

Appendix B

Effectiveness of Road Decommissioning and Stream Crossing Restoration Flathead National Forest

This report includes photo documentation of typical stream crossing sites where culverts have been removed and stream channels have been restored. The intent is to demonstrate implementation of applicable terms and conditions, and to illustrate the effectiveness of these treatments. Table 1 lists the terms and conditions that relate to road decommissioning and restoration of stream crossing sites.

When roads are decommissioned or put into long term storage, the following practices are typically implemented.

1. At stream crossings, fill is excavated and culverts are removed. Slopes are laid back to a stable slope angle (typically 30%).
2. Streams are constructed to match the morphology¹ of upstream and downstream reaches.
3. If channels are susceptible to adjustment through down-cutting or bank erosion, vortex weirs are constructed.
4. Side slopes may be seeded and covered with erosion blanket if erosion potential is high. If erosion potential is low, slash may be placed on bare slopes to decrease erosion potential and facilitate establishment of vegetation.
5. One-two years following treatment, shrubs and/or trees may be planted to compliment herbaceous vegetation.

Table 1. Terms and conditions related to road decommissioning.

BO	Term and Condition
Spotted Beetle Resource Management Project	<ul style="list-style-type: none"> The Forest Service shall monitor road management and timber harvest activities to ensure state and Forest Service best management practices are being met during implementation using a qualified staff biologist or technician. Revegetation of stream banks, stream crossings and riparian areas will be sufficiently monitored to ensure Forest Service standards regarding successful establishment of mature vegetation beyond initial planting are met and results reported to the Service on a yearly basis. Following culvert removal, to the maximum extent practicable, the Forest Service shall reconstruct the stream channel to the natural streambed configuration and function. The stream channel should mimic the upstream and downstream channel morphology and function. The Forest Service shall minimize, to the maximum extent practicable, the use of hard armoring techniques such as riprap wherever rock, logs, and vegetative bank stabilization techniques would be more appropriate to minimize potential bank erosion.
Moose Post-Fire Salvage Project	<ul style="list-style-type: none"> The Forest shall avoid, to the maximum extent practicable, the use of hard armoring techniques such as riprap where rock, logs and vegetative bank stabilization techniques would be more appropriate to minimize potential bank erosion. Following the implementation of road management and timber harvest activities and until such time as the area disturbed by these activities has been stabilized, the Forest shall monitor action areas to ensure reclamation efforts are effective and treated portions of decommissioned roads are not contributing sediment to streams. Should substantial sediment sources be identified, the Forest shall arrest these sources in a timely manner. During culvert replacement or removal on perennial fish bearing streams, a qualified fisheries biologist, hydrologist, engineer, or technician will be on site to ensure all BMPs are being met during implementation. In addition, if contractors are unfamiliar with BMPs and mitigation measures required for culvert replacement or removal, a fisheries biologist will be on site at the first perennial stream crossing project implemented by that contractor to ensure BMPs and mitigation measures are utilized. Following the rehab of decommissioned, temporary and reconstructed roads and until such time as the

¹ Channel morphology is defined by pattern, cross-section dimensions, profile (slope), and substrate.

	area disturbed by project actions has been stabilized, the Forest shall monitor these roads to ensure that reclamation efforts are effective and that treated portions of roads are not contributing sediment to streams. Should sediment sources be identified the Forest shall arrest these sources according to the terms and conditions stated above.
Westside Reservoir Salvage Project	<ul style="list-style-type: none"> Following the rehab of decommissioned, temporary and reconstructed roads and until such time as the area disturbed by project actions has been stabilized, the Forest shall monitor these roads to ensure that reclamation efforts are effective and that treated portions of roads are not contributing sediment to streams. Should sediment sources be identified the Forest shall arrest these sources according to the terms and conditions stated above.

The following photographs represent typical conditions following culvert removals at stream crossing sites. These photographs illustrate the general effectiveness of stream channel restoration and stabilization of side slopes. Installation of erosion blanket is extremely effective in holding the soil in place and accelerating the establishment of vegetation. Straw wattles are also effective in preventing sediment delivery to streams from the side slopes.



Lookout Creek during implementation. Note vortex weirs that provide grade control through the restored reach.



Goldie Creek in the spring of 2006. Work was completed the previous fall (2005).



Goldie Creek in the summer of 2006. Crews are planting shrubs and trees.



Goldie Creek in the summer of 2006. Crews are planting shrubs and trees.



Tributary to Skookoleel Creek on Road 5284 at crossing site #1 in 1998, two years following treatment.



Tributary to Skookoleel Creek on Road 5284 at crossing site #8 in 1998, two years following treatment.



Tributary to Big Creek on Road 316A in 1998, three years after treatment.