

Use of Wildlife Exclosures for Riparian Protection and Management

Upper Llano River Watershed

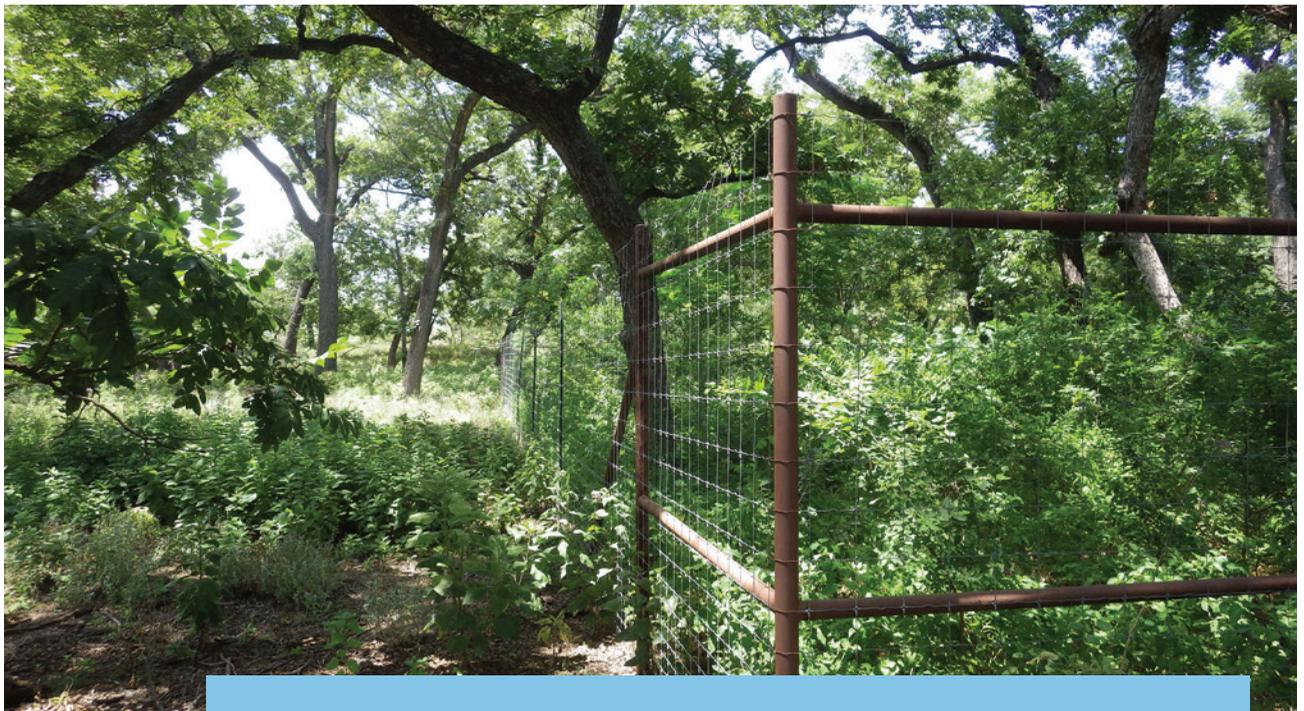
The riparian area, or zone, of a river is the transitional area between the water and upland. Riparian zones often don't have definitive boundaries, but include stream banks, floodplains, and wetlands. A properly functioning riparian area will "dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload, and aid in floodplain development; improve flood-water retention and groundwater recharge; and develop root masses that stabilize streambanks against cutting action," (Prichard et al., 1998).

Native pecan trees provide much of the riparian habitat along the North and South Llano rivers. These pecans and other woody species provide bank stability and important shade for aquatic habitats. However, due to intensive browsing from deer and axis populations, few of the younger pecans trees or other woody species are surviving. As the mature pecan trees die, there are fewer trees in the riparian zone to replace them.

WILDLIFE EXCLOSURES

To offset the loss of woody species in the riparian zone, the Upper Llano River Watershed Protection Plan calls for a coordinated effort to manage white-tailed deer and non-native, exotic populations (primarily axis deer) through increased landowner participation in wildlife management plans and the establishment of exclosures along critically degraded riparian zones. The construction of temporary exclosures allows saplings to become established and reach a growth state resistant to browsing pressures.

A 100' x 100' exclosure was constructed in 2011 at the Texas Tech Llano River Field Station. More recently (2017 and 2018) more than 35 exclosures were constructed at the Field Station, at South Llano River State Park, and on several private properties. These exclosures will be used to assess the difference in plant structure and tree recruitment between where both deer species are prevented from feeding and an adjacent control where they can feed.



August 2018 photo of exclosure constructed at Texas Tech Llano River Field Station in 2011.

FINDINGS

Analysis of the 2011 enclosure found species richness higher in enclosures than open riparian areas, especially among grasses, forbs and saplings. Very few seedlings/saplings were found outside of the enclosures, whereas within enclosures, pecan, basswood, hackberry and elm were common with few chinaberry and mesquite. Standing-crop-above-ground plant biomass was 3-25 times greater within enclosures and litter layer biomass was 2-5 higher than outside. Higher preferred browse species (pecan, hackberry, elm, wild four o'clock) were taller and denser inside the enclosures (Yarnold, 2017).

For the more recently constructed (summer 2017) enclosures, four of the enclosures had visible differences compared to surrounding areas as early as three months post construction and by April 2018, about 20 of the enclosures had visible differences compared to surrounding areas. In many cases vegetation inside was taller whereas the control plots outside the enclosures had little vegetative structure and were grazed to the bare ground. One enclosure had wintergrass and buffalograss that is 6-8 inches tall and seeding out, while the outside area is dominated by frost weed. Many enclosures also have small seedlings of cedar elm, pecan and live oak, while none have been recorded outside enclosures. These preliminary data suggest that the combined negative effect of both species of deer on plant biomass is substantial. While identifying the effect of each deer species is difficult, differences in grass biomass may be attributed to axis deer foraging given that their diet consists of substantially more grass than white-tailed deer diets (Buchholz, et al, 2018).



Close-up of an enclosure.

RESOURCES

Cost-share assistance to landowners for enclosure construction is available through Natural Resources Conservation Service [Environmental Quality Incentives Program](#) (EQIP) and Texas Parks and Wildlife [Landowner Incentive Program](#) (LIP).

REFERENCES

- Buchholz, M., et al. 2018. Texas Tech University Axis Deer Project Update. Texas Tech University, Department of Natural Resources Management, Lubbock, TX.
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- Yarnold, M.S. and T.L. Arsuffi. August 2017. Exotic and native ungulate foraging pressures along Texas Hill Country streams: Impacts on riparian structure and function. Ecological Society of America conference, Portland, OR.

PARTNERS

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Funding provided through a federal Clean Water Act §319(h) Nonpoint Source Grant administered by the Texas State Soil and Water Conservation Board from the U.S. Environmental Protection Agency.

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