

Parks Canada National Best Management Practices

Trail Maintenance and Modification

Parks Canada National Best Management Practices for Trail Maintenance and Modification

Approved by

Original signed by Nadine Crookes

Nadine Crookes, Director Natural Resource Conservation Branch

Original signed by Ed Jager

Ed Jager, Director Visitor Experience Branch

August 4, 2016

Date

Contents

Introduction.....	4
Scope of Application.....	4
Exceptions.....	5
Approved geographic area of application.....	6
Components of the environment that may be affected.....	6
Mitigation Measures	7
1. Common Activities	8
Work Site Conditions/Staging/Laydown.....	8
Equipment Operations.....	8
Construction Materials and Practices	9
Invasive Alien Species.....	10
Waste.....	10
Hazardous Material	11
Wildlife	11
Vegetation	12
Erosion and Sediment Control.....	13
Visitor Safety and Experience.....	14
Cultural Resources	15
2. Trail Modification and Re-routing.....	15
3. Bridge, Boardwalk and Culvert Maintenance.....	16
4. Decommissioning and Rehabilitation	17
Trails.....	17
Trail Structures and Fixtures (e.g., boardwalks, viewing platforms, stairs, railing, benches).....	18
5. Supplementary Mitigations.....	18
Appendix 1 - Proper Pruning Method	21

Introduction

The Best Management Practice (BMP) pathway is applied when there is a suite of routine, repetitive projects or activities, with well understood and predictable effects. This fulfils Park's Canada's obligations under the *Canadian Environmental Assessment Act 2012* as a manager of federal land (see the [Guide to the Parks Canada EIA Process](#)). The BMP maximizes efficiency through creation of a pre-approved impact assessment for the defined suite of projects, to which standard mitigation and environmental management measures can be applied.

National BMPs can be applied in the following ways:

- Direct application: Use as is as long as the proposed project falls within the scope of the BMP(s) and its application will ensure there are no significant residual adverse environmental effects.
- Application along with supplemental mitigations: *This will likely be the case when using a National BMP.* Slight modifications will likely be required to ensure all potential impacts are mitigated and to provide project-specific clarifications (e.g., critical timing windows, contact information, SAR considerations, which mitigations apply to the project and which ones do not apply).
- Application as part of a Basic Impact Analysis (BIA) or Detailed Impact Analysis (DIA): where one or more BMPs may not address all the potential adverse environmental effects of a proposed project, Field Units can apply the BMP(s) as part of a BIA or DIA.
- Develop a Field Unit specific BMP: use the National BMP as a resource to create a BMP to address site-specific needs (i.e., *rip off and duplicate*). In this case, the new BMP must be signed off and approved by the Field Unit Superintendent.

The impact assessment officer (IAO) will review a proposed project and advise the functional manager of the project if and how this BMP should be applied. The IAO's advice will be based on whether the project falls within the scope of the BMP, and whether application of the mitigation measures in the BMP will adequately address potential adverse effects of the project. The IAO will also be responsible for adding any required supplemental mitigations to ensure site specific considerations are addressed.

Project Managers are responsible to ensure all mitigation measures applicable to the project are added to the terms and conditions of any permits or contracts issued for the project.

The IAO must ensure the project, EIA pathway applied and determination are recorded in the Parks Canada National Impact Environmental Assessment [Tracking System](#).

Scope of Application

This BMP applies to the maintenance and modification of existing trails within national parks and national historic sites, including historic canals.

Parks Canada trails may require maintenance and modification to meet sustainable trail standards, correct poor design, ensure user safety and improve overall visitor experience. Trails also include a wide range of structures and fixtures that need to be maintained including benches, garbage bins, viewing platforms, stairs, and signage.

General activities addressed in this BMP include:

- trail tread maintenance (e.g., re-shaping tread, building up the tread, grading and outslope for drainage, removing obstacles, filling in potholes, covering roots and exposed rocks, broadcasting soil and area clean up)
- trail reroutes and extensions less than 500m long and located within 50m on either side of the existing trail tread (e.g., preparing trail base, excavation, grading, trail surfacing)
- trail widening within half a meter from either side of the existing trail tread (e.g., preparing trail base, excavation, grading, trail surfacing)
- vegetation management (e.g., clearing and grubbing, corridor clearing, trimming, re-vegetation)
- erosion control measures (e.g., slope stabilization, maintenance of crib or retaining walls, check dams and steps)
- drainage structure maintenance and installation (e.g., digging to create drainage dips/knick, rolling grade dips and/or installation of other trail drainage features, cleaning debris from existing drainage structures)
- routine repair and replacement of structures or fixtures (e.g., benches, garbage bins, barriers, handrails, trail signs, markers, pit privies)
- routine repair and replacement of rotted or damaged materials in Class B pedestrian bridges¹, boardwalks, stairways, culverts (Note: non-fish bearing waterbodies only)
- trail decommissioning and rehabilitation (e.g., blocking off and disguising the trail, restoration of damaged slopes, re-grading the tread, re-vegetation)
- operation of equipment (helicopters, hand machinery, vehicles such as ATVs, mini-excavators, mini-dozer, tracked dumping equipment)
- waste management related to construction activities

Exceptions

This BMP does NOT apply to the following:

- New trail construction projects, trail re-routes, or extensions greater than 500m in length and/or located more than 20m from either side of the existing trail tread (Note: further level of analysis is likely required for these projects but this BMP may be used as part of that analysis).
- Work below the High Water Mark² of a fish bearing waterbody.
- Realignment of a watercourse.

¹ Class B bridges are not suspension bridges, truss bridges nor viewing platforms or towers. They have a drop in elevation between the walking surface and the adjacent surface or streambed of 2.4 metres or less. They do not have a dangerous site condition such as: Fast flow during all or part of the year; Deep water; Hazardous streambed; The adjacent surface within 1.2m of the walking surface being of a slope of more than 1 in 2; or Any other condition deemed as being dangerous by the Parks Canada Professional Engineer having jurisdiction. Class B bridges have low risk of injury due to collapse or if a person should fall from the bridge. Source: *Design, Construction and Inspection of Vehicular and Pedestrian Bridges* (2008)

² High Water Mark is the usual or average level to which a body of water rises at its highest point and remains for a sufficient time so as to leave a mark on the land (Fisheries and Oceans, 2016). Upper Controlled Water Elevation (UCWE) is used as a definition of high-water mark in managed waterways.

- The use of explosives near a fish bearing waterbody.
- Installation of a new boardwalk or full replacement of an existing boardwalk in an environmentally sensitive area (e.g., moss, wet areas, shoreline).
- Bridges that are NOT Class B pedestrian bridges (as defined in the Parks Canada [Design, Construction and Inspection of Vehicular and Pedestrian Bridges](#)).
- Installation of new parking lot or washroom facilities.
- Paving of an existing parking lot or re-surfacing a trail with asphalt (refer to Parks Canada [National BMP for Roadway, Highway, Parkway and Related Infrastructure](#)).
- Projects located within Zone I (Special Preservation).
- Work which may adversely impact any potential or established Aboriginal and Treaty rights or traditional use.
- If the project has the potential to have residual adverse effects on an individual or a residence of a listed species at risk (endangered, threatened, or extirpated status) or any adverse effects on the critical habitat of a listed species at risk.

Should any of the above conditions apply, the project will require use of another applicable BMP or combination of BMPs to fulfill impact assessment requirements or consideration of another environmental impact analysis pathway i.e., Basic Impact Analysis (BIA) or Detailed Impact Analysis (DIA). Some or all of the mitigation measures in this BMP may be used to prepare a BIA or DIA.

NOTE: Consult with the relevant Field Unit or national Parks Canada specialists (e.g., environmental impact analysis, species at risk, cultural resources, indigenous consultation, wildfire risk reduction, and visitor experience) for guidance as required.

Approved geographic area of application

This BMP is intended for use in all Parks Canada administered protected heritage places.

Components of the environment that may be affected

Soil/Land Resources:

- Soil compaction and rutting
- Soil erosion, loss of topsoil and exposure of subsoils
- Soil contamination from waste (e.g., garbage, litter, sewage, fuel)
- Increase in anthropogenic footprint
- Trail-side trampling

Air/Noise Quality:

- Temporary decreased ambient air quality (e.g., dust, equipment emissions)
- Temporary increased levels of CO₂ and other pollutants
- Increased ambient noise levels

Water Quality:

- Surface and groundwater contamination from waste (e.g., garbage, litter, sewage, fuel)
- Sedimentation, causing increased turbidity
- Changes in temperature regime and natural drainage patterns

Vegetation:

- Damage to and/or removal of vegetation from trail route clearing; side-trampling during use; root exposure, resulting in physiological stress and, in the case of trees, susceptibility to windfall
- Introduction of invasive alien species, or expansion of existing populations
- Impacts on valued and sensitive vegetation features
- Habitat destruction and mortality from wildfire

Wildlife:

- Wildlife disturbance during construction and on-going use of the trail causing displacement/preferred habitat avoidance
- Wildlife habituation/attraction to artificial food sources from garbage or litter
- Damage to nests/dens/roosts and disruption of nesting/denning/roosting animals
- Loss of food sources and habitat
- Introduction of alien invasive species, or expansion of existing populations
- Habitat destruction and mortality from wildfire

Visitor Safety and Experience:

- Reduced quality of visitor experience due to noise and presence of construction equipment
- Increased visibility of human disturbance on the landscape and decreased aesthetic
- Reduced accessibility to portions of the site where work is taking place
- Hazard to visitors and staff due to conflict with trail use and trail construction and maintenance activities (e.g., heavy equipment and hand tool operation, helicopter use, tree removal)

Cultural Resources:

- Adverse effects on the heritage value or character-defining elements of a cultural resource or a heritage place, including:
 - Impacts to archaeological resources (known or potential) from displacement or destruction resulting in loss of heritage value
 - Adverse effects on cultural landscapes or landscape features of heritage value
 - Wildfire risk

Mitigation Measures

This BMP includes a broad range of mitigation measures and as such, the IAO must review the document carefully to determine which apply to the project. To use this document efficiently and reduce the overall size and scope of the mitigations to present to contractors and project managers, follow the recommendations below:

Step 1) Go to the Microsoft Word toolbar and select the View tab, then check the Navigation Pane box. This allows you to see all the headings and will allow for efficient editing. For example, if a whole section does not apply, simply right click on it in the Navigation Pane and choose delete.

Step 2) Section 1. Common Activities includes mitigation measures which should, in most part, apply to all trail maintenance and modification projects. Review this section and delete the mitigation measures that may not apply to the project.

Step 3) Review Sections 2 to 4; keep relevant sections and delete those that do not apply. Review relevant sections and delete mitigation measures that do not apply to the project.

Step 4) Add any supplementary mitigation measures to Section 5. Supplementary Mitigations. For example, reference to “designated Parks Canada staff” is made through this BMP; details on site and project specific contacts must be included in this section.

Step 5) Save the document as a pdf or print a paper copy and include with the EIA determination record.

1. Common Activities

Work Site Conditions/Staging/Laydown

1. All people working on the project must review the mitigation measures and any site specific considerations with designated Parks Canada staff³ before work begins. This may be done once seasonally for regular maintenance activities but projects such as trail re-routing or work in/near water, require individual start-up meetings.
2. Staging and parking areas for material and equipment must be identified, including duration of use, within an existing disturbed footprint (e.g., roadway, gravel surface, previously disturbed area with high resiliency).
3. Material drop sites (via foot, vehicle, helicopter or boat) must be approved by designated Parks Canada staff.
4. When transporting material via helicopter:
 - o Choose a drop point that is open and easily accessible from the construction site and that will minimize travel to and from the construction site.
 - o Plan multiple drop sites at strategic locations to avoid doubling back on the trail to distribute materials.
5. Cover construction material with weighted tarps when appropriate. Minimise damage to adjacent plant material and rehabilitate if necessary.
6. Use existing roadways, trails, disturbed areas or other areas as approved by designated Parks Canada staff for site access, travel within the site and construction activities (e.g., sawing wood).
7. Clearly mark work site and restricted areas with stakes, biodegradable flagging tape or other means; remove when project is completed.
8. Keep disturbance footprint as small as possible and limit vehicle access to essential vehicles only.

Equipment Operations

9. Equipment must be properly tuned, clean and free of contaminants, in good operating order, free of leaks (e.g., fuel, oil or grease), and fitted with standard air emission control devices and spark arrestors prior to arrival on site.

³ The following applies wherever “designated Parks Canada staff” is referenced in this BMP: for National Historic Sites and Parks: the Resource Conservation Manager/staff; for the Historic Waterways: the Waterway Environmental Assessment Officer; and for Jasper, Banff, Lake Louise, Yoho and Kootenay National Parks: the Integrated Land Use Policy and Planning Manager, unless otherwise specified.

10. During construction, any required cleaning of tools and equipment must be done greater than 30 meters from waterbodies to prevent the release of wash water that may contain deleterious substances.
11. Equipment operators must be fully trained and experienced.
12. Select equipment appropriate to the nature of work being conducted (e.g., avoid using large scale machinery when hand tools or smaller scale machinery could be used).
13. The crossing of any waterbody by construction equipment, or the use of such equipment within waterbodies must be approved by designated Parks Canada staff. If approved:
 - Consult with designated Parks Canada staff prior to project start-up, to determine single entry and exit points for any watercourse crossings.
 - Use small scale equipment when at all possible (e.g., mini excavator, ATV, Ditch Witch)
 - Use established/constructed fords when available.
 - Protect access points (e.g., swamp mats, pads).
14. When crossings are not required, operate machinery above the High Water Mark to minimise disturbance to the banks and waterbody.
15. Use low pressure or rubber tracked equipment or access matting where feasible to minimize soil compaction and ground disturbance.
16. Minimize idling of engines, contingent on operating instructions and temperature consideration.
17. Machinery (e.g., excavators, bobcats, chainsaws, generators) must be stored, maintained and refuelled on a flat surface, outside the drip line⁴ of trees and a minimum of 30 meters from waterbodies, as measured from the High Water Mark; increase the 30 meter buffer depending on level of risk and site specific conditions. Refueling must take place on a tarp or portable berm, or on compacted ground.
18. Consider using bio-degradable chain oil/vegetable oils in chain saws, especially when working within 30 meters of waterbodies.
19. If operating chain saws directly over or adjacent to waterbodies is unavoidable, use measures such as tarps to trap and prevent debris from entering the waterbody as much as possible.
20. Gas generators must be secured to prevent movement during operation and set up on an impermeable fuel mat with a berm or within a container that can contain 150% of the volume of fuel in the generator.

Construction Materials and Practices

21. Ideally, use timber that contributes to sustainable practice, such as recycled old growth or certified materials (e.g., Forest Stewardship Council certification). Trees of significant importance to the landscape must not be used unless otherwise directed by designated Parks Canada staff.
22. When building with unfinished wood, consider using species native to the area as directed by designated Parks Canada staff.
23. Use natural material and environmentally-friendly finishes (e.g., paints and stains) and products whenever possible.
24. When practical, consider pre-fabrication (e.g., bench or parts of structures) at an approved off-site location to minimize on-site construction impacts.
25. When practical, treatment of wood products (e.g., preservatives, paints, stains) should be done at an approved location prior to transport to the site. Field treatments should be applied over tarps or in another approved contained area and not be applied over or

⁴ The area defined by the outermost circumference of a tree canopy where water drips from and onto the ground.

- within 30 meters of water. Treatments must be approved by designated Parks Canada staff.
26. Treated wood must be handled, installed, and disposed of according to the [Parks Canada Guide for the Use, Handling and Disposal of Pressure Treated Wood 2009](#) or contact the Parks Canada [Environmental Management team](#) for advice.
 27. Minimise the number of saw cuts made to treated wood in the field. If unavoidable, cut treated wood away from waterbodies and over tarps to catch debris; cuttings, sawdust and other treated wood waste material must not enter waterbodies.
 28. All cuttings, sawdust and other treated wood waste material must be collected and disposed of at an approved disposal facility.
 29. Treated wood must not be burnt or left onsite to decay.
 30. Concrete mixing activities must take place over tarps a minimum of 30 meters from waterbodies. Fresh, wet, uncured concrete and concrete dust must not come into contact with waterbodies; contain and remove any associated concrete waste to an approved disposal facility.

Invasive Alien Species

31. Footwear, clothing, equipment and machinery coming into contact with the terrestrial or aquatic environment must be free of invasive alien species individuals, seeds, propagules (i.e., any other material that may cause the spread of the species) and pathogens. In particular:
 - Equipment from outside the protected heritage place must be washed/steam cleaned prior to arrival.
 - Ensure that footwear, clothing and equipment are free of invasive alien species (e.g., seeds, propagules) when travelling between invaded and uninvaded terrestrial and aquatic sites within the protected heritage place.
32. All soil, gravel, untreated construction lumber, erosion and sediment control products (e.g., hay, straw, mulch), or other applicable materials from outside the protected heritage place must be from a certified weed-free source.
33. Ensure that organic material (e.g, topsoil, borrow and fill material, gravel) taken from the construction site is free of invasive alien species before using in other parts of the protected heritage place.
34. Minimise ground disturbance and vegetation removal, as practical and within project requirements.
35. Minimise bare soil exposure (e.g., cover stockpiled material with tarps, plant native species, cover with natural mulch/ground coverings).
36. Stabilize and re-vegetate disturbed areas as soon as possible with native plants, soil and seed mix approved by designated Parks Canada staff. If there is insufficient time remaining in the growing season, stabilize the site to prevent erosion and vegetate the following spring.
37. Monitor disturbed and re-vegetated areas for several growing seasons to ensure that native vegetation is growing successfully and invasive alien species spread is prevented.

Waste

38. All wildlife attractants must be secured (e.g., petroleum products, human food, recyclable drink containers and garbage) within wildlife-proof containers, a secure building or vehicle. Keep food waste separate from construction waste and remove daily; if daily removal is not possible, secure until it can be removed.
39. Notify designated Parks Canada staff immediately should wildlife gain access to the above mentioned attractants.

40. Contain and stabilize waste material (e.g., dredging spoils, construction waste and materials, vegetation) above the High Water Mark to prevent them from entering any waterbody.
41. All construction materials must be removed from the site on project completion (e.g., refuse material, waste petroleum, construction material).
42. Contain waste and transport to an approved waste landfill site outside the Parks Canada protected heritage place, unless otherwise directed; cover waste loads during transportation.

Hazardous Material

43. Prevent the release of hazardous substances into the environment, including but not limited to, petroleum products and their derivatives, antifreeze or solvents.
44. All on-site personnel must be briefed on reporting requirements for hazardous materials spills; spills must be reported immediately to designated Parks Canada staff.
45. All construction sites must be equipped with containers suitable for the secure, temporary storage of hazardous wastes, separated by type.
46. A spill contingency response kit including sorbent material and berms to contain 110% of the largest possible spill (i.e., fuel or other toxic liquids) related to the work must be available on site at all times. On-site personnel must be aware of its location and trained in its use. Any contaminants must be recovered at source and disposed according to applicable laws, policies and regulations.
47. Identify and handle all toxic/hazardous materials as required under the *Canadian Environmental Protection Act*, *Transportation of Dangerous Goods Act* and Workplace Hazardous Materials Information Service.
48. Petrochemical products, paints and chemicals must be stored a minimum of 30 meters away from waterbodies and secured overnight in a Parks Canada approved enclosed area under lock and key; increase the 30 meter buffer depending on level of risk and site specific conditions.
49. Any hazardous waste or contaminated material uncovered during excavation/construction, must be investigated, source identified, removed and disposed of outside the protected heritage place at an approved facility. Disposal documentation must be provided to designated Parks Canada staff.

Wildlife

50. On-site personnel must be made aware of and report any incidental sightings of species at risk immediately to designated Parks Canada staff.
51. Schedule activities to avoid critical wildlife life stages (breeding, nesting, denning, roosting, rearing, migration). Consult with designated Parks Canada staff to discuss localized wildlife concerns.
52. Follow [Reducing Risk to Migratory Birds](#) guidance from [Environment and Climate Change Canada](#), including avoiding vegetation clearing during site-specific migratory bird timing windows. Consult with designated Parks Canada staff for specific approaches to avoiding impacts on migratory birds (e.g., nest surveys, exclusion zones for located nests, area avoidance).
53. Should active nests, dens, roosts or calving areas be discovered, stop work and contact designated Parks Canada staff immediately for direction.
54. Conduct trail activities during daylight hours, avoiding critical foraging times (dusk and dawn).
55. Minimize the time excavations remain open and cover or fence when left unattended to reduce the potential for wildlife injury.

56. Never approach or harass wildlife (e.g., feeding, baiting, luring).
57. If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area and move away from areas of potential conflict.
58. Designated Parks Canada staff must be alerted immediately to any potential wildlife conflict (e.g., aggressive behaviour, persistent intrusion), distress or mortality. In the case of aggressive behaviour or persistent intrusion, stop work and evacuate the area.
59. On site workers must receive any required wildlife awareness training, according to field unit policy.

Vegetation

General:

60. Apply Wildlife mitigations #51-53.
61. Carry cut branches and slash away from trail infrastructure and out of trail user view. Spread branches out with cut ends facing away from trail.
62. Burning is not permitted within the protected heritage place unless approved by Parks Canada.
63. Where re-vegetation is required, use weed-free salvaged topsoil, native plants and seed mix approved by designated Parks Canada staff.

Clearing and Grubbing:

64. Apply General mitigations (#60-63).
65. Protect trees and plant species of high ecological, heritage or cultural value; all clearing activities must be flagged and pre-approved by designated Parks Canada staff.
66. Retain a 30 meter vegetated buffer, from the High Water Mark of waterbodies and a 15 meter buffer from steep slopes. If clearing is required within the buffer zone, conduct minimal selective clearing by hand to ensure soil stability and prevent run off. In sloped areas, buffers should increase in width as the slope increases.
67. Clear minimum area necessary; trees should be removed only as necessary for project completion, visitor/trail crew safety or wildfire risk reduction.
68. When felling trees, precautions must be taken to minimise damage to surrounding vegetation.
69. The felling of trees with obvious wildlife use (e.g., snags with cavity nests, trees with stick nests) must be avoided wherever possible; if unavoidable, designated Parks Canada staff approval is required.
70. Cut stumps as close to ground as possible. If clearing is conducted during winter in snow cover, return to site after snow melt to flush cut stumps as required.
71. All cut wood is the property of Parks Canada; consult with designated Parks Canada staff to determine appropriate cutting methods, use and disposal of cut wood and other plant material.
72. If woody debris is chipped, spread thinly within the surrounding forest with space between the chips to ensure native vegetation can grow and re-establish; spreading too thick may result in growth suppression and fire hazard.
73. Where practical, clear trees in a phased approach provided timing windows for critical wildlife life stages can be respected. Ideally, trees should not be cut until construction reaches them, in case last-minute adjustments are necessary.
74. Salvage and replant small trees when appropriate or dispose as directed by designated Parks Canada staff.
75. When possible, conduct work when the ground is frozen or under a condition (such as snowfall) that limits ground compaction. If not possible, consider the use of rig mats or other appropriate measures to minimise impacts.

76. Protect roots of trees to drip line to prevent disturbance or damage. Avoid traffic, dumping or storage of materials over root zone.
77. All holes left in the tread width from clearing and grubbing shall be filled with native material and compacted to ensure a stable, even tread surface.
78. When log ends or stumps are freshly cut and exposed within the sight lines of the trail corridor, rub exposed area with soil to reduce the brightness of fresh saw cuts.

Vegetation Maintenance:

79. Apply General mitigations (#60-63).
80. Stay within the existing trail tread when conducting maintenance activities.
81. Remove trail obstructions that impede use and safety of the trail corridor.
82. Natural features (e.g., trees, shrubs, rocks) should be left undisturbed as close to the trail edge and its fixtures as possible unless otherwise directed by designated Parks Canada staff.
83. Employ pruning techniques to minimise risk of tearing the bark and harming the tree; ensure that only branch tissue is removed and stem or trunk tissue is left undamaged (refer to Appendix 1-Proper Pruning Method).
84. Exposed roots creating erosion control issues should be covered with an appropriate layer of approved soil or fill. Consult with designated Parks Canada staff when such coverage is not possible.

Riparian Vegetation Maintenance:

85. Apply General mitigations (#60-63).
86. Removal of riparian vegetation should be kept to a minimum and undertaken only when absolutely required. When practical, prune or top vegetation instead of grubbing/uprooting.
87. Combined maintenance activities (e.g., mowing, brushing, topping, slashing) will affect no more than one third of the total woody vegetation, such as trees and shrubs, within 30 meters of the High Water Mark in any given year.
88. Use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction.
89. Ensure canopy vegetation immediately adjacent to waterbodies is maintained unless deemed a hazard.
90. When practical, alter riparian vegetation by hand. If machinery must be used, operate on land and minimize disturbance to the banks of the waterbody.
91. Restore banks to original condition should any damage occur.
92. When altering a tree on the bank of a waterbody, ensure the root structure and stability are maintained.
93. Organic material and debris must not be allowed to enter waterbodies.
94. Minimize removal of natural woody debris, rocks, sand or other materials from the banks of waterbodies and avoid any disturbance below the High Water Mark.

Erosion and Sediment Control

95. Apply Alien Invasive Species mitigations as appropriate.
96. Schedule operations to avoid wet, windy and rainy periods or very dry periods that may increase erosion and sedimentation.
97. In areas prone to erosion, install erosion and sediment control measures before starting work, especially within 30 meters of a waterbody.
98. Regularly inspect and maintain erosion and sediment control structures during all phases of the project and modify measures as necessary.

99. Select erosion and sediment control products that correspond with the nature and duration of the project.
100. Use erosion and sediment control products made of 100% biodegradable materials (e.g., jute, sisal or coir fiber) when possible. Ensure backing materials are also biodegradable.
101. Use of hay or straw in erosion and sediment control are potential wildlife attractants and may contain invasive species; use must be approved by designated Parks Canada staff.
102. Use sediment and erosion control products that reduce potential for wildlife entanglement⁵ when possible. These options include:
 - Net-less erosion control blankets made of excelsior or loose mulch and unreinforced silt fences.
 - Netting with a loose-weave wildlife safe design.
103. Limit duration of soil exposure; phase activities whenever possible and restore disturbed areas as soon as possible.
104. Avoid equipment operation on steep or unstable slopes and in areas prone to erosion such as sand dunes.
105. Manage water flowing onto the site as appropriate for the project:
 - Divert upland surface runoff away from exposed areas.
 - Filter water being pumped/diverted from the site; silt-laden water must not be pumped directly into a waterbody (e.g., pump/divert water to a vegetated area 30 meters from the waterbody, to a constructed settling basin or other filtration system).
 - Minimise slope length and gradient of disturbed areas. Backslopes must be sloped to a 45 degree angle or less or to best match existing side slopes.
 - Cover erodible soils with mulch, vegetation, or rip-rap.
 - Construct check dams or similar devices in constructed swales and ditches.
106. Consider removing and maintaining sod mats for improved re-vegetation success and erosion control; disturbed areas should be reclaimed with topsoil.
107. Cover spoil piles with biodegradable mats or tarps or plant them with native grass or shrubs approved by Parks Canada.
108. Topsoil separation is required; stockpile topsoil away from subsoils and spoil material and more than 15 meters away from waterbodies, drainage features and/or the top of steep slopes.
109. Store excavated soils on tarps to limit damage to underlying vegetation and cover with weighted tarps if left for an extended period of time.
110. Excess organic material will be distributed on the trail tread or other existing un-vegetated areas.
111. Immediately stabilize disturbed areas, shoreline or banks, preferably through re-vegetation, with native species approved by designated Parks Canada staff. If there is insufficient time remaining in the growing season, the site should be stabilized, (e.g., cover exposed areas with erosion control blankets to keep soil in place) and/or vegetated the following spring; maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.
112. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.
113. Remove temporary erosion and sediment control products, especially non-biodegradable materials, when they are no longer required.

Visitor Safety and Experience

114. If possible, schedule construction activities outside peak visitor season.

⁵ [Wildlife-Friendly Plastic-Free Netting in Erosion and Sediment Control Products](#)

115. The work site will be closed and marked while active construction, repair or maintenance is underway; consider temporary detours or reroutes as appropriate.
116. If closing the area is not possible, maintain a safe working distance between work activities and visitors; consider the use of lookouts to manage traffic through the construction/hazard area.
117. As much as possible, schedule noisy activities to minimise impacts to visitors, especially around townsites, campgrounds and other high visitor use areas.
118. Secure and clearly mark unattended safety hazards (e.g., excavations, unsecured decking on a bridge, debris piles) with fencing, warning signs, area closures or combination thereof.

Cultural Resources

119. Apply any mitigation measures that may have been previously identified by a Parks Canada archaeologist and/or other conservation specialist (e.g., cultural landscapes or landscape features of heritage value) for the immediate area of work.
120. Avoid known and potential archaeological sites.
121. Stockpiled material must not be permitted to damage or bury known cultural resources.
122. Apply any mitigation measures that may have been previously identified by a Parks Canada archaeologist and/or other conservation specialist for the immediate area of work.
123. If cultural resources are encountered, work must cease in the immediate area and designated Parks Canada staff notified.
124. Notify the site supervisor upon discovery of any archaeological resources. If features (i.e., structural remains and/or artifact concentrations) are encountered, leave in place, mark the location (e.g. with prominent flagging) and contact designated Parks Canada staff to take photographs and, if possible, depth measurements. The designated Parks Canada representative must provide the information immediately to the Terrestrial Archaeology section for an assessment of significance before work can resume.

2. Trail Modification and Re-routing

125. The final route of new trail segments will be determined on site and approved by designated Parks Canada staff⁶.
126. Biodegradable flagging tape must be collected and disposed of as required when the project is completed.
127. Stay within the flagged area during trail rerouting activities.
128. If excavating, sod mats or topsoil should be salvaged and stockpiled for future rehabilitation. Remaining soil should be broadcasted and raked to a soil thickness of 25 millimeters or less; ensure that vegetation is uncovered (e.g., on grassy slopes gently rake grass to stand back up).
129. Use a clinometer to confirm trail grades meet sustainable trail guidelines⁷.
130. Plan construction work so each section of the trail is completed as quickly as possible.
131. Carefully follow the designed layout for the trail and ensure natural drainage patterns are preserved.
132. Remove loose rocks from the trail tread and fill in any resulting holes.

⁶ When several options are being contemplated, consider discussing with an archaeologist to identify the best option in order to limit impacts and reduce the need for mitigation measures.

⁷ Refer to The Five Essential Elements of Sustainable Trails in *Trail Solutions: IMBA's Guide to Building Sweet Singletrack*, Pg 63-69 or contact the [Trails Team](#) .

133. When constructing gravel trails, source gravel from local gravel pits to minimise hauling distance.
134. Reclaim materials whenever possible (e.g., use non-salvageable woody debris, excavated soil and surface material from new sections of trail on decommissioned sections of trail, use gravel from decommissioned sections on new sections of trail).
135. Shape loosened soils to match the local terrain.
136. Dispose of stockpiled vegetation as directed by designated Parks Canada staff.
137. When using borrow pits⁸:
 - Locate borrow pits well off the trail for safety and aesthetic considerations.
 - Do not locate borrow pits adjacent to tree root-balls.
 - Do not disturb soils from tipped up root-balls of fallen trees as they provide micro-habitats for small mammals and increase structure and plant diversity.
 - Scout for suitable soil deposits with a hand auger; look for above average grade deposits (mounds) with a minimal organic layer and vegetation cover.
 - Fewer, larger pits are preferable to multiple smaller pits.
 - Stockpile organic soils for later decommissioning of exhausted borrow pits.
 - Create only a single access trail to the borrow pit to minimize off trail impact. Flag access route if necessary (particularly on construction days).
 - Flag and record locations of active borrow pits for future use and eventual restoration.
 - Restore borrow pit when exhausted by grading area and covering with stockpiled organic soil. Any required replanting or reseeded must be done using native plants/seed mixture approved by Parks Canada

3. Bridge, Boardwalk and Culvert Maintenance

138. This BMP excludes work below the High Water Mark of fish bearing waterbodies. However, when working in close proximity to fish bearing waterbodies or in/near waterbodies that feed directly into fish bearing waterbodies, respect timing windows⁹ to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed.
139. Minimise the extent and duration of work within watercourses and bank areas.
140. Conduct in-stream work during periods of low flow or at low tide and not when flows are elevated due to local rain events or seasonal flooding.
141. Locate machinery crossings at straight sections of the watercourse, perpendicular to the bank, whenever possible. Avoid crossing on meander bends, braided streams, alluvial fans, or any other area that is inherently unstable and may result in the erosion or scouring of the bed.
142. Machinery fording of a flowing watercourse must be limited to a one-time event (i.e., over and back) and is to occur only if no alternative crossing method is available. In addition:
 - For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur.
 - Grading of the stream banks for the approaches should not occur.
143. Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of waterbodies below the High Water Mark. If material is

⁸ An area from which material (soil, gravel) has been excavated for use at another location. Typically borrow pits are used when the trail tread surface needs to be raised and fill material is required.

⁹ <http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html>

- removed, set it aside and return it to the original location once construction activities are completed.
144. Ensure contingencies are in place for occurrence of unexpected high flow conditions during the activity.
 145. When rock material is used in or near a watercourse:
 - Use clean, durable, non-ore-bearing, coarse granular aggregate material that is appropriately sized to resist displacement during peak flood events.
 - Do not obtain rocks from below the High Water Mark of any watercourse.
 - Do not use acid-generating rock or rock that fractures and breaks down easily.
 - Install rock at a similar slope to maintain a uniform stream bank and natural stream alignment.
 - Ensure rock does not constrict the natural channel width.
 146. When removal and application of protective coatings is required implement the following:
 - Remove paint or protective coatings in a manner that prevents paints, paint flakes, primers, solvents or other waste material from entering the watercourse.
 - When feasible, use tarps to trap and prevent falling debris, spills or drips from entering the watercourse.
 - Store, mix and transfer paints and solvents on land and not on the bridge to prevent spills into the watercourse.
 - Contain paint flakes, abrasives and other waste materials and dispose at an approved location; waste materials must not be deposited into watercourses or riparian areas.
 147. When removal of debris is required within culverts and around bridge piers and abutments, implement the following:
 - Remove materials with hand tools when feasible. If machinery is required, operate from land and minimise damage to the bank of the watercourse.
 - Limit removal of accumulated material (e.g., branches, stumps, woody materials, garbage) to the area within the culvert, immediately upstream of the culvert and to that which is necessary to retain culvert function and water flow. For bridges, only remove debris necessary to protect piers and abutments.
 - Remove accumulated material and debris slowly to allow clean water to pass, to prevent downstream flooding and reduce amount of sediment-laden water going downstream.
 148. Boardwalks should be high enough above the existing ground surface to allow grasses and native shrubs to re-vegetate around the structure and beneath deck boards.
 149. Limit ground disturbance under boardwalks to the installation of staircase posts and sills.
 150. Stabilize shoreline or banks disturbed by any activity associated with the project.
 151. Restore bed and banks of the water body to the original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct the natural water flow should be restored.
 152. If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, ensure rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.

4. Decommissioning and Rehabilitation

Trails

153. Remove culverts and any existing trail surfacing material, including underlying geotextile fabric and dispose of as required by designated Parks Canada staff. Then, completely break up, or scarify, the compacted subsurface of the full length of the old trail tread to 10cm depth.

154. Cover and camouflage the old trail with topsoil, plants, grasses and re-plant small trees taken from re-route construction, where feasible.
155. Use stockpiled topsoil from the site to facilitate rehabilitation activities.
156. Re-grade visible decommissioned trail ends to surrounding slopes.
157. Reclaim eroded areas and ensure proper erosion control measures are identified and installed in the decommissioned section (e.g., check dams made of logs or rocks fixed across the trail to trap soil; for rocky trails with little soil covering, fill burlap bags with soil and rocks and use as check dams, consider transplanting a local shrub in the bag).
158. Reduce the visibility of the old trail so the transition areas are unrecognizable and the decommissioned trail is effectively closed (e.g., drag logs and branches over the tread and plant deadfall in the ground vertically to block the corridor at eye level; rake leaves and other organic matter over the tread to disguise the area.)
159. Ensure closed sections are clearly blocked off to users and create a natural, seamless transition to the new section; install signs if required.
160. Any replanting or reseeding must be done using native plants/seed mixture approved by Parks Canada.
161. Decommissioned trails will be monitored for visitor use, erosion, non-native plants and vegetation establishment; corrective actions will be implemented if necessary.

Trail Structures and Fixtures (e.g., boardwalks, viewing platforms, stairs, railing, benches)

162. Confine work to the existing footprint of the item to be decommissioned.
163. Rehabilitate the site to a natural condition, in consultation with designated Parks Canada staff.
164. Ensure any holes or depressions left from removal of structures or fixtures are filled.
165. Ensure wastes from demolition activities do not enter waterbodies (e.g., use tarps to capture debris). Any waste that does fall into a waterbody will be immediately retrieved, provided worker safety is not compromised, and if removal can be done without excessive disturbance of bottom sediment.
166. Consider re-use of structures, fixtures and materials (e.g., benches, building material) where practical and appropriate elsewhere in the protected heritage area. If not salvageable, materials must be disposed of outside the national protected place at an approved disposal facility unless otherwise directed by designated Parks Canada staff.

5. Supplementary Mitigations

In the application of National BMPs, supplementary mitigations will likely be required to ensure all potential impacts are mitigated. For example, a few site-specific mitigation measures may be needed to protect cultural resources or species at risk, to specify a critical timing window and to provide contact information. NOTE: if the number of supplementary mitigations is considerable in extent and nature, it should be determined whether a Field Unit specific BMP is better suited to address the impacts or another EIA pathway selected.

In this circumstance, the relevant BMP should be indicated in the EIA Requirement Checklist, with a note that application of the BMP will be supplemented through the addition of mitigation measures to address project or site-specific requirements. All relevant mitigations and project-specific clarifications should be included as terms and conditions in any permits and authorization documents (e.g., contracts) for the project.

Supplementary mitigation measures may be included here:

References

2030 Palette. [Riparian Buffers](#). Accessed March 2016.

California Coastal Commission. 2012. [Water Quality Fact Sheet Series: Wildlife-Friendly Plastic-Free Netting in Erosion and Sediment Control Products](#).

Environment and Climate Change Canada. [Reducing Risk to Migratory Birds](#). Accessed January 2016.

Fisheries and Oceans Canada. 1993. [Land Development Guidelines for the Protection of Aquatic Habitat](#).

Fisheries and Oceans Canada. 2007. *Saskatchewan Operational Statement: Temporary Stream Crossing*.

Fisheries and Oceans Canada. 2007. *Saskatchewan Operational Statement: Maintenance of Riparian Vegetation in Existing Rights-of-Way*.

Fisheries and Oceans Canada. 2007. *Saskatchewan Operational Statement: Bridge Maintenance*.

Fisheries and Oceans Canada. 2007. *Saskatchewan Operational Statement: Culvert Maintenance*.

Fisheries and Oceans Canada. [Self-Assessment Criteria](#). Accessed January 2016.

International Mountain Bicycling Association. *Designing and Building Sustainable Trails*. Accessed January 2016.

International Mountain Biking Association. 2004. *Trail Solutions: IMBA's Guide to Building Sweet Singletrack*.

Massachusetts Department of Conservation and Recreation. 2010. *Trails Guidelines and Best Management Practices Manual*.

Nova Scotia Environment. 2015. [Guide to Altering Watercourses](#).

Parks Canada. 2005. *Guidelines for the Management of Archaeological Resources*.

Parks Canada. 2008. *Design, Construction and Inspection of Vehicular and Pedestrian Bridges*.

Parks Canada. 2009. *Parks Canada Guidelines for the Use, Handling and Disposal of Treated Wood*.

Parks Canada. 2009. *Model Class Screening Report for Routine Projects in National Park Communities*.

Parks Canada. 2010. *Standards and Guidelines for the Conservation of Historic Places in Canada: A Federal, Provincial and Territorial Collaboration*. Second edition.

Parks Canada. 2013. *Cultural Resource Management Policy*.

Parks Canada. 2013. *Balsam Hollow Brook Trail Improvements*. Prince Edward Island National Park.

Parks Canada. 2013. *Cultural Resource Management Policy*.

Parks Canada. 2014. *Trail Surface Building/Upgrades and Primitive Campsites*. Fundy National Park.

Parks Canada 2014. *Basic Impact Analysis: Reeds and Rushes Trail Re-route*. Prince Edward Island National Park.

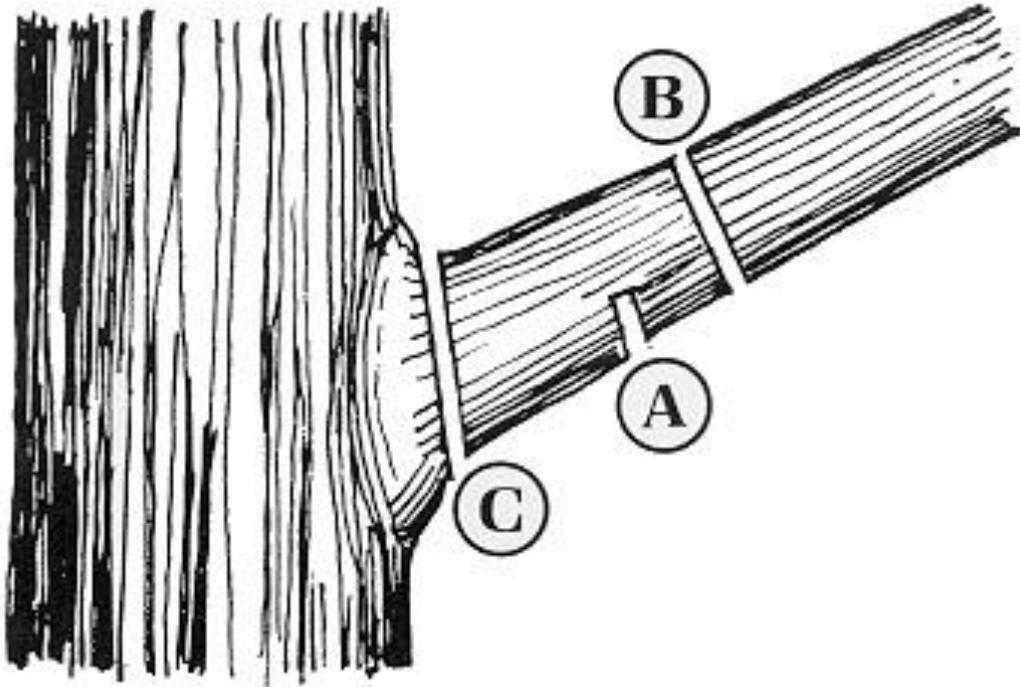
Parks Canada 2014. *Decommissioning Boardwalk Section of Reeds and Rushes Trail*. Prince Edward Island National Park.

Parks Canada 2014. *Basic Impact Analysis: Trail Re-route Port-la-Joye - Fort Amherst National Historic Site of Canada*. Prince Edward Island National Park.

Partners in Protection. 1999. *Firesmart, Protecting your Community from Wildfire*. ISBN 0-662-34064-7.

Last Update: June 27, 2016

Appendix 1 - Proper Pruning Method



To find the proper place to cut a branch, look for the branch collar, an often visible swelling that forms at the base of a branch where it is attached to its parent branch or to the tree's trunk. On the upper surface, there is usually a branch bark ridge that runs (more or less) parallel to the branch angle, along the stem of the tree. A proper pruning cut does not damage either the branch bark ridge or the branch collar.

A – The first cut is a shallow undercut to prevent bark tearing

B – The second cut completely removes the limb

C- The third cut removes the stub and is cut flush with the branch collar