

APPENDIX D – IMPLEMENTATION AND MONITORING PLAN

Mitigation measures specific to this project proposal are included in Chapter 2 of this SDEIS. These are elaborated on in this appendix where further clarification is necessary. These mitigation measures will be incorporated into the project design or included as permit or contract requirements. In addition to these project-specific mitigation measures, all projects on NFS lands in the GNF must also meet Forest Plan standards in order to maintain consistency with Forest Plan direction. Relevant standards for specific resources are outlined below

The Forest Service also has resource-specific Best Management Practices (BMPs) that are designed to lessen impacts on resources or to enhance resource values. Specific watershed resource guidance is found primarily in FSH 2509.22 (Soil and Watershed Conservation Practices) and Watershed Management Guidelines for the GNF (April 1987). The following text is intended to provide guidance to Bridger Bowl and the Forest Service during construction of any approved project elements.

Other regulatory agencies, including but not limited to, the US Army Corps of Engineers, the State of Montana Department of Environmental Quality, and Gallatin County, provide direction that must be followed to obtain necessary permits and certifications and ensure compliance with their regulations.

EROSION CONTROL

Compliance with Montana state requirements for protection of state waters (Administrative Rules of Montana- ARM 16.20.603) means that “land management activities must not generate pollutants in excess of those that are naturally occurring, regardless of condition resulting from runoff or percolation over which man has no control or from developed land where all “reasonable” land, soil, and water conservation practices have been applied. BMPs are reasonable only if beneficial uses are protected and Montana water quality standards are met. BMPs that comply with Montana water quality law have three elements in common: BMPs are applied during implementation, beneficial uses are not impaired, and monitoring is in place to determine whether BMPs function properly.

The area of exposed soils will be minimized at construction sites.

The length and gradient of disturbed areas will be minimized.

Erosion control BMPs will be implemented on all disturbed areas prior, during, and immediately following initial disturbance.

Water bars will be constructed across all disturbed areas at the recommended spacing (see Table D-1). Water bars and surrounding graded areas will be stabilized with seeding, straw, and erosion control blankets as necessary to ensure proper slope stabilization.

**Table D-1
Water Bar Spacing Requirements**

Slope Gradient (%)	Interval (feet)
10	150
15	125
20	100
30	50
40	35
50	30
>50	30

Source: SE Group, 2004

Water bars would be constructed across the hillslope topography of all disturbed slopes after seeding and fertilization. Water bars would be constructed 12-18 inches deep, in a row, by digging a small trench and casting soil material to the downhill side. Each water bar would begin in an undisturbed area of vegetation upslope, traverse across the disturbed area at gradient between five and ten percent, and discharge water into undisturbed vegetation on the lower side of the disturbed area.

Silt fences will be installed along the downslope portion of all disturbed areas and between all waterbodies (including wetlands) and active construction sites.

RIPARIAN AREAS AND STREAMBANK PROTECTION

To minimize adverse effects on riparian areas, all Stream Management Zone (SMZ) provisions of the 1991 Montana Streamside Protection Act and subsequent 1993 rules from the Montana Department of State Lands (MDSL, 1994), and Montana Forestry BMPs (MDSL, 1991) will be followed.

A 310 permit is required from the Gallatin Soil Conservation District for culverts installation in perennial streams. One stream crossing is proposed; the road will cross the stream as close to perpendicular to the stream as possible.

Final design of the proposed stream crossing will minimize impacts to the channel bed and banks. Known areas of slope instability near streams will be avoided. Riprap, boulders, or logs will be placed at potential scour locations to prevent undermining or lateral migration of the stream bank.

No grading, operation of heavy machinery or broadcast burning will occur within the 50 foot SMZ or within identified wetland areas, unless approved as part of the road crossing project. Operation of wheeled or tracked equipment in SMZ will only occur on established roads or when the ground is frozen and/or covered with at least six inches of snow.

Equipment servicing and fueling will not occur within 100 feet of surface water. All petroleum products will be securely stored in leak proof containers. Petroleum waste products will be removed from the site at least weekly.

Fertilizer application will be minimized in SMZs (i.e., road or trail crossings). Manufacturer recommendations will be followed for minimum distances from water.

Herbicides associated with noxious weed control will not contact surface water and must be applied by a competent applicator in strict accordance with label directions and Forest Service requirements.

Stockpiling of soil and construction materials will not occur in SMZs. Log landing and decking areas will also be located out of the SMZs.

A Stormwater Pollution Prevention Plan will be prepared to satisfy conditions of the National Pollution Discharge Elimination System (NPDES) program. Prior to construction, an NPDES permit will be obtained from the EPA.

The amount of vegetation manipulation in sensitive areas such as wetlands, stream environments, and important wildlife habitat features will be minimized.

To the extent possible, avoid placing any heavy machinery in wetlands. If heavy machinery needs to operate on wetland sites with saturated soils or standing water, provide pads (such as plywood) under the machinery that would be capable of supporting it from sinking into the soil surface.

In areas where isolated stump or rock outcrop removal is necessary for construction of ski trails, no excavation would occur in wetlands or riparian areas. Any incidental soil disturbance that occurs during stump and rock removal would be restored to pre-existing conditions by planting with Forest Service approved native seed mix, and then applying erosion control BMPs.

Where tree clearing in wetlands is unavoidable, the shrub component understory will be maintained in order to provide root systems necessary for stability and sediment filtration. Mechanical trimming of shrubs for skier safety would be allowed to the degree that their vigor and survival are maintained.

VEGETATION MANAGEMENT AND REVEGETATION

Machine harvest or ground based yarding of trees will not occur on slopes greater than 35 percent unless the soil is frozen and/or covered by more than six inches of snow.

Ski trail edges will be cut according to the Forest Edge Feathering and Scalloping techniques described in Section 2.4.1 to reduce the strong contrast between ski trails and undisturbed surrounding areas and to minimize wind throw.

Slash will not be disposed of in streams, drainage channels, or wetlands. Any slash created during any summer construction season will be used or disposed of within one year. Disposal would include uses such as soil stabilization structures, chipping, scattering, or burning.

All disturbed areas that have been regraded and re-topsoiled will be revegetated as soon as possible. All grass seed shall be free from noxious weeds. Seed shall be delivered to the site in sealed containers (bags) with the dealer's guaranteed analysis and blue tagged certification.

Minimum revegetation requirements involve seeding with a native grass seed mixture, to be approved by Forest Service for applications on NFS lands. Other plantings of shrubs, brush, or trees may also be required. If non-native species are demonstrated not to be overly aggressive and allow for the establishment of native species, a seed mix containing non-native could be allowed if approved by the Forest Service for applications to NFS lands. Many non-native species have proven to be very effective in the revegetation process. Examples are provided in Table D-2.

**Table D-2
Required Seed Mix and Application Rates**

Common Name	Botanical Name	lbs./acre
Regreen	<i>Agropyron X Triticum</i>	35.0
Pryor slender WG	<i>Agropyron trachycaulum</i>	6.0
Tufted hairgrass*	<i>Deschampsia cespitosa</i>	0.5
Cover Sheep fescue	<i>Festuca ovina</i>	1.5
Alpine bluegrass*	<i>Poa alpina</i>	0.5
Silvery lupine	<i>Lupine argenteus</i>	3.5

*Must be of North American origin

Native grass mixture will be seeded by broadcast and/or drill seed method. The seed mixes will be applied at optimum rates (i.e., 15-20 lbs/acre and 35-45 lbs/acre, respectively).

The areas to be applied with seed will be prepared for planting by loosening and roughening.

If seed is drilled, planting depths should be specified for each species based on germination requirements.

All revegetated areas on slopes over 30 percent, where mineral soil is exposed, would be fertilized during the application of seed unless specified otherwise. The fertilizer would be uniform in composition, granular, free flowing and suitable for application with approved equipment. Guaranteed analysis by weight of 14 percent nitrogen, 24 percent phosphoric acid, and 14 percent potash is necessary. Application rate would be 200 pounds per acre.

All revegetated areas on slopes over 30 percent, where mineral soil is exposed, would be mulched. Only certified weed-free mulch sources would be utilized. Mulch would be applied at the rate of two tons/acre. Care should be taken to avoid thick (greater than three inches) spots. If hydromulch is utilized, the application rate is 1500 lbs/acre.

MONITORING AND MAINTENANCE

Pre-project surveys will be conducted in and adjacent to areas to be disturbed for any new plant species added to the Forest Service Sensitive Plant Species list after the publication of this document as directed by a Forest Service biologist.

Revegetated areas would be monitored at least every two years by Bridger Bowl until fifth year performance standard is met. Such monitoring should include both qualitative and quantitative approaches to assess the success and prognosis of all runoff and erosion control measures and revegetation efforts. In addition, monitoring should take place after each runoff event. The following are specific items, which should be viewed during monitoring:

- Revegetation establishment success and progress.
- Sheet and rill erosion, gullies, slumping, and subsidence.
- Soundness and effectiveness of erosion control measures.
- Noxious and undesirable weed invasion.
- Degree of herbivory by rodents or rabbits on seed and seedlings.
- Evidence of excessive wildlife grazing.

If performance standards have not been met, then remedial action should be implemented immediately. The following performance standards would be used to determine whether revegetation objectives have been met. Areas that reach fifth year performance standards would not need further monitoring.

First Year after Implementation

Seedling Density - The density and abundance of seedlings is at least three to four seedlings per linear foot of drill row (if drilled) or transect (if broadcast).

Percent Vegetative Cover - Total vegetative cover, including mulch, would be at least 100 percent.

Erosion should be reduced by 75 percent from worst case condition (exposed soil with no protection).

Fifth Year after Implementation

Percent Vegetative Cover - Total vegetative cover would be at least 80 percent of pre-disturbance vegetative cover as measured along a reference transect for establishing baseline conditions.

Dominant Species - 90 percent of the revegetation consist of species included in the seed mix and/or that occurs in the surrounding natural vegetation as measured along the referenced transect for establishing baseline conditions.

Erosion Condition/Soil Surface Factor - Erosion condition of the reclaimed area is at least that for the reference transect for establishing baseline conditions.

Erosion should be reduced by 95 percent from the worst case condition (exposed soil with no protection).