CONFEDERATED SALISH AND KOOTENAI TRIBES

Jocko River Master Plan

A guide to ecological restoration activities in the lower main stem Jocko River corridor

Appendix B: Recommended Best Management Practices

Prepared by the CSKT Fish, Wildlife, Conservation, and Wildland Recreation Program

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APPENDIX B - RECOMMENDED BEST MANAGEMENT PRACTICES (BMPS)

INTRODUCTION

Best Management Practices (BMPs) include technologies -- either structural or non-structural -- for controlling the delivery of sediment or pollutants that adversely impact a stream. Although a wide range of BMPs have been developed for land uses affecting everything from urban streams to agricultural lands, this section focuses on river restoration implementation BMP, which are designed to reduce construction related impacts during the implementation of restoration activities.

RIVER RESTORATION IMPLEMENTATION BMPS

River restoration projects are designed to improve the existing river and floodplain habitat conditions. Because active restoration measures typically require heavy machinery and aggressive construction strategies, minimizing the near -term disturbance is a priority. BMPs are designed to do just that. Examples of construction-related disturbances include: hydraulic fluid and other petroleum based fluid spills and leaks, invasive weed species infestations, turbidity, vegetation disturbance, and soil compaction.

Construction-Equipment BMPs

Active restoration techniques require the deployment of heavy equipment necessary for channel shaping, fish habitat structure placement, and mechanized site revegetation. To minimize the potential for petroleum-based fluid spills and leaks, all heavy equipment should be new or in a well-maintained condition. If equipment is not new or in a well-maintained condition, the operator must replace the equipment. Each equipment operator is required to carry a standard petroleum spill kit that includes super absorbent pads or pillows to minimize the extent of pollution in the event of a petroleum fluid leak. The spill kit is required to be on-site during the construction period. Pads or pillows that are used will be replaced to maintain a stocked spill kit. Leaking equipment must be removed from the stream as quickly as possible and fixed prior to returning to project construction.

All heavy equipment will be washed prior to mobilization to the site to minimize the introduction of noxious weeds to the project site. It will be the equipment contractors' responsibility to insure that adequate measures have been taken. Equipment with muddy tracks or housing will not be allowed on-site and will be washed prior to project construction.

Turbidity Control BMPs

Turbidity, defined as a measure of suspended solids in water, will be minimized during all construction phases. Three techniques are typically deployed to minimize turbidity during project construction:

- clear water diversions;
- turbid water detention and pumping;
- local construction site isolation;

- crossings; and
- silt fencing.

Clear water diversions are used to route surface water from or around the project area. High flow floodplain channels or other abandoned channels often provide ideal clear water diversion channels. If natural channels are not present in the project area, diversion channels may be excavated around the project area. A gravel berm or cofferdam fronted with visquene, sand bag dam, or inflatable water dam is placed at the upstream end of the project area in order to divert the surface flows into the diversion channel. Another method that may be appropriate for work on the Jocko River spring creeks includes piping surface flows around the project area. This technique is only possible when stream flows are at a minimum. It may not be cost effective relative to diversion channels.

Short-term turbidity pulses should be expected when surface water is diverted into clear water diversion channel at the beginning of the project. Similarly, a short-term turbidity pulse should be expected when surface flows are returned to the constructed channel reach.

Turbid water detention basins may be necessary to mitigate hyporheic water upwelling into the project area. Channel spanning gravel berms placed down the length of the project area may be necessary for trapping turbid water. Berms should be fronted with visquene to limit berm porosity and leakage. Hay bales and other passive turbidity control devices may be used in combination to detain turbid water within detention basins. One or more trash pumps (or larger pumps) may be necessary to pump the accumulated turbid water from the detention basins. Pump size and the number of pumps to be deployed should be determined from the volume of upwelling water. Water should be pumped onto a porous low terrace or floodplain surface and away from active clean water. Turbidity filtration devices (e.g., DirtBag) may be used to retain fine sediment and to minimize the discharge of turbid water. Pump discharge should be monitored regularly to ensure turbid water does not discharge directly into clean surface water. Consultation with Montana Department of Environmental Quality is suggested in order to ensure that turbidity abatement efforts satisfy state and federal water quality laws.

Isolating the local construction area with a silt curtain is another technique for minimizing construction impacts. Silt curtains may be installed at the bottom of a channel segment or around the immediate construction area. Silt curtains trap turbid water and keep it separate from clear water adjacent to the immediate construction area. The turbid water may then be pumped away from clean water.

If numerous live water crossings are anticipated for hauling/transporting material, temporary crossings are constructed using culverts. Crossings eliminate vehicle movement through clean water.

Overland surface flows may be mitigated through the proper placement of silt fencing, hay bales, or another sediment retention technology. Silt fencing should be placed at a distance from the project site to minimize overland surface flow to the project area. High disturbance areas such as equipment storage sites, material stockpile locations, and access roads should be addressed appropriately to limit surface discharge from these sites to nearby water bodies. Silt fencing and other devices should be removed from the project area once vegetation recovery has ensured that sediment delivery from overland flows has subsided.

Vegetation Disturbance

The footprint of the project area should be minimized to encourage rapid site recovery once active restoration is complete. The number of access routes should be minimized and adhered to in order to centralize equipment disturbance. Focused disturbance is easier to mitigate than diffuse disturbance and reduces the potential for widespread noxious weed invasions.

Vegetation disturbance on the site should also be minimized. Techniques include using a low clearance excavator and carefully handling large woody debris and large rock. Disturbed areas are to be recontoured and reseeded after the river work is completed.

Soil Compaction

Heavy construction equipment exerts significant pressure on river corridor soils. Depending on soil composition, construction activities can substantially compact project-area soils and cause them to resist water penetration. Compacted soils increase overland surface flows and fine sediment delivery to receiving waters. Similarly, a large area of compacted soil may reduce water infiltration, vegetation colonization, and site recovery. Compacted soils should be broken up (scarified) by the excavator operator at the completion of the project. Seeding and revegetating and distributing small and large woody debris on the scarified surface will speed vegetation recovery and break up overland flow paths. Treating high use areas such as equipment storage sites, fueling stations, roads, and material stockpiling sites is essential.

Cut and Fill Material

Restoration designs typically attempt to balance of the quantities cut and fill materials necessary to complete the project. If the amount of excavated material exceeds the amount of fill required for channel shaping, the excess material should be out-hauled and stockpiled outside of the 100-year floodplain.

BMP Summary

Best Management Practices are instituted to limit the delivery of sediment and other pollutants to a receiving water body. Implementing BMPs designed to control sediment and nutrient delivery reduces the short-term impacts of restoration projects. BMPs should be initiated and maintained throughout the course of the project to ensure that water quality standards are not being violated.

CONSTRUCTION SEQUENCING AND SPECIFICATIONS

Construction sequencing orders common tasks that are typically completed in preparing for, carrying out, and completing river restoration projects. While the tasks will vary by project, the basis of the construction sequence is standard to most restoration efforts.

Task 1: Construction Staking

The project area should be appropriately staked prior to the arrival of heavy equipment and construction materials. The stakeout delineates the design channel alignment, material stockpiling locations, access routes, clear water diversions, crossings, and equipment storage areas.

Task 2: Gather, Sort, and Distribute Materials in Project Area

All project materials should be delivered to the project area and distributed to the appropriate sites based on material quantities outlined in design plan. Stockpile locations should be located to minimize stream crossings and to use existing roads. Additional ingress and egress routes should be located away from live water. Task 1 should be completed approximately one week to several days prior to actual construction.

Task 3: Construct Clear-Water Diversions and Install Temporary Crossings

Clear water diversions should be installed incrementally during project construction as individual sites are completed. The location of construction bypass channels and dewatering specifications should be outlined in the design plan. General dewatering specifications include:

1. Prior to channel shaping or earthwork, stream flow will be diverted outside of the immediate construction area. The contractor will locate diversion channels in existing chute cut-off channels and side channels. If not available, a diversion canal will be constructed at the most feasible location, minimizing disturbance to existing vegetation. All diversion channels will be designed and constructed to accommodate the estimated base flow.

2. Stream flow will be diverted into the bypass channels using gravel cofferdams fronted with visquene or other method.

3. Stream flow will be diverted incrementally into the bypass channels to minimize increases in turbidity and to reduce fish entrainment in dewatered channel units. Netting or electrofishing trapped fish should be undertaken to limit fish loss in the dewatered channel segment. Workers should contact fish and wildlife personnel responsible for electrofishing at least 48 hours in advance of channel dewatering.

Task 4: Channel Shaping and Floodplain Construction

Channel construction typically includes initially rough shaping the channel followed by a structure placement and fine channel shaping. Task 4 includes rough shaping the channel to approximate design dimensions using a large excavator and loader or off-road truck. During the rough-shaping phase, the approximate channel and floodplain dimensions are developed through cut and fill excavation.

Channel shaping will occur only when the reach is completely dewatered or not receiving any additional surface water contribution. Site dewatering strategies are implemented during this phase.

Task 5: Structure Placement and Finish Work

Final channel shaping will be completed immediately following rough channel shaping. If possible, one construction crew will complete the rough shaping and floodway filling, while a second crew completes structure placement, final channel shaping, and revegetation work. All sod and shrub transplants are placed on finish grade surfaces. Finished elevations will be within 0.3 feet of the final design grade, as determined by the construction supervisor.

Task 6: Reactivate Stream Flow into Constructed Channel

Stream flow may be reintroduced into newly constructed channels incrementally throughout the construction period. Following completion of Task 5, water is incrementally diverted into the new channel and all diversion channels reclaimed to floodplain elevation with excess fill material. Diversion channels should be electrofished as water is introduced to the new channel reaches.

Task 7: Reclaim Diversion Channels, Final Floodplain Construction

As project reaches are completed, diversion channels are filled to design floodplain elevations, and the remainder of the floodplain is shaped to final grade. Logs and slash windrows are buried to the floodplain elevation to prevent floodplain erosion and the potential development of chute cut-offs. Large woody debris and extra construction rock are also buried in the diversion channels to minimize the potential for diversion channel avulsion formation. Topsoil and/or hydromulch are distributed on exposed areas.

Task 8: Implement Revegetation Plan

The revegetation plan is implemented following in-channel construction.

Task 9: Site Cleanup and Equipment Mobilization

The final construction task includes implementing post-construction BMPs, including scarifying access and stockpiling areas, recontouring disturbed areas to approximately the pre-project condition, mobilizing equipment from the project area, and revegetating scarified areas. A post-construction site review will be made by the project supervisor to ensure all appropriate post-project BMPs have been implemented.

Task 10: As-built Project Monitoring

The as-built project monitoring plan is implemented following the completion of project construction. The monitoring plan, which is part of the restoration design report, should address physical, chemical, and biological processes. Monitoring is necessary to determine if the restoration project achieved the proposed project goals established in the design report. Periodic monitoring in the years following project completion improves understanding of how the project is functioning and provides managers with information on how to improve future projects.

BEST MANAGEMENT PRACTICES (BMP) AND CONSTRUCTION SEQUENCING SUMMARY

The following checklist of BMPs should be implemented before, during, and after a river restoration project. Many of these items may be used to augment the construction sequencing tasks.

- Implement a sediment and erosion control plan using BMPs before, during, and after construction to limit sediment and pollutant delivery to receiving water bodies.

- Monitor sediment and erosion control measures after precipitation events. Clean, repair, and replace structures as necessary.

- Monitor sediment and erosion control measures periodically throughout all phases of construction. Clean, repair, and replace structures as necessary.

- Establish staging areas for the crew, equipment, hazardous materials, chemicals, fuels, lubricating oils, etc. no closer than 300 feet of a streambank.

- Install sediment and erosion controls around staging areas to prevent discharge from these sites.

- Refuel construction equipment at least 100 feet from streambanks and springs.

- Limit vegetation disturbance, construction equipment access points, and in-stream equipment periods.

- Use sediment filter devices to prevent turbid discharge from reaching clean water.

- Revegetate all disturbed areas as soon as possible after construction using only native plants to reduce soil erosion. Annual species like rye or wheat may initially be planted along with native species in areas subject to immediate soil loss (such as on a steep slope) to provide rapid erosion control. Final revegetation should use native species only.

- Evaluate vegetation establishment after project completion and inspect all sediment control structures periodically after project completion. Retain sediment control structures until site stabilization is achieved.

- Remove temporary sediment and erosion control structures upon final site stabilization.