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Clark Fork River Operable Unit

of the Milltown Reservoir/Clark Fork River Superfund Site

Record of Decision

Appendix C:

Clark Fork River OU BMPs and Riparian Management Plan Considerations

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Region 8

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APPENDIX C

Clark Fork River OU BMPs and Riparian Management Plan Considerations

Developing an Effective Riparian Grazing Management Plan

Benefits Of Proper Riparian Management To Ranchers

1. Water storage and availability
2. Increased vegetation
3. Better forage quantity and quality
4. Flood protection and reduction
5. Reduced streambank erosion
6. Increased water quality
7. Shelter for livestock
8. Acceptance and "security"

General Principles For Grazing Livestock In Riparian Zones

1. Tailor the approach to the specific situation and landowner objectives (have clearly defined goals and objectives).
2. Incorporate riparian management into an overall plan.
3. Select season of use so grazing occurs, as often as possible, during periods compatible with animal behavior, conditions in the riparian zone, and riparian objectives.
4. Determine *riparian* objectives.
5. *Monitor* change.
6. Limit livestock time in pastures with riparian areas.
7. Control (influence) distribution of livestock within a pasture.
8. Ensure adequate residual vegetation cover.
9. Provide adequate regrowth time and rest for plants.

Be actively involved by:

1. Determine an appropriate season for grazing a specific riparian zone.

2. Use various methods for reducing intensity and use in the riparian area through control and distribution of livestock within a pasture.

Techniques for Controlling Distribution of Livestock

1. Offstream water development
2. Stable access points
3. Salt and mineral block placement
4. Improve upland forage
5. Riding/herding
6. Drift fences
7. Turn-in location
8. Smaller pastures with a riparian area in each
9. Fencing: permanent or temporary

Early Season (Spring) Ranchers

Best Used When:

1. Succulent forage in the uplands that discourages livestock impacts in the riparian zone
2. Temperatures encourage livestock to stay out of the riparian zone
3. Wet soils discourage livestock use
4. Well-drained soils reduce soil compaction

Potential Advantages:

1. Less soil compaction and streambank shearing *if* livestock use is minimized
2. Provides time for regrowth of riparian and upland vegetation
3. Less browsing pressure on woody vegetation

Possible Drawbacks:

1. High potential for soil compaction, trampling, and erosion
2. Has potential for reducing plant vigor thereby changing plant community composition
3. Upland forage nutrition may be low
4. High potential to affect wildlife

Late Season (Fall) Grazing

Best Used When:

1. Mostly herbaceous plant communities rather than woody communities

2. Palatable cool season forage in uplands
3. Offstream water available or other conditions draw livestock out the riparian zone

Possible Benefits:

1. Drier conditions on the floodplain reduce soil compaction, streambank shearing, and erosion
2. Plants have a completed growth cycle (e.g., set seed)
3. Less impact on wildlife.

May be Detrimental When:

1. No regrowth due to soil moisture and temperature
2. No incentives to induce livestock to move out of the riparian zone
3. When woody species maintenance and regeneration objectives are not met

Hot Season (Mid-Summer) Grazing

Least Likely to be Negative When:

1. Conditions are closely monitored and grazing period is limited in duration and frequency
2. Actions taken to induce livestock to move out of the riparian zone
3. Opportunities are provided for regrowth based upon time of removal, climatic conditions, and frequency of use

Possible Disadvantages:

1. Greater tendency to hang in the riparian zone
2. More intense use may reduce plant vigor and change plant communities
3. Damage to trees and shrubs

Potential Advantages

1. Drier and more stable soils and streambanks
2. Potential for regrowth after hot season cessation of growth by plants
3. Palatability of riparian forage is greater than upland plants

Winter Grazing

Especially Beneficial When:

1. Pasture is large enough to feed away from the stream
2. Cold drainages or south-facing slopes reduce riparian use
3. Soil compaction, streambank shearing is more likely during other periods

Possible Advantages:

1. Minimal soil compaction and streambank damage—provided the livestock are removed before the soils/streambanks thaw
2. Livestock use will not affect plant development (plants are dormant)
3. Livestock distribution is easily influenced by location of feed and water

Possible Detrimental Impacts:

1. Grazing of dead material can reduce streambank protection and sediment trapping in the spring when run-off occurs
2. Browsing and physical damage to woody plants may be high

Conclusion of Good Riparian Management

1. What operators do to encourage livestock not to loiter in the riparian zone while they are in a pasture is more important than either season of use or length of time in the pasture per se.
2. Two common threads for good riparian management:
   a. Presence of offstream water developments; and
   b. Operator involvement.
3. Many useful techniques were not tied to any particular grazing "system."

Thus, riparian grazing might be incorporated into each of the traditional grazing systems, except season-long, ***as long as the condition of the riparian zone itself remains of primary concern.***

Management, not the system, is the key.

Developing a Riparian or Wetland Management Plan

An objective is defined as something toward which effort is directed; an aim or end of action. Objectives should contain the following five elements (e.g., five W's): 1) who, 2) what, 3) when, 4) where, and 5) why. For example, the John Doe Ranch (who) will provide for survival and recruitment of cottonwood trees from a frequency of 0 percent (what) in 2004 (when) to a frequency of 5 percent (what) in 2009 (when) along Big Creek in the Longhorn Pasture (where) to provide for future perching/resting sites for great blue herons (why). Do not confuse the management practice to achieve an objective (how) with the elements of the objective.

Once objectives have been clearly defined, the next step is to develop a management plan. The following discussion uses riparian or wetland areas as an example in how a management plan is developed and monitored.

Introduction and Development of a Plan

A management plan based only on objectives related to non-riparian (uplands) or wetland areas does not usually result in maintenance or improvement of riparian or wetland areas. Therefore, where maintenance or improvement of riparian or wetland areas is desired, the land use plan, activity plan objectives, and management prescriptions must be determined specifically for the riparian or wetland features while considering the needs of the entire watershed. The establishment of specific objectives, description of the desired plant community, and selection of key species should be an interdisciplinary effort. Management objectives need to be focused, achievable, measurable, repeatable, have a starting and ending point in time and location, be reasonable, clear, concise, and affordable. In short, management objectives need to have realistic and attainable goals. In addition, they should be dictated by the present condition and trend of the riparian or wetland habitat in relation to management goals, the resource potential for change, and the importance of other resource values. Major considerations in establishing management objectives in riparian or wetland areas should include the following:

1. Vegetation
    a. The potential of the site (that is, the riparian or wetland plant association).
    b. The desired plant community.
        i. If the potential of the site is woody vegetation, then the health and reproduction of woody vegetation should receive equal consideration as the herbaceous vegetation (depending on the riparian or wetland objectives). If one of the objectives for a riparian or wetland area is streambank stability, then woody vegetation vigor should be of utmost importance due to the vastly different streambank stability protection afforded by the woody vegetation when compared to the herbaceous vegetation.
        ii. The development and/or maintenance of different age classes (for example, seedlings, saplings, poles, and mature for trees; seedlings, saplings, and mature age classes for shrubs) of the key woody plant species on the site to maintain a viable plant community. (Once again, only if the potential of the site is for woody vegetation.)
        iii. The type of vegetation cover necessary to minimize the erosive effects of run-off events.
        iv. The vegetation structure necessary for wildlife cover diversity.
    c. The stabilization of streambanks.
    d. The value of the site for forage production.
    e. The amount of vegetation stubble required to trap and hold sediment deposits during run-off events to rebuild streambanks and restore/recharge aquifers. It is important to realize that on streams with high gradients and low silt loads, it is more difficult to improve them than those with low gradients and high silt loads (that is, mud management).

f. The kind and amount of "weedy species" present. The more persistent and difficult the weedy species are to control, the more limited the management opportunities. Therefore, proper understanding of the ecology of weeds present will help the manager(s) make realistic and attainable goals.

2. Water Quality/Quantity Issues

   a. Raising the elevation of the present water table and expanding the sponge effect.

   b. The improvement or maintenance of water quality and quantity or change in the timing of the flow.

3. Streambank Stability

   a. The establishment of proper stream channels, streambanks, and floodplain conditions and functions.

   b. The maintenance of long term adjustment processes that may affect channel or wetland conditions. These processes include sediment deposition, streambank development, floodplain development, and stream dynamics (meandering).

4. Wildlife

   a. The improvement or maintenance of the fishery habitat.

   b. The importance of the riparian or wetland community to riparian or wetland dependent wildlife and to wildlife species that occur primarily on upland sites but are periodically attracted to riparian or wetland areas.

5. Other

   a. The aesthetic values of a healthy riparian or wetland zone.

   b. The period of time that is acceptable or necessary for riparian or wetland rehabilitation/restoration.

   c. The reduction of upland erosion and stream sediment load and the maintenance of soil productivity.

Implementation of the Plan

Once a management plan has been written, the following steps should be taken:

1. Implement the management plan.

2. Design a monitoring plan that will evaluate the effectiveness of the management plan and provide information for identifying the cause of any failures. Monitoring needs to be done at the initiation of management plan in order to establish a baseline or "starting point."

3. Monitor the site or the stream reach over time. Management must be flexible enough to accommodate changes based on experience. Mistakes need to be documented and not repeated elsewhere.

4. Once the management plan is in progress, the most important element is frequent supervision.

5. Determine the outcome of the management plan. If it is successful, then proceed with the existing management plan. If the plan was either a partial or complete failure, then modify the management objectives. *Remember, mistakes need to be documented and not repeated elsewhere.*

Developing the Monitoring Plan

Key Areas—As objectives are considered and developed for riparian or wetland areas, key areas for monitoring must be located in representative portions of the riparian or wetland areas as well as in the uplands. These key areas will indicate where appropriate monitoring will be conducted and will provide the basis for decisions as to whether management objectives are being met or not. Key areas must possess (or have the potential to produce) all the specific elements in the objective(s) because these will provide data for evaluation of management efforts. In many cases, it is appropriate to select the key areas first and then develop objectives specific to each.

Key Plant Species—Key plant species will vary with the potential of each individual site. Selected key plant species should be those that are necessary to the operation of the natural stream functions. The type of vegetation present will affect channel roughness and the dissipation of stream energy. Willows and other large woody vegetation (trees) filter large water-borne organic material, and their root systems provide streambank stabilization. Sedges, rushes, grasses, and forbs capture and filter out the finer materials while their root masses help stabilize streambanks and colonize captured sediments. On sites where the potential exists for both woody and herbaceous vegetation, the cumulative effect of plant diversity greatly enhances stream function. Finally, it is essential that the physiological and ecological requirements of the key woody species, along with key herbaceous species, be understood so that a proper management program can be designed. This includes determining the effects of grazing/browsing on the particular growth characteristics of the species involved.

Utilization Guidelines (if appropriate)—Utilization target guidelines are a tool that can be used to help ensure that long-term objectives are met. Utilization levels of browse or forage can be monitored annually, or more often; whereas progress in reaching long-term resource objectives (such as streambank stabilization, rebuilding of the streamside aquifer, and the re-establishment of beaver, fish, moose, or other big game habitat) can only be determined over a longer period of time. The accomplishment of these long-term objectives relates directly or indirectly to the need to leave a certain amount of vegetation available for other functions (soil stabilization, trapping sediment, wildlife cover, or forage). Utilization monitoring provides a means of insuring that the necessary amount of vegetation is left to protect the site and provide for reaching other vegetation-dependent objectives.

Summary

The establishment of utilization targets for riparian or wetland key plant species and the management of browsing/grazing to ensure these targets are met are critical factors involved in proper riparian or wetland area management. The establishment of utilization

targets requires that the manager know the growth habitats and characteristics of the important plant species for which they are managing and how the plant species respond to browsing and grazing. The manager must know the characteristics, preferences, and requirements of the grazing/browsing animals. Therefore, utilization targets should be developed for riparian or wetland areas that:

1. Will maintain both woody species and herbaceous species in a healthy and vigorous state and promote their ability to reproduce and maintain different age classes in the desired riparian or wetland plant community.
2. Will leave sufficient plant residue necessary to protect streambanks during run-off events and provide for adequate sediment filtering, and dissipation of flood water energy.
3. Are consistent with other resource values and objectives (such as aesthetics, water quality, water quantity, and wildlife populations).
4. Will limit streambank instability to acceptable levels.

In many instances, proper utilization guidelines can only be derived over time through trial and error by monitoring, analyzing, and evaluating the results. Initial results may be different than expected. The manager should not hesitate to make changes in key species or utilization guidelines where required to meet objectives.

When establishing utilization targets to ensure riparian or wetland area improvements, guidelines should be considered that will provide a margin of safety for those years when production is less than average. This could take the form of reduction in the utilization targets for both riparian or wetland areas and upland areas to provide additional carryover forage and vegetation necessary for streambank protection and sediment filtering. The importance of providing for adequate vegetation vigor and regeneration at the end of the growing season can not be emphasized enough.

Finally, because of the variation in riparian or wetland sites and management, one standard utilization target is not appropriate. However, utilization should be considered, together with regrowth potential, to ensure the presence of vegetation stubble necessary to the operation of natural stream functions or accomplishment of other land use objectives.

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