

Soil Loss in Tile Drainage Systems

November 2016

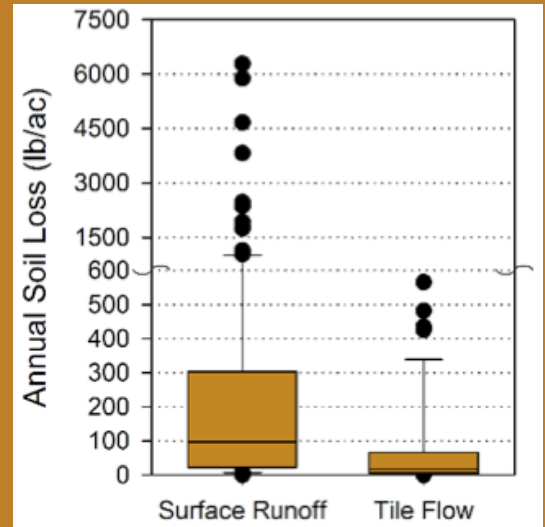


Discovery Farms programs in Minnesota and Wisconsin have collected edge-of-field water quality information from 24 farms and 45 fields starting in 2002. A total of 112 site years of surface runoff data and 47 site years of tile flow have been collected at the various locations. This large dataset allows for review and analysis of important water quality topics. This fact sheet examines the factors that impact soil loss in tile systems.

Soil is mainly transported by surface runoff, however, there are a few tile sites with higher losses.

Median soil loss from surface runoff was 109 lb/ac with a typical range from 33 to 331 lb/ac. This median equates to about 3 five gallon pails full of soil from an area the size of a football field.

Median soil loss from tile was 18 lb/ac with a typical range from 7 to 64 lb/ac. There have only been three tile monitoring sites that have had greater than 150 lb/ac soil loss in a given year.

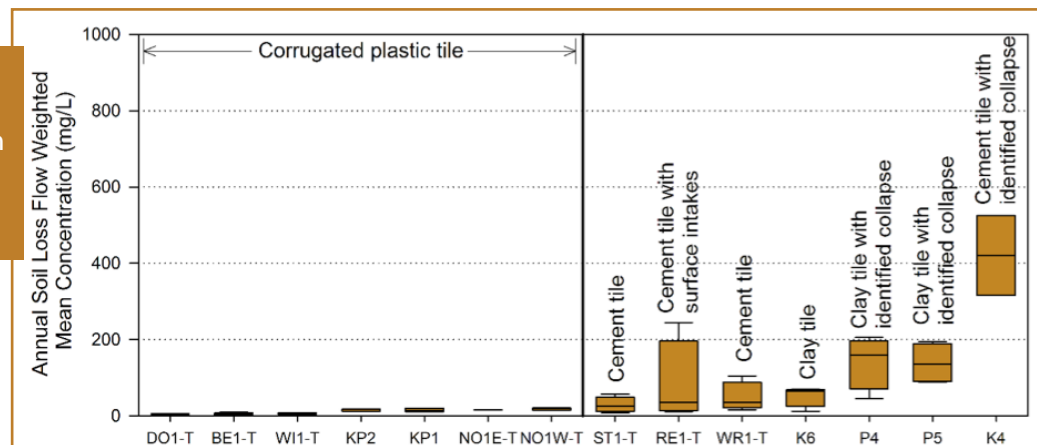


Updating and maintaining tile drainage systems will decrease the amount of soil loss.

Tile monitoring sites with higher concentrations of sediment were older cement or clay tile systems with surface intakes or tile collapses.

1. Modernize old cement or clay tile systems with corrugated plastic pipe.

Sites with corrugated plastic had almost no soil loss (left half of graph). Sites with cement or clay had a range of soil losses (right side of graph). Gaps at the connections of cement and clay pipes are larger than the perforations in modern corrugated plastic tile and allow more soil particles to pass through.



2. Update tile systems to remove the need for surface intakes when possible.

Surface intakes allow more soil to enter the system because they are directly connected to the surface.

3. Prevent tile collapses.

High flow velocity and pressure inside the tile are two common causes of tile collapse. Collapses can create direct conduits to the soil surface. They range in size from a few inches to several feet and can be hard to find. Make sure to check for degradation over time, inadequate venting, outlet blockages and animal burrows. When altering tile lines make sure to adequately size mains and use proper joints to prevent collapse.