



MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS, POST-WILDFIRE RISK ANALYSIS – PRELIMINARY REPORT

NOTE: The results given on this form are preliminary in nature and are intended to be a warning of potential hazards and risks. It is not a final risk analysis and further work may alter the conclusions. Please contact the author for more information.

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| FIRE: 15 N70624 | | FIRE YEAR: 2015 | DATE OF REPORT: Oct. 14, 2015 |
| AUTHOR: Tedd Robertson | | | |
| REPORT PREPARED FOR: Selkirk Resource District (Kootenay Lake FD), and Southeast Fire Centre | | | |
| FIRE SIZE, LOCATION, AND LAND STATUS: | | | |
| Fire size is 479.8 ha based on MFLRNO data, located on the east side of Mt. Midgely 14 km northwest of Creston, BC (TRIM sheet 082F.017). The southern half of the fire is on crown land, the northern half is on the Darkwoods Property, a large private land tract owned by the Nature Conservancy of Canada. | | | |
| VALUES AT RISK: Private property, dwellings, domestic water supply, existing forest roads, Highway 3 | | | |
| WATERSHEDS AFFECTED: | TOTAL AREA | AREA BURNED | BURN SEVERITY* |
| 1. Brash Creek (S6) | 115.8 ha | 50.3 ha | 41% L, 35% M, 24% H |
| 2. Campbell Creek (S6) | 142.1 ha | 62.7 ha | 53% L, 38% M, 9% H |
| 3. Midgely Gully 1 (Darkwoods) | 19.9 ha | 1.9 ha | 39% L, 61% M, 0% H |
| 4. Midgely Gully 2 (Darkwoods) | 18.9 ha | 12.5 ha | 62% L, 38% M, 0% H |
| 5. Midgely Gully 3 (Darkwoods) | 131.5 ha | 112.6 ha | 55% L, 36% M, 8% H |
| 6. Midgely Gully 4 (Darkwoods) | 55.2 ha | 46.2 ha | 35% L, 34% L, 31% H |
| 7. Midgely Gully 5 (Darkwoods) | 53.7 ha | 53.6 ha | 70% L, 30% M, 0% H |
| 8. Midgely Face 1 (Darkwoods) | 158.7 ha | 129.8 ha | 71% L, 19% M, 10% H |
| 9. Midgely Face 2 (Darkwoods) | 46.2 ha | 37.5 ha | 81% L, 19% M, 0% H |
| 10. Midgely Creek (Darkwoods) | 758.1 ha | 44.6 ha | 100% L, 0% M, 0% H |
| 11. Summit Tributary 1 | 56.1 ha | 7.3 ha | 4% L, 96% M, 0% H |
| 12. Summit Tributary 2 (No Name Creek) | 601.4 ha | 11.9 ha | 96% L, 0% M, 4% H |
| | | | * (percent of burned area from GIS calculation using polygons on Figure 1 Visually Estimated Burn Severity Map, not BARC derived Burn Severity Map) |
| SUMMARY OF INCREMENTAL HAZARDS AND RISKS³: | | | HAZARD¹ |
| <u>Location - Hazard type : Element at Risk</u> | | | RISK² |
| Darkwoods (NCC) Property – debris slides/flows : undeveloped private land | | | n/a |
| Darkwoods (NCC) Property – increased runoff/peak flow : forest road drainage | | | n/a |
| <i>No field work was completed in this area to confirm interpretations due to the lack of developed private property or downstream domestic water users. No risk analysis completed due to lack of public safety concerns or occupied private land at risk.</i> | | | |
| <i>In general, the extent and severity of burn in this area is sufficient to cause an elevated likelihood of landslides and peak flow runoff events, but the only down slope development is private land forestry access roads.</i> | | | |
| Brash Creek – snow avalanches : developed private land | | | H |
| Brash Creek – debris flows : developed private land | | | H |
| Brash Creek – debris flows : dwellings (note: hazard rating is lower than for private land as the debris flow would need to be a larger event in order to reach dwelling locations) | | | M |
| Brash Creek – increased peak flow : downstream drainage structures | | | H |
| <i>The Brash Creek gully headwall has areas of high burn severity as well as evidence of past landslide events and snow avalanches (size 2-3). The extent and severity of burn in the upper gully headwall area is expected to increase the likelihood of these natural hazards. The down slope gully is well defined (≥ 10 m deep) and continuous through the private land. In the event of a snow avalanche, it would most likely remain confined in the gully and would unlikely have the runout potential to reach private land given the limit start zone size. In the event of a debris flow, it is unlikely to affect areas outside of</i> | | | |

Brasch

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| <p><i>the gully, but may run out a significant distance down slope if sufficient water is present. While a domestic water license is held in Brash Creek, according to the license holder it is not presently used and there is no infrastructure in place.</i></p> | | |
| <p>Campbell Creek – debris flows : private land Campbell Creek – debris flows : dwellings (note: hazard rating is lower than for private land as the debris flow would need to be a larger event in order to reach dwelling locations) Campbell Creek – debris flows : domestic water quality Campbell Creek – increased peak flow : downstream drainage structures Campbell Creek – increased turbidity from soil erosion : domestic water quality</p> <p><i>Campbell Creek originates in a seepage area near 1360 m elevation with gentle to moderate slopes below a bedrock controlled concave basin, and does not have the same potentially unstable gully headwall characteristics as Brash Creek. Overall, debris flow potential (both initiation and transport) is less in Campbell Creek than Brash Creek. The Campbell Creek gully becomes more defined below approximately 1100 m elevation, and continues through private land with a licensed POD near 790 m elevation. A residential dwelling is located in close proximity to the gully near 780 m elevation, but the gully confinement and orientation is sufficient that in the unlikely event of a debris flow reaching this low elevation, it would not likely impact the dwelling.</i></p> <p><i>There is no direct surface flow connectivity between the fire and Campbell Creek during much of the year, but surface flow connectivity is likely during spring runoff or fall rain on snow events. As a result, these are the most likely times for adverse effects to downstream water quality. Past experience has shown that fallen needles, ash, and fine sediment mobilized as a result of surface erosion following a fire can travel significant downstream distances in small creeks, impacting both water quality and POD infrastructure.</i></p> <p><i>The high risk to domestic water quality relating to debris flows is a function of the high probability that elevated turbidity levels would reach the POD location in the event of a debris flow, and does not imply a direct impact to the POD location by a debris flow.</i></p> <p><i>According to the property owner, Mr. Rod Campbell, the private land driveway crossing of Campbell Creek was overwhelmed during an early spring runoff event in 1997 causing flooding and erosion of the private driveway.</i></p> | <p>M L M H M</p> | <p>M L H H M</p> |
| <p>Summit Creek Tributary 1 – peak flow : Highway 3 <i>Approximately 7 ha (13% of watershed) affected with moderate burn severity (generally lower than BARC implied) and primarily within previously harvested areas, therefore the incremental increase in the likelihood of peak flow hazard is estimated to be low.</i></p> <p>Summit Creek Tributary 2 – peak flow : Highway 3 <i>Approximately 12 ha (2% of watershed) affected, some of which is in a previously harvested area, and therefore there is no significant incremental increase in peak flow hazard.</i></p> | <p>L L</p> | <p>L L</p> |
| <p>Refer to accompanying maps for watershed locations and additional information.</p> <p>1. Hazard = $P(H)$, the probability of occurrence of a hazardous event 2. Risk = Partial risk $P(HA) = P(H) \times$ the probability of it reaching or affecting an element at risk 3. Rating definitions consistent with Land Management Handbook 69, Post-wildfire Natural Hazards Risk Analysis in British Columbia (Province of British Columbia, 2015)</p> | | |
| <p>FURTHER ACTIONS:</p> <ol style="list-style-type: none"> 1. Increase monitoring and maintenance on down slope forest roads (including culvert and ditch cleaning) in order to maintain drainage and address issues that arise in case of increased runoff and soil erosion. Note: Topaz Creek road was graded down slope of and within the fire perimeter between Sept. 22 and Sept. 28, with grading of spur roads ongoing on Sept. 28. 2. Increase flow capacity at road crossings of Brash Creek and Campbell Creek as a preventative measure to accommodate potential for increased runoff due to extent and severity of burned areas within the watersheds. This applies to both crown land and private land crossings. 3. Warnings should be provided to down slope residents of potential for increased debris flow and flooding risks in Brash Creek and Campbell Creek; areas adjacent to the creeks should be avoided if unusually high flow or | | |

turbidity is observed.

4. Effects of fire on hillslope hydrology should be taken into account when planning future forest development in the affected watersheds, either salvage harvesting or development of non-burned areas.

POTENTIAL MITIGATION:

Recommended mitigation limited to increasing stream crossing culvert capacities within and down slope of the fire area, and increasing road inspections/maintenance in order to reduce the likelihood of road drainage system failure, redirected runoff, and associated potential for slope failure.

COMMENTS:

Refer to accompanying maps and photos for additional information.

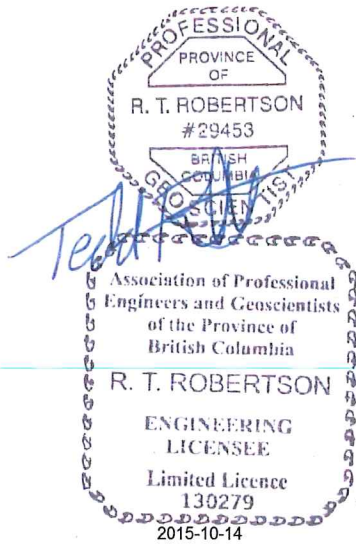
SIGNATURE:

Tedd Robertson, P. Geo. Eng. L.

ATTACHMENTS:

Photos, Figure 1 Visually Estimated Burn Severity Map, and BARC derived Burn Severity Map.

Southern Interior Forest Region, preliminary report form version 1.1, 2010



Mt. Midgely Fire 15 N70624 Select Photographs



Photo 1: Mt. Midgely Fire 15 N 70624 as viewed from the east side of the valley near Wyndell.



Photo 2: Zoomed in view of charred areas in the upper watershed areas of Brash Creek and Campbell Creek.



Photo 3: Area within upper gully headwall of Brash Creek where there is moderate to high vegetation burn severity, and high soil burn severity.



Photo 4: Evidence of overland flow near site of Photo 3.



Photo 5: High soil burn severity within area of moderate vegetation burn severity in the upper Campbell Creek drainage.

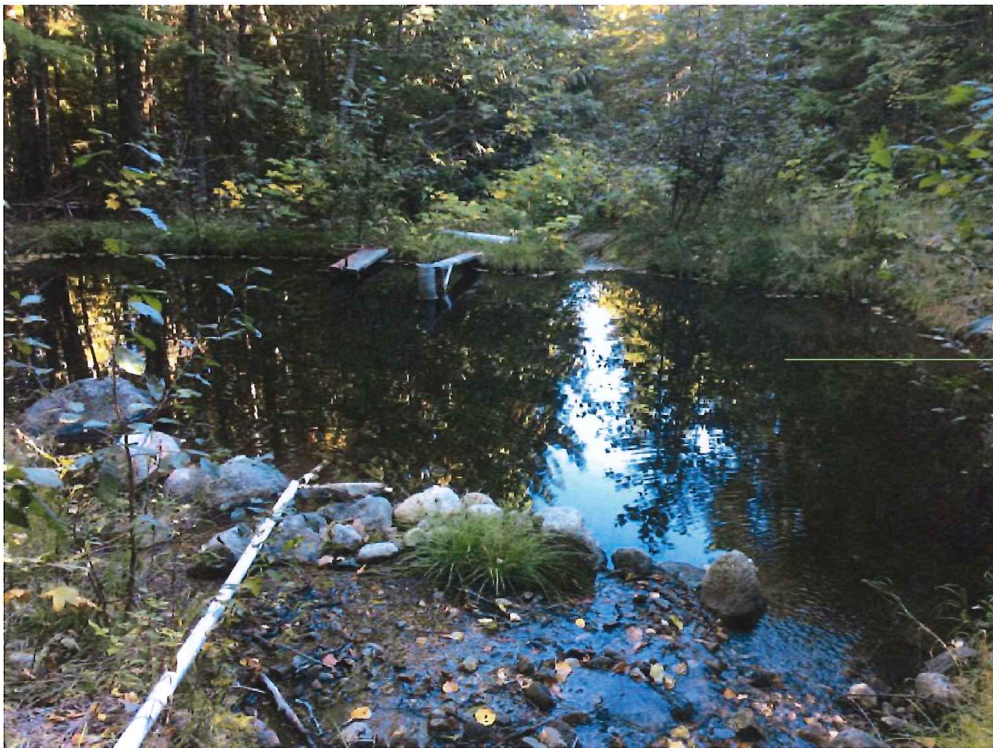


Photo 6: Licensed point of diversion for domestic water supply in Campbell Creek.