Saturated Buffer Fact Sheet

USDA Natural Resources Conservation Service – Iowa January 2015

Definition and Purpose – A saturated buffer is a riparian buffer in which the water table is artificially raised by diverting subsurface drainage along the buffer (Fig. 1) accomplished by installing a water control structure in the main drainage outlet. In Iowa, this practice is being investigated as a way to reduce nitrate and phosphate loading to surface waters.

Conservation Practice Standard - Interim Conservation Practice Standard (Code 739), "Vegetated Subsurface Drain Outlet" was approved for use in July 2012 for a period of three years in order to evaluate the saturated buffer as a nitrate reduction practice. An annual report has been submitted for 2013 and 2014, and a final report will be completed after July 2015. The final report may recommend the interim standard be converted to a national standard, incorporated into an existing standard, or discontinued. Even if approved, a national standard is not likely to be finalized for two or more years.

Research and demonstration sites - The USDA Agricultural Research Service (ARS) began saturated buffer research at a site along Bear Creek in Iowa in late 2010. A Conservation Innovation Grant (CIG) was awarded to the Agricultural Drainage Management Coalition (ADMC) in 2011 to install and monitor nine saturated buffer sites in Iowa (2), Illinois (3), Indiana (2), and Minnesota (2). The USDA-Farm Service Agency (FSA) awarded a grant to ADMC to install and monitor six (6) additional saturated buffer sites in Iowa (1), Illinois (2), Indiana (1) and Minnesota (2).

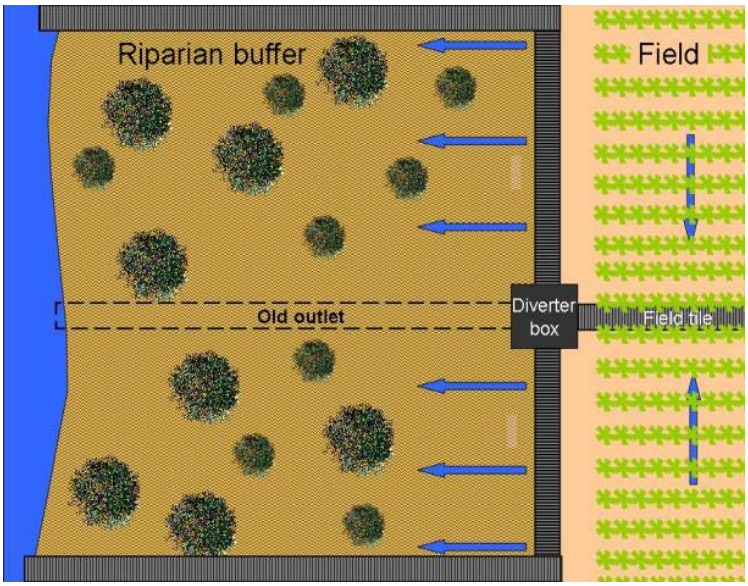

Figure 1. Not-to-scale schematic of a riparian buffer with an intercepted tile outlet, diverter box, and distribution lines in the upstream part of the buffer (from Jaynes and Isenhart, 2011). Typically the old outlet will remain in place to outlet high flows that exceed the utilization capacity of the buffer.

Results – Nearly four (4) years of data from the ARS site (Bear Creek) show that a substantial fraction of subsurface drain flow can be diverted into the buffer (Fig. 2) with substantial reduction in nitrate delivery to the stream (Fig. 3). Data from the ADMC sites was incomplete as of January 2015. Analysis of the data from the ADMC sites and other on-going research areas will be required to properly evaluate the effects of different sites and site conditions.

Financial and Technical Assistance – Technical assistance with the planning and design of saturated buffers is available through normal NRCS procedures using the interim standard. Design guidance is

limited and preference should go to sites that will be monitored in order to further evaluate this practice. As with all interim standards, design approval remains with the State Conservation Engineer.

Financial assistance is available through EQIP. However, the components (pipe and water control structure) of the system cannot be placed in a Conservation Reserve Program (CRP) buffer. If a national standard is approved, FSA may provide financial assistance for the components in the future.

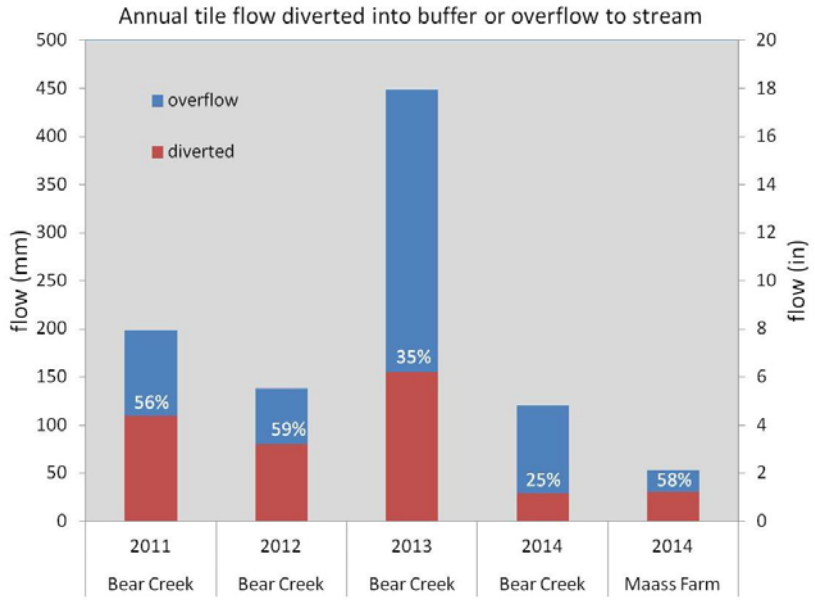

Figure 2. Total tile flow and percent diverted into the buffer at two saturated buffer sites. 2014 data is through August; additional flow occurred after that date. Chart provided by D. Jaynes, ARS-NLAE.

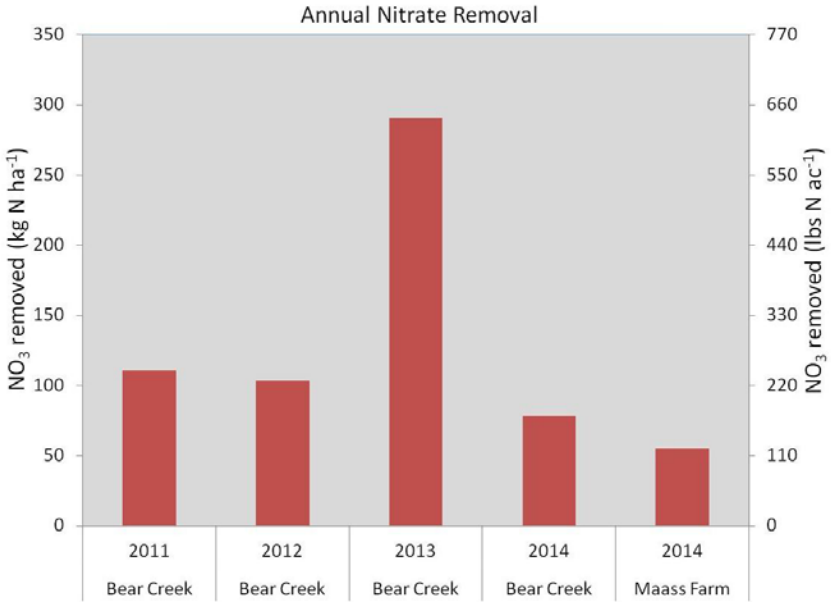

Figure 3. Nitrate removed by diverting tile flow through a riparian buffer. Units are lbs, not lbs/ac. 2014 data is through August; additional flow occurred after that date. Chart provided by D. Jaynes, ARS-NLAE.