FACT SHEET No. 14

Rangeland Watershed Program

U.C. Cooperative Extension and USDA Natural Resources Conservation Service

Grazing Effects on Riparian Areas

Documentation shows that cattle, given the opportunity, will spend a disproportionate amount of time in a riparian area as compared to drier upland areas. This may be five to 30 times higher than expected based on the extent of the riparian area. Features that contribute to higher use levels in riparian areas are: (1) higher forage volume and relative palatability in the riparian area as opposed to the uplands, (2) distance to water, (3) distance upslope to upland grazing sites, and (4) microclimatic features.

Although many of the riparian-fisheries-grazing studies have been deficient in design, measurement, or documentation, a great deal of case history and observational information has been accumulated. Concerning grazing impacts on riparian areas, four components were most often studied: (1) fish habitat in the aquatic system; (2) woody vegetation components of the riparian area relating to fish and bird habitat; (3) herbaceous utilization and grazing levels that can influence yields of plants, small mammals, and invertebrates; and (4) watershed conditions of cover and soil compaction on the floodplain and runoff from upland range. The direct effects of livestock grazing have been summarized as follows:

1. Higher stream temperatures from lack of sufficient woody streamside cover.

2. Excessive sediment in the channel from bank and upland erosion.

3. High coliform bacteria counts from upper watershed.

4. Channel widening from hoof-caused bank sloughing and later erosion by water.

5. Change in the form of the water column and the channel it flows in.

6. Change, reduction, or elimination of vegetation.

7. Elimination of riparian areas by channel degradation and lowering of the water table.

8. Gradual stream channel trenching or braiding depending on soils and substrate composition with concurrent replacement of riparian vegetation with more xeric plant species.

In an extensive review of livestock impacts on riparian ecosystems, Oregon State University researchers documented many factors interrelated with grazing effects, primarily dealing with instream ecology, terrestrial wildlife, and riparian vegetation. However, as with many others, the authors were not able to find much information other than that abusive grazing practices are damaging to many features of riparian ecosystems. Little information is available on how well-managed grazing affects riparian-stream systems. Criticisms of conventional grazing systems such as rest-rotation typically contain no information on actual grazing intensity or degree of plant utilization.

Permanent removal of grazing will not guarantee maximum herbaceous plant production. Researchers found that a protected Kentucky

bluegrass meadow reached peak production in six years and then declined until production was similar to the adjacent area grazed season-long. Similar results were reported in northeastern Oregon. The accumulation of litter over a period of years seems to retard herbage production in wet meadow areas. Thus, some grazing of riparian areas could have beneficial effects.

Resistance of common riparian woody plants to defoliation has not been investigated. However, genera commonly represented in riparian areas such as dogwood, maple, cottonwood, willow, and birch appear to be more resistant to foliage and twig removal than genera common in the drier uplands. Light to moderate grazing generally appears to have little adverse effect and in some cases may stimulate growth. Severe overgrazing almost invariably is detrimental to willow communities. There are research reports that cattle alter the structure of high-altitude willow communities by changing the size, shape, volume, and quantity of live and dead stems per bush, and the spacing of plants. Researchers concluded that 10 to 12 years was not sufficient time for a riparian willow community to recover from a history of excessive grazing. Others have reported that reestablishment of acceptable wildlife habitat often occurred about 5 years after release of remnant shrubs from heavy grazing. Little information is available on how careful grazing affects willow communities except for observations that leaving a residual herbaceous stubble of about 4 inches usually results in little or no use of willows.

While vegetation recovery after release from excessive grazing generally can occur within five to 15 years, impacts on fishery environments go far beyond the riparian vegetation. Channel and bank morphology, instream cover, and water flow regimens are important factors. Little is known about the recovery time for these factors in different environments. Some researchers have suggested that sediment delivery to the stream was the most detrimental impact of trampling to fisheries. Others, however, pointed out that the retention of bank morphology and stability are probably more important. The maintenance of streambank structure and function is a key item in riparian-stream habitats from both fisheries and hydrologic standpoints. Fisheries biologists suggest several conditions for optimum fish habitat:

1. At least 60 percent of the stream shaded between 10:00 a.m. and 4:00 p.m. during summer months.

2. At least 80 percent of the streambank in stable condition.

3. Not more than 15 percent of the gravel/rubble substrate covered by inorganic sediment.

4. At least 80 percent of site potential for grass-forb, shrub, and tree cover.

5. Instream cover should be about 50 percent of the total stream area.

6. Overhanging banks on at least 50 percent of the streambanks.

Vegetation plays a dominant role not only in the erosional stability of streambanks but also in the rebuilding of degraded streambanks. Streamside vegetation serves as a natural trap to retain sediments during high flows. These sediments form the physical basis for new bank structure.

References

Bohn, C. 1986. Biological importance of streambank stability. Rangelands 8:55-56.

Branson, F.A. 1985. Vegetation changes on western rangelands. Range Monograph 2. Denver, CO. Society for Range Management.

Bryant, L.D. 1988. (personal communication) USDA For. Serv. Pac. N.W. Res. Sta. LaGrande, OR.

Elmore, W., and R.L. Beschta. 1987. Riparian areas: perceptions in management. Rangelands 9:260-265.

Green, D. 1989. (personal communication) Oregon St. Univ., Dept. of Rangeland Resources. Corvallis, OR.

Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications...a review. J. Range Manage. 37:430-438.

Knopf, F.L., and R.W. Cannon. 1982. Structural Resilience of a willow riparian community to changes in grazing practices. p. 198-207. *In*: Peek, J.M., and P.D. Dalke (eds.) Wildlife-livestock relationships symposium: Proceedings 10, Coeur d'Alene ID. April 20-22, 1981. Univ. of Idaho, For.,Wildl., and Range Exp. Sta., Moscow, ID.

Meehan, W.R., and W.S. Platts. 1978. Livestock grazing and the aquatic environment. Soil and Water Cons. 33:274-278.

Platts, W.S. 1983. Those vital streambanks. Western Wildlands 3:7-10.

Platts, W.S., and R.F. Raleigh. 1984. Impacts of grazing on wetlands and riparian habitat. p. 1105-1117. *In*: Developing Strategies for Rangeland Management. Westview Press, Boulder, CO.

Skovlin, J.M. 1984. Impacts of grazing on wetlands and riparian habitat: a review of our knowledge. p. 1001-1103. *In*: Developing strategies for Rangeland Management. National Research Council/National Academy of Sciences. Westview Press, Boulder CO.

Storch, R.L. 1979. Livestock/streamside management programs in eastern Oregon. p. 56-59. *In*: Proceedings of the Forum—Grazing and Riparian/Stream Ecosystems. Trout Unlimited, Denver, CO.

Volland, L.A. 1978. Trends in standing crop and species composition of a rested Kentucky bluegrass meadow over an 11-year period. p. 526-529. *In*: Hyder, D.N. (ed.), Proceedings of the First International Rangeland Congress, Denver, CO. August 14-18, 1978. Society for Range Management, Denver, CO.