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Conservation buffers can improve water quality

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Conservation buffers can improve water quality

Abstract

Conservation buffers are areas or strips of land where permanent vegetation is established in and around row crop fields to protect environmentally sensitive areas such as streams and tributaries; thus, these buffers are important for improving water quality.

Keywords

Agronomy, Agricultural and Biosystems Engineering

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering

INTEGRATED CROP MANAGEMENT

A photograph of a person in a field, possibly a farmer or researcher, with large, stylized text overlaid on the image. The text reads "INTEGRATED CROP MANAGEMENT". The background shows a field with tall grasses and a person in the distance.

Conservation buffers can improve water quality

Conservation buffers are areas or strips of land where permanent vegetation is established in and around row crop fields to protect environmentally sensitive areas such as streams and tributaries; thus, these buffers are important for improving water quality.

Conservation buffers can be located adjacent to streams to stabilize banks, or strategically located in crop fields to reduce surface runoff and associated soil erosion. Well-designed buffer strips contribute to the removal of nitrates and other agricultural chemicals. Riparian buffer zones or strips also influence biological communities. For example, invertebrates associated with streams thrive as numbers of trees and shrubs increase, and fish habitat is improved by shading the water and reducing water temperature.

Riparian buffer plan

The first step toward an effective riparian or streamside buffer is creating a solid, research-based design. Riparian buffer design is flexible and diverse and can offer different benefits. Goals that can be achieved by installing a riparian buffer include effective runoff and sediment control, prevention of stream bank erosion, reduced nutrients in runoff water, increased water infiltration into the soil, improved wildlife and fish habitat, and elimination of point rows along a meandering stream.

Riparian buffer design can incorporate trees, shrubs, and grasses, thereby allowing the benefits of each component to complement the others in a natural setting.

A native grass zone (minimum of 20 feet) improves soil macropores, minimizing surface runoff and moderating flooding. Native species to be considered are switchgrass, big bluestem, Indian grass, and forbs.

A shrub zone (minimum of 12 feet) slows water flow, allowing suspended sediments to settle, absorb nutrients, and provide food sources for wildlife. Species to consider are ninebark, red osier dogwood, chokecherry, gray dogwood, and nanking cherry.

A tree zone (minimum of 30 feet) shades streams, absorbs excess nutrients, stabilizes stream banks, and provides habitat for animals. Trees recommended nearest the stream are willow, poplar, box elder, and silver maple. Trees recommended at moderate elevations are sycamore, green ash, white ash, silver maple, basswood, and swamp white oak. Upland tree species are eastern red cedar, black ash, and black walnut, red oak, hackberry, hickory, and eastern white pine.

Buffer installation and maintenance

Riparian buffers require maintenance to stay healthy and competitive. Be prepared to water and mow around trees or mulch trees and shrubs, and burn grasses seasonally (at least a couple times in the first 3 years). You can use herbicide for spot control of weeds, but make sure any chemical use is approved for use near streams.

Maintenance tips include keeping an evenly spread, shallow water flow through the buffer. Soil may settle at the edge of the grass zone so remove it if it builds up too high. Plants are most effective in their uptake of excess nutrients when growing vigorously, so harvesting or cutting vegetation is not only good maintenance but also a great way to keep nutrients out of the water.

Tillage strategies above the buffer, such as no-till and conservation tillage, help control erosion and runoff, and help the buffer function naturally without overloading it.

Buffers are often the most suitable use of marginal land through Conservation Reserve Program (CRP). Installing a buffer does not interfere with cash flow and may actually improve on marginal lands currently in row crops. Also, look for other programs that can enhance the benefits provided by the CRP, such as Environmental Quality Incentives Program, the Wildlife Habitat Incentives Program, the Wetlands Reserve Program, and the Stewardship Incentive Program.

Include conservation professionals in planning process

County conservationists, district foresters, soil and water conservation district staff and contractors can help with buffer design. Planting help and volunteer help is also available from nonprofit groups. Contact your local chapter of Pheasants Forever, Ducks Unlimited, and Trees Forever, as well as the Future Farmers of America, 4-H, high school science classes, or local service groups.

When it is all said and done, buffers are a win-win scenario--producers get better land use and potential return, and everyone else gets improved water quality and resource conservation.

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