

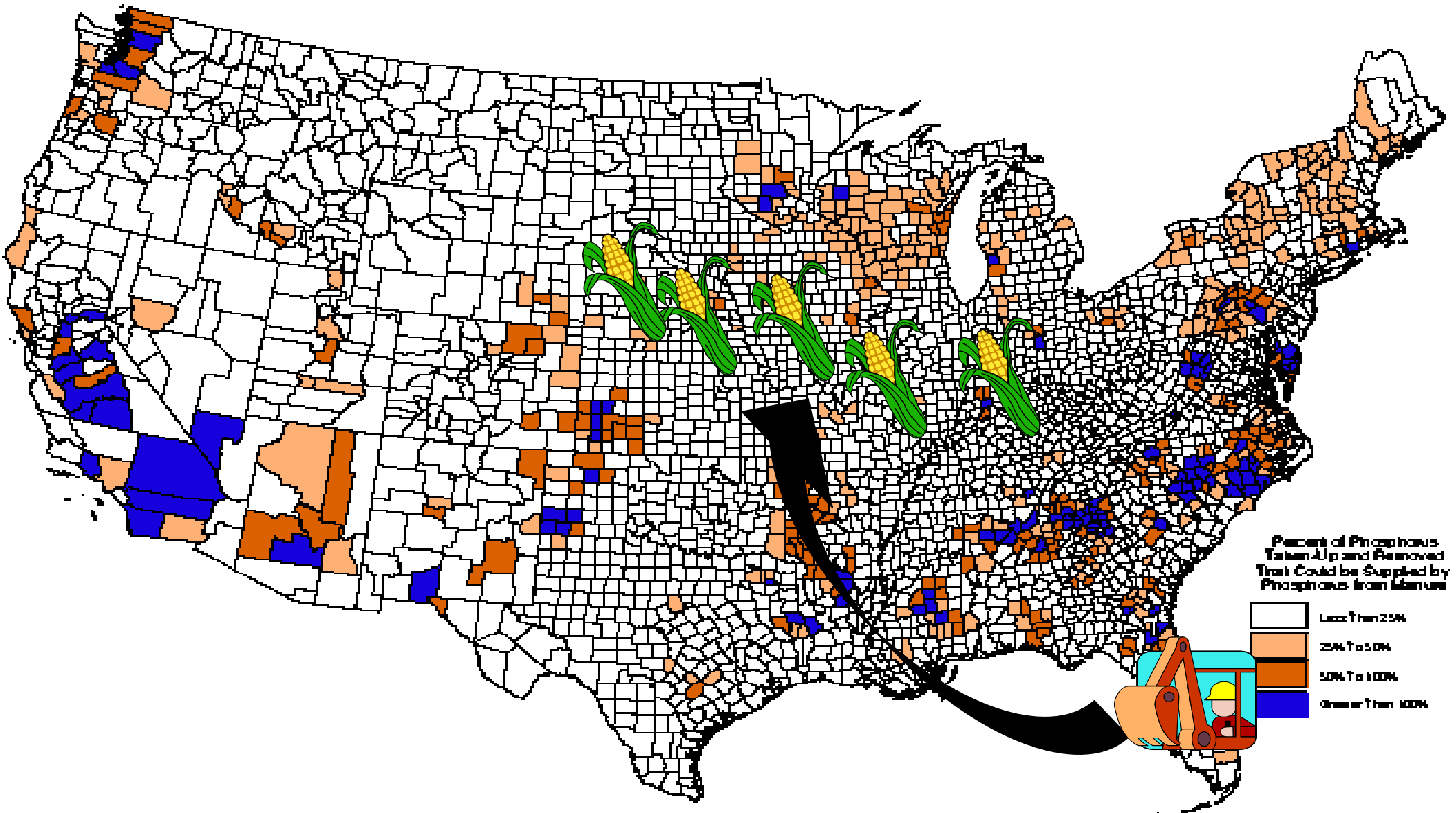




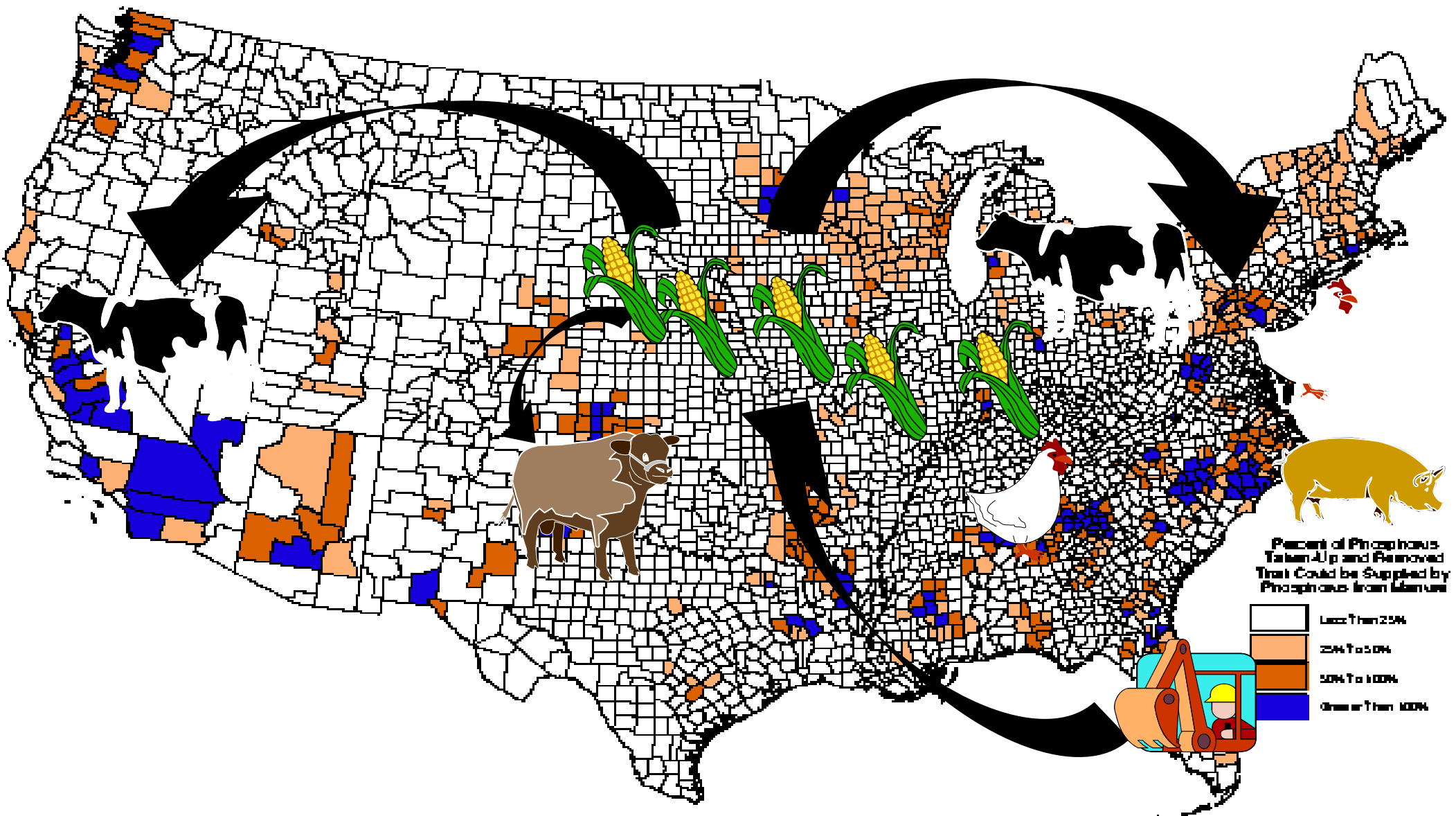
# Manure P vs. Crop Land P Use



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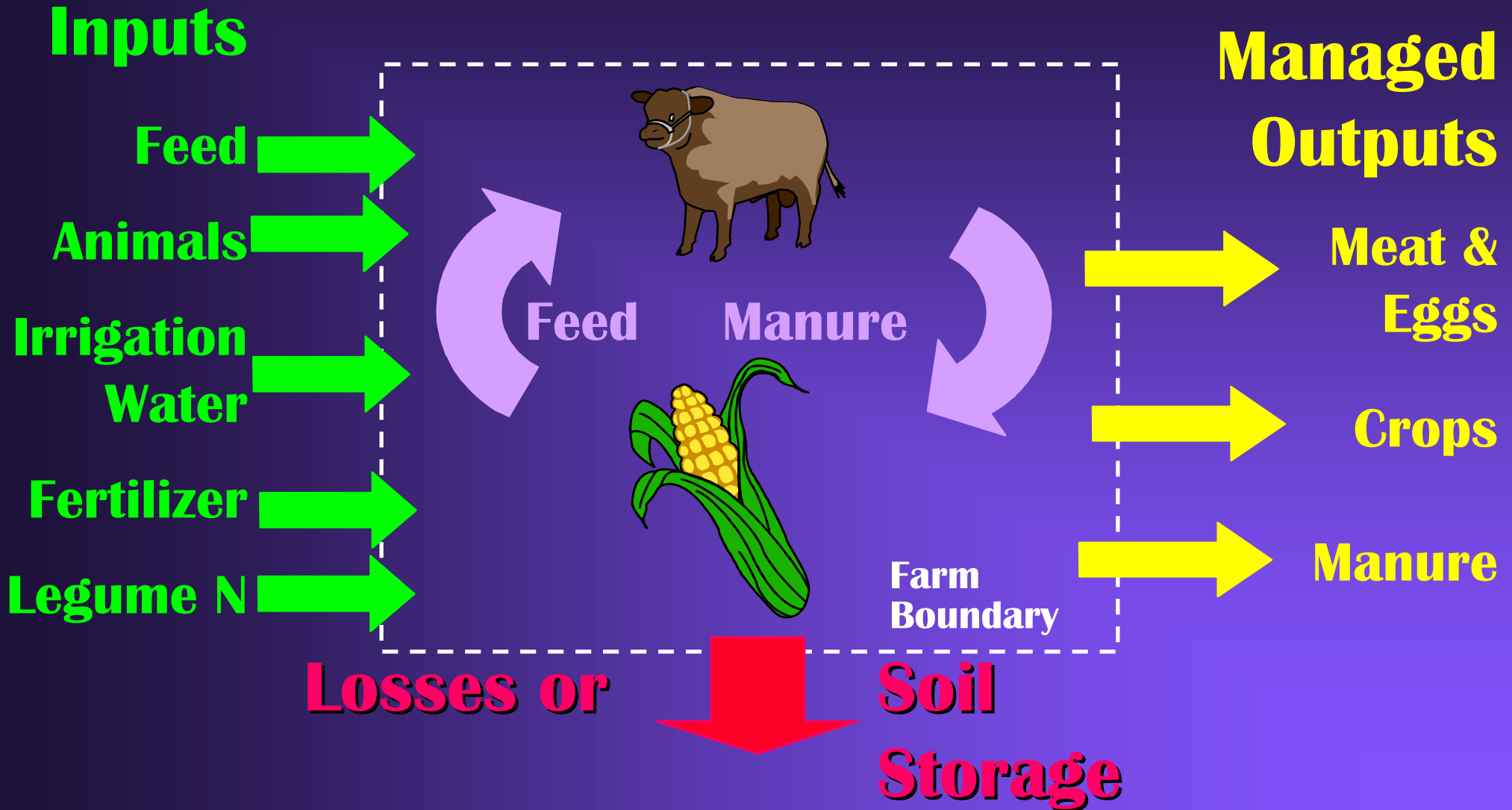
# Manure P vs. Crop Land P Use



# What is “Whole Farm” Nutrient Balance



# NUTRIENT BALANCE



# ARE INPUTS & OUTPUTS IN BALANCE?

**Water  
In**  
1 gal.



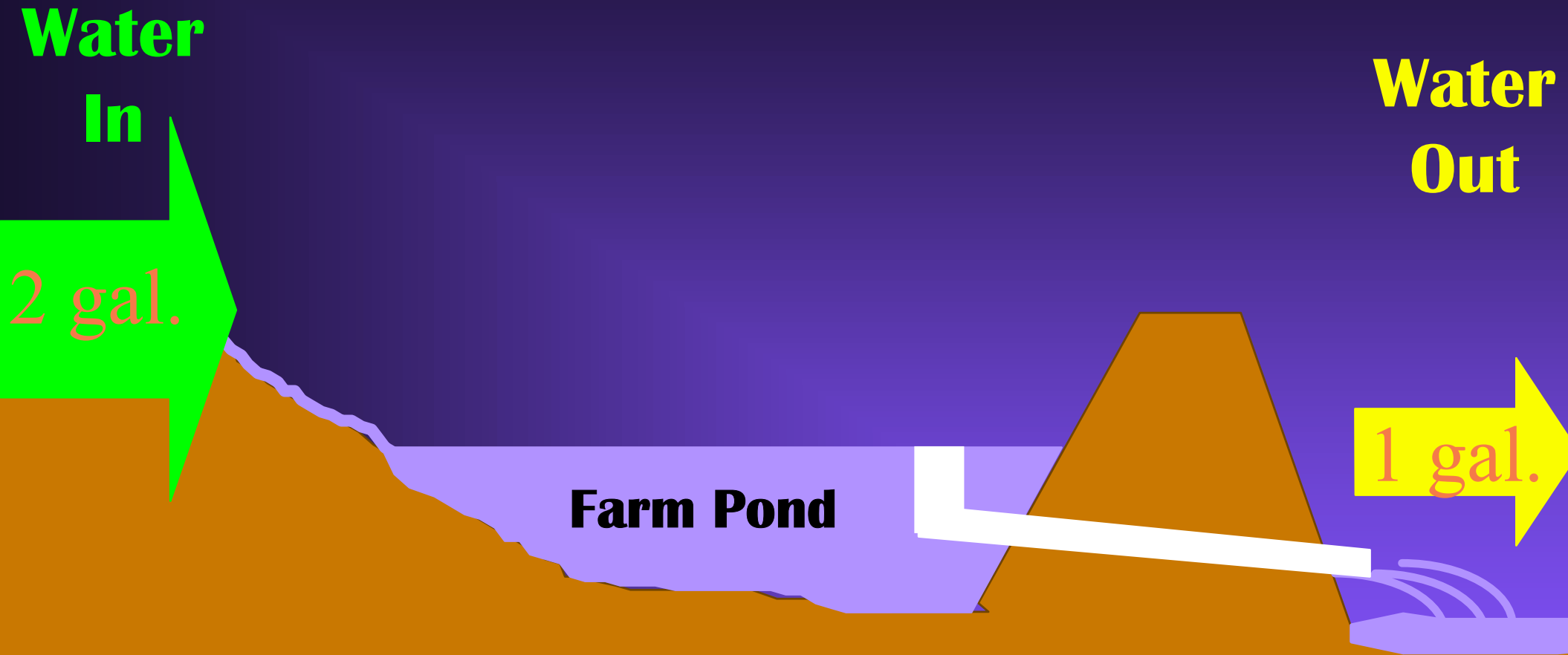
**Water  
Out**



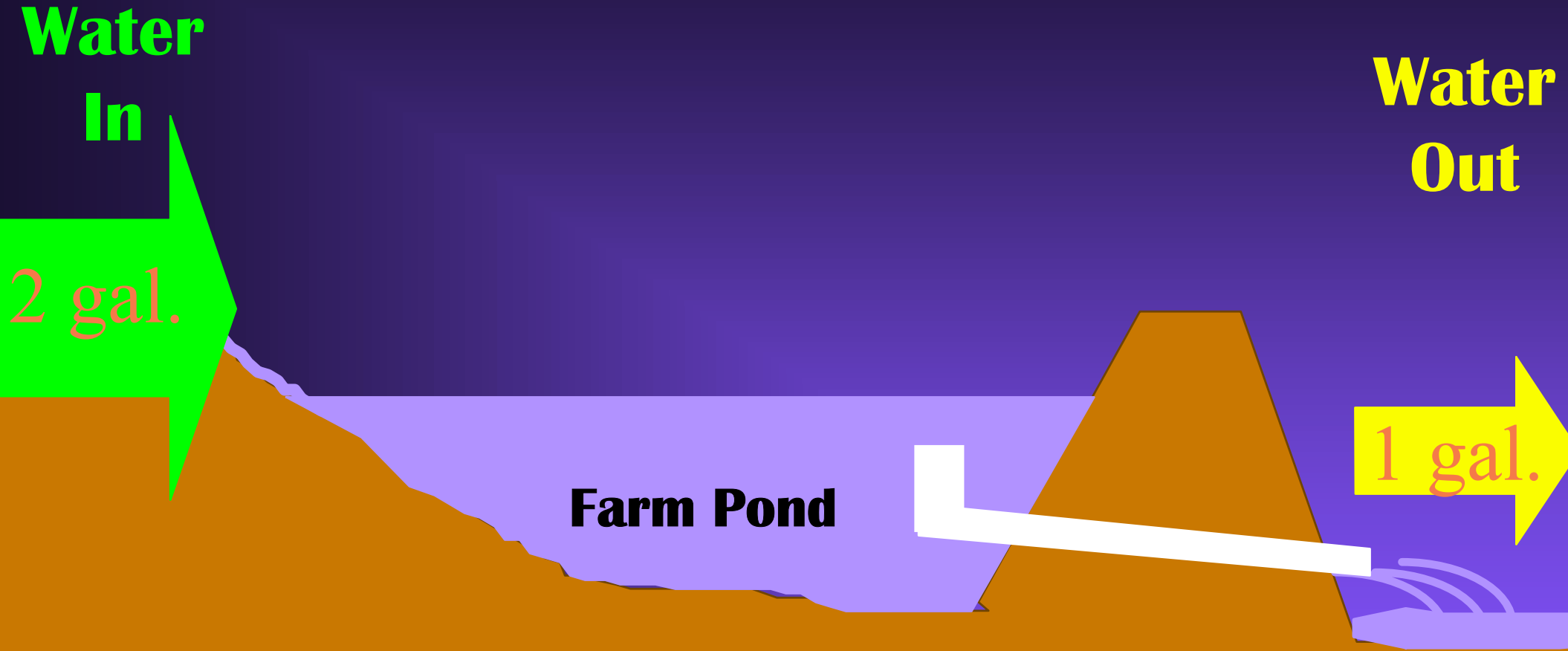
**Farm Pond**



# ARE INPUTS & OUTPUTS IN BALANCE?

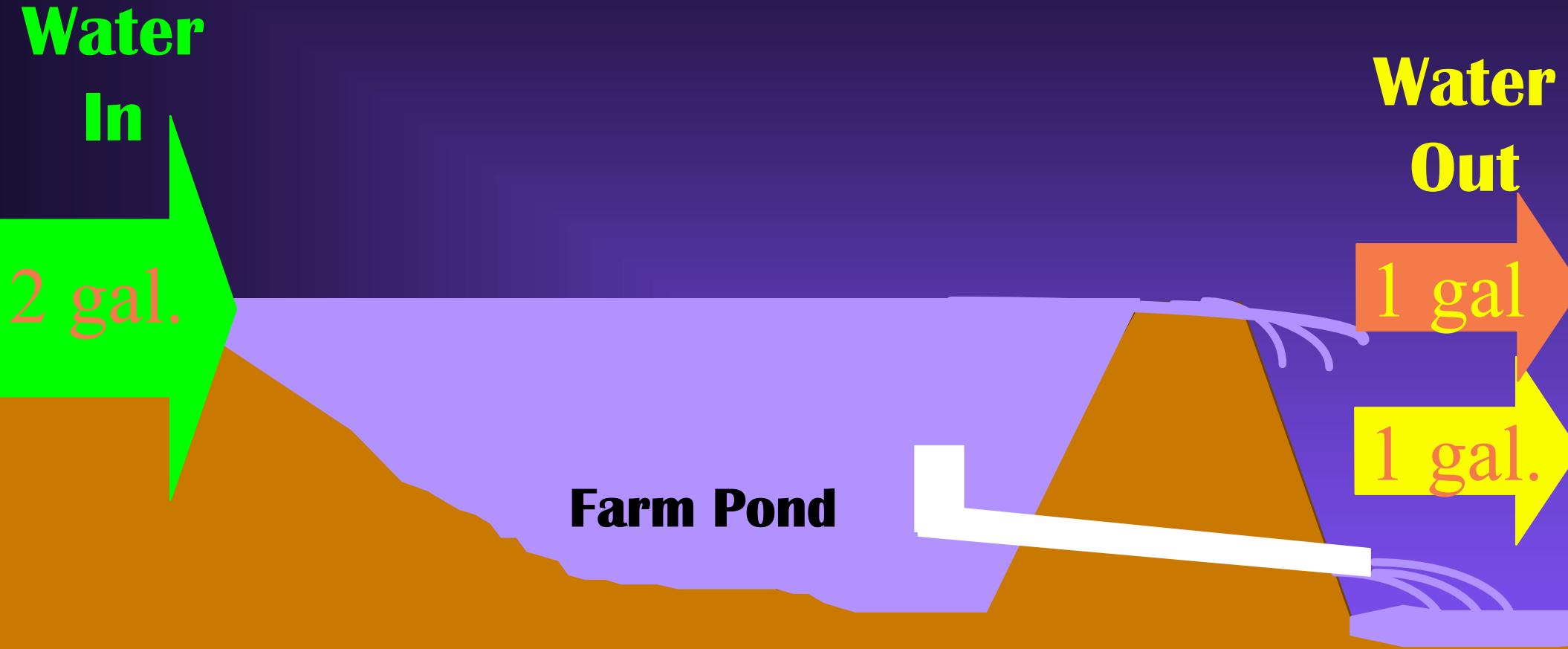



# ARE INPUTS & OUTPUTS IN BALANCE?





# ARE INPUTS & OUTPUTS IN BALANCE?



A photograph showing a large agricultural facility, possibly a feed mill or processing plant, in the background. In the middle ground, there is a large pond or reservoir. In the foreground, a tractor is visible, partially obscured by trees. The text is overlaid on the image in a large, bold, red font.

**Typical Nutrient Balance  
on AFO's are 2:1 to 5:1**

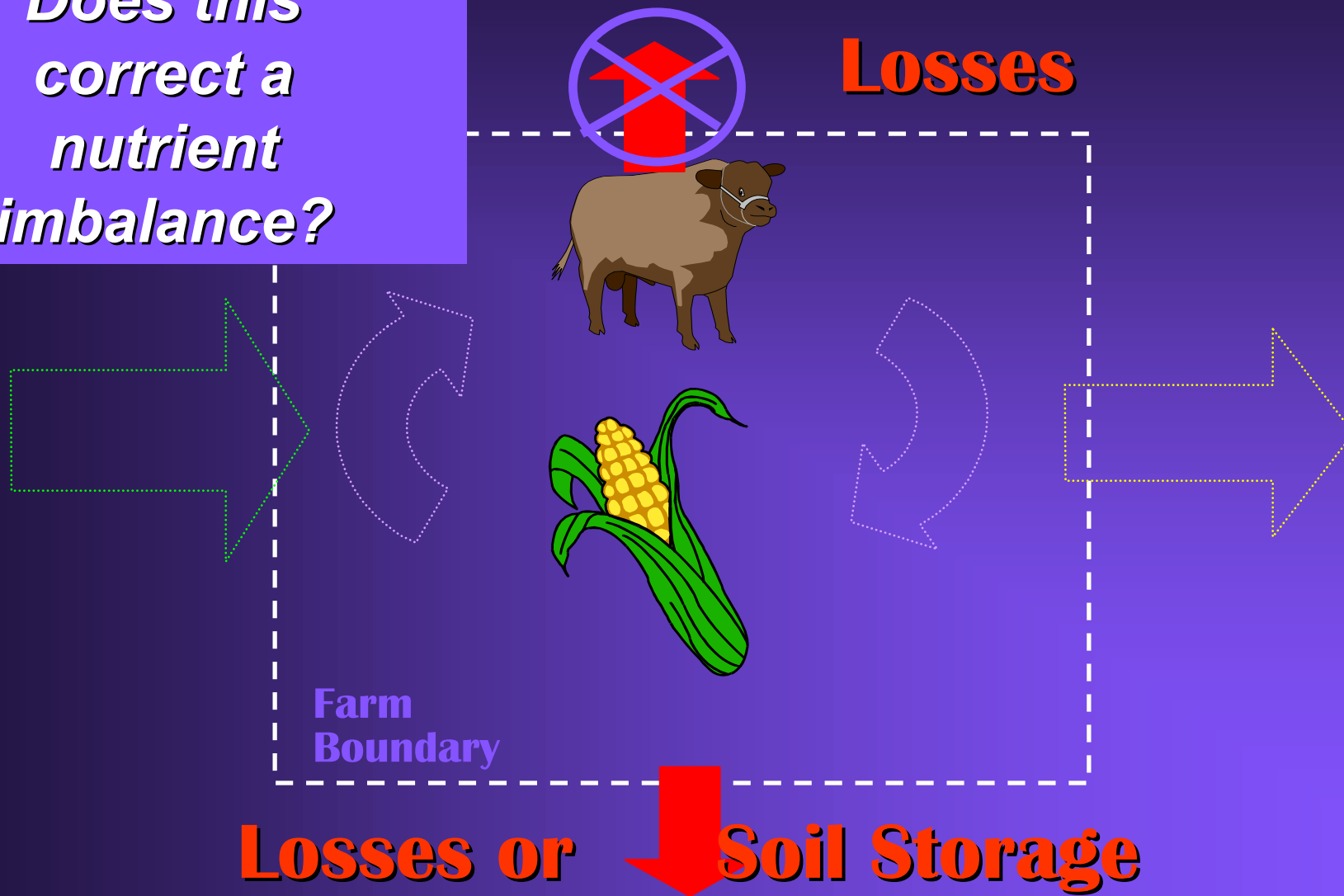


**What are Appropriate  
Strategies for Managing  
Nutrient Imbalances?**

5. 25. 2000

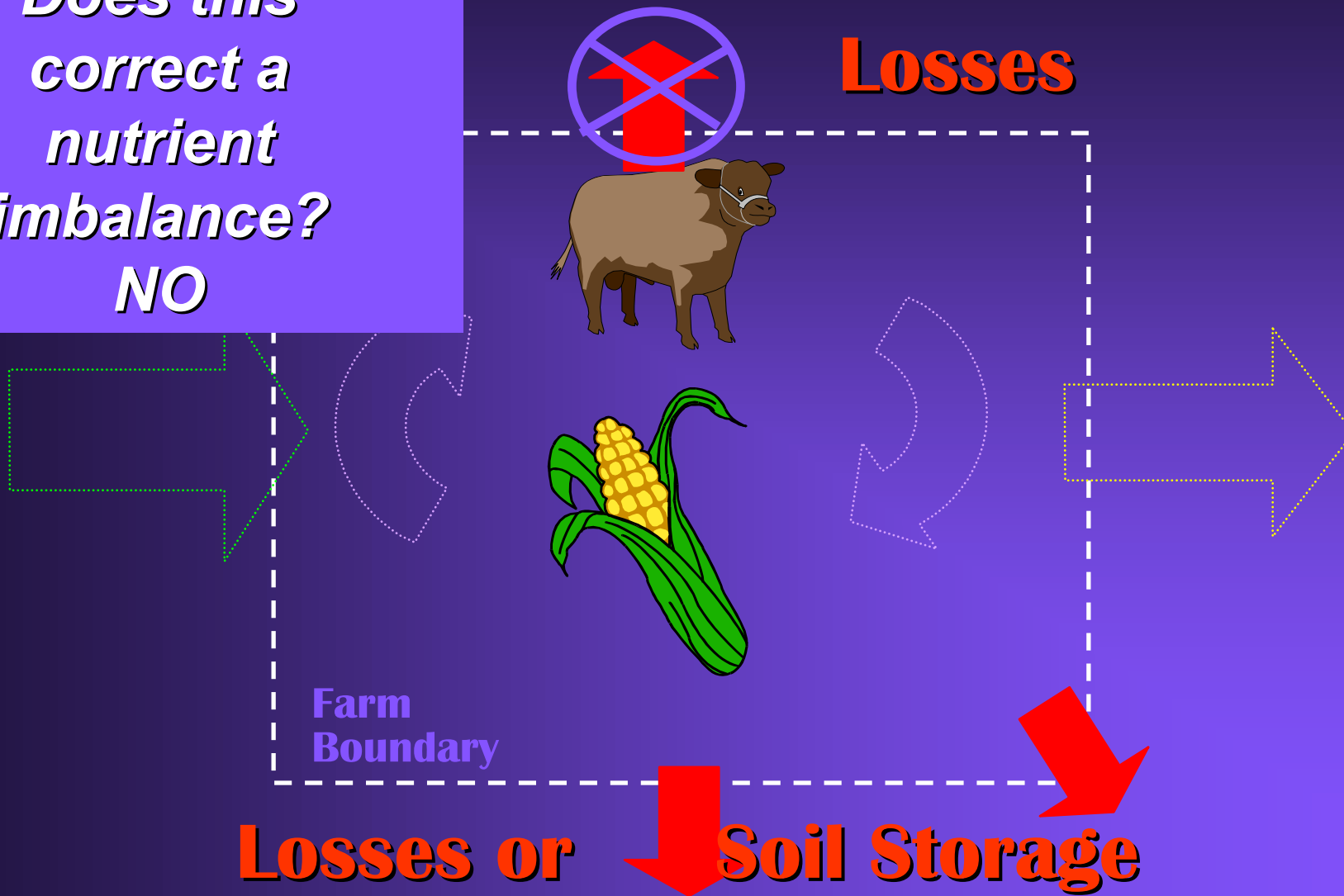
# ***“Plug the Leaks” Approach:***

***Does this  
correct a  
nutrient  
imbalance?***



# ***“Plug the Leaks” Approach:***

***Does this  
correct a  
nutrient  
imbalance?  
NO***



# Plugging the Leaks... Temporary Solution to Imbalance

**Water  
In**

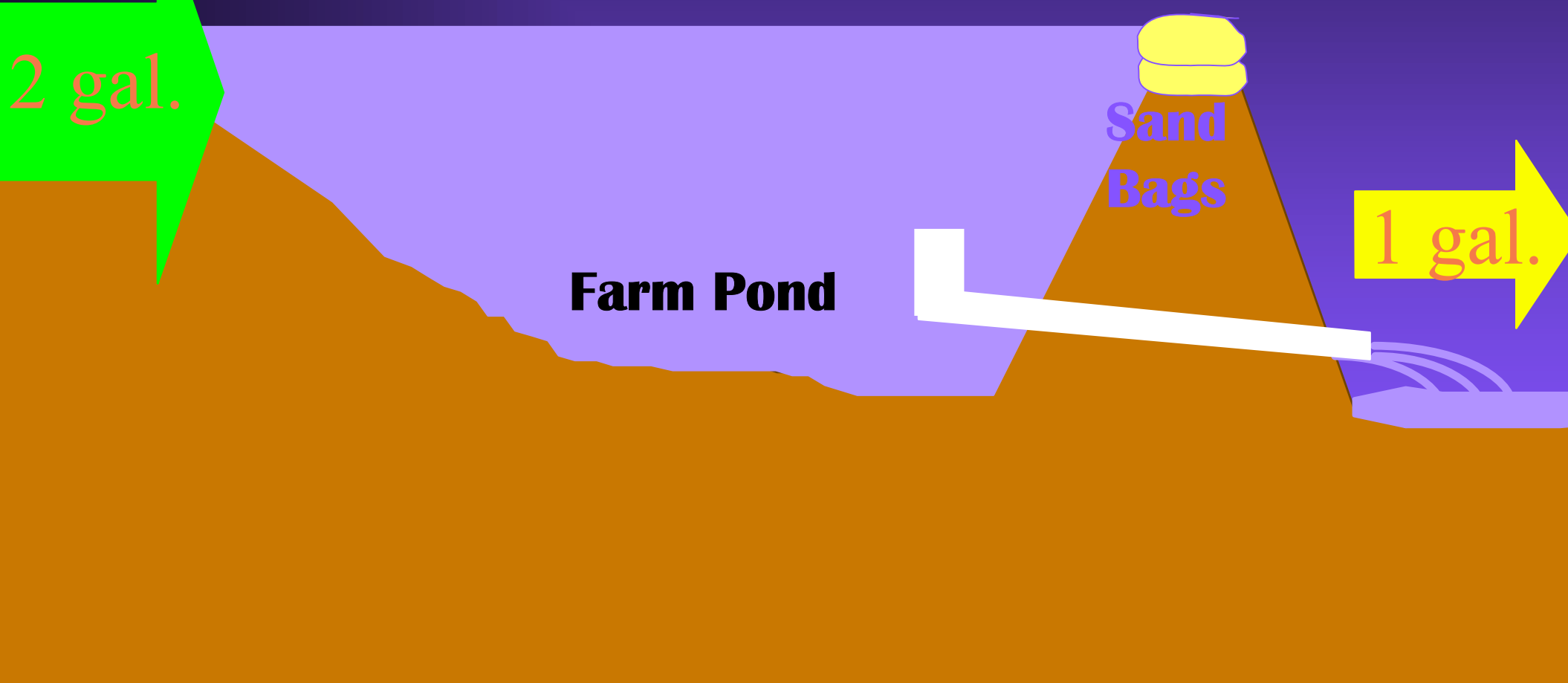
**2 gal.**

**Water  
Out**

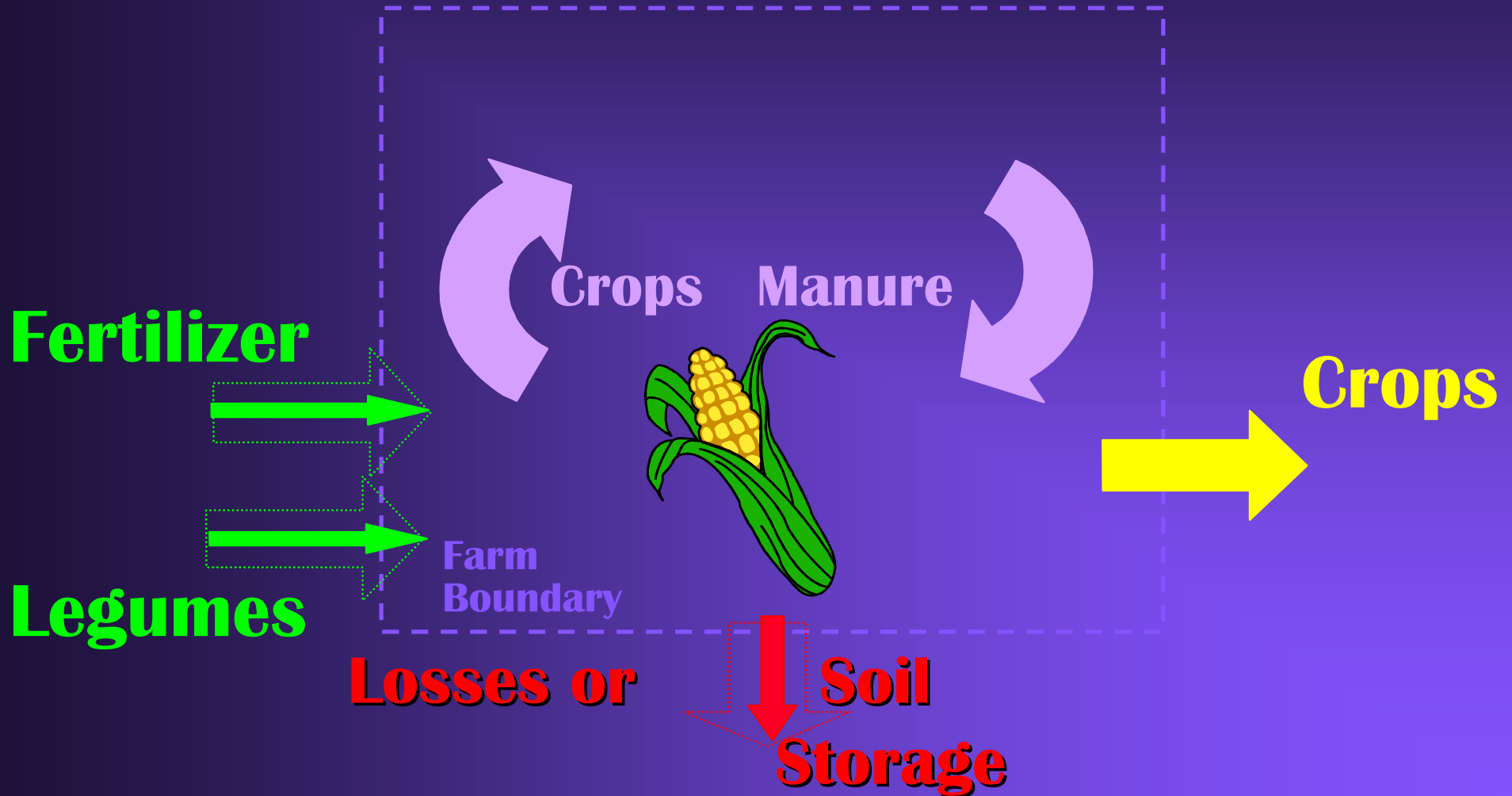
**1 gal.**

**Sand  
Bags**

**Farm Pond**

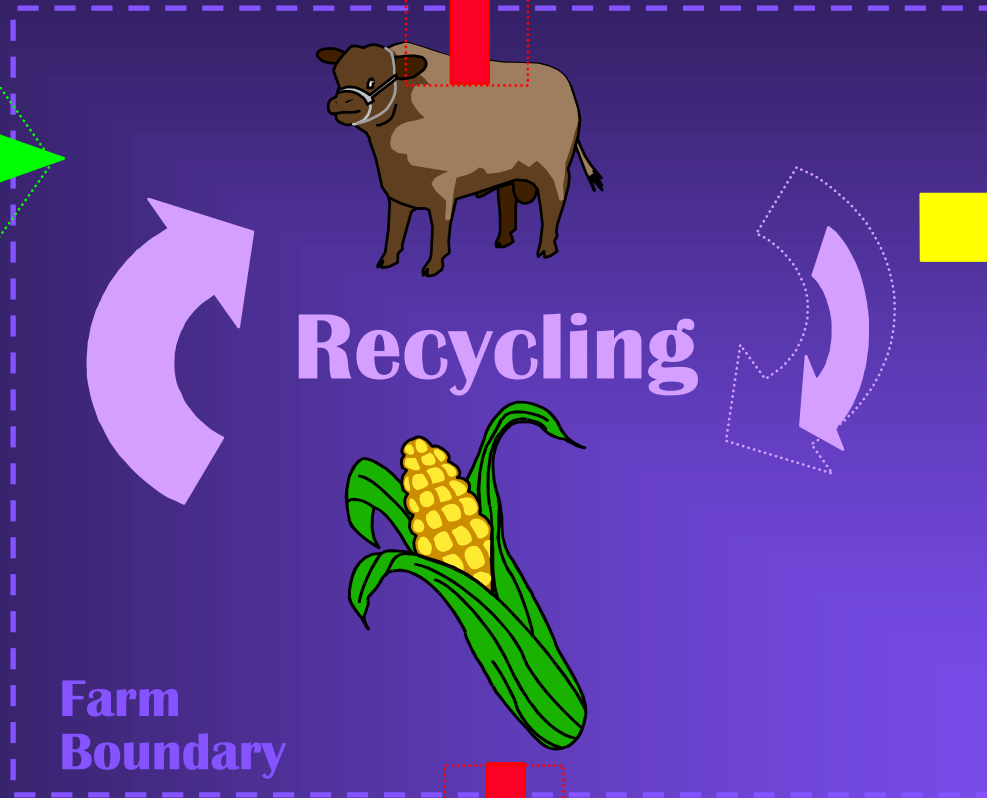
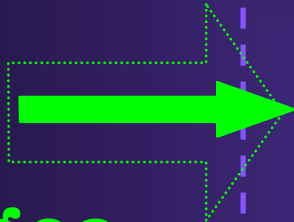


# *Sustainable Strategy No.1: Credit Manure Nutrients in Crops*

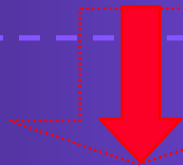


# *Sustainable Strategy No. 2: Reducing Feed Inputs*

**Feed  
&  
Forages**

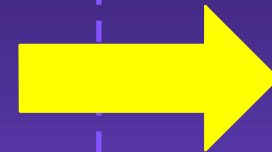


**Losses or**



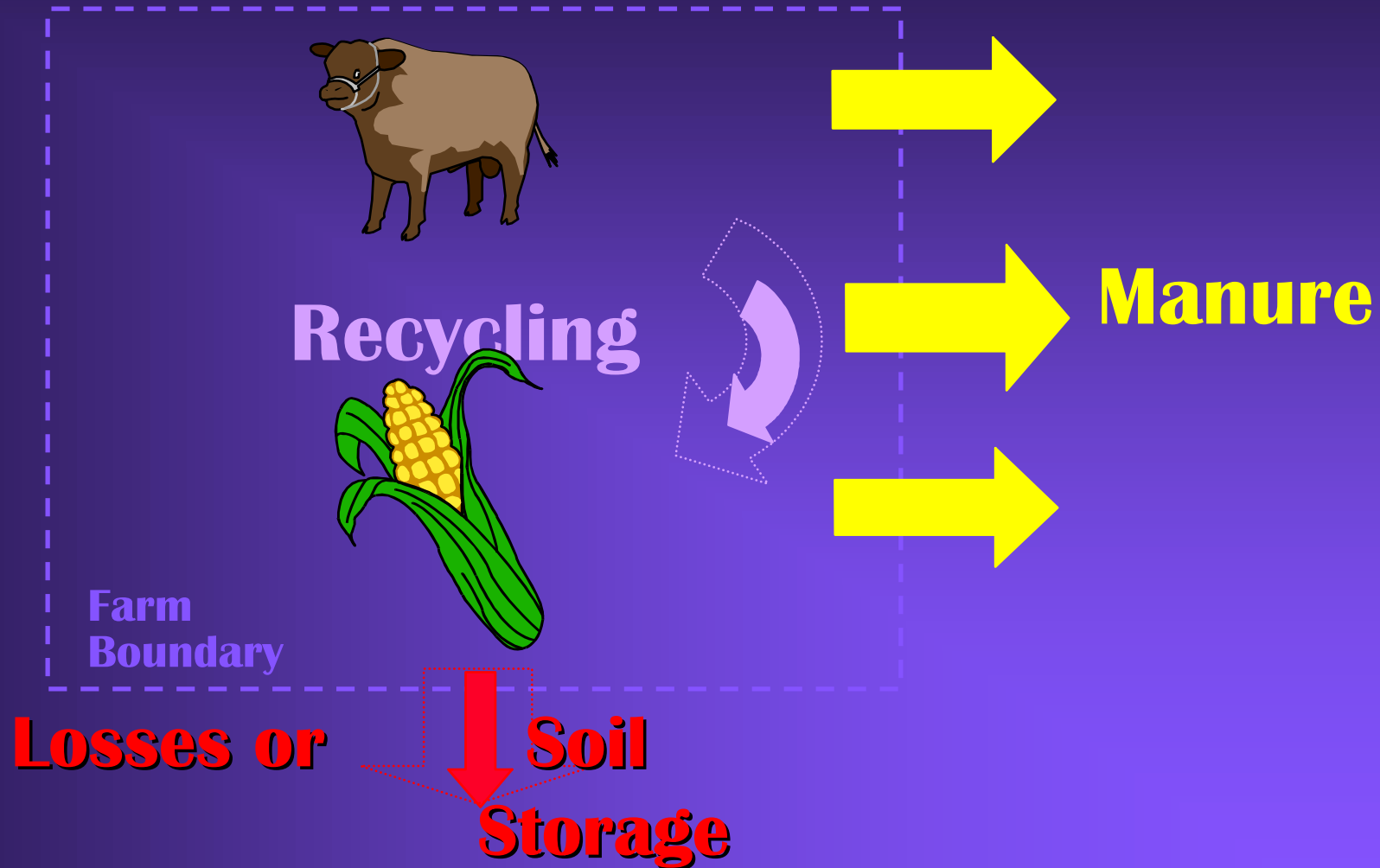
**Soil  
Storage**

**Meat  
&  
Milk**





# *Sustainable Strategy No. 3: Move Manure Nutrients Off Farm*

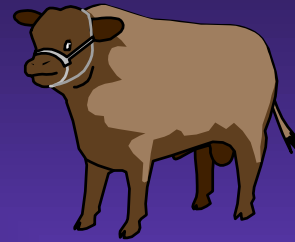


# Must Encourage Manure Markets

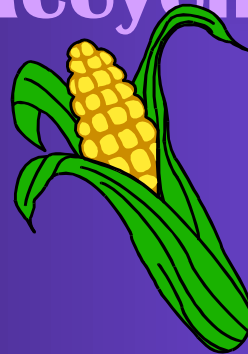
- Compost Production
- Pelletizing
- Value Added Processing
- Energy Production
- Move to non-ag markets



# *Sustainable Strategy No. 4: Manure Treatment*



**Recycling**

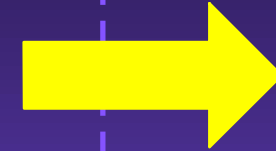


**Farm  
Boundary**

**Losses or**



**Soil  
Storage**



**Manure**



**Low  
Impact  
Losses**

# New EPA Regulations

- Nutrient Management Plans and permits on all large operations.
- Voluntary on medium size
- Land Application is not a discharge if it follows an NMP
- Include P index
- Buffers to surface water
- Annual reports



# What is a NMP? EPA view

- EPA requires 5 components
  - Manure Handling & Storage
  - Land Application
  - Site Management
  - Record Keeping
  - Other Utilization



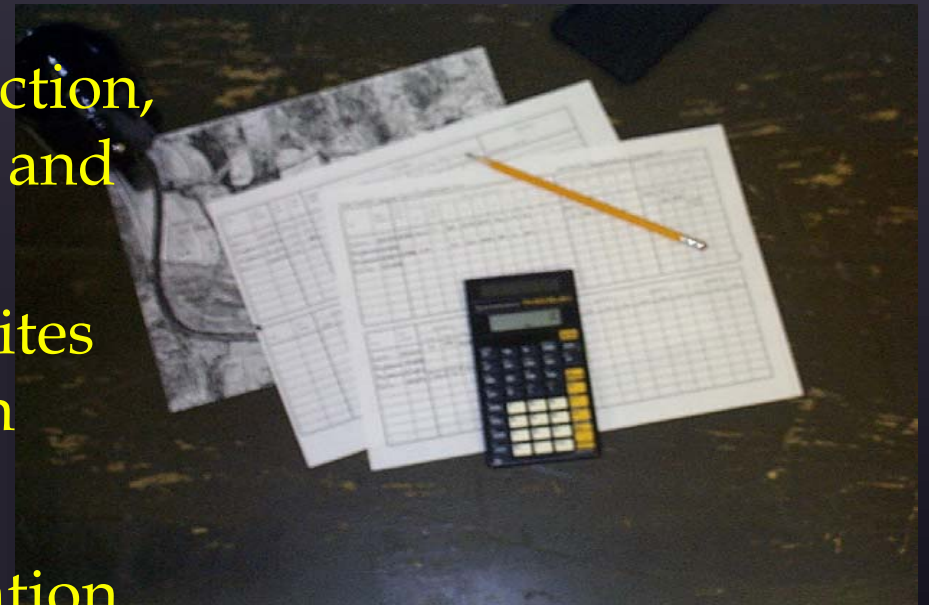
# Minimum Standards to Protect Water Quality in NPDES Permits for CAFOs

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1. **Maintain Proper Storage Capacity**
2. **Proper Operation & Maintenance to prevent seepage**
3. **Divert Clean Water**
4. **Nutrient Management Plans**
5. **Record Keeping and Testing**
6. **Rates & Timing of Land Application of Manure & Waste Water**
7. **Buffers or Equivalent Practices**
8. **Animal Mortality**
9. **Prevent Direct Contact of Animals with the Waters of the US**
10. **Chemical Disposal**

# What is a CNMP? NRCS view

- Technical Guidance for Developing CNMPs
  - Manure and Wastewater Collection, Handling, Storage, Treatment, and Transfer
  - Evaluation and Treatment of Sites Proposed for Land Application
  - Land Application
  - Records of CNMP Implementation
  - Inputs to Animals
  - Other Utilization Activities







# What is the purpose of a CNMP?

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- EPA approach: Make sure water quality is not impaired.
- NRCS: Document conservation on the farm.
- Is it a regulatory tool?
- Is it something a farmer should be able to understand and use?
- How is it different from the NPDES permit?



# Who controls the answer?

- NRCS has National Standard and cost share \$.
- EPA controls NPDES program
- But, it is a STATE level decision.
- Each state can and will have different processes and plans, our role is to insure that the plans help the farmer protect the environment.



# Other considerations

- Plan review: should be living document but permits are renewed every five years
- Working plans will require continuous updates and revision- this needs to be done by the farmer.



# Georgia Plan template

- Our EPD wanted plans to be short and to the point since it is part of the permit
- Tried to focus on what does the farmer needs to know to manage his operation better and meet all EPA requirements.



# Task force first worked to define CNMP

## ■ Published Bulletin to define

- Maps
- Storage and Handling
- Nutrients Produced
- Land Application and Balance
- Off-farm Utilization
- Mortality
- Record Keeping
- Emergency Response
- Closure



# Maps

- Maps needed for CNMP

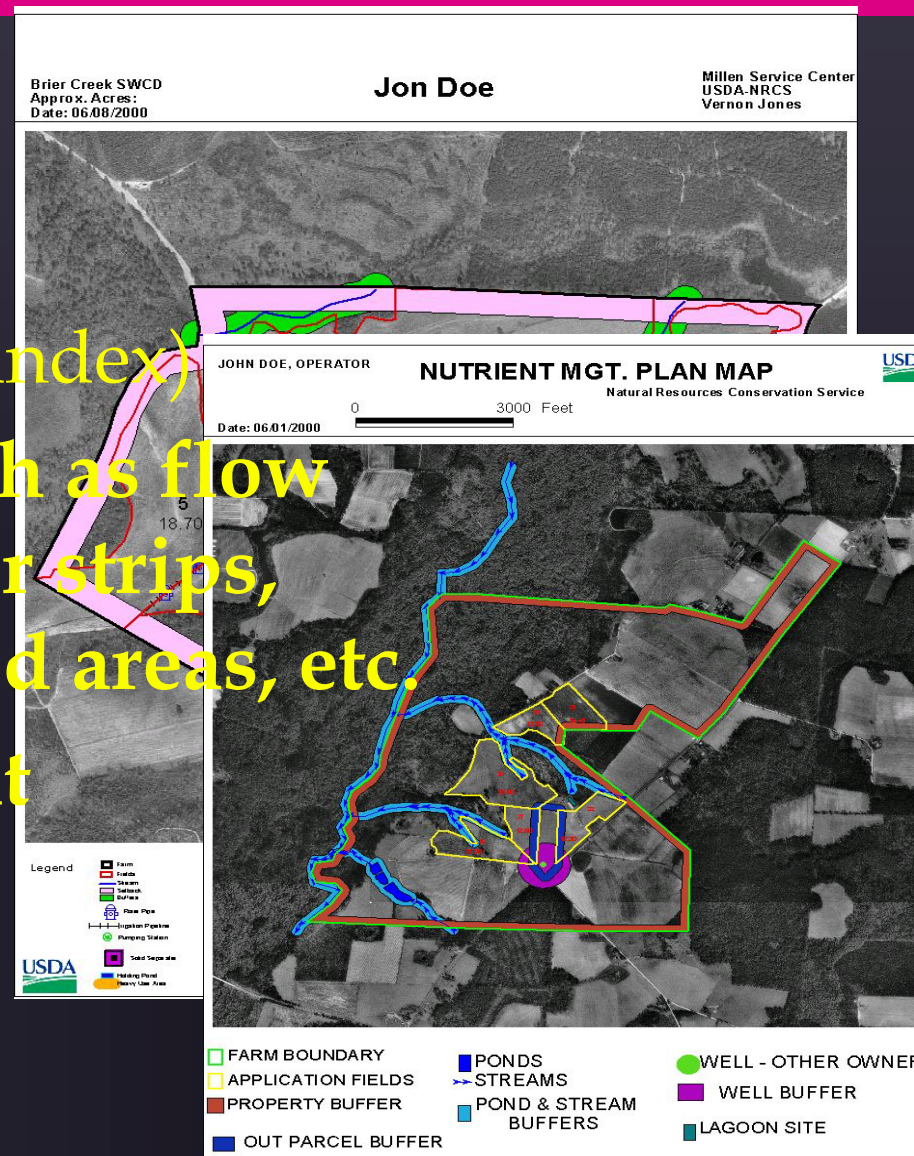
  - Farm map

  - Soils map (optional until P index)

- Includes many features such as flow directions, buffers and filter strips, diversions, set-backs, wetted areas, etc.

- Working with NRCS toolkit

- Southern Region webpage.



# Manure Storage and Treatment

- Structure Description, Capacity, Designer, Installation date.
- Diversions, Monitoring
- Inspections and Records
- Operating Levels



# Nutrients Produced

- Teach a number of methods to calculate based on maximum animal numbers
- Account for Storage and Handling Losses
- N, P, and K available for Land Application
- Program developed to account for feeding programs





# Land Application and Balance

- Spreadsheet and application rate for each field
- BMP's on each field
- Application timing and methods
- Include P index



# Balance and off-farm transport

- Plan must be developed for excess N or P.
- Records kept to document use.



# Other components

- Mortality: amount, practice, permits
- Records kept
- Emergency Response Plan
- Closure Plan



# Tools available

- LPES curriculum
- Many software packages
  - NRCS packages
  - University programs
- Paper based efforts are still useful



# Introduction: Georgia Rules

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- GA DNR administers federal NPDES permits for large farms as well as state LAS permits for medium farms
- GA Dept. of Agriculture is involved in the NMP process and facility inspections through a MOU with EPD



# Georgia Requirements

- <300: below threshold for specialized AFO/CAFO regs, however Clean Water Act applies
- 301 to 1,000: LAS Permit, certified operator on staff, state approved NMP
- 1,001 and greater: NPDES Permit, certified operator on staff, state approved NMP, monitoring wells



# Nutrient Management Plan Development

- Begin with recommended NMP template
- Initial collection of data by farmer
- Assistance by NRCS on maps and storage structure design info
- Cooperative production of plan by operator and certified planner
- Submit to GDA for review
- GDA forwards to EPD for final approval



# Plan Development and Technical Assistance:

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- Plans in Georgia are joint effort and most have cost the farmer little to develop.
- About 100 have been approved
- 90% by Extension
- Implementation phase presents challenges





# What Regional Activities are needed?

- Consistency in Plans and Regs.
- Certified Planners working across lines
- Tools
- Voluntary EMS programs



# AWARE



The University of Georgia  
College of Agricultural & Environmental Sciences

**AWARE: Animal Waste Awareness  
in Research & Extension**

- Newsletter
  - 200 people plus agents
- Web page
  - [www.agp2.org/aware](http://www.agp2.org/aware)
- Listserv
  - [listserv@listserv.uga.edu](mailto:listserv@listserv.uga.edu)
  - subscribe aware



# AGRICULTURAL POLLUTION PREVENTION



Working together to reduce waste  
and increase Efficiency, Economics,  
and the Environment