Drainage Management For Reducing Nutrient Loss

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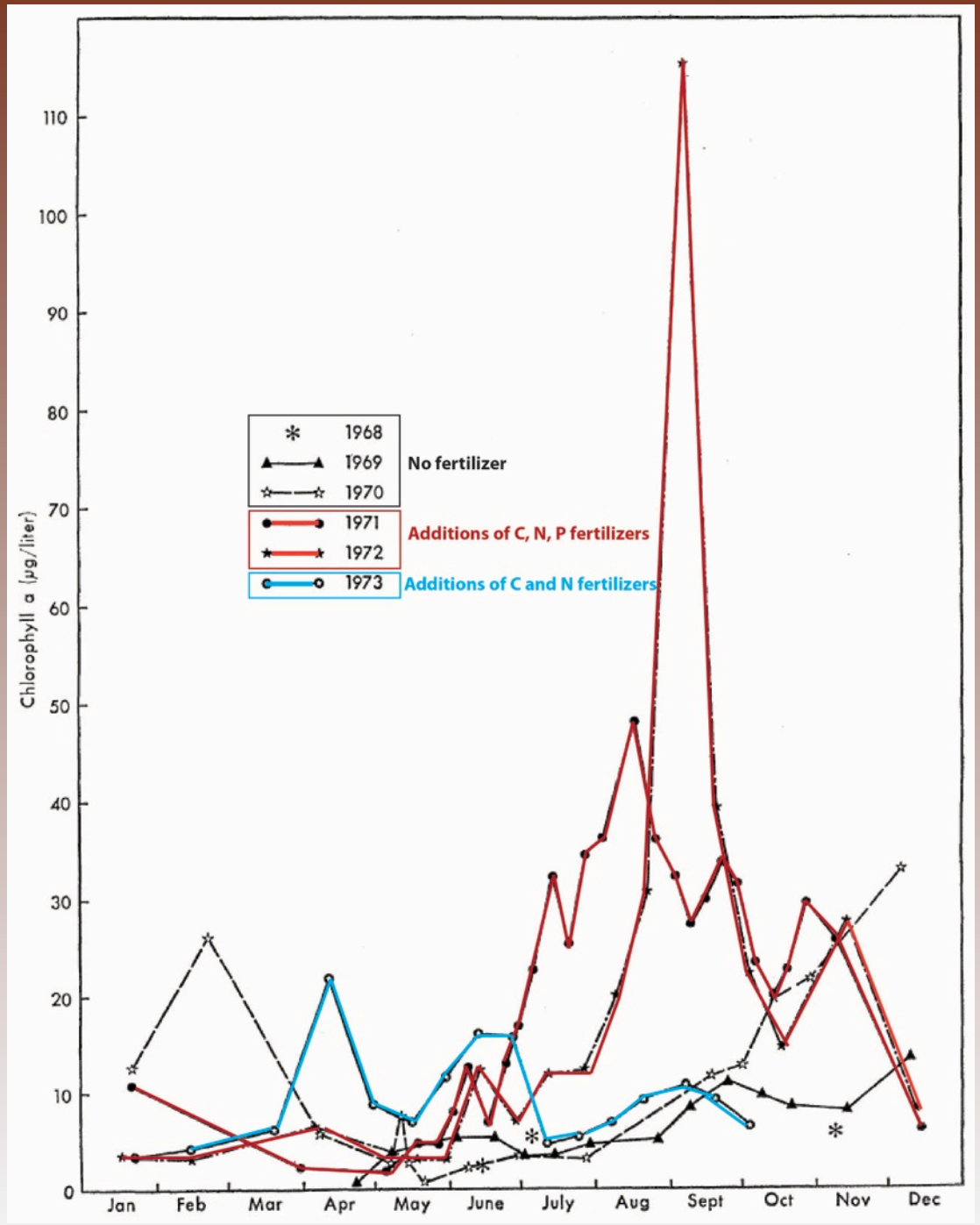
Nitrogen and Phosphorus

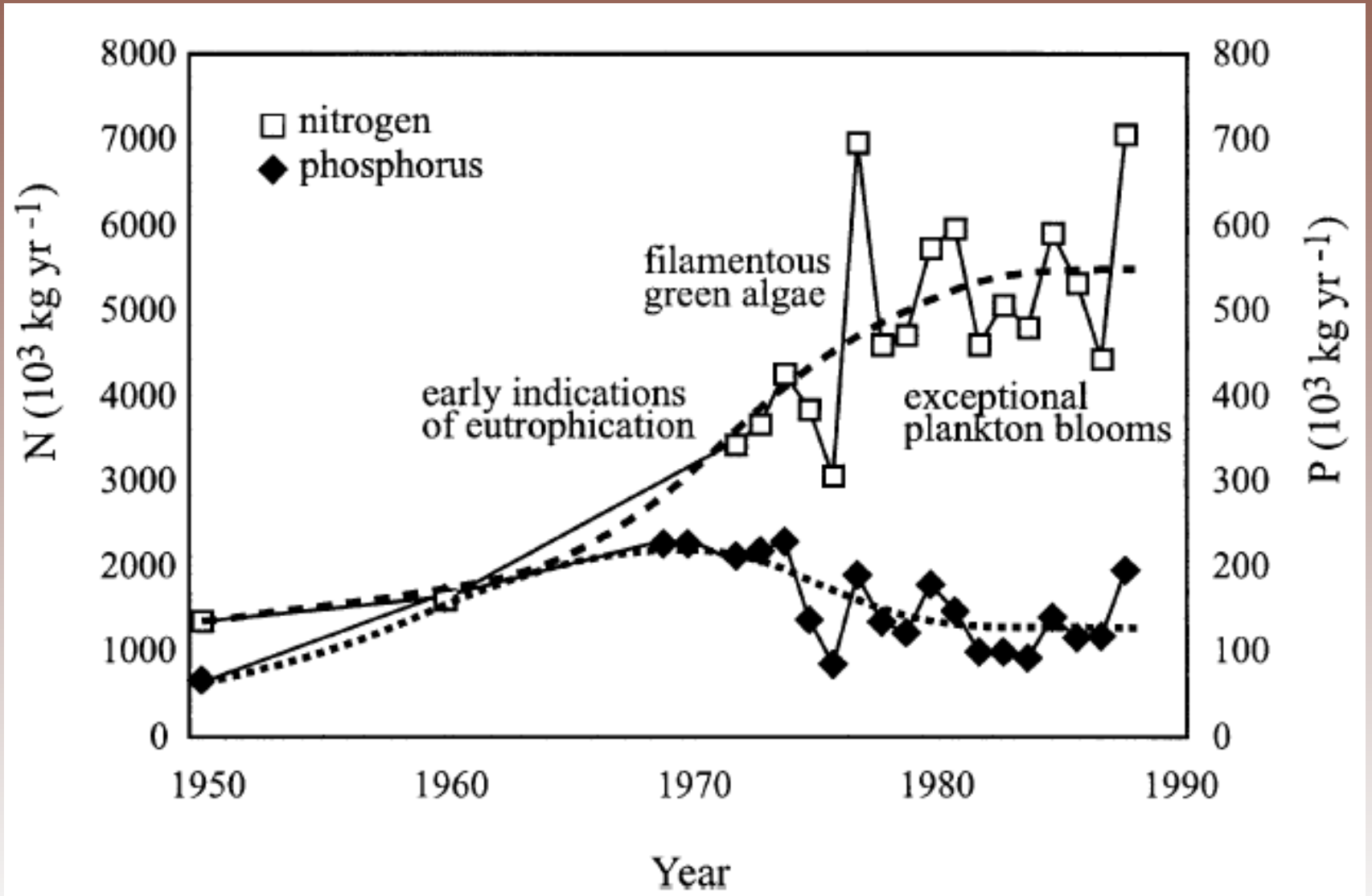
- N and P support aquatic growth
  - N for protein synthesis
  - P for DNA, RNA, and energy transfer
- Terrestrial vs. coastal waters
  - P limiting nutrient in inland ponds
  - N limiting in coastal estuaries

Algae = Bad



Ponds Are P Limiting

Estuaries Are N Limiting



Hmm… Ponds vs. Estuaries… P vs. N

- Phosphorus
  - TMDL established for White Island Pond
  - TMDL in development for Monponsett Pond
  - More to come… The physical (and visual) connection make bogs an easy target
- Nitrogen
  - Multiple TMDL's established throughout Buzzards Bay
  - Reduction in upgradient sources likely, including
  - BIG MONEY and BIG PLAYERS

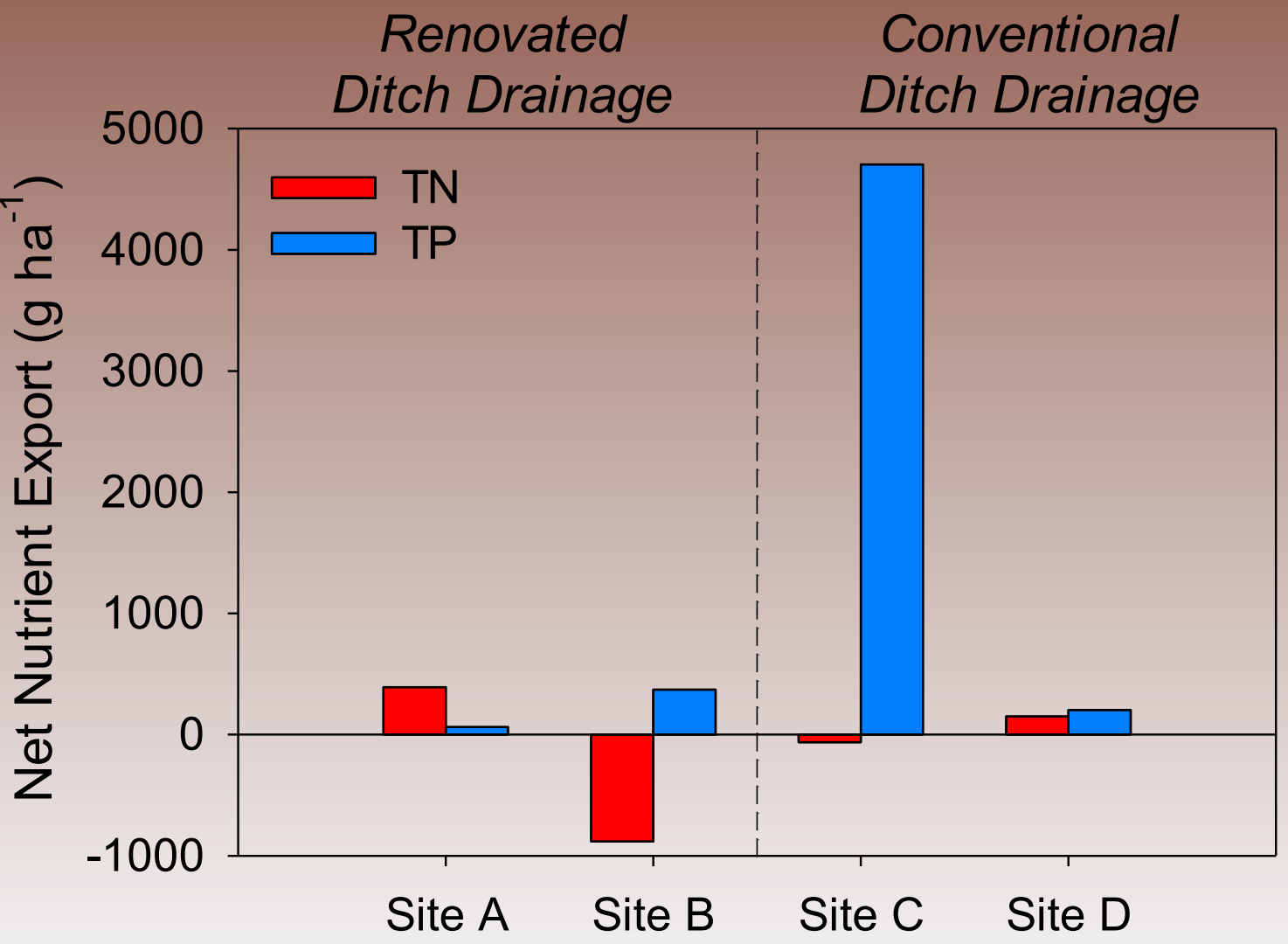
Drainage Management

- Two prominent drainage methods
  - Ditch drainage
  - Tile drainage
- Transport mechanisms for nutrients
  - Physical leaching of P and N from soils
  - Chemical desorption of P from soils
- Critical for cranberry cultivation
  - Root growth
  - Reduction in fruit and root diseases
  - Increased crop production
- **Balance between enhancing agronomic benefits and reducing environmental impacts through focused drainage management**

Ditch Drainage

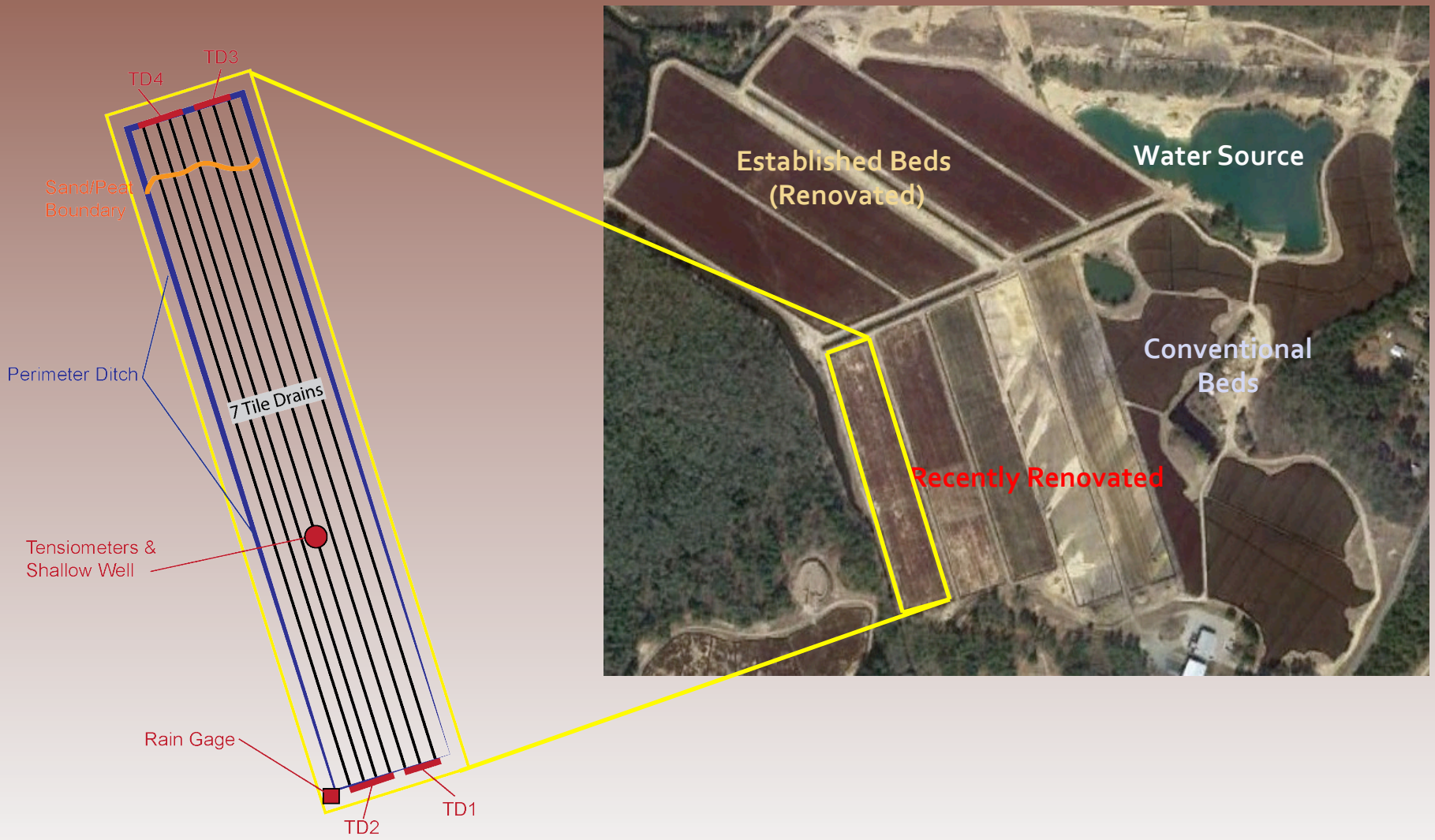

5/2010
1991
2012
Renovated Ditch Drainage
240 ft
1991
Imagery Date: 5/20/2010

Harvest Flood Nutrient Export

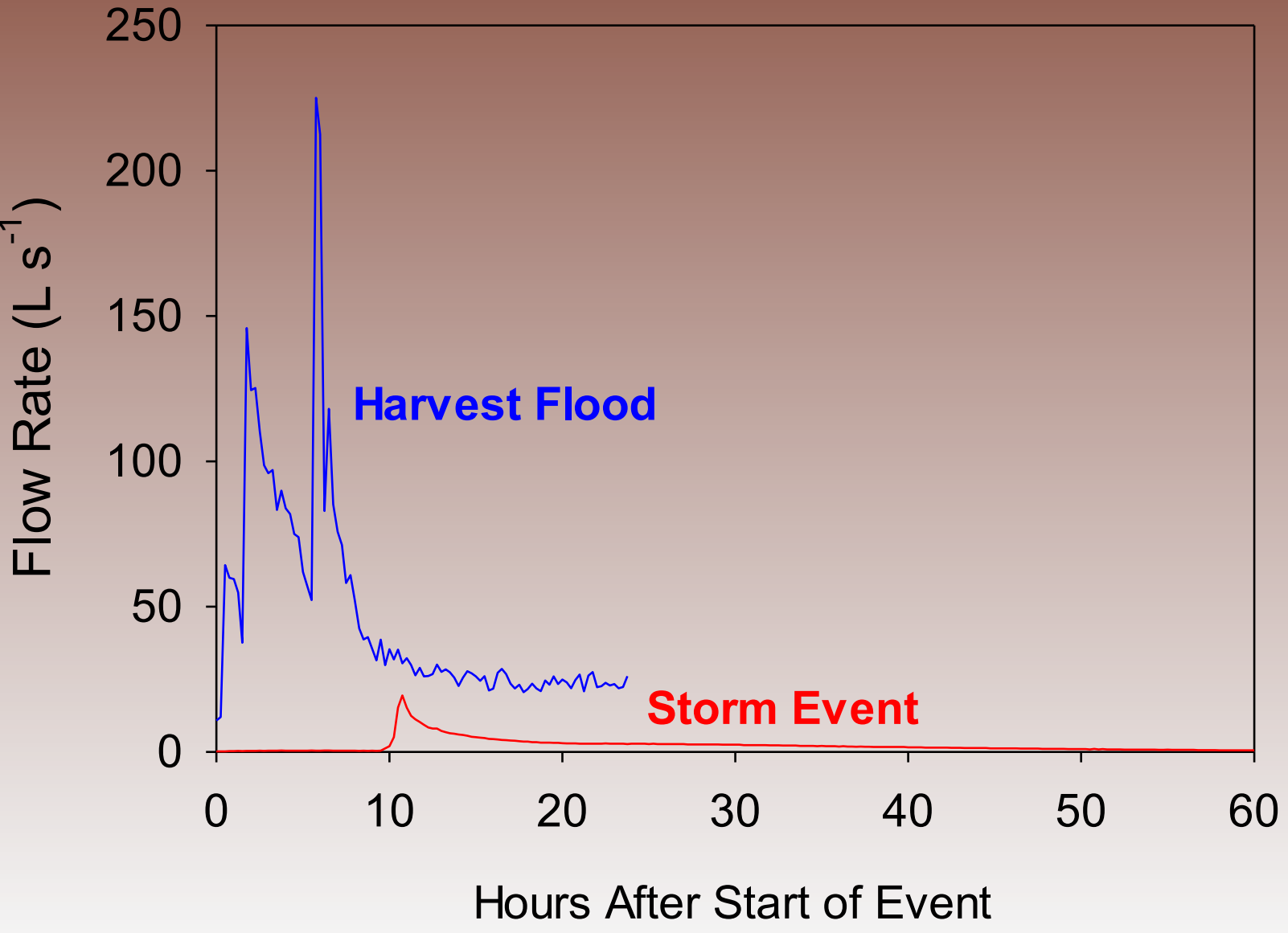


Tile Drainage

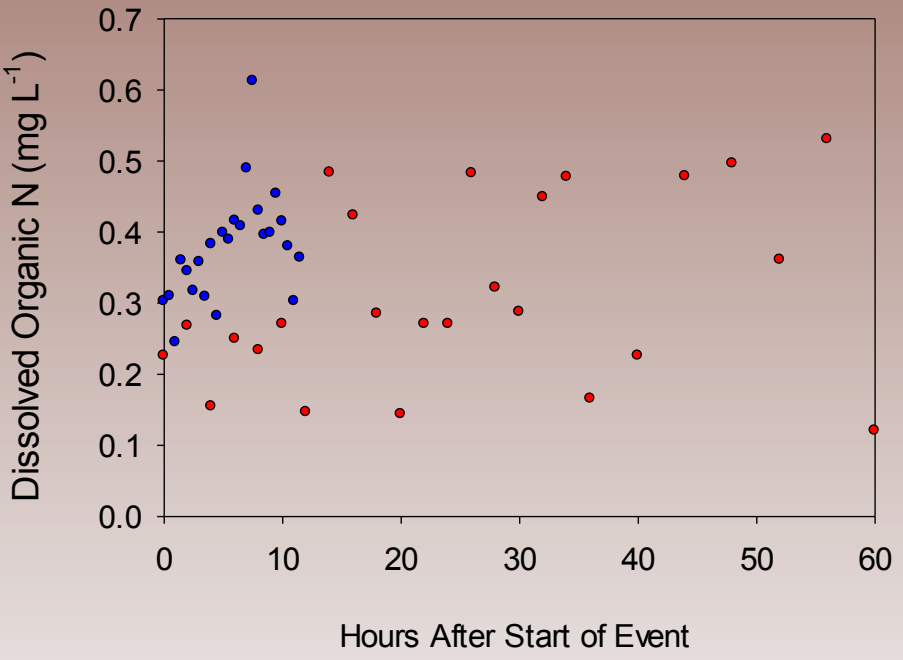
Nutrient Monitoring

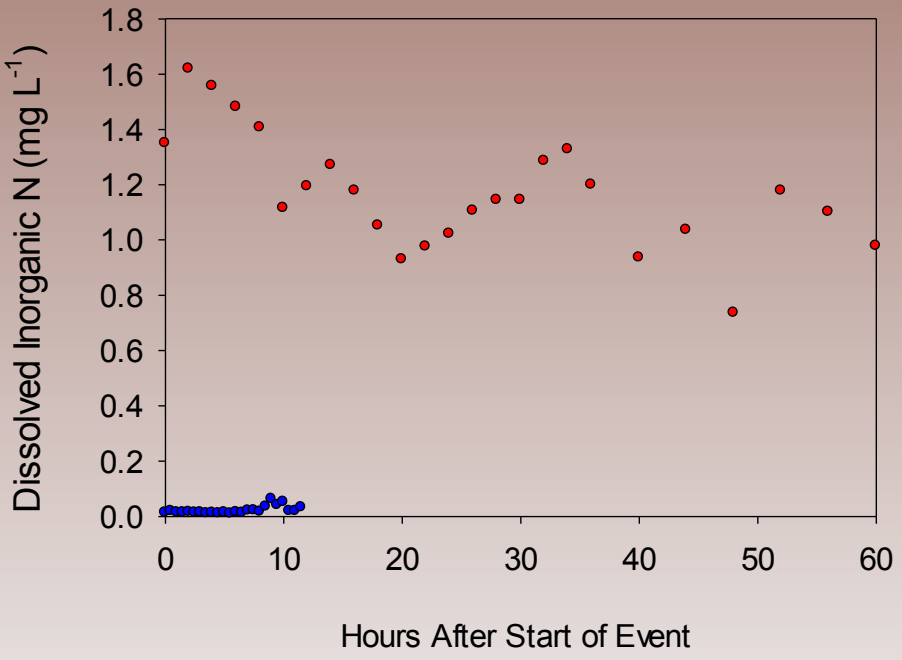


Storm Vs. Harvest Flood

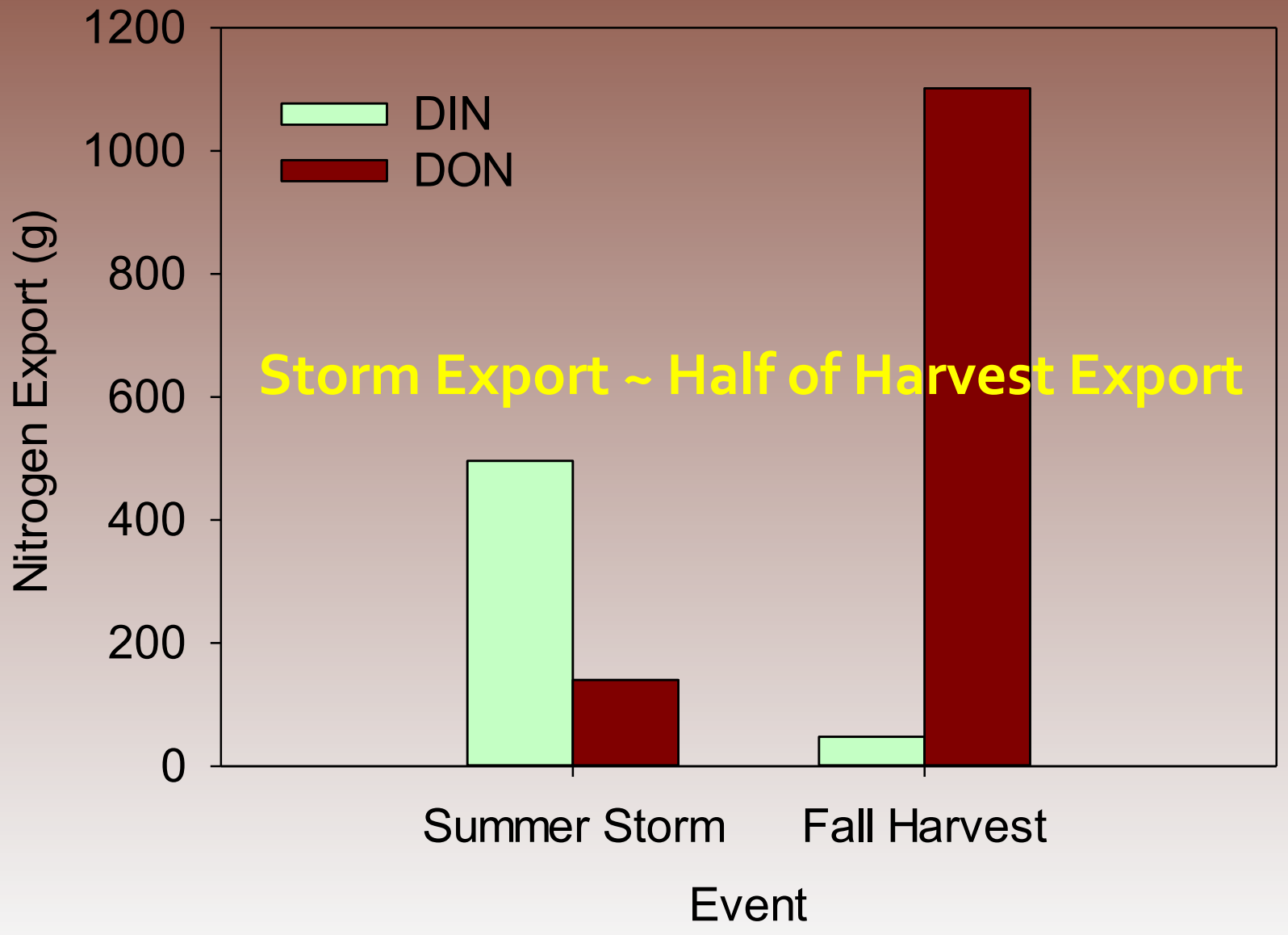


Organic vs. Inorganic N





N Export


1200
1000
800
600
400
200
0
Nitrogen Export (g)
DIN
DON
Storm Export ~ Half of Harvest Export
Summer Storm
Fall Harvest
Event

Conclusions

- Drainage is central to farming, but may intensify nutrient loss
- Extensively ditched older beds may promote P loss
- Newer beds with tile drainage (and high N application rate) can result in high exports of N
- Drainage water IS manageable
  - Filtration system
  - Amendments to immobilize nutrients
  - Holding ponds to promote settling