



Runoff Lessons:

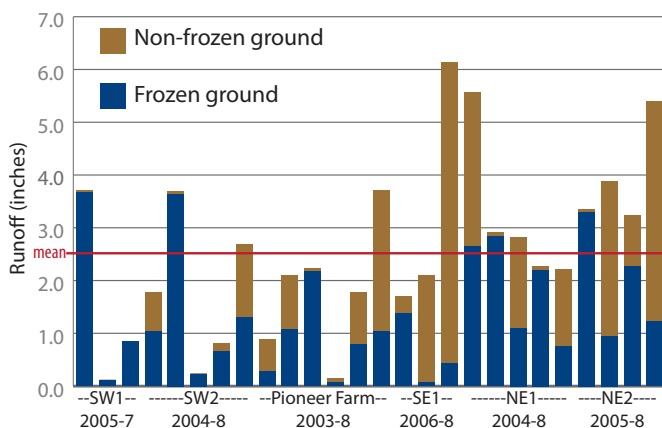
25 Edge-of-Field Monitoring Stations (2003-2008)

The UW Discovery Farms Program and the UW Platteville Pioneer Farm work with Wisconsin agricultural producers to identify the impact (both positive and negative) of a number of farming systems and settings around the state. Over the past nine years we have identified many of the positive contributions that farms have on the environment. The information in this article is interpretations made by UW Discovery Farms of data collected by U.S. Geological Survey (USGS). In the fall of 2010, USGS will publish a comprehensive report with conclusions and additional data collected from Discovery Farms across Wisconsin. Please check the Discovery Farms website (www.uwdiscoveryfarms.org) for more information in our newsletter and more lessons learned about surface and tile runoff and manure and nutrient management from data collected at the Wisconsin Discovery Farms.

In 2003, UW Discovery Farms and the UW Platteville Pioneer Farm partnered with the USGS to collect surface-water runoff and water quality samples from over 25 edge-of-field stations located around the state of Wisconsin. These data provide valuable information on precipitation amounts, volume and depth of water leaving the fields as runoff, time periods in which runoff occurred, and nutrient and sediment content of the runoff water. The data presented here are pending USGS approval and publication and are considered to be provisional until published later this year.

Precipitation amounts, runoff volumes, and critical time periods

- On average, for all sites in the state, precipitation was nearly average at approximately 30-32 inches per year.
- Runoff averaged 2.5 inches, see Figure 1 (8% of precipitation ran-off).
- Runoff is not generated every time it rains.
- There has been a runoff event in March during every year on every farm we've ever monitored.
- February and March have high runoff frequency, but April, May, and June and other time periods with high soil water content are comparable in terms of runoff risk.
- On average, runoff volumes have been nearly equally distributed between frozen (54% of total annual runoff) and non-frozen (46% of total annual runoff) periods. In any one year, frozen ground can contribute up to 100% of annual runoff.



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Figure 1. Average runoff depth recorded from Discovery Farms and Pioneer Farm from 2003-2008. (Data are provisional pending U.S. Geological Survey publication.)

Sediment losses

- Average sediment loss for all farms and all years was 670 lb/acre/year. Tolerable soil loss in study areas was 6,000-10,000 lb/acre/year.
- Nearly all sediment losses occurred when the soil was not frozen.
- Individual storms can contribute a high amount of sediment, especially in vulnerable areas of the rotation, for example after fall or spring tillage in preparation for planting corn after alfalfa.

Phosphorus losses

- Most (nearly 60%) P lost was while the soil was not frozen.
- Average loss was 2 lb/acre/year, and about 1/2 of P lost was in the dissolved form (not attached to sediment).
- Phosphorus and nitrogen losses from manure application, whether solid or liquid manure, increased significantly when time between application and runoff event is short (one week or less).
- Decreasing sediment loss decreases particulate phosphorus loss, but dissolved losses of phosphorus are decreased with proper manure application timing and rates.
- **Timing of manure application is critical, and day-to-day decisions are important!**

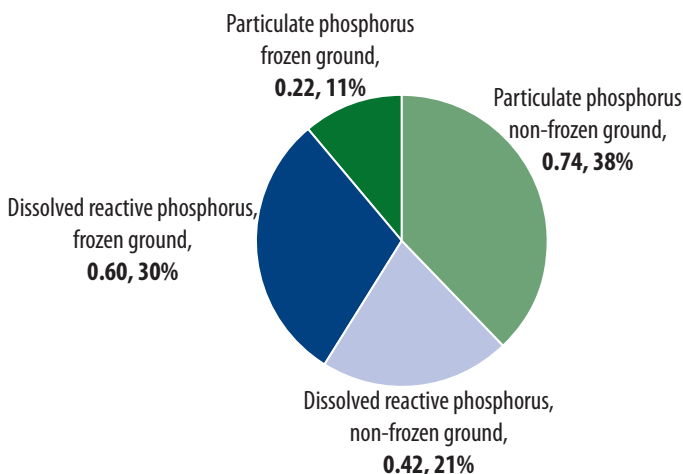
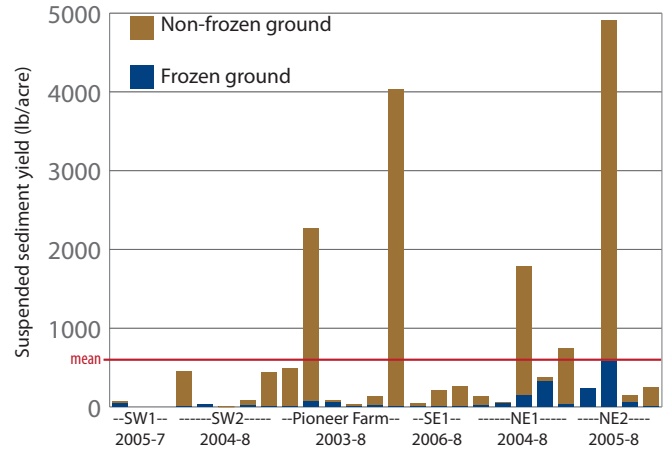


Figure 3. Phosphorus losses collected from Discovery Farms and Pioneer Farms from 2003-2008. (Data are provisional pending U.S. Geological Survey publication.)

Figure 2. Sediment losses collected at Discovery Farms and Pioneer Farm from 2003-2008. (Data are provisional pending U.S. Geological Survey publication.)



Nitrogen losses

- Most N lost was during the frozen ground period.
- Average loss of N was 7 lb/acre/year, and most losses were in the Organic N form.
- Ammonium was a significant fraction of N lost while ground was frozen.
- Because nitrogen changes between forms so readily, more research is needed to better understand losses and management strategies.
- During critical time periods, create a plan with options for manure management on your operation that allow you to avoid spreading manure in risky areas during risky time periods.

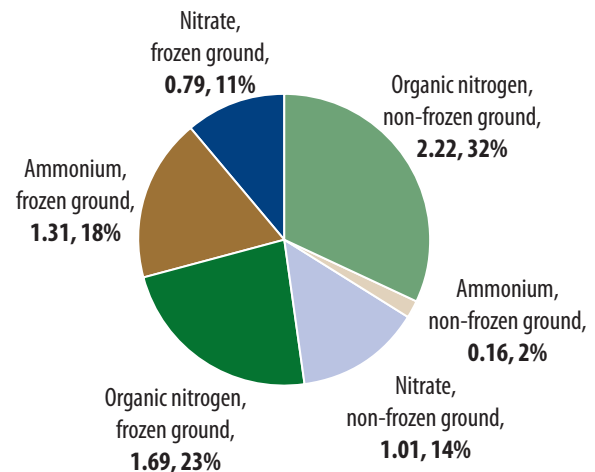


Figure 4. Nitrogen losses recorded by Discovery Farms and Pioneer Farm from 2003-2008. (Data are provisional pending U.S. Geological Survey publication.)