LANDSCAPE CONSERVATION COOPERATIVES

Multi-LCC Mississippi River Basin / Gulf Hypoxia Initiative
High Impact Conservation Practices – Fact Sheets

## Suite #1 – Tributaries: Buffers for Field Borders and Streams

*Updated 22 September 2015 (draft for review)*

**WHAT ARE BUFFER STRIPS?**

The concept of a buffer strip is relatively straight forward—in short, it is a width of land in some sort of vegetation that flanks a wetland or water body or a field border. There can be many types of buffer strips, including riparian buffers, grassed waterways, filter strips, and contour grass strips. Often, however, the purposes of these various buffer technologies remain the same: to slow the flow of water entering a waterway or leaving a field and/or to filter that water as it moves through the buffer.

Some buffer technologies achieve these objectives in different ways. For instance, grassed waterways are actually designed to move water off of fields as quickly as possible. However, strategically placed grassed waterways can significantly reduce soil erosion and nutrient loading and can prevent the formation of ephemeral gullies. In contrast, riparian buffers and filter strips actually work to *slow* the water from entering a waterway, filtering the water in the process.

There are a variety of types of buffer and border technologies, and the use of any of them depends on the characteristics of each individual field. Overall, however, buffer strip technologies provide multiple benefits for both wildlife and water quality.

**WHY BUFFER STRIPS?**

As already mentioned, buffer and border strips are powerful tools for reducing the amount of sediment, nutrients, and other contaminants that enter a water way. By placing an organic barrier between the field and the waterway, buffer strips work to filter the water that passes through them by removing nutrients from the water and preventing most of the sediment from entering the waterway. Each buffer technology accomplishes this in different ways, but

according to the NRCS the results are clear. When these buffer strips are properly designed, utilized, and maintained, they can…

- Remove up to 50% or more of nutrients and pesticides
- Remove up to 60% or more of certain pathogens
- Remove up to 75% or more of sediment

**WILDLIFE BENEFITS**

Buffer strips, especially riparian and other vegetative buffers, can provide habitat for numerous forms of wildlife. Especially when planted with native vegetation, buffer strips can increase and protect the biodiversity of a region. Beyond providing primary habitat for a variety of species, buffer strips can also provide corridors species that have to cross the vast open areas common in many agricultural landscapes. These corridors provide crucial shelter from predators and the elements that many species rely on in order to survive.

Buffer strips can also benefit aquatic wildlife in a number of ways. Perhaps most obviously, the presence of buffer strips can work to "mellow" the hydrograph of a particular waterway, altering it to resemble the natural hydrograph that many aquatic species are adapted to. Similarly, filter strips that work to remove nutrients and other contaminants from runoff can have a direct and local beneficial impact on water quality, improving biological conditions in the process. And finally, riparian forest buffers can provide shade for many smaller streams, resulting in cooler water temperatures more conducive to aquatic life.

Overall, the various buffer and border technologies can have beneficial impacts on a variety of species, including blue-winged teal, belted kingfisher, riparian birds such as Acadian flycatcher, upland birds such as pheasant and quail, blackside darter, creek chub, johnny darter, sculpin, smallmouth bass, copper-bellied watersnake, and mussels.

**INSTALLATION & COSTS**

There are two primary components to the cost of buffer technologies. First is the initial installation and upkeep. These costs vary significantly based on the amount of earthwork that needs to be done, the width of the buffer, and the type of vegetation being planted. The second component is the cost of taking a certain amount of land out of production. Like the other cost, this cost relies heavily on the individual characteristics of each particular field and the type of buffer being installed. Furthermore, planting native tallgrass species or certain slow-growing trees may require years of upkeep and maintenance before the full benefits of the buffer are realized. However, most buffer strips inherently target marginal croplands, lands that either flood consistently are at high risk to erosion. Protecting these marginal lands could offset some of the costs of buffer strips and make the technology more appealing to land owners.

**MONITORING**

Existing grassland bird monitoring programs could be leveraged to provide some data about the effectiveness of buffer strips in providing habitat, although significant data already exists on the wildlife benefits of various buffer practices in agricultural landscapes. Additionally, IBI monitoring in the waterways could provide information about the aquatic life impacts of this practice.

Real-time sediment and nutrient load monitoring would provide up-to-date information on water quality in the water way.

**LIMITATIONS/CONSIDERATIONS**

Because buffer technologies require taking land out of production, landowners may require additional incentives in order to assume the risk; however, there are many programs available to landowners to help defray the costs of installation and, in some cases, the lost income due to the remove of land from production.

Because buffer strip practices are generally small in size and relatively narrow, research has indicated that the wildlife benefits, particularly of herbaceous buffer strips, are generally limited in agricultural landscapes due to high levels of predation, nest parasitism, and limited vegetative structure and diversity. Improvements to the wildlife habitat benefits of buffer strips generally occur with increases in length and width, utilization of tree and shrub plantings, and placement of buffer practices in locations that connect or enlarge existing areas of habitat.

**RESEARCH, PROGRAMS, AND MORE INFORMATION**

For more information on buffer technologies, visit the NRCS' Common Sense Conservation webpage:

- http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/home/?cid=nrcs143_023568

NRCS CP33 CRP standards.

See also Prairie STRIPS (Science-based Trials of Rowcrops Integrated with Prairie Strips), Iowa State University, https://www.nrem.iastate.edu/research/STRIPs/

**OPPORTUNITY AREAS**

(TBA)

**SOURCES**

Clark, W.R and K.F. Reeder. 2007. Agricultural buffers and wildlife conservation: A summary about linear practices. Pages 45-55 in J.B. Haufler, Fish and Wildlife Responses to Farm Bill Conservation Practices, Technical Review 07-1, The Wildlife Society, Bethesda, Maryland, USA

Evans, K.O., Burger, L.W., Riffell, S. & Smith, M.D. (2014) Assessing multiregion avian benefit from strategically targeted agricultural buffers. *Conservation Biology*, 28.4, 892–901. DOI: 10.1111/cobi.12311

Riffell, S.K., Monroe, A.P., Martin, J.A., Evans, O.K., Burger, L.W. (2015) Response of non-grassland avian guilds to adjacent herbaceous field buffers: testing the configuration of targeted conservation practices in agricultural landscapes. *Journal of Applied Ecology*, 52, 300-309. DOI: 10.1111/1365-2664.12389

Stutter, M.I., Chardon, W.J., Kronvang, B. (2012) Riparian buffer strips as a multifunctional management tool in agricultural landscapes: introduction. *Journal of Environmental Quality,* 41.2, 297-303. DOI: 10.2134/jeq2011.0439