

Riparian Notes

Note Number 2, January, 2004

Steve Nelle, NRCS, San Angelo, Texas

Riparian Roots

A large rainfall event several years ago on the North Concho River Watershed produced rapid runoff and out-of-bank flow. The floodwater looked like rich chocolate milk flowing down the river. A one gallon sample of this runoff from the main channel was collected and filtered. It contained 12.8 grams of sediment. That may not sound like a lot, but this concentration is the equivalent of **4.6 tons of sediment per acre foot** of runoff. This one storm event contributed 7400 acre feet of muddy water into O. C. Fisher reservoir, north of San Angelo, along with an estimated 34,000 tons of soil.

Riparian researchers have shown that the majority of sediment in rivers is not coming from upland watersheds, but instead from eroding and unstable banks, channels and floodplains. They estimate that 80% of river and creek sediment is coming from the riparian area itself. Stabilizing channels, banks and floodplains can do a great deal toward improving water quality and reducing the excess movement of sediment.

A riparian area that is functioning properly will support a heavy stand of densely rooted upright vegetation. Riparian plant species have different rooting characteristics than upland plants. Root systems of riparian vegetation are denser and stronger than upland species. This dense, strong root mass is one of the critical factors in maintaining bank and channel stability. The power of rushing floodwater is immense and an equally immense network of roots to support and reinforce wet banks and riparian soils is needed.

A study of the root system of an important western riparian sedge (Nebraska sedge) revealed an amazing fact: **One cubic foot of soil contained 21 miles of roots!** The stability rating of this sedge community was equal to the stability of anchored rock. By contrast, a common upland grass of the same region (Nevada bluegrass) had about 2 miles of roots and a stability rating only 30% as great as Nebraska sedge.

Another study of a Platte River riparian system showed that root biomass was over 4 times more than above ground biomass. **Root biomass was about 21,700 pounds per acre** consisting of grasses, sedges and forbs, while above ground production was about 4,700 pounds per acre.

A certain amount of erosion and deposition is normal and natural in river and creek bottom areas. However, when bank erosion becomes excessive, it is a sure sign that erosion and deposition are out of balance and the riparian vegetation is inadequate.

Three broad types of riparian vegetation help provide needed stability:

- **Colonizer plants** very quickly spread and put down a mat of new roots by stolons or rhizomes (knotgrass, spikerush, some sedges, water hyssop, water primrose).
- **Stabilizer plants** are usually taller upright plants with strong dense root masses (switchgrass, Emory sedge, sawgrass, eastern gammagrass, bushy blustem).
- **Riparian Woody plants** with larger diameter roots function as “riparian rebar” (black willow, sycamore, button bush, little walnut, baccharis, indigobush amorphia).

“Riparian roots reinforce riverbanks, reducing the reckless rage of rampant runoff”