

APPENDIX I

Mitigation Measures for Activities having Potential Impacts on Riparian Areas and Water Quality in the Nose Creek Watershed.

Mitigation is defined as actions taken to lessen the actual or foreseen adverse environmental impact of a project or activity. Different governing bodies approach mitigation in different ways. The Department of Fisheries and Oceans *Policy for the Management of Fish Habitat* defines mitigation as those actions taken during the planning, design, construction and operation of a project that alleviate potential adverse effects on fish habitat. Mitigation can consist of relocation, incorporation of design features that eliminate or reduce negative impacts, and construction BMPs and preventative measures. While DFO considers mitigation as actions that avoid a harmful alteration, disruption or destruction of fish habitat (HADD), Alberta Environment includes measures to restore the productive capacity at a crossing site to a level equal to or greater than that which existed prior to construction. This includes measures to avoid HADD, as well as enhancement or replacement of habitat loss. DFO considers the latter measures as compensation (Alberta Transportation 2001).

The Nose Creek Watershed Partnership views mitigation as measures taken to lessen the actual or foreseeable adverse environmental impact that may be caused directly or indirectly by a project or activity, particularly in regard to riparian areas and water quality. There is an intrinsic relationship between riparian areas and water quality and it is accepted that protecting riparian areas will also result in improved water quality. Table E1 summarizes mitigation measures that should be employed for various activities that may impact the health of riparian areas and water quality.

Table C1. Mitigation measures to reduce deterioration of riparian areas in the Nose Creek Watershed.
Source: Alberta Transportation 2001.

Potential Cause of Deterioration	Mitigation Measure
Out of stream site preparation releases sediment through erosion of exposed soils, spoil piles or destabilized banks	<ul style="list-style-type: none"> • Employ terrestrial sediment control methods as temporary measures to prevent sediment from reaching a watercourse until slope vegetation is established. Controls trap sediment from sheet or overland flows. Examples include: <i>Silt fence or Filter Fence</i> – Permeable fabric barriers installed on contour <i>Straw bale Sediment Barrier</i> – Straw bales installed across flow path <i>Sediment Trap</i> – Constructed by excavating a pond or by building embankments above ground level
Instream work or stream diversions release sediment	<ul style="list-style-type: none"> • Minimize instream work with heavy machinery • Cofferdams - Isolate work area from flowing water • Instream Silt Barriers – • Sensitive Area Isolation • Construct new channel and channel features in the dry, and ensure that temporary diversions are protected against erosion • Ensure that pumped water from cofferdams is allowed to settle and diversion outlets are protected against erosion • Timing restrictions
Loss of area resulting from encroachment	<ul style="list-style-type: none"> • Avoid encroachment • Minimize encroachment into the channel • Bioengineering to stabilize surface soils • Compensate for lost area
Channelization	<ul style="list-style-type: none"> • Incorporate geomorphic channel design and fluvial geomorphology in design of diversions • Supply suitable alluvial material on bed and banks • Incorporate appropriate habitat features in new channel design to compensate for lost habitat area
Snow and ice removal (salting, sanding and plowing)	<ul style="list-style-type: none"> • Prevent sediment and toxic substances from entering water course
Beaver dam removal	<ul style="list-style-type: none"> • Control release of water impounded by dam • Minimize use of heavy machinery
Bridge deck cleaning, washing, painting, sandblasting, patching and replacing	<ul style="list-style-type: none"> • Prevent materials from entering water • Use bridge skirting during painting and sandblasting • Avoid sweeping or washing dirt and road grit into watercourse
Road surface maintenance, grading and paving	<ul style="list-style-type: none"> • Prevent materials from entering water
Removal of trees and wood debris	<ul style="list-style-type: none"> • Avoid use of heavy machinery in water • Avoid removal near the edge of the bank • Maintain vegetated buffer
Weed and pest control - spraying	<ul style="list-style-type: none"> • Prevent herbicides and pesticides from entering water • Maintain vegetated buffer • Avoid spraying close to top of bank

Potential Cause of Deterioration	Mitigation Measure
Ditch maintenance	<ul style="list-style-type: none">• Timing restrictions• Prevent sediment from entering water• Work during dry conditions• Dispose of cleaned out material away from ditch• Avoid removal of bank vegetation• Perform periodic inspections to ensure ditch flow is not causing erosion, check dams and flow diversions are functioning and vegetation is established