Riparian Notes

Note Number 11, March, 2005 ***Steve Nelle, NRCS, San Angelo, Texas***

Losing Ground

It is a serious thing to lose riparian ground. There are two different ways that riparian areas can lose ground - either by down-cutting or by channel widening. Either type of erosion can cause long term riparian problems.

Down-cutting takes place as a creek channel cuts deeper and deeper. This type of vertical instability is also called "degradation" since the elevation of the channel is lowered or degraded over time. Down-cutting is extremely critical to overall riparian health and function. Channel degradation literally drains the water table across the entire floodplain, just like shooting a bullet hole in a large barrel of water. Not only does it lower the water level, but it prevents it from ever re-filling to the previous level. These artificially deepened channels drastically reduce the volume of water that can be stored in shallow riparian water tables. With this reduction in the water table and water storage, aquatic habitat is compromised and some riparian plant species cannot survive or cannot reproduce since the distance to water is too great. Down-cutting dries up riparian areas.

Down-cutting can begin for several reasons. If the creek is artificially manipulated or straightened, this can lead to down-cutting. Disturbances on the upland water catchment which cause accelerated runoff (such as urbanization or overgrazing) can lead to down-cutting. When riparian vegetation becomes insufficient to hold the bottom or the banks of the channel in place, this too can lead to down-cutting. On smaller creeks, roots of riparian species (herbaceous and woody) can form an interwoven matrix of roots under the channel and provide the reinforcement needed to hold the bottom of the channel in place. If this vegetation is lost or damaged, it can lead to channel instability. Often, a combination of these factors occurs simultaneously to initiate the down-cutting process. Unfortunately, a serious side effect of channel degradation is that it precipitates the eventual down-cutting of all other side channels that enter the main channel as they seek a stable gradient. Down-cutting also may trigger a natural adjustment of the channel which normally leads to the second type of channel erosion.

Channel widening occurs when the creek banks become unstable and are unable to hold up. As banks erode and slough, the channel gets wider and wider. This channel widening is also serious since it can reduce the width of the riparian floodplain. When floodplains are lost to channel widening, the size of the riparian sponge is reduced and the capacity to store water for sustained release is reduced. Channel widening can either be a reaction to down-cutting, or it can be caused by inadequate riparian vegetation.

As channels widen, natural sinuosity and meandering is reduced. When sinuosity is decreased, channel gradient increases and water velocity increases which in turn leads to more and more erosion. As channels get wider and wider, their ability to transport sediment is diminished, which in turn, causes degradation of aquatic habitat as channels become shallow and clogged.

Excessive and un-natural riparian erosion often starts a nasty chain reaction. Keeping a close watch of creeks and riparian areas and being alert to subtle changes may allow the manager to act before the damage becomes excessive.

It should be understood that some bank erosion is natural and normal even in properly functioning riparian areas, especially on outside bends. This bank erosion should ideally be offset by the formation of point bars and increased sinuosity. The next issue of *Riparian Notes* will describe how riparian erosion combined with good vegetation can actually build back and restore damaged creeks.