USDA-CSREES 2006 National Water Quality Conference

Nutrient and Sediment Losses from Wisconsin Agricultural Practices

Wisconsin's Discovery Farms program is evaluating the impact of agriculture on the quality of surface water runoff by monitoring edge-of-field sites on privately owned farms throughout Wisconsin. Relationships determined between field management and the quality of surface water runoff can provide information on the sources, magnitude, and timing of nutrient and sediment losses to streams in agricultural areas. Understanding the factors contributing to these losses and the timing of when they occur is an important step in reducing or mitigating the affects that agriculture has in the Mississippi River Basin.

Two years of monitoring data have been collected in three small (16.9 – 39.5 acres) paired basins on a farm in southwestern Wisconsin. Soils in each basin are classified as silt loam, with average slopes of six percent or less. Drive-over terraces and no-till planting are used as soil and water conservation practices. More than half of the average annual surface water runoff occurred during periods of frozen ground, with most of this runoff occurring during February and March. On average, runoff from frozen ground contained over half of the annual losses of total phosphorus and total nitrogen, yet only a small percentage of the annual suspended sediment losses. Individually, fields receiving surface applied manure shortly preceding surface water runoff events had greater losses of phosphorus and nitrogen than those that received manure during other times of the year. Phosphorus in runoff from these fields was primarily in the dissolved form, while nitrogen was primarily in organic nitrogen and ammonium forms. Management strategies that target the timing, rates and location of manure application to agricultural land, particularly during February and March, could reduce the amount of nutrients lost to steams in Wisconsin.

Author: Dennis Frame
Coauthor(s): Fred Madison - University of Wisconsin Discovery Farms Todd Stuntebeck - United States Geological Survey Matt Komiskey - United States Geological Survey