

The Benefits of Restored Oxbows

By Karen Wilke, The Nature Conservancy in Iowa

Historically, North Central Iowa was a mosaic of prairie potholes, wetlands and meandering streams. However, today less than one percent of those wetlands remain, resulting in an immense loss of water storage and wildlife habitat across the Iowa landscape. The need for improved floodplain hydrology and increased water storage has become increasingly apparent during the extreme weather events and flooding many parts of Iowa experienced this spring.

Oxbows are one example of a wetland feature that has greatly diminished over the years. Oxbows are old stream meanders cut off from the current stream channel, forming a small floodplain wetland that connects to the stream only during high flows. Healthy oxbows can provide many benefits, including wildlife habitat, water quality improvements and flood-water storage.

However, over time many of Iowa's oxbows have filled in with excess soil due to high rates of soil erosion across the landscape, and the benefits they once provided diminish. By excavating the excess sediment, we can restore the oxbow's benefits providing more storage for excess floodwaters, improved nutrient cycling and sustaining water year-round for thriving fish and wildlife populations.

The Nature Conservancy in Iowa, along with partners, have been monitoring the benefits restored oxbows provide over the last five years, and here's what we've found:

- On average, restored oxbows can remove 47 percent of the Nitrates ($\text{NO}_3\text{-N}$) that enter the oxbow through tile water, groundwater and creek flooding. $\text{NO}_3\text{-N}$ reductions can be up to 100 percent when dry weather allows tile water to sit in the oxbow for longer periods of time. On average, it takes an oxbow about 25 days to remove excess $\text{NO}_3\text{-N}$ from tile water.
- Surveys have found 30 fish and 54 bird species utilizing restored oxbow habitat year-round. This includes the state and federally endangered Topeka Shiner, a minnow which requires the off-stream habitat as refuge from predatory fish.

Currently, 23 oxbows have been restored in the Boone River Watershed, but hundreds more potential restorations exist. TNC in Iowa and partners can offer up to 100 percent cost share to restore additional oxbows in the Boone River Watershed.

If you'd like to learn more, contact Karen Wilke at kwilke@tnc.org or 480-678-2352.

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Grazing River Corridors with Virtual Fencing

By **Omar de Kok-Mercado, Natural Resources Conservation Service**

“Pre-settlement Iowa was an immense landscape of grasses and forbs that stretched from Indiana to the foothills of the Rockies. With oak savannas following the Mississippi River to Texas and connecting to the pine savannas of the Southeast, it was a graziers paradise. The landscape was covered by ruminant animals that were always moving. These animals met their dietary needs by selectively grazing a buffet of plants as they moved over the seemingly endless expanse of prairie and silvopasture (in the form of oak savannas.) The combination of these deep-rooted perennial grasses and animal grazing established our deep and rich grassland soils on which we have since built the foundation of our lives.

As a species, humans also foraged. When we grew tired of having to constantly move and graze like other animals, we invented tillage. We grabbed a stick and cleared a small plot of ground and planted the seeds we preferred over all the others. Until the invention of tillage, soil was never disturbed at large (less by cataclysmic events such as earthquakes and landslides), and there was permanent cover on the soil.

Tillage was the advent of agriculture, and with agriculture came the depletion of natural resources. On average, modern industrial agriculture is the opposite of a highly diverse self-regulating system and has replaced the natural ecosystem for the luxury of controlled inputs. The loss of diverse, self-regulating systems has caused a degraded environment.

What if we could develop a profitable agricultural system that behaved like the self-regulating prairies and oak savannas that used to cover the Midwest? Edge-of-field conservation practices like bioreactors and saturated buffers are costly to install and only relieve the symptoms of the environmental problems associated with corn and soybean production. How can we implement conservation and remain profitable?

By looking at our past, we can define the future of agriculture. One way is through grazing our river

corridors, which provides many advantages: vegetation management, animal welfare, grazing land connectivity and improved water quality. Implementing an at-scale grazing river corridor provides several challenges: the cost of fencing, the task of tracking large herds and access to lands.

Virtual fencing is quickly developing as a viable prospect. GPS technology has been stacked into ear tags, with several pilot projects occurring in the U.S. Virtual fencing has the potential for greater resolution of herd management, health monitoring, weight gain, etc. Paddocks, or grazing areas, can be pre-ordained, and all livestock movement can be monitored remotely.

With livestock grazing large corridors, (e.g., along the Mississippi River) the river serves as a means of transport to markets and processing facilities. Restored corridors not only serve as grazing grounds, but also provide a multitude of other economic opportunities in the forms of longer term leasing, fruit and nut trees, timber, hunting, recreation and improved water quality for commercial fisheries. Grazed river corridors can function as high-diversity and low-input silvopastures that not only produce a more resilient environment, but also fortify our rural communities through greater socioeconomic opportunities.

Imagine a Midwest that not only conserves its lands and waters, but also defines its agriculture through fostering its beautiful natural heritage: seas of grass, wonder-filled hills and valleys flowing with clear water. Maintaining our current agricultural productivity into the future is going to require a more robust approach to landscape level management. Grazing river corridors at-scale is a transitory agricultural compromise in order to continue our current practices while pursuing a more resilient model, allowing us the time to redefine the future of agriculture.

If you'd like to learn more, contact Omar de Kok-Mercado at omar.dekokmercado@ia.usda.gov or 515-532-2165.

The views and opinions expressed in this article are those of the author featured and do not necessarily represent the official policy or position of any agency of the U.S. government.

Conservation Practices and Land Leases

By Angie Rieck-Hinz, extension field agronomist, Iowa State University

I'm often asked by both landowners and tenants how to incorporate specific conservation practices into leases. The first step is for both parties to meet for an open discussion about the goals of implementing specific practices.

Activities like including a cover crop on crop acres takes planning, even up to a year in advance. Considerations for discussion include who will pay for the seed and the seeding of the cover crop, termination costs, the possibility of decreased commodity crop yields and other factors.

Other practices like moving from conventional tillage to strip- or no-tillage may require a significant machinery investment on the part of the tenant. In any case, these annual practices may require a huge learning and adoption curve, so expectations from both parties need to be understood and addressed. Starting on a small number of acres is highly advisable.

More permanent practices like waterways and terraces are likely to benefit the landowner long term more than the tenant and may be a cost the landowner incurs. It may also require management and maintenance by the tenant, so including language in the lease should be specific to the situation.

There are many conservation practices available that address soil erosion, water quality and wildlife benefits, but we will focus here on cover crops.

Cover crops are loosely defined as closely planted crops that bridge the gap between harvest and planting of primary commodity crops like corn and soybean. During this time, much of Iowa landscape is bare of vegetation, making it most vulnerable to water and wind erosion as well as nutrient loss. Cover crops are planted for many reasons, including (but not limited to) reducing erosion, cycling nutrients such as nitrogen that could otherwise be lost to leaching, improving soil health and for an animal feeding source.

If a landowner or tenant is considering incorporating cover crops for any of these reasons, here is a list of considerations and ways to start the conversation:

- Identify the goal(s) of growing the cover crop.
- Talk to experienced cover-crop users to learn how they started, understand the benefits and any challenges experienced.

- Have an open discussion on the potential for yield loss in the commodity crop.
- Explore and discuss local cost-share opportunities and the funding cycles.
- Discuss a termination plan.
- Offer tenant incentives like sharing seed and seeding costs or even lowering cash rent.
- Temper expectations by providing a back-up plan and communicate consistently. What if it does not rain and the seed does not germinate? What if herbicide carryover impacts cover crop growth? What if a wet spring delays termination and subsequent planting of corn or beans and impacts yield? Discuss options and expectations that will define success or failure.
- Realize the inclusion of a cover crop is part of the cropping system and will require adjustments throughout. It is not just something that might be there from September to April.
- Start small. There is no need to seed every acre to cover crops until everyone has more experience with this cropping system and expectations are met with reality.

The Iowa Learning Farms produced a series of publications titled *Talking with Your Tenant* that contain four fact sheets, talking points and research findings for sharing among tenants and landowners. The series includes: *Cover Crops; No-Till/Strip Till; Denitrifying Practices: Wetlands, Bioreactors, Saturated Buffers; and Land Use Changes: Prairie Strips, Perennial Cover, Extended Rotations*.

These fact sheets, and other resources on leases and conservation practices, are available from Iowa State University Extension and Outreach by contacting your local county Extension office.

If you'd like to learn more, contact Angie Rieck-Hinz at amrieck@iastate.edu or 515-231-2830.



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