



2009 CSREES National Water Conference; St. Louis, MO

Importance of streamflow and land use in understanding trends in water quality associated with agricultural management practices

Jeffrey W. Frey*, Michael R. Meador
U.S. Geological Survey; *jwfrey@usgs.gov

Abstract:

Conservation tillage has been a cornerstone of agricultural management practices (AMPs) used to keep soil and agricultural chemicals on fields and out of streams. It was assumed that the installation of AMPs would lead to improved water quality based on studies at a field scale; however assessment of water quality improvement after installation of AMPs has frequently been inconclusive for studies on a watershed scale. Because concentrations of agricultural chemicals and sediment are closely related to streamflow it is important to account for changes in streamflow over time to accurately assess whether there have been changes in water chemistry and sediment over time. Water chemistry and sediment concentrations at Sugar Creek at New Palestine, Indiana in Hancock County were monitored from 1992 through 2006 as part of the National Water-Quality Assessment Program. Conservation tillage increased on soybeans from about 2 percent of the farmed acres in 1990 to about 95 percent in 2007 in Hancock County. Although land use in the Sugar Creek basin is primarily corn/soybean cropping (about 94 percent), beginning in 2001 Hancock County became the third fastest growing county in Indiana. Trends in suspended sediment and nitrate at Sugar Creek were assessed using a method that accounts for changes in streamflow over time. No significant trends in concentration for suspended sediment or nitrate were found from 1992 through 2006. However, concentrations of suspended sediment decreased by 30.6 percent (p -value=0.039) between 1992 and 1999. Nitrate concentrations decreased by 14.3 percent between 1992 and 1999, but this decrease was not significant (p -value=0.363). It appears that improvements in sediment concentrations in Sugar Creek after the adoption of conservation tillage in the 1990s were mitigated by increased urbanization beginning in 2001. This analysis shows the importance when determining trends in water quality to account for changes in streamflow and land use.

Impact Statement:

Information is being used by the Sugar Creek Watershed group and Soil and Water Conservation District to prioritize AMPs.

Category: Agricultural BMPs

Type of Presentation: Oral Presentation