

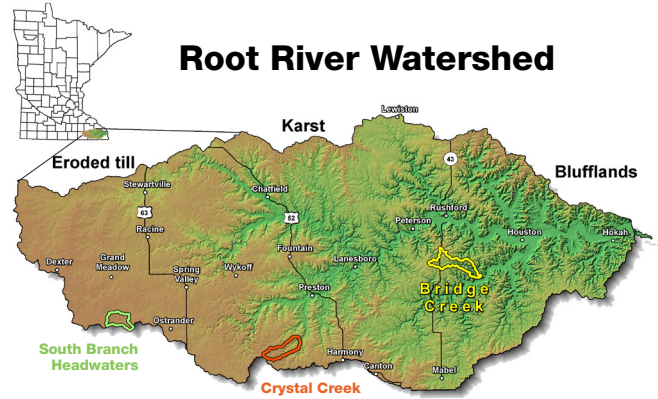
# Field Runoff

Root River Field to Stream Partnership

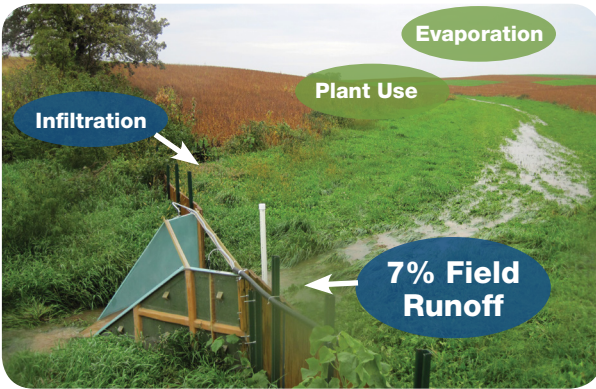


## Primary Project Goal

To determine the range of sediment and nutrient losses associated with runoff from representative farming systems and small watersheds in southeastern Minnesota. Information below includes data from 4 fields, collected over 6 years.



## Where does the water go?



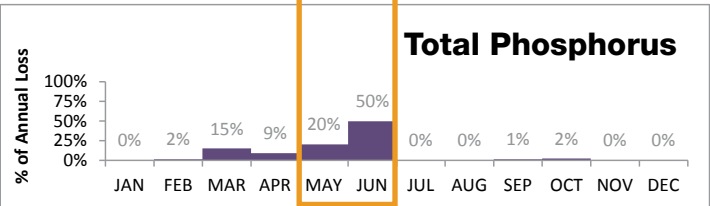
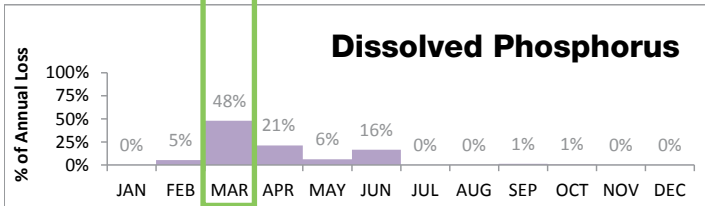
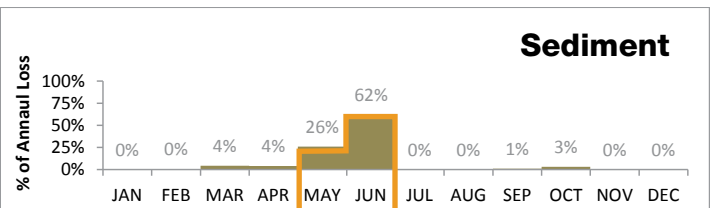
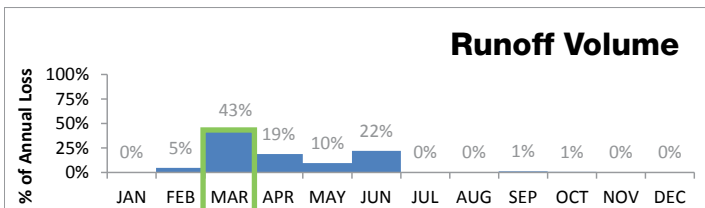
On average, 7% of the annual precipitation runs off the field. This value, however, is highly variable by site and year.

**How we manage this 7% can make a BIG difference for clean water.**

On average, 47% of the total runoff (water) occurred when the soil was frozen.

Over 50% of the annual nutrient and sediment losses typically occurred during 1-2 rain events each year.

**Timing of Losses:** Sediment and nutrient losses peak at varying times of the year. **Understanding this timing is key to reducing loss.**



- Dissolved phosphorus losses were highest in March and often occur when the ground is frozen. **Incorporation of fertilizer and proper management of soil test phosphorus levels will help reduce these losses.**
- Nearly 90% of sediment loss occurred during May and June. Total phosphorus loss is closely linked to sediment loss. **Good soil conservation practices will help reduce these losses.**

### Contact:

Kevin Kuehner, Minnesota Department of Agriculture  
507-765-4530, kevin.kuehner@state.mn.us

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## Precipitation & Runoff

- Precipitation averaged 2% above normal during the study period with a mix of dry, normal and wet conditions.
- Field runoff averaged 2.6 inches (7% of annual precip.) with almost half occurring during frozen soil conditions.
- Field surface runoff has been observed in every month ~20 runoff events each year (runoff does not occur every time it rains)

## Field Sediment Loss

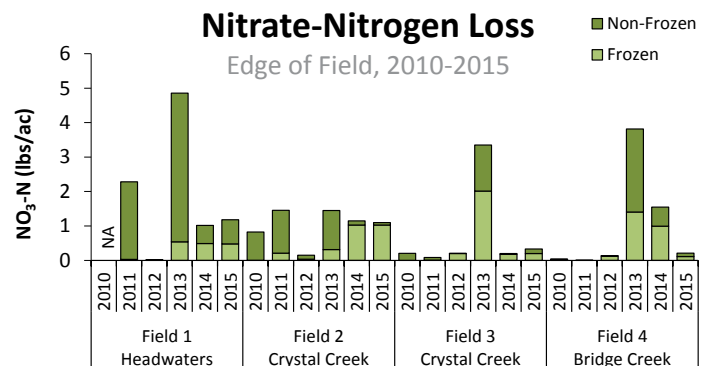
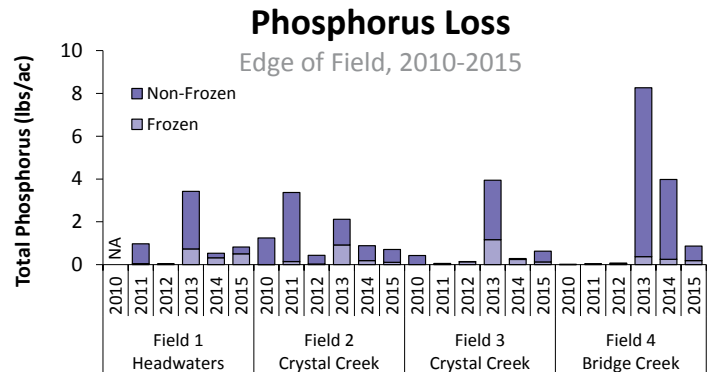
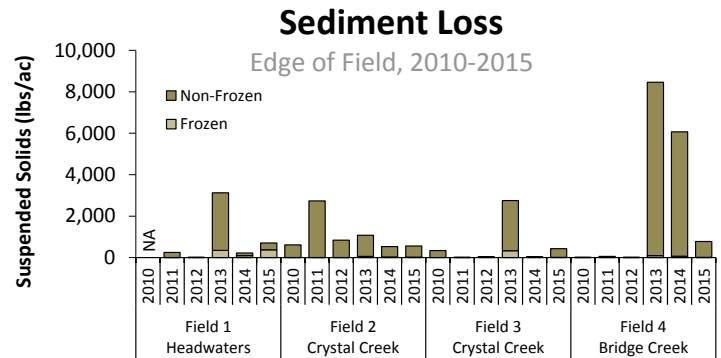
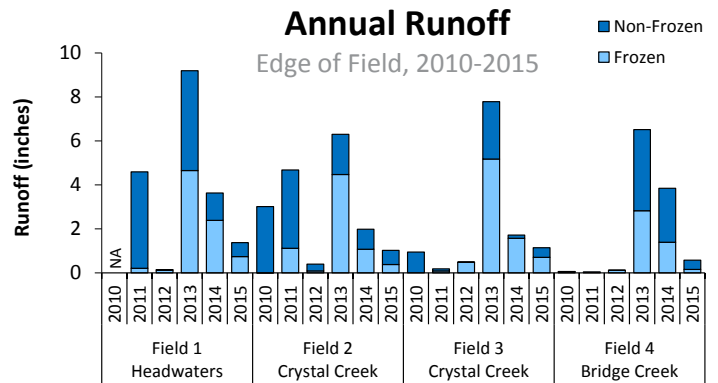
- **Average sediment loss:** 1,288 lbs/ac (0.64 tons/ac.)  
Range: 2 to 8,457 lbs/ac
- **Sustainable soil loss:** < 1,000 lbs/ac/yr  
If erosion is visible losses likely exceed this.
- 87% of annual loss occurred during select storms in May & June. During this critical time, fields were prepared for planting but not at full canopy.

## Field Phosphorus Loss

- **Average total phosphorus (P) loss:** 1.4 lbs/ac  
Range: <0.1 to 8.3 lbs/ac
- **Dissolve P (not attached to sediment):**  
Accounts for 16% of total P loss  
Almost 50% of this loss occurs when the ground is frozen.
- **Particulate P (attached to sediment):**  
80% loss occurred in May & June.
- For every 1,000 lbs/ac of sediment loss about 1.0 lbs/ac of P is lost.

## Field Nitrogen Loss

- **Average total nitrogen loss:**  
10 lbs/ac. (includes organic forms of N)  
If substantial soil loss occurs, total nitrogen (TN) in surface runoff can exceed 34 lbs/ac.
- **Nitrate-N form:** ~16% of TN  
Range: 0.2 to 4.9 lbs/ac  
Average surface runoff loss: 1.1 lbs/ac  
Sub-surface tile average loss: 29 lb/ac
- **Surface Runoff:** Total nitrogen transported in surface runoff can be controlled through soil conservation.
- **Sub-Surface Leaching:** Most nitrogen is lost this way and is detected as nitrate-nitrogen in tile drainage, springs, streams, rivers and groundwater.



Reducing nitrate leaching losses will be challenging, but it is a very important task. Fine-tuning nitrogen rates, crediting legumes and manure, applying nitrogen in split applications and using nitrification inhibitors are important practices.

