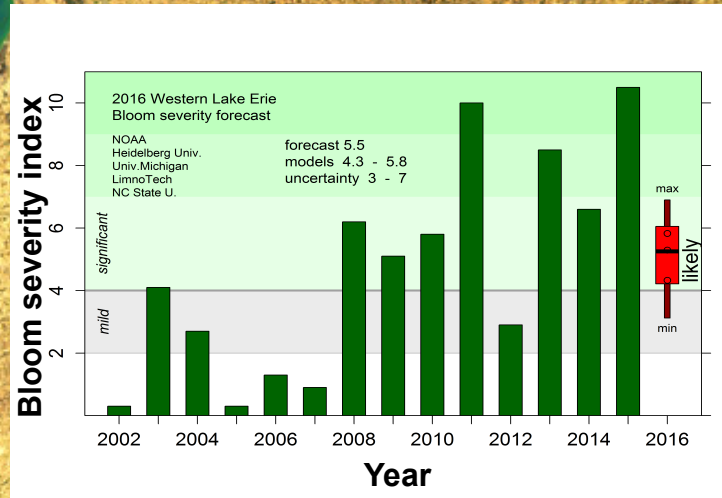


# **Decreasing phosphorus losses with drainage water management practices**

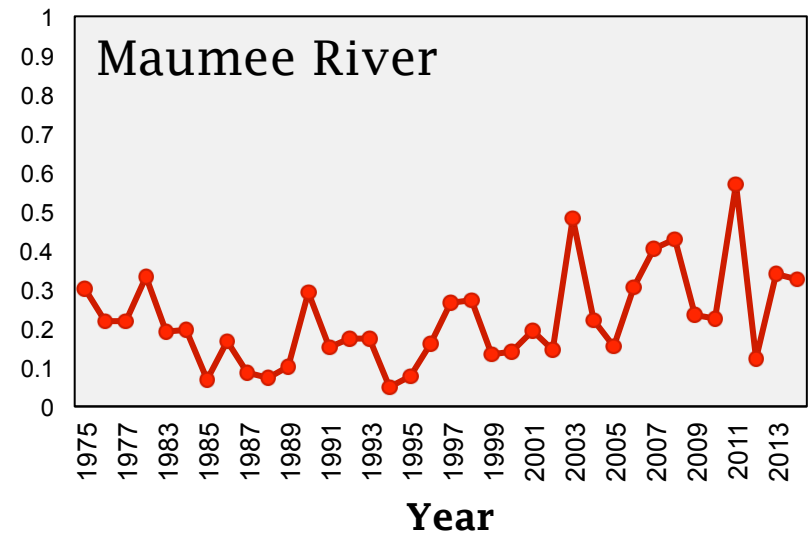
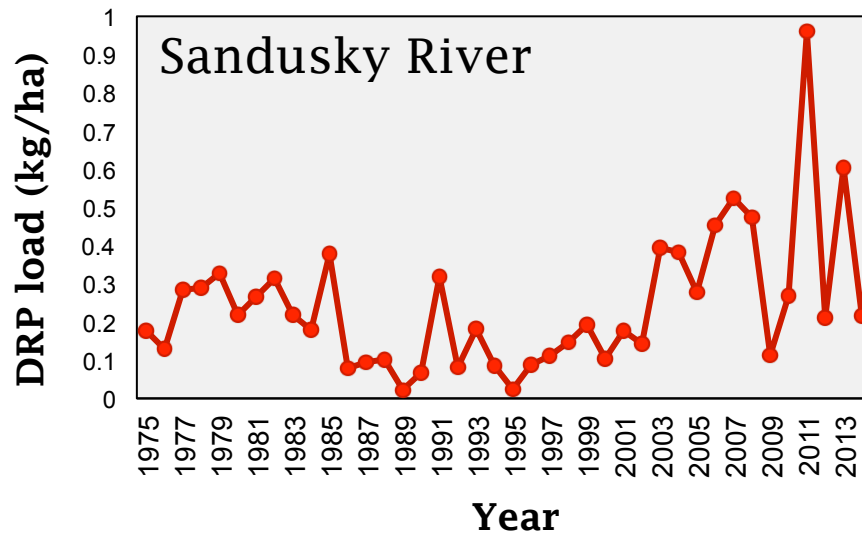
**Mark Williams, Ph.D.**

USDA-ARS, National Soil Erosion Research Lab



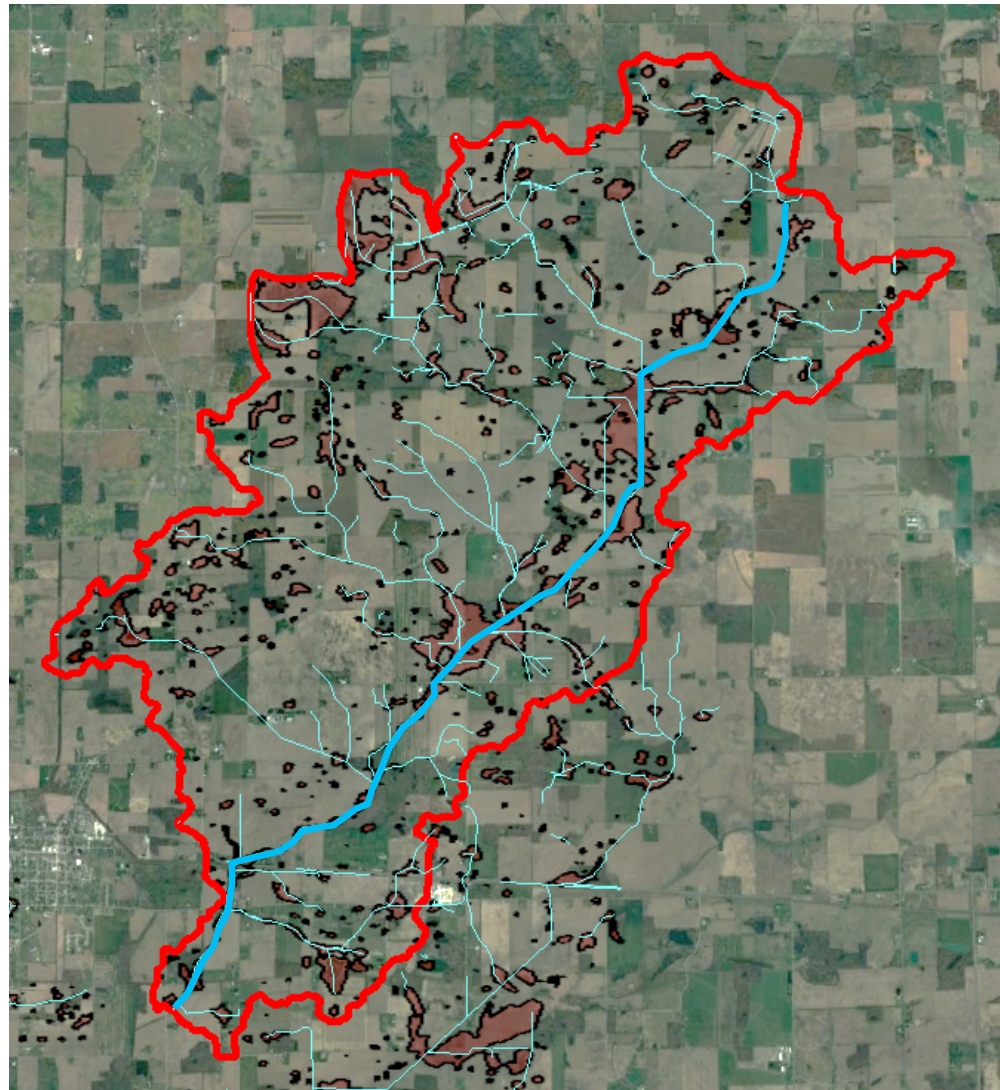
# RE-EUTROPHICATION of LAKE ERIE

# Upward trends in dissolved P loading





# Increased hydrologic connectivity





# USDA-ARS edge-of-field monitoring



## Edge-of-field monitoring



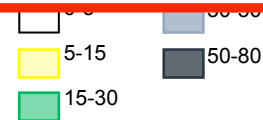
## Surface runoff



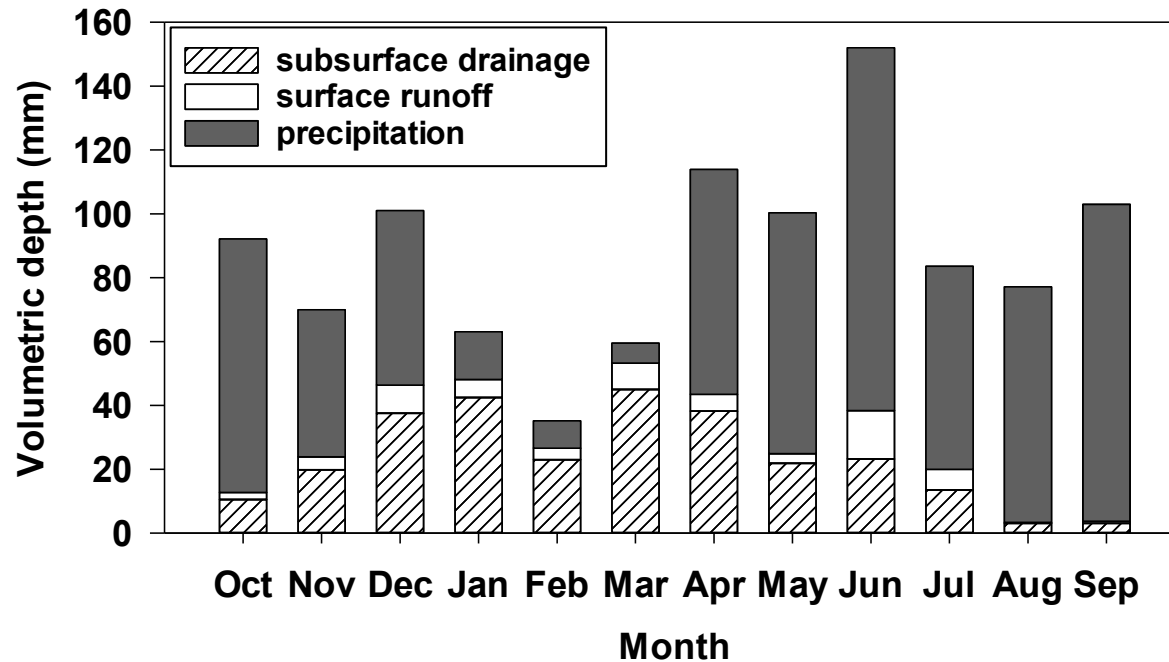
## Tile drainage



- ★ Major city
- USDA-ARS edge-of-field site

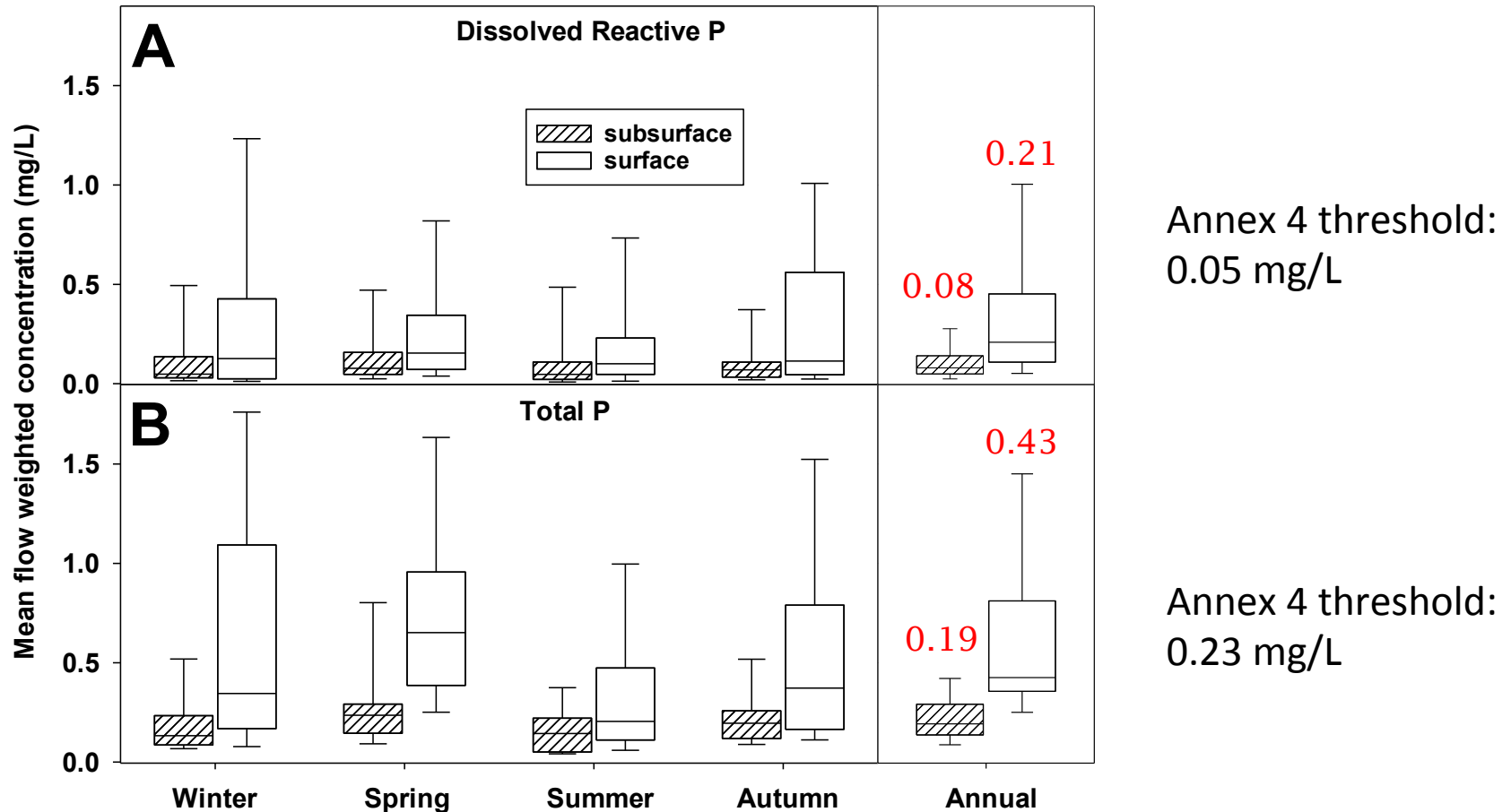


# Surface runoff and tile discharge



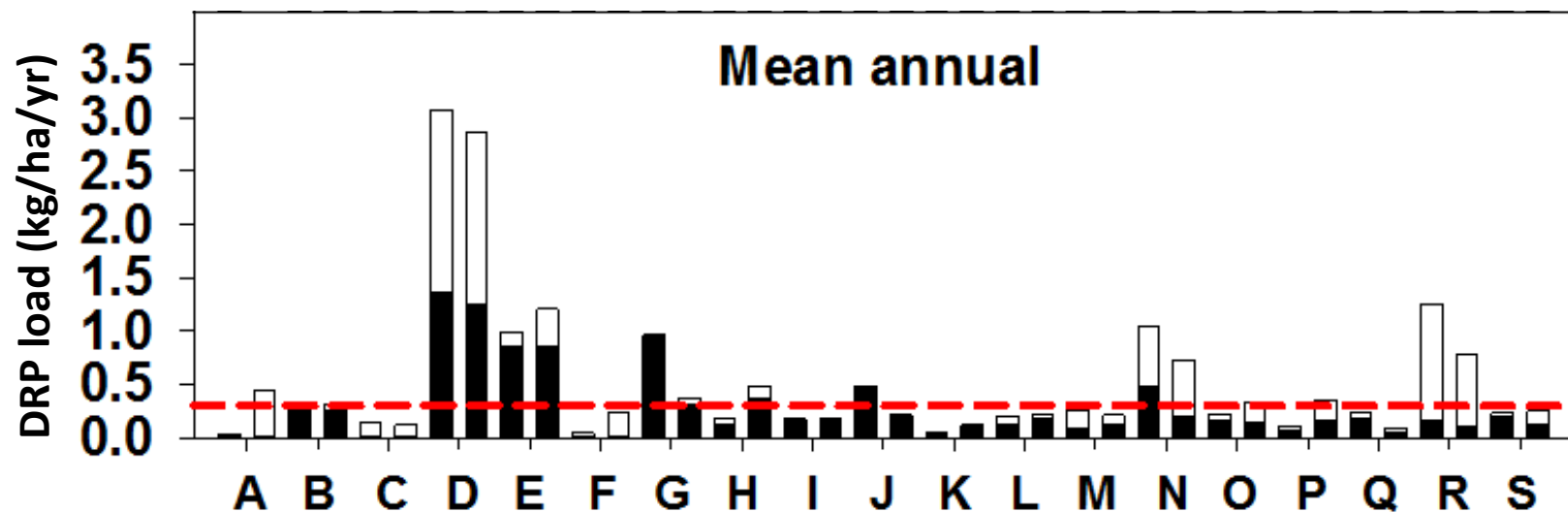
On average, 79% of water leaving field sites is tile discharge

# Phosphorus concentrations





# Phosphorus loadings



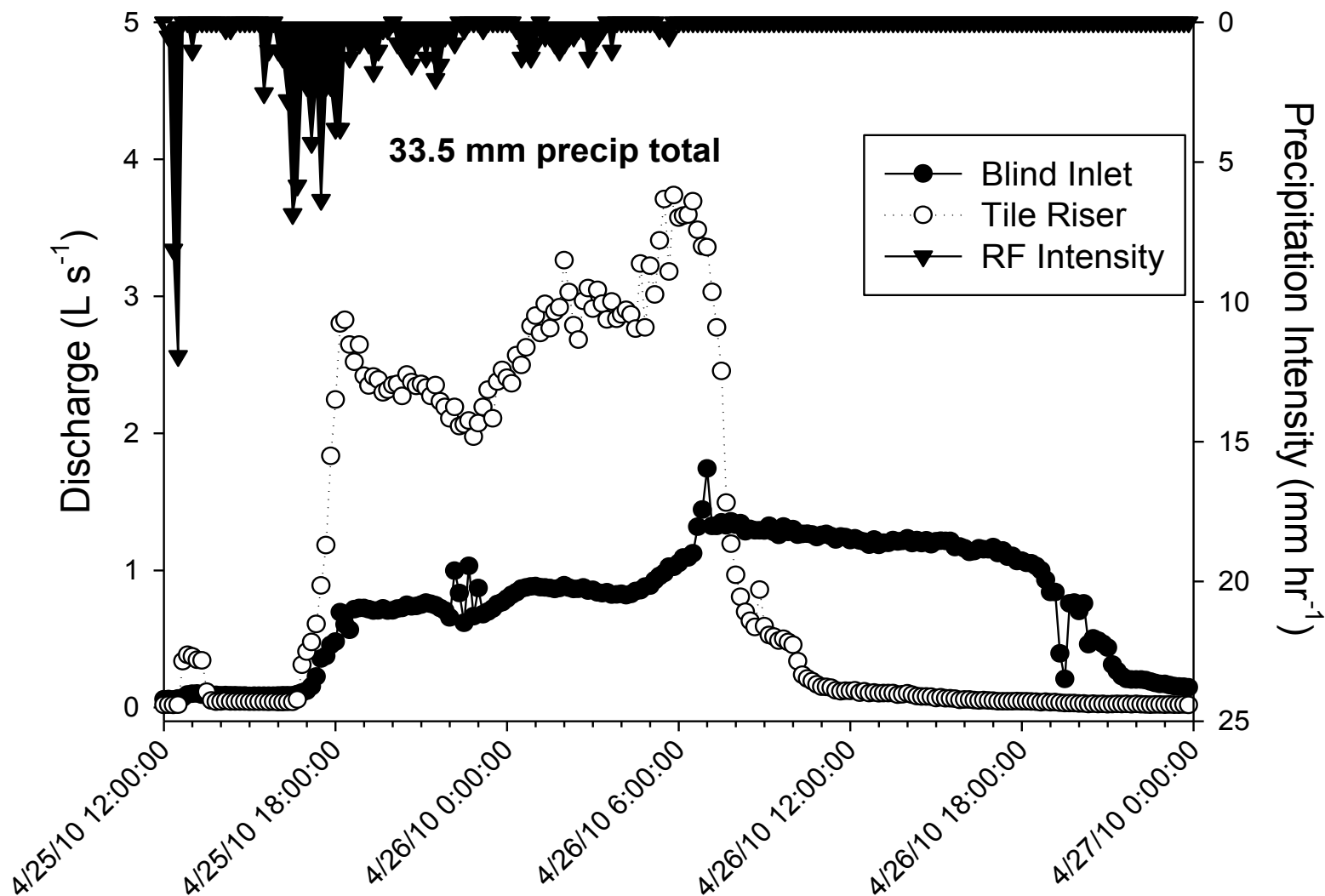
DRP loading targets (0.29 kg/ha) were met in 50% of site years

On average, tile drains accounted for 65% of field DRP load



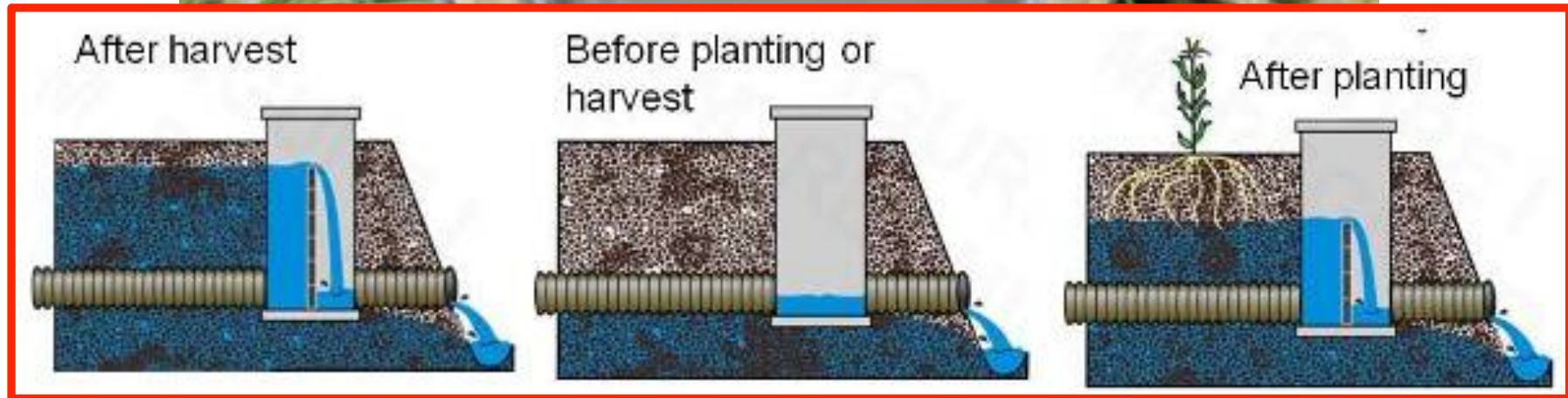
# Blind inlet

# Blind inlets decrease peaks in runoff



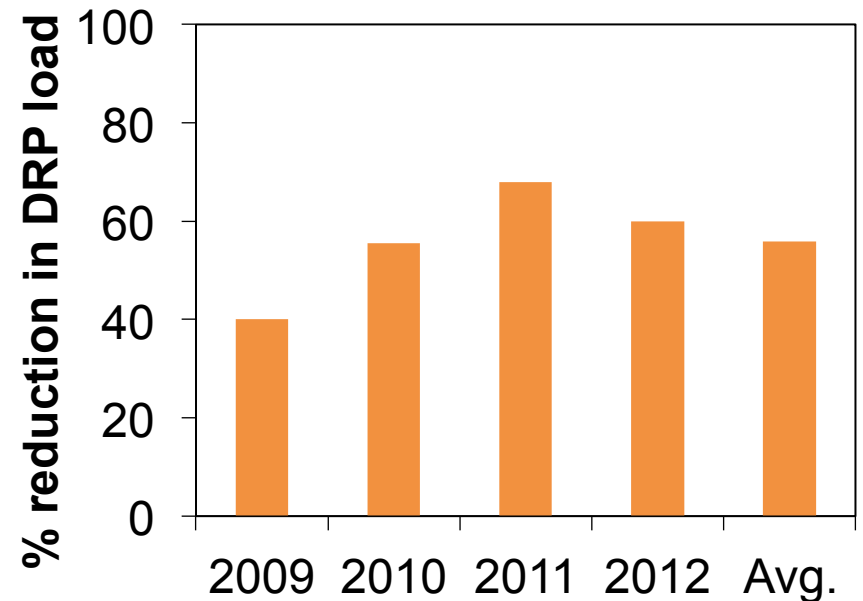
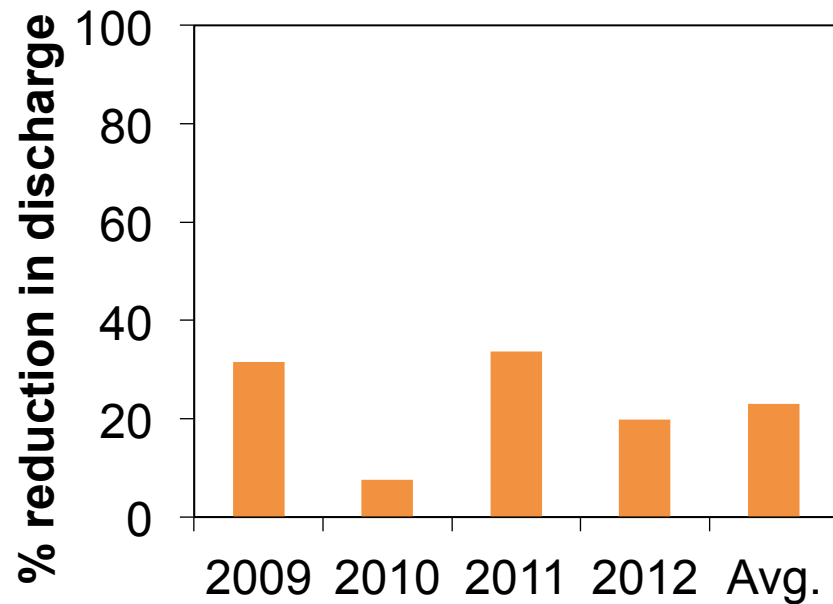


Nutrient	2009 % Reduction	2010 % Reduction
Sediment	11	79
Ammonium-N	30	59
Nitrate-N	34% increase	24
Total N	66	48
Soluble P	64	72
Total P	52	78



# Drainage water management

# Decreases in tile discharge and soluble P with drainage water management





# Summary

Phosphorus concentrations and loads from tile-drained fields often exceed critical thresholds

Decreasing hydrologic connectivity can decrease losses

Blind inlets and drainage water management are two practices that can decrease connectivity and phosphorus loads



# Questions

## Contact Information

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