CLARK FORK RIVER RIPARIAN EVALUATION SYSTEM (CFR RipES) FOR STREAMBANK AND RIPARIAN CORRIDOR BUFFER POLYGONS

This evaluation is intended for use in the field by appropriately trained and qualified personnel. Knowledge of the local flora and of riverine channel and floodplain morphology, as well as visible indications of site contamination by metals, is required. The resulting polygon score is used to rate the degree of phytotoxic effect on site from mining-related metals contamination. Several items involve estimation of vegetation canopy cover. For these estimations, use the Daubenmire (1959) method of canopy cover estimation. This is a very efficient and reliable method for doing work of this nature, ***when the observers are adequately skilled, practiced, and have calibrated their individual assessments for consistency of call.*** Frequent and periodic tests and recalibration exercises are recommended for quality control.

Ocular estimation of detailed site characteristics may be difficult on large, brushy sites where visibility is limited, however extreme precision is not required. It is important to remember that the rating score is not an absolute value. The factor breakout categories and point weighting in the evaluation are based on the collective experience of an array of riparian scientists, soil scientists, range professionals, and land managers.

Each factor below is to be scored according to conditions observed within the polygon. The evaluator will estimate the parameter in question, select the appropriate scoring category, and enter that value on the field form. Do not introduce bias by using some preconceived notion of what the parameters should be.

Polygon Delineation Criteria

The streambank and riparian corridor buffer is delineated by measuring from the "bankfull" stage (the lateral extent of inundation by the 1.5-year mean flood) on each side of the stream out approximately 50 feet that is flexible or variable in width, ***OR*** where the historic 100-year floodplain elevation is reached. In other words, areas outside the historic 100-year floodplain are not included in the streambank and riparian corridor buffer; and in cases where high banks are reached, the streambank and riparian corridor buffer will be less.

The streambank and riparian corridor buffer along each side of the river will be broken into polygon units based on three types of river planar morphology: convex curvatures (outside curves), concave curvatures (inside curves), and straight channel stretches no longer than 500 feet. A minimum mapping unit (MMU) of 20 linear feet will be used to delineate the polygons. Polygon units will not cross land-ownership boundaries.

Field Form

The field form for streambank and riparian corridor buffer polygons is found in Appendix C. The field form contains questions on critical aspects of live vegetation and streambank integrity. These questions were designed to access the impact of mine wastes to the vegetation and the streambank stability on the site.

Live Vegetation and Streambank Integrity

Plant community integrity is essential for a riparian system to perform its normal functions. For example, riparian vegetation dissipates the energy of flowing water and stabilizes streambanks, thereby reducing erosion and introduction of streambank material into the channel. Riparian

vegetation also inhibits surface water transport of upland soil into the stream. These functions are particularly important during spring runoff periods and after major summer or fall rains.

Riparian vegetation also traps sediment already being carried by the stream, thereby promoting streambank building and development of new bars. These become the sites for new pioneer vegetation that further enhance system stability. Sediment retention is all the more important because excessive sediment loads reduce habitat quality for aquatic life (including fish) and destabilize the natural hydrologic regime of the system. Healthy riparian systems enhance water quality downstream by filtering out organic and chemical pollutants from the channel as well as before they reach the channel.

Appropriate riparian vegetation shields soil and water from wind, sunlight, and raindrop impact. This reduces erosion due to wind and the disruptive impact of rainfall as well as promoting ground water recharge by enhancing storm water infiltration. Vegetation canopy cover provides shade, thereby reducing water temperatures and improving aquatic habitat. Dense vegetation can reduce soil compaction by the presence of healthy root systems and by limiting accessibility of both domestic livestock and wild ungulates to sensitive sites. Although an increase in vegetation may increase evapotranspiration rates, in natural riparian systems the benefits offset this loss.

Finally, riparian areas are rich in biotic production. The presence of water and essential nutrients make these areas among the most productive sites of a landscape, especially in the arid and semi-arid western United States. Near streambank riparian vegetation produces the bulk of the organic detritus necessary to support healthy benthic communities.

Most of the factors rated in this evaluation are measured by ocular estimation. Such estimation may be difficult on large, brushy sites where visibility is limited, but extreme precision is not necessary. While the rating categories may be broad, evaluators do need to calibrate their eye with practice. It is important to remember that a rating is not an absolute value. The factor breakout groupings and point weighting in the evaluation score are based on the collective experience of an array of riparian scientists, soil scientists, range professionals, and land managers.

1. **Live vegetative canopy cover (excluding tufted hairgrass [*Deschampsia cespitosa*]).** River floodplains located in inter montane valleys of western Montana, such as the Upper Clark Fork River Valley, will under natural, undisturbed conditions have a nearly complete canopy cover of live vegetation. Lack of vegetation cover indicates severe disturbance to riparian sites. Live vegetation cover helps to stabilize banks, control nutrient cycling, reduce water velocity, provide fish cover and food, trap sediments, reduce erosion, and reduce the rate of evaporation (Platts and others 1987). Live vegetation cover is ocularly estimated using the canopy cover method described by Daubenmire (1959). Do not include the canopy cover of tufted hairgrass (*Deschampsia cespitosa*) in with live vegetative canopy cover estimates, since along the Clark Fork River this species indicates mine waste metals contamination.

   Scoring (represents 53.8 percent of total points):
   21 = More than 90 percent of the polygon area is covered by the canopy of live plants (excluding tufted hairgrass [*Deschampsia cespitosa*]).
   14 = 80 to 90 percent of the polygon area is covered by the canopy of live plants (excluding tufted hairgrass [*Deschampsia cespitosa*]).
   7 = 70 to 80 percent of the polygon area is covered by the canopy of live plants (excluding tufted hairgrass [*Deschampsia cespitosa*]).

0 = Less than 70 percent of the polygon area is covered by the canopy of live plants (excluding tufted hairgrass [*Deschampsia cespitosa*]).

2. **Completeness of the canopy of deep, binding, woody vegetation.** Streamside vegetation stabilizes the streambank structure to the extent that it provides deep, binding roots. Species such as willows (*Salix* spp.), water birch (*Betula occidentalis*), and cottonwoods (*Populus* spp.) provide excellent protection with deep, binding root mass. ***DO NOT*** include shallow rooting species such as snowberry (*Symphoricarpos* spp.), rose (*Rosa* spp.), and currants/ gooseberries (*Ribes* spp.). These short statured species do not provide adequate deep, binding root mass to effectively stabilize a stream the size of the Clark Fork River.

   The ability of the woody vegetation to protect the streambank and floodplain during overbank flows is directly related to the completeness of its cover over the soil surface. Estimate the percent of the area within the buffer zone polygon that is actually covered by the canopy of these deep, binding, woody species.

   Scoring (represents 23.1 percent of total points):
   9 = The canopy of deep, binding, woody plant species covers at least 80 percent of the area within the buffer zone.
   6 = The canopy of deep, binding, woody plant species covers between 60 and 80 percent of the area within the buffer zone.
   3 = The canopy of deep, binding, woody plant species covers between 40 and 60 percent of the area within the buffer zone.
   0 = The canopy of deep, binding, woody plant species covers less than 40 percent of the area within the buffer zone.

3. **Amount of active lateral cutting of the streambank.** Record the percent of the streambank length within the polygon that is actively cutting (eroding laterally). Any cutting occurring within the past year is considered active. Cut banks with vegetation establishing are considered healing and the cutting no longer active. This is indicated by the lack of perennial plant species on the streambank face and by on-going erosion. Cutbanks with perennial plant species established are considered to be healing, and are no longer actively cutting.

   Scoring (represents 23.1 percent of total points):
   9 = No more than 5 percent of the streambank length in the polygon is actively cutting.
   6 = Between 5 and 15 percent of the streambank length in the polygon is actively cutting.
   3 = Between 15 and 35 percent of the streambank length in the polygon is actively cutting.
   0 = More than 35 percent of the streambank length in the polygon is actively cutting.

Overall Scoring:
Greater than 75.0% = Class 3 Streambank
50.0%-75.0% = Class 2 Streambank
Less than 50.0% = Class 1 Streambank