

Edge of field water quality  
monitoring from various  
management practices in the  
Ozark Highlands  
Project 05-1300

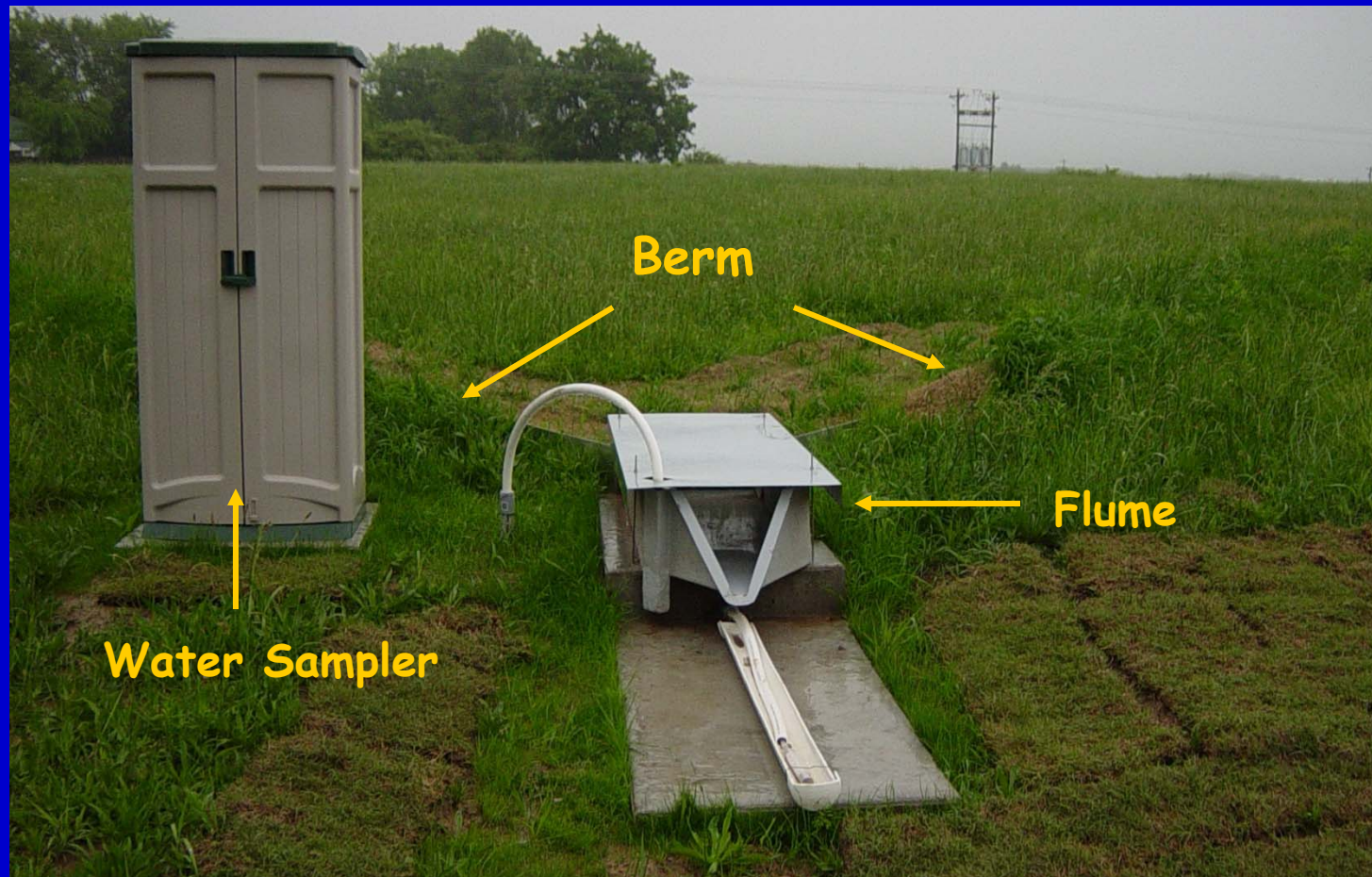
T.C. Daniel  
Joe Staed  
Paul DeLaune  
Andrew Sharpley  
Tara Verkler



# Project Goals

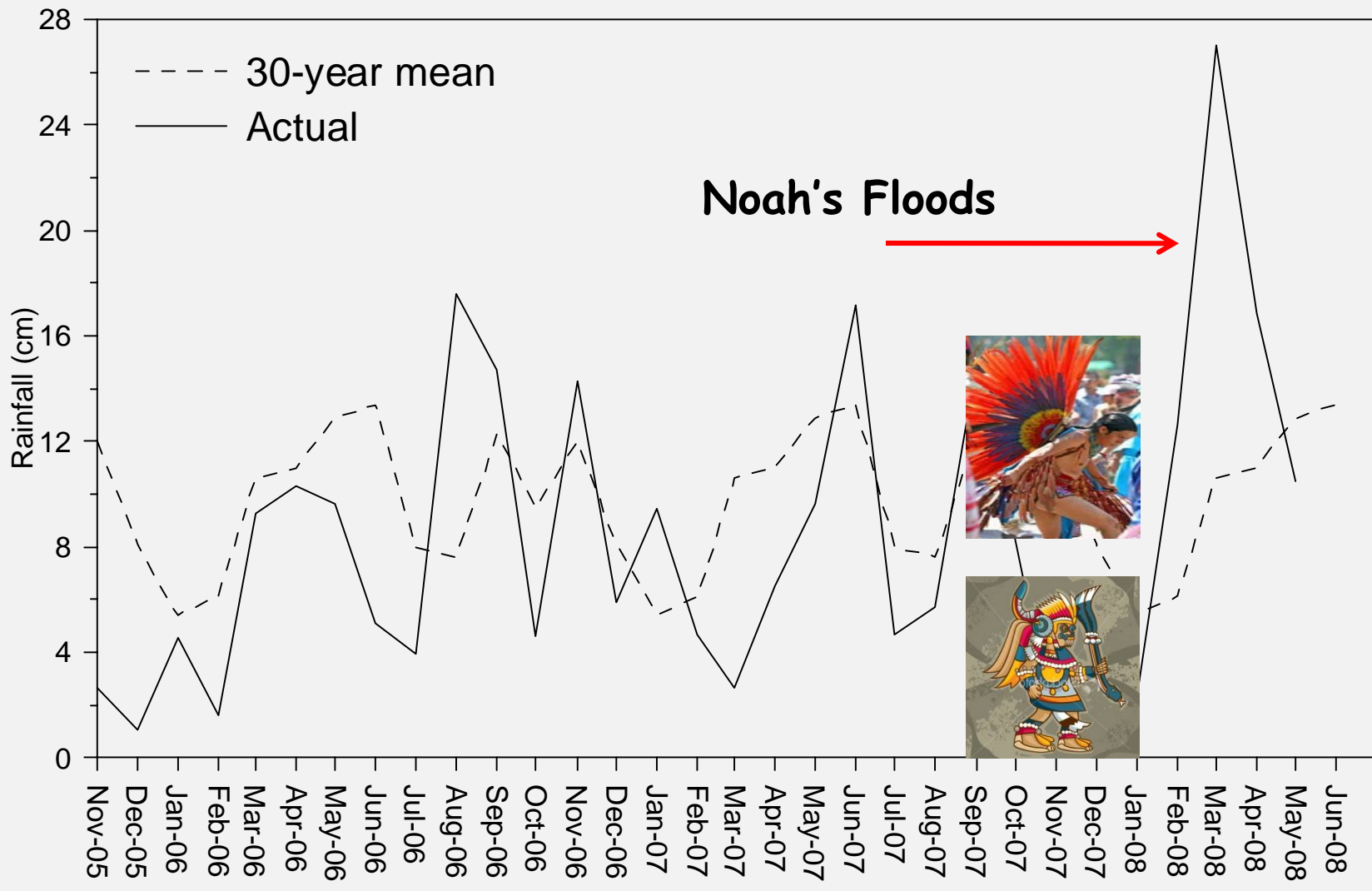
- Develop edge-of-field P loadings from agriculture
- Demonstrate that BMPs improve water quality
  - Forage/Grazing management
  - Broilers litter application
  - Soil test P (STP)
  - Swine slurry application

# Watershed Project to Collect Contaminants in Natural Runoff



# Impediments to Project Goals

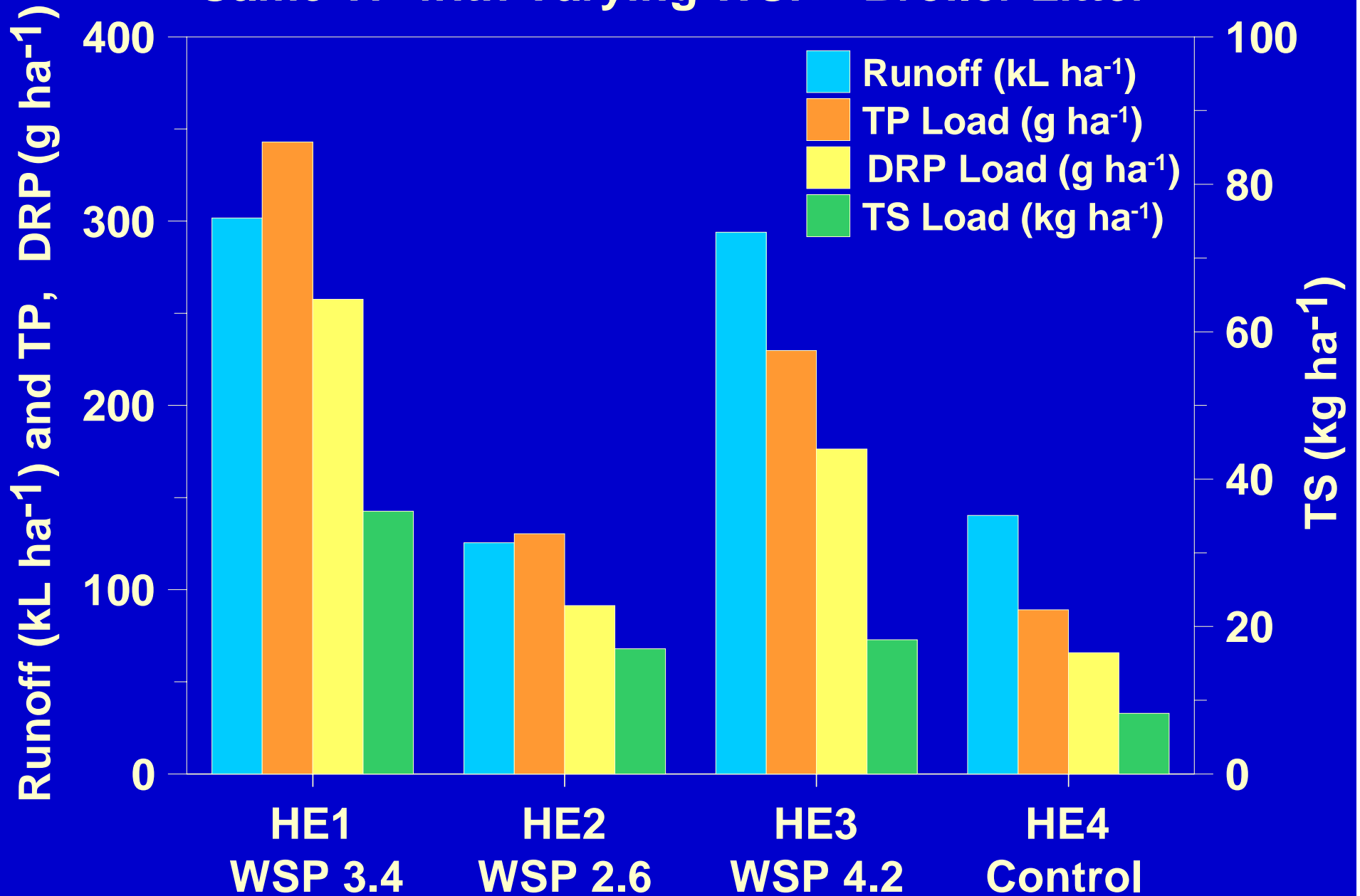
- Runoff depends on rainfall
  - ~20-30% below normal for project period
- Runoff varies ! ! ! !
  - Between years & paired watersheds (same year)
  - Runoff volume & load
  - Treatment effect difficult to show
- Manure sampling & land application
  - Slurry & Litter



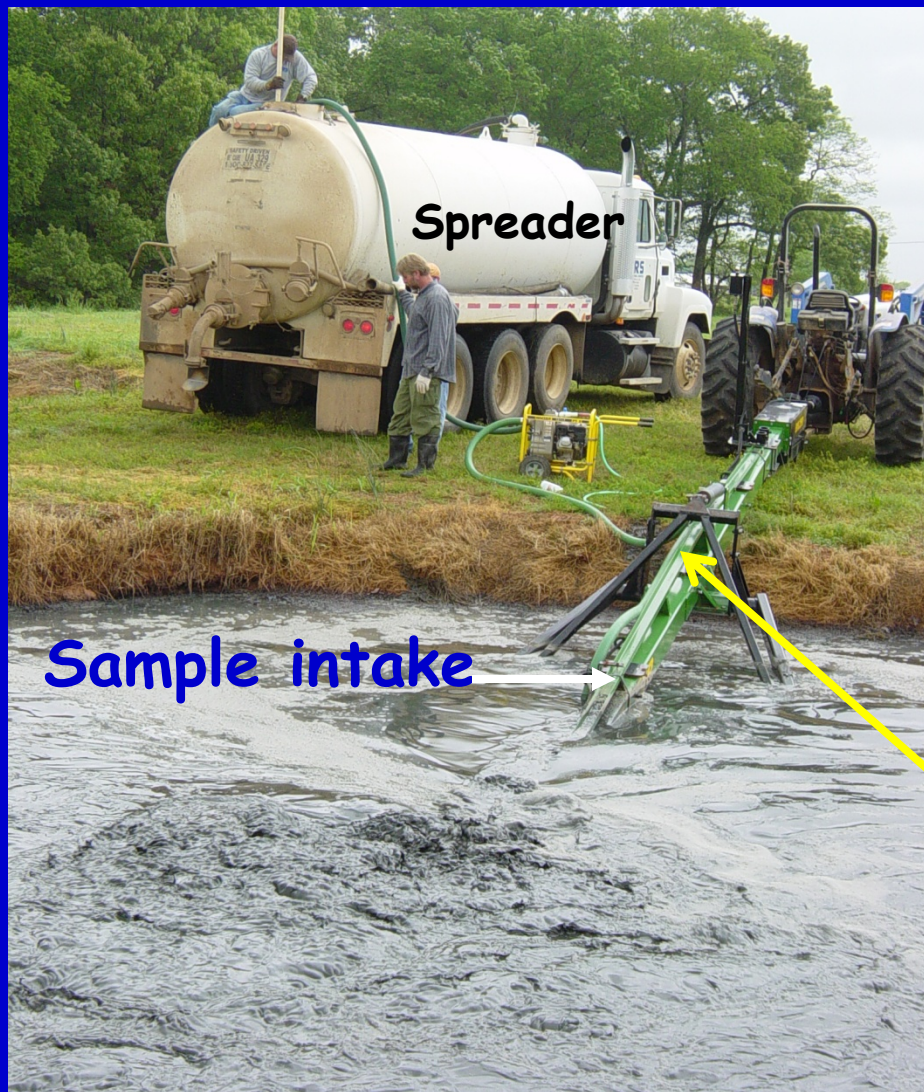
**Project Period**



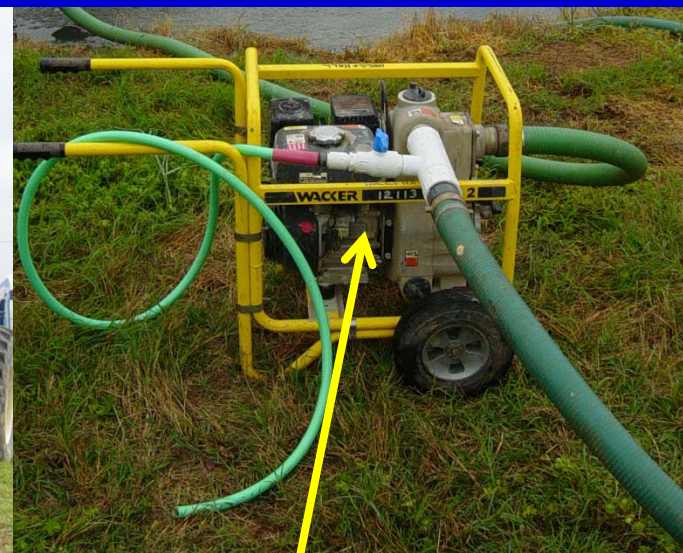
# Project Summary of Runoff Volumes and Loads Same TP with Varying WSP - Broiler Litter



# Manure Sampling & Analyses



Sample intake



Sample splitter

Agitator

# What Worked to Accomplish Goals

- Interdisciplinary input
  - Diligence
- Attention to detail
  - Quality staff

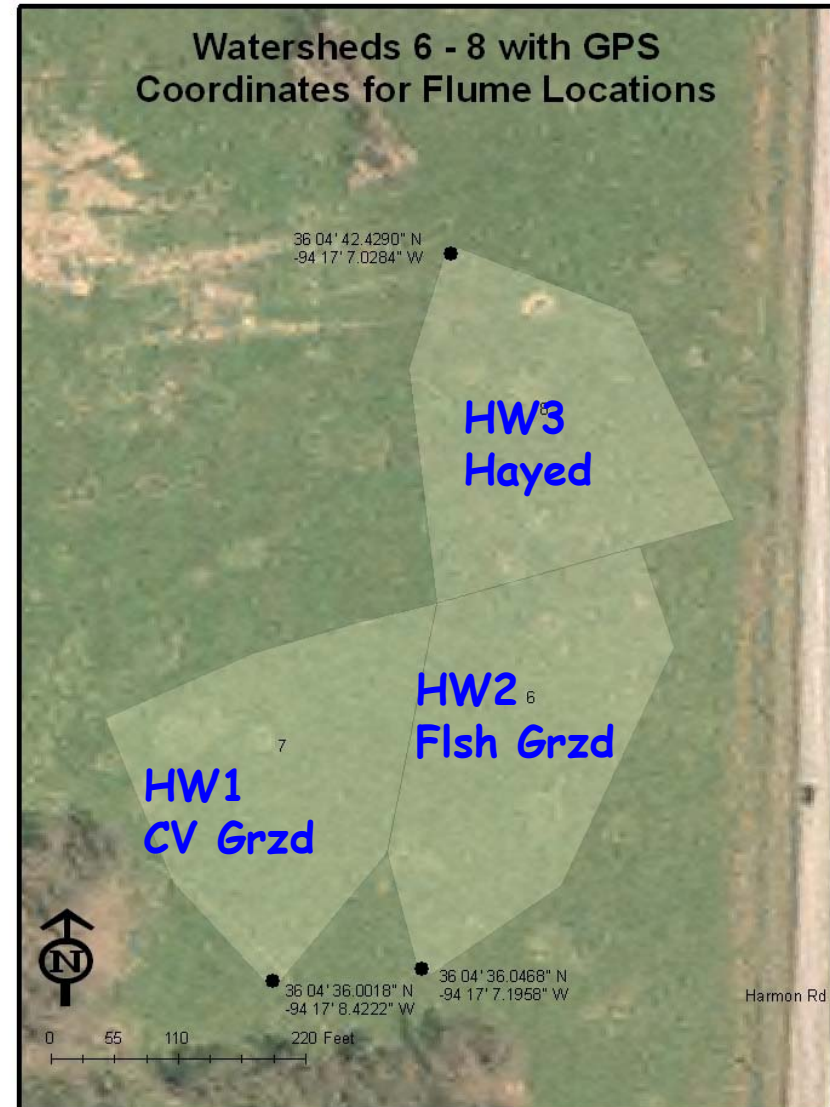


# Accomplishments

# Forage management affects runoff P load

## Management type

- Hayed
- Conventional
- Flash grazed

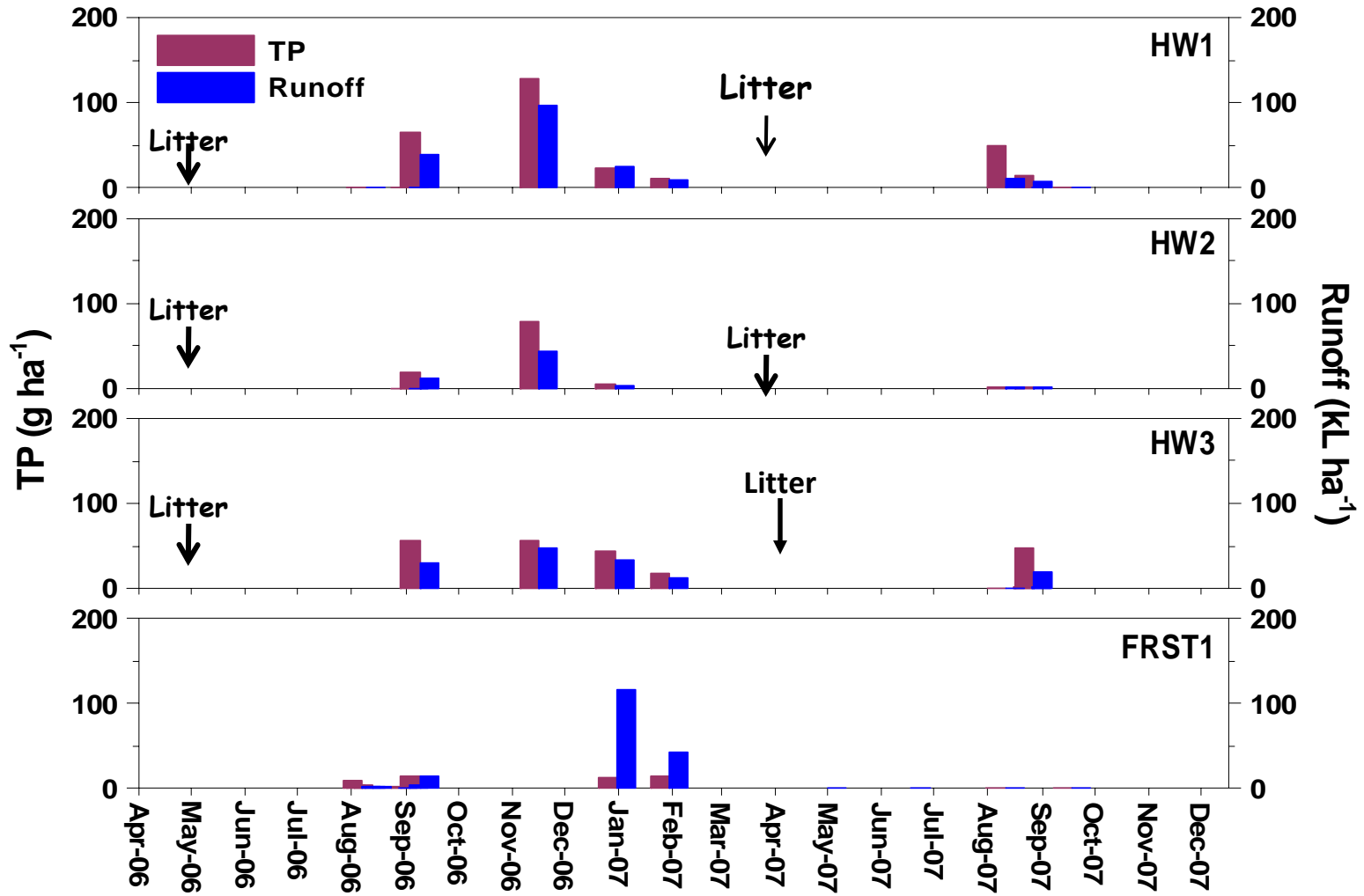


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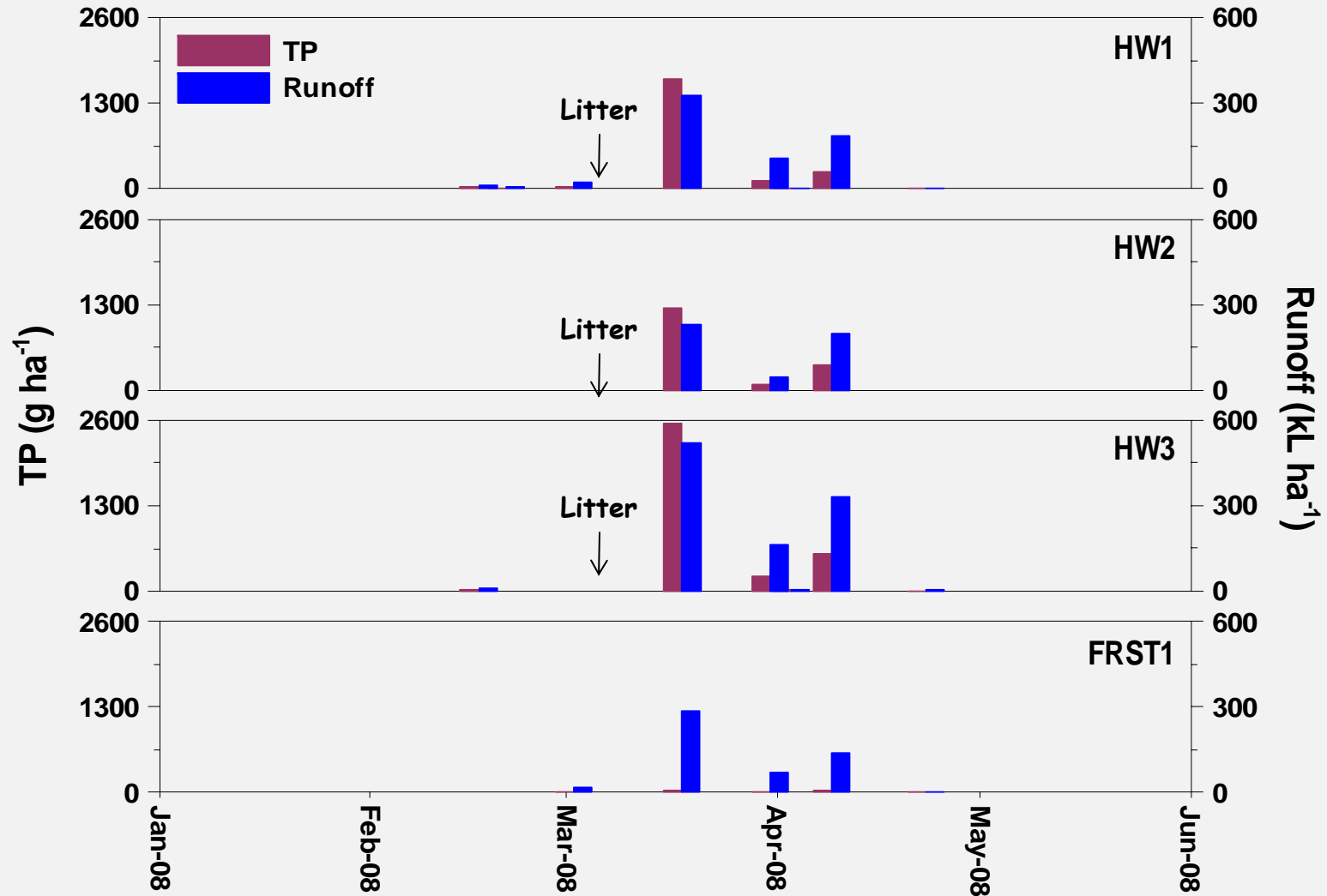
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# Grazing Practices Affect Runoff and TP Loads- 2006-07



# Grazing Practices Affect Runoff and TP Loads- 2008



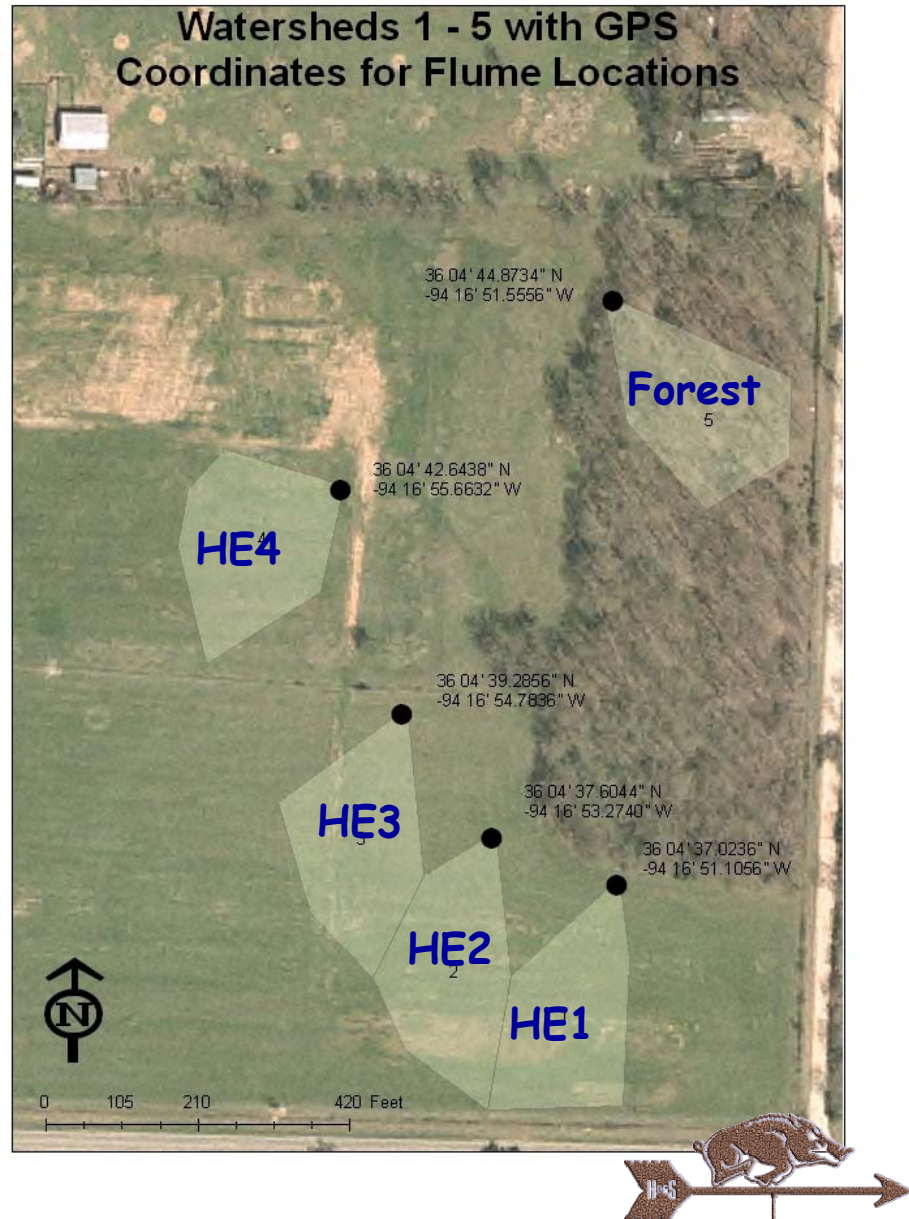
**WEP (water extractable P) in manure controls runoff phosphorus (P) loss**

**Broiler Litter**

- 40 lbs/ac TP
- WEP 1:100
  - HE1 = 14
  - HE2 = 4
  - HE3 = 8
  - HE4 = 0

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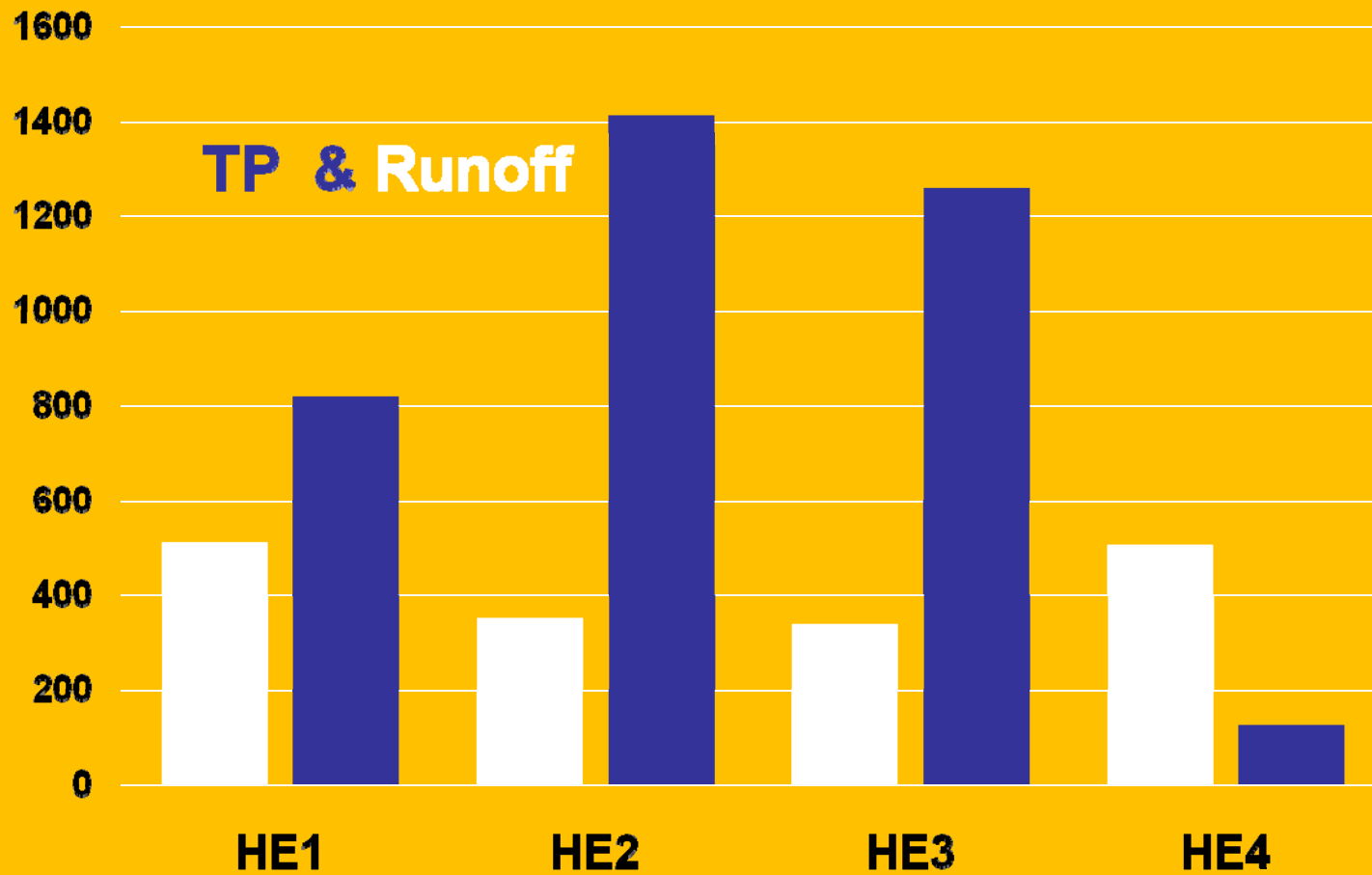
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## 2008 Total P & Runoff Loads

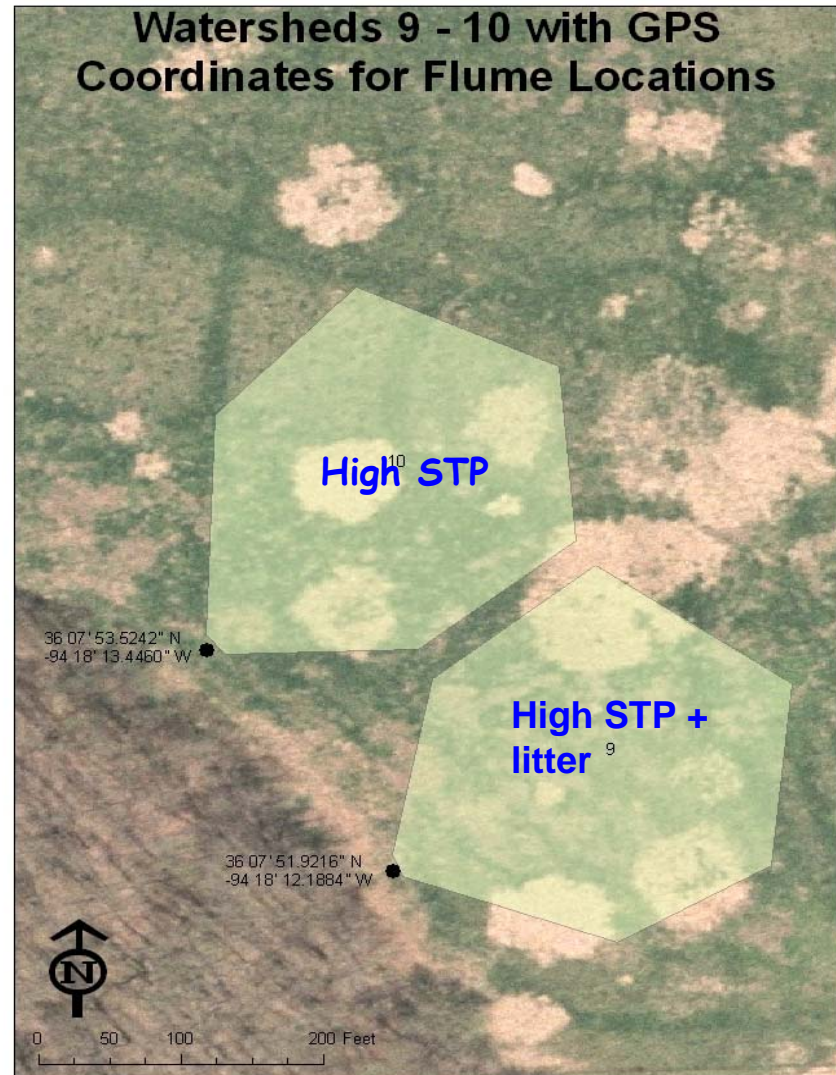




Litter application  
affect P loss more  
than STP levels

## STP levels

- High ~ 400 ppm
- High + 1.5 tons litter



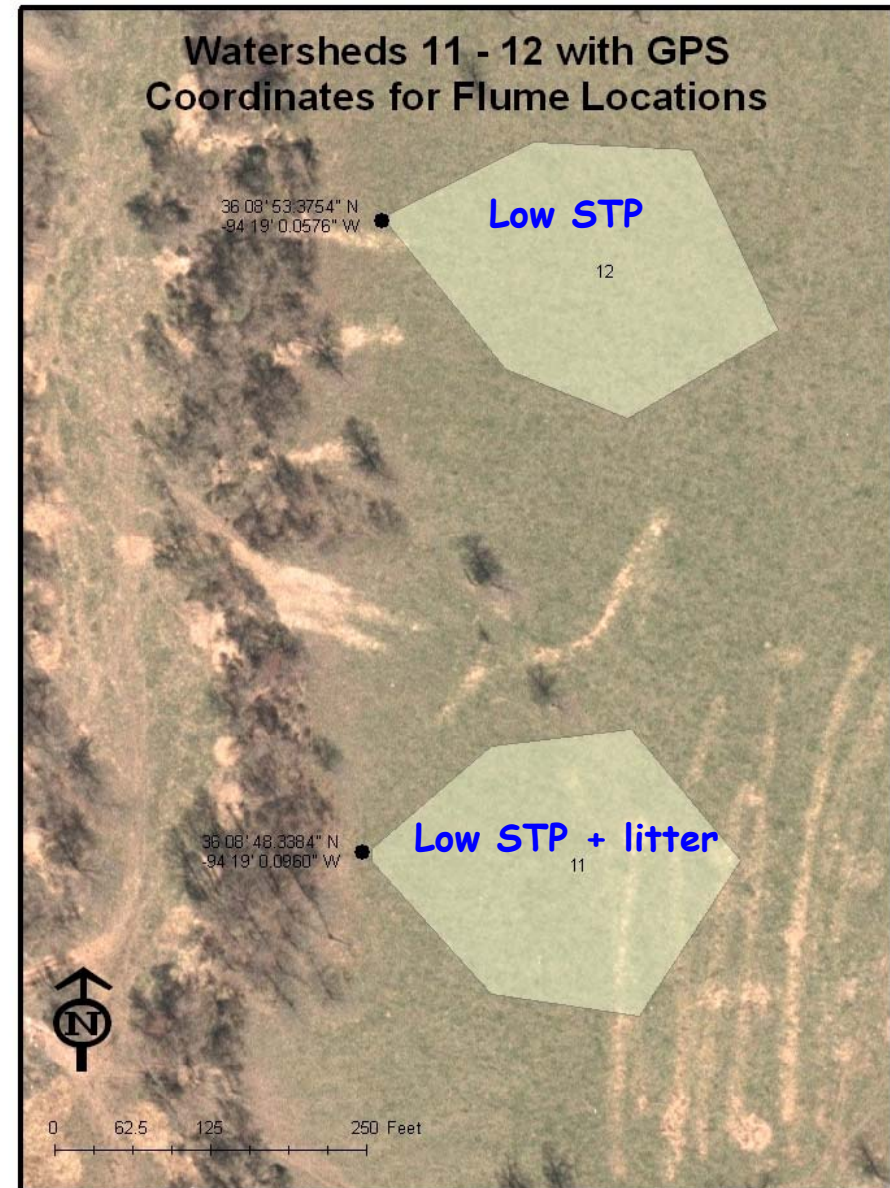
# Litter application affect P loss more than STP levels

## STP levels

- High ~ 50 ppm
- High + 1.5 tons  
litter

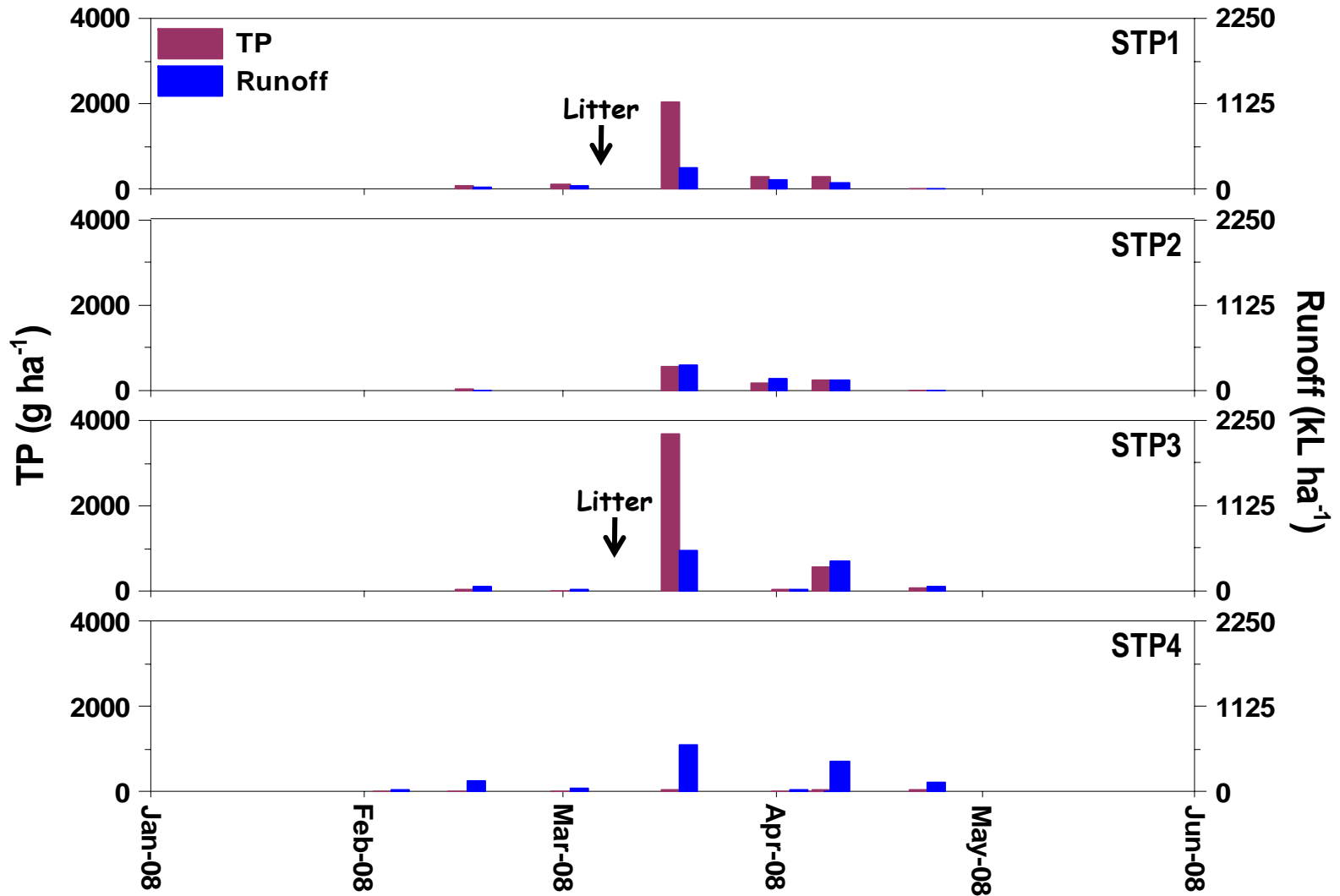
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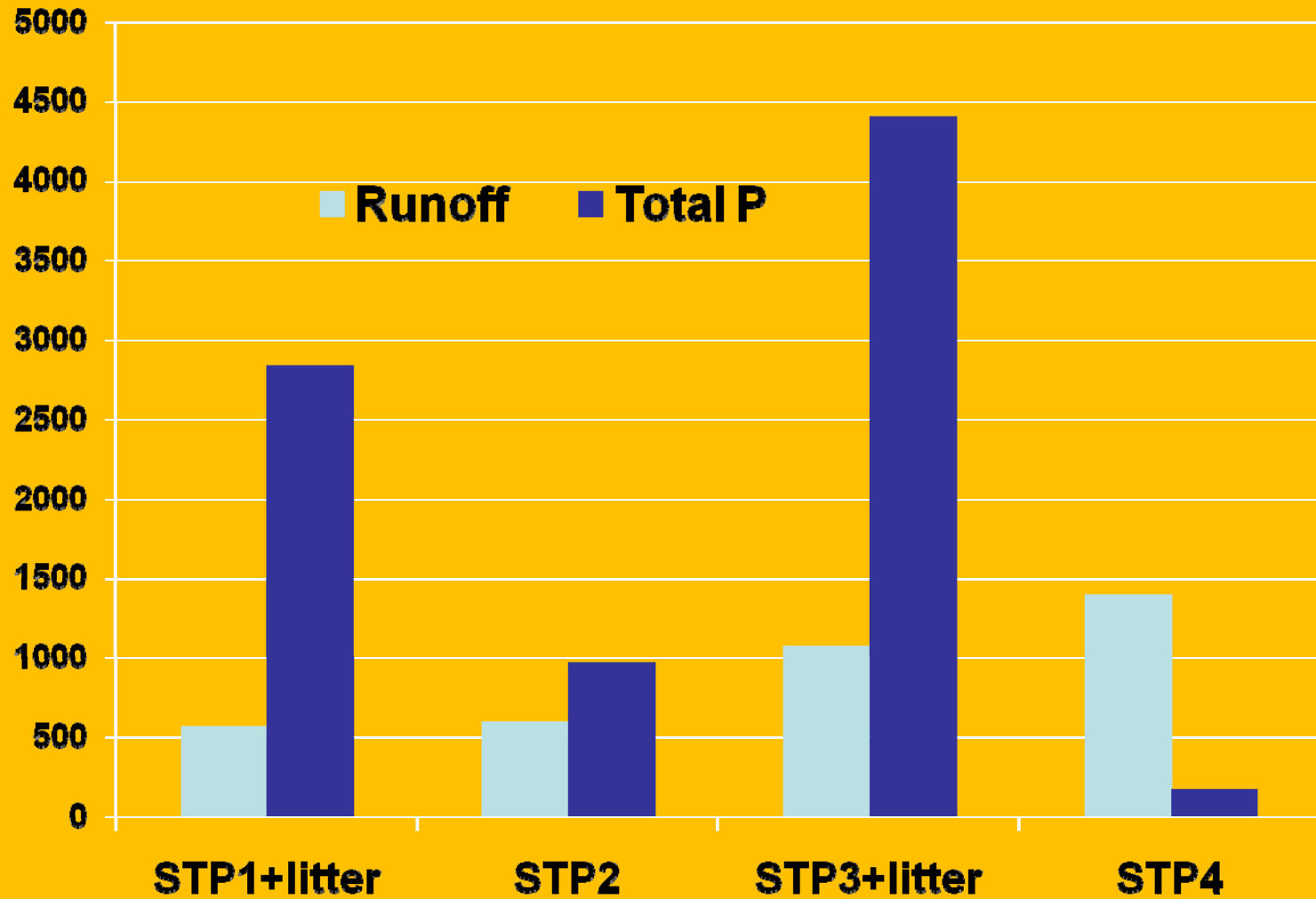




## Low and high STP and litter application 2008



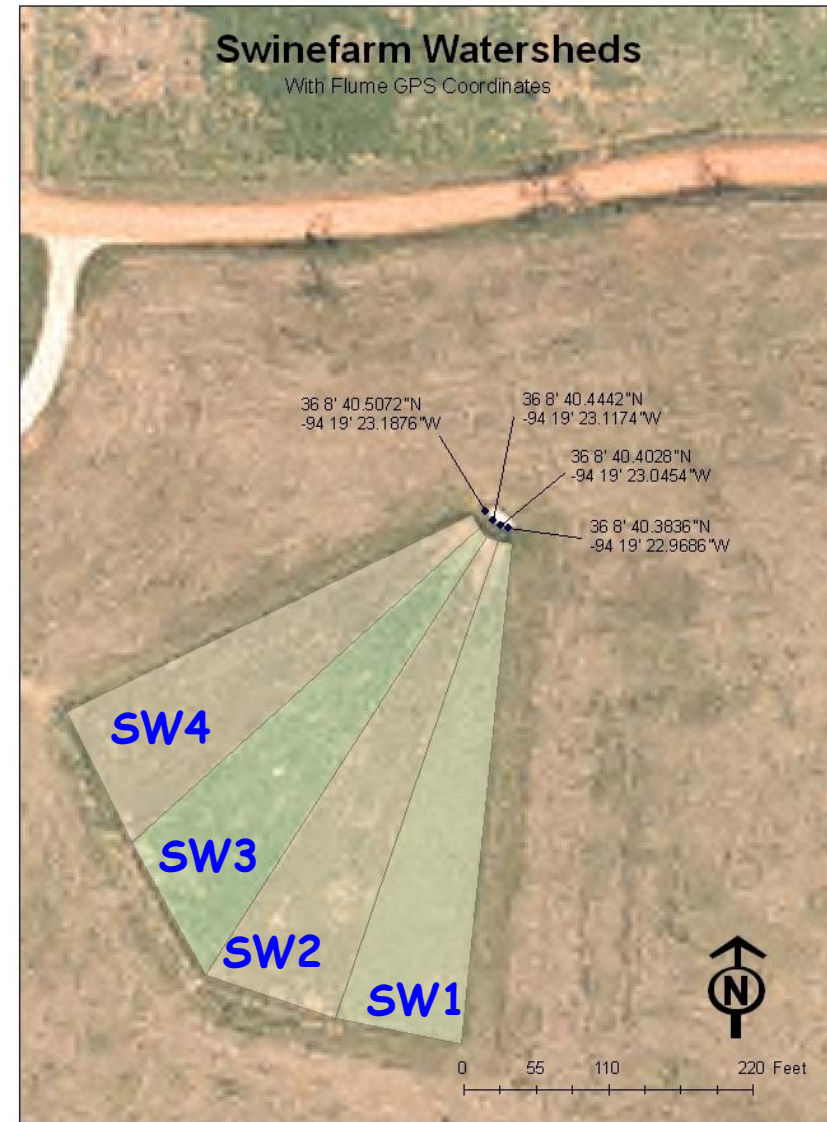
## TP & Runoff Load 2008



# WEP in manure controls runoff phosphorus (P) loss

## Swine slurry

- Same Total P
  - 40 lbs/ac
- Different WEP



# Difficulties

- **Runoff varied between WSs**
  - No runoff in 2007
- **Sampling lagoon**
  - Proven sampling protocol
    - Standard Methods cautions about error
    - Temporal variation
      - Same day vs. days later
- **Never got application correct**
- **Required sampling vs. Book values**

# Summary & Conclusions

- Runoff is weather dependent
  - Varies between WS and years
  - Variability can mask treatment effect
- Runoff dominates NPS load
  - Lower runoff lower load regardless of TRT
- Background NPS loads occur
- Manure addition mask STP contribution



# Summary & Conclusions

- When manure applied
  - WEP addition determines TP load
  - Affects concentration and P load
  - Concentration and P load
    - WEP application rate
    - Time between application and runoff
- Lagoon slurry sampling VARIABLE
  - Bookvalues for nutrient content