

Proposed Priority Ecological Restoration Sites

Blackwater River Ungulate Winter Range



Submitted By:

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1 Introduction

In 2013 the Society for Ecosystem Restoration in North Central BC (SERNBC) was created and registered with the Province of B.C.'s Registrar of Companies, and incorporated under the Society Act.

SERNBC is a group of individuals and agencies interested in collaborating to help restore vulnerable and degraded ecosystems in the Omineca Region of Northern British Columbia. Members include representatives from government agencies such as Forest Stewardship, Environment, and BC parks; organizations like the Fish and Wildlife Federation, B.C. Trappers Association, the Guide Outfitters Association, and Cattlemen; as well as private citizens.

The purposes of the society are to:

- Identify, treat, and monitor vulnerable ecosystems in the Omineca Region and achieve a desired future condition that will sustain ecological services and human socio-economic needs.
- Coordinate ecosystem restoration activities in the Omineca Region and foster collaboration amongst stakeholders.
- Acquire technical information on ecosystem restoration and disseminate it to members and stakeholders.

The geographic extent of the program encompasses the Vanderhoof, Fort St. James, Prince George and Mackenzie forest districts - approximately 20 percent of the landbase of British Columbia!

SERNBC activities focus on ecosystems that are either already degraded, or are in peril of becoming degraded, have a high functional importance to wildlife and biodiversity, and which are not explicitly managed through other programs. To date they have been working in Douglas-fir ecosystems, grassland ecosystems, wetland ecosystems, berry producing shrub ecosystems, and whitebark pine ecosystems.

In the summer of 2013 the Ministry of Forest Lands and Natural Resource Operations (MFLNRO) in cooperation with SERNBC, contracted Avison Management Services Ltd. (AMS), to identify and prioritize sites that would benefit from ER activities. The area of priority was narrowed to the Blackwater River Ungulate Winter Range. This summary report details the methods utilized to identify and prioritize potential treatment sites, reports the results of this exercise and outlines proposed sites and recommended treatments for these sites in the Blackwater UWR. This report is not meant to be an exhaustive list of potential treatment areas, but rather a starting point to initiate ecological restoration activities in this UWR.

2 Methods - Initial Steps

2.1 Review of Literature

Understanding management strategies and habitat guidelines for ecological restoration, and ungulate winter ranges is essential for understanding the right treatments to prescribe. The plan included reviewing relevant literature on this topic.

List of Documents Reviewed:

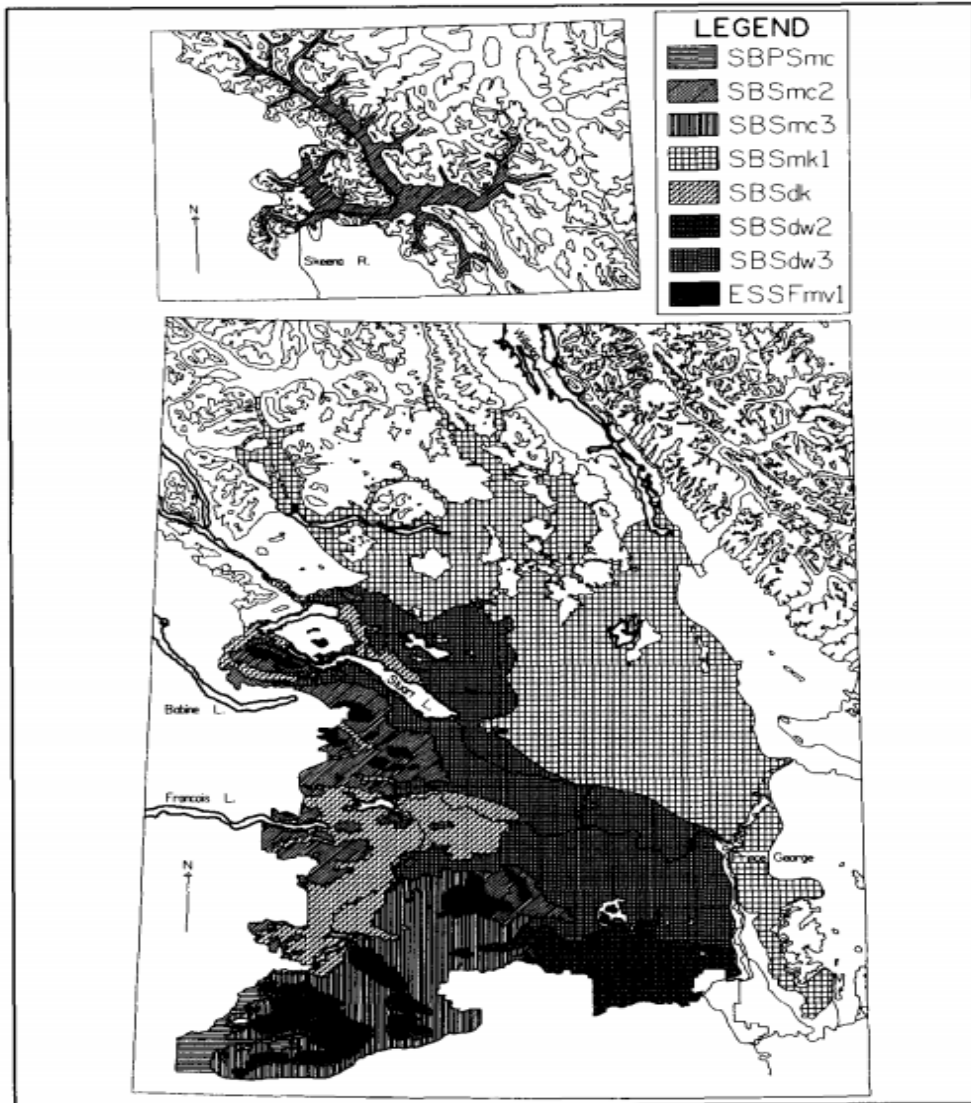
- The Vanderhoof Ecosystem Restoration Strategic Plan.
- Mule Deer Ungulate Winter Range (U-7-013) Report - Prince George Forest District, Omineca Region.
- Amended Order #U-5-001, U-5-002 and U-5-003 – Ungulate Winter Ranges Cariboo Chilcotin Land Use Plan, Transition and Deep Snowpack.
- Mule Deer Ungulate Winter Range for the Vanderhoof Forest District (U-7-011) Report.
- Mule Deer Ungulate Winter Range (U-7-002) Report – Fort St. James Forest District, Omineca Region.
- Land Management Handbook 60. Management Strategy for Mule Deer Winter Ranges in the Caribou-Chilcotin Part 1a: Management Plan for Shallow and Moderate Snowpack Zones.
- Land Management Handbook 59. Management Strategy for Mule Deer Winter Ranges in the Caribou-Chilcotin Part 1b: Management Plan for Transition and Deep Snowpack Zones.
- Habitat Guidelines for Mule Deer – Northern Forest Ecoregion.
- Winter Food Habits of Mule Deer in the Central Interior of British Columbia.
- Land Management Book 24. A Field Guide for Site Identification and Interpretation of the Prince George Forest Region.
- Additional relevant literature and reports as needed or discovered.

2.2 Creation and Review of Maps and GIS Analysis

Using GIS programs, a GIS specialist created suitable maps which include Ortho Photos, and Vegetation Resource Inventory (VRI). We conducted an initial in-office review of maps looking closely at VRI polygons in conjunction with the most recent obtainable Ortho Photos in the UWR. Polygons of potential treatment sites were created based on prioritization of treatment possibilities within the UWR.

Initial identification, listing, and review of potential Biogeoclimatic Ecosystem Classification System (BEC) site series were also conducted during this step.

Figure 1: Forest Ecosystems of the southwest portion of the Prince George Forest Region.



Potential site series identified for the Blackwater UWR are as follows:

- SBSdw2/01
- SBSdw2/02
- SBSdw2/03
- SBSdw2/04
- SBSdw2/05
- SBSdw2/06
- SBSdw2/07
- SBSdw2/08
- SBSdw2/09
- SBSdw2/10
- SBSdw2/11
- SBSmh/01

Draft

2.3 Initial Prioritization of Potential Treatment Sites

Based on the VRI and Ortho data in the created maps, polygons of potential treatment areas were created. Polygons of potential treatments areas were classified into treatment categories, these categories were:

- Prescribed Burn
- Selective Mechanical Harvest
- Thin From Below (Mechanical)
- Thin From Below (Hand Crew)
- Multiple Treatment Phases

Not every potential treatment site in a large UWR like the Blackwater could be visited or sampled. Identified potential treatment polygons were prioritized using the following point system criteria:

<u>Criteria</u>	<u>Points</u>
• Assumed Potential Treatment Options for Site are Aligned with Recommended Management Strategies for Mule Deer UWR (High, Moderate, Low)	(3,2,1)
• Vulnerability and Treatment Timing Needs (Immediate, Short term, Long Term)	(3,2,1)
• Proximity to Other Potential Treatment Sites (Close, Moderate, Far)	(3,2,1)
• Access to site (Good, Moderate, Poor)	(3,2,1)
• Potential Project Costs by Type (Prescribed Fire, Harvest, Thinning)	(3,2,1)

Higher point treatment polygons were given priority in terms site visits over the lower point treatment areas.

2.4 Reconnaissance

The initial in-office mapping exercises and prioritization process yielded numerous potential treatment sites. Although some sites were considered higher priority in terms of site visits over other areas, due to funding constraints, time, and travel distances, lower priority sites that were in close proximity to higher priority sites were visited in conjunction with higher priority sites.

Field reconnaissance included an initial site visit. Crews attempted to see enough of the treatment polygon to get a sense if the ecosystem in the polygon was degraded, vulnerable, and if so, appeared to be a suitable area for potential treatment. If the site appeared to lack functionality, degraded, or vulnerable and the site could be potentially treated to improve its

current or future state, detailed sampling and data collection occurred as outlined in section 2.5.

If it was determined that the site was functioning well, not degraded or vulnerable, or was likely to be precluded from treatment based on any obvious exclusionary factors [e.g. private land, proximity to structures, stand structure or site series differing from what was portrayed by GIS analysis, (i.e. already logged, etc...)], minimal data was collected.

Additionally, while in the field, additional potential treatment areas were identified that had not previously been identified during the in-office phase of work. These areas were considered and added to the list of potential treatment areas. Typically, as field crews were already in the area and present at the site, the choice was made to go ahead with a detailed site analysis immediately to avoid additional costs of returning to the site at a later date.

As funding for this project was limited, in some instances photo plot sites were initiated when intensive sampling had already occurred elsewhere on the site, and it was determined that additional intensive sampling plots would not necessarily provide significantly different reconnaissance information than the initial plot had already provided. These photo plots are quick and easy to produce and do provide good photographic information on the site including vegetation structure and diversity, stand structure, coarse woody debris abundance, and canopy closure.

2.5 Site Analysis and Initial Treatment Prescription

Once it was determined that a potential treatment area site was either not functioning, degraded, or vulnerable and could potentially be treated to restore or improve it to a future functioning state, the site was analyzed further. Further analysis included describing the area using the Biogeoclimatic Ecosystem Classification System down to the site series, data regarding topography, stand structure, understory structure, tree regeneration, wildlife habitat use, degradation indicators, fire risks, and fuels information. This data was recorded on the ER Field Card (which can be viewed in Appendix 4). Some sites were fairly homogenous in terms of the site series classification, while others varied greatly in topography, gradient, and aspect and had multiple site series within a potential treatment area. We attempted to sample and identify each site series within a given potential treatment area.

Part of the site analysis was to also field verify in-office categorization and prioritization of potential treatment areas, update and change these if necessary, formulate an initial field prescription of the treatment polygon, and gather information which may modify polygon boundaries based on field reconnaissance of the area.

3 Post Field Work Treatment Site Prioritization

After field sampling had concluded, we again utilized the gathered information to further prioritize potential treatment sites. This process included dropping some sites that did not meet prioritization criteria, and adding and refining prioritization criteria to determine which sites treatment prescriptions would be developed for.

3.1 Dropped Sites

Some sites that were visited were dropped from the original list if one or more of the following criteria applied. Criteria for dropping sites are outlined as follows:

Criteria

- Site has changed, not as portrayed on Ortho photos.
- Leading tree species not as indicated in VRI.
- Slope or gradient too great or not enough for treatment.
- Site is functioning well, not degraded or vulnerable.
- Treatment is not feasible.
- Treatment for the site would be overly expensive to treat (i.e. large areas of small dense non-marketable MPB killed pine).

3.2 Modified Potential Treatment Sites

Portions of some identified sites polygons were either functioning well or were not feasible for treatment, while smaller portions were good candidates for treatment. In these cases the boundaries of the potential treatment area were modified to exclude the non-treatable portion of the site where appropriate. Using a desktop analysis, some site polygons were initially classified in one potential treatment type; however, after a site visit and sampling, these sites were modified and placed into another potential treatment type.

3.3 Additional Prioritization Criteria

We used additional prioritization criteria to further prioritize potential treatment areas that were not dropped. The objective was to prioritize a few sites that were threatened, degraded, vulnerable, and/or had lost functionality, and have a high probability of achieving treatment objectives using available resources efficiently. To achieve this, we used the following prioritization criteria.

<u>Criteria</u>	<u>Points</u>
• Potential Treatment Options for Site are Aligned with Recommended Management Strategies for Mule Deer UWR (High, Moderate, Low)	(3,2,1)
• Rarity of Threatened, Vulnerable, or Degraded Ecosystem	(3,2,1)
• Vulnerability of site (Vulnerable, Threatened, Degraded)	(3,2,1)
• Treatment Timing Needs (Immediate, Short term, Long Term)	(3,2,1)
• Functionality of Site (Poor, Adequate, Good)	(3,2,1)
• Proximity to Other Potential Treatment Sites (Close, Moderate, Far)	(3,2,1)
• Access to site (Good, Moderate, Poor)	(3,2,1)
• Potential Project Costs by Type (Prescribed Fire, Harvest, Thinning)	(3,2,1)
• Likelihood of Successful Treatment (High, Moderate, Low) (i.e. timber types, fire breaks, asses to existing roads, costs, etc...)	(3,2,1)

To view the table used to calculate relative priority of each site, see Appendix 7 - Blackwater UWR - Potential ER Treatment Site Prioritization Table

4 Results

4.1 Original Potential Treatment Areas List

A total of 23 potential treatment sites were identified for field reconnaissance sampling. Desktop prioritization of potential treatment areas identified 23 total sites¹, these sites were categorized as follows.

Table 1. Original list of potential sites by treatment category in the Blackwater UWR.

Site Id	Approximate Location			Potential Treatment Prescription Category	Approximate Hectares ²
1	10U	507649	5906560	Prescribed Fire	40.02
2	10U	507474	5907330	Thin From Below (Hand Crew)	52.72
3	10U	505328	5906140	Prescribed Fire	53.63
4	10U	504833	5906090	Selective Harvest	17.07
5	10U	503424	5906220	Selective Harvest	3.96
6	10U	501896	5905370	Prescribed Fire	91.32
7	10U	501763	5906420	Selective Harvest	22.37
8	10U	501902	5906750	Selective Harvest	33.36
9	10U	501142	5907300	Selective Harvest	16.97
10	10U	494527	5905080	Prescribed Fire	129.89
11	10U	494011	5905580	Thin From Below (Hand Crew)	15.43
12	10U	491438	5905000	Selective Harvest	46.5
13	10U	491564	5905990	Thin From Below (Hand Crew)	43.19
14	10U	490293	5905070	Selective Harvest	5.92
15	10U	490227	5905250	Selective Harvest	7.33
16	10U	490552	5905380	Stand Thinning (Hand or Mechanical)	31.25
17	10U	489864	5905760	Thin From Below (Mechanical)	47.87
18	10U	487502	5905820	Thin From Below (Mechanical)	83.9
19	10U	485339	5906210	Prescribed Burn	55.86
20	10U	482667	5905660	Prescribed Burn	71.1
21	10U	482178	5906280	Selective Harvest	78.25
22	10U	478996	5905250	Selective Harvest	100.14
23	10U	471594	5903350	Selective Harvest	26.53
24	10U	489401	5905180	Selective Harvest	27.61
Total					1102.19

¹ A "site" is a polygon representing an identified potential treatment area.

Eight (8) sites were categorized as potential prescribed burn treatment areas. Three (3) sites were categorized as potential Thin From Below (Hand Crew) treatment areas. Eleven sites were categorized as potential Selective Harvest treatment areas. Two (2) sites were categorized as potential Thin From Below (Mechanical) treatment areas. One (1) site was categorized as a potential combination of Thin From Below (Mechanical) and Thin From Below (Hand Crew) treatment area.

4.2 List of Dropped Sites

Several sites were dropped after site visits conformed that these sites, although in need of thinning contained non –merchantable mountain pine beetle killed pine. These stands typically include young age class Douglas fir. Mechanical treatments would be too expensive as costs would not be offset by timber sales. In addition, high levels of mortality or damage to immature Douglas fir would likely result.

Table 2. List of Dropped Potential Treatment Sites.

Site Id	Potential Treatment Category	Reason Dropped
4	Selective Harvest	Non-Merchantable, pine beetle killed 25-30 yr. regen.
21	Selective Harvest	Non-Merchantable
22	Selective Harvest	Non-Merchantable
23	Selective Harvest	Non-Merchantable

4.3 List of Modified Sites

Seven potential treatment site boundaries were modified as a result of site reconnaissance visits. Modification of these sites occurred for various reasons including:

1. Treatment area is too large and extends outside of UWR.
2. Treatment is appropriate in only a portion of the area.
3. Slope $\geq 70\%$, existing erosion was evident in portions of the area, and additional erosion potential is high.
4. Reduction of the footprint of Post Fire Fir Beetle Post Management.
5. A different treatment type is more appropriate for the site.

Table 3. List of Modified Potential Treatment Sites.

Site Id	Potential Treatment Category	Reason Modified
2	Thin From Below (Hand Crew)	Treatment area is too large and extends outside of UWR, smaller area is appropriate.
3	Prescribed Fire	Treatment is appropriate in only a portion of the area.
6	Prescribed Fire	Slope $\geq 70\%$ in some areas, erosion evident in these areas, additional erosion potential.

10	Prescribed Fire	Reduce the footprint of Post Fire Fir Beetle Post Management
18	Thin From Below (Mechanical)	Treatment is appropriate in only a portion of the area.
19	Prescribed Burn	Potential treatment is more suitable for thinning
20	Prescribed Burn	Potential treatment is more suitable for thinning

4.4 List of Recommended Sites Locations

The following table is the updated and narrowed list of recommended treatment areas for the Blackwater UWR.

Table 4. List of Recommended Treatment Sites.

Site Id	Approximate Location			Potential Treatment Prescription Category	Modified Hectares ²
1	10U	507649	5906560	Prescribed Fire	40.02
2	10U	507474	5907330	Thin From Below (Hand Crew)	26.4
3	10U	504952	5905750	Prescribed Fire	10.69
5	10U	503424	5906220	Selective Harvest	3.96
6A	10U	501800	5905560	Prescribed Fire	12.37
6B	10U	501403	5904730	Prescribed Fire	7.52
7	10U	501763	5906420	Selective Harvest	22.37
8	10U	501902	5906750	Selective Harvest	33.36
9	10U	501142	5907300	Selective Harvest	16.97
10	10U	494527	5905080	Prescribed Fire	112.04
11	10U	494011	5905580	Thin From Below (Hand Crew)	15.43
12	10U	491438	5905000	Selective Harvest	46.5
13	10U	491564	5905990	Stand Thinning (Hand or Mechanical)	43.19
14	10U	490293	5905070	Selective Harvest	5.92
15	10U	490227	5905250	Selective Harvest	7.33
16	10U	490552	5905380	Stand Thinning (Hand or Mechanical)	31.25
17	10U	489864	5905760	Thin From Below (Mechanical)	47.87
18	10U	487502	5905820	Thin From Below (Mechanical)	83.9
19	10U	485339	5906210	Thin From Below (Mechanical)	55.86
20	10U	482667	5905660	Thin From Below (Mechanical)	71.1
24	10U	489401	5905180	Selective Harvest	27.61
Total					721.66

4.5 List of Recommended Sites by Priority

The following table is the narrowed list of prioritized treatment sites for the Blackwater UWR.

Table 5. List of Recommended Treatment Sites by Priority.

Site Id	Potential Treatment Prescription Category	Priority Rating
1	Prescribed Fire	Moderate
2	Thin From Below (Hand Crew)	Moderate
3	Prescribed Fire	Moderate
5	Selective Harvest	High
6A	Prescribed Fire	High
6B	Prescribed Fire	High
7	Selective Harvest	High
8	Selective Harvest	High
9	Selective Harvest	High
10	Prescribed Fire	High
11	Thin From Below (Hand Crew)	High
12	Selective Harvest	High
13	Stand Thinning (Hand or Mechanical)	High
14	Selective Harvest	High
15	Selective Harvest	High
16	Stand Thinning (Hand or Mechanical)	High
17	Thin From Below (Mechanical)	High
18	Thin From Below (Mechanical)	High
19	Thin From Below (Mechanical)	Low
20	Thin From Below (Mechanical)	Low
24	Selective Harvest	High

5 Discussion and Recommendations

This report is a summary of a systematic approach used to identify and help initial prioritization of potential treatment sites in the Backwater Ungulate Winter Range. It is important to note that these sites were identified and prioritized using desktop GIS analysis, followed by the collection of preliminary ecological reconnaissance data. It is expected that additional refinement and modification of each site will be required as additional information is gathered and more is understood about the best restoration methods and procedures to achieve the desired results. Given the constraints for this project, we were not able to place a reconnaissance sampling plot in every site. Typically, these sites were visited briefly but detailed ecological information was not collected as they were similar to sites sampled in the same general vicinity. The author of the report recommends additional intensive sampling of potential treatment sites to determine more accurate estimates of timber and CWD volumes. Additional field visits should be utilized to further refine treatment prescriptions and delineate and layout realistic and detailed treatment boundaries. For sites that have been identified as potential prescribed fire treatment areas, it is expected that additional assessment and ground work will need to be initiated prior to the commencement of a burn. Once a potential site has been selected by SERNbc for treatment, a detailed treatment prescription should be developed in cooperation with management and regulatory agencies.

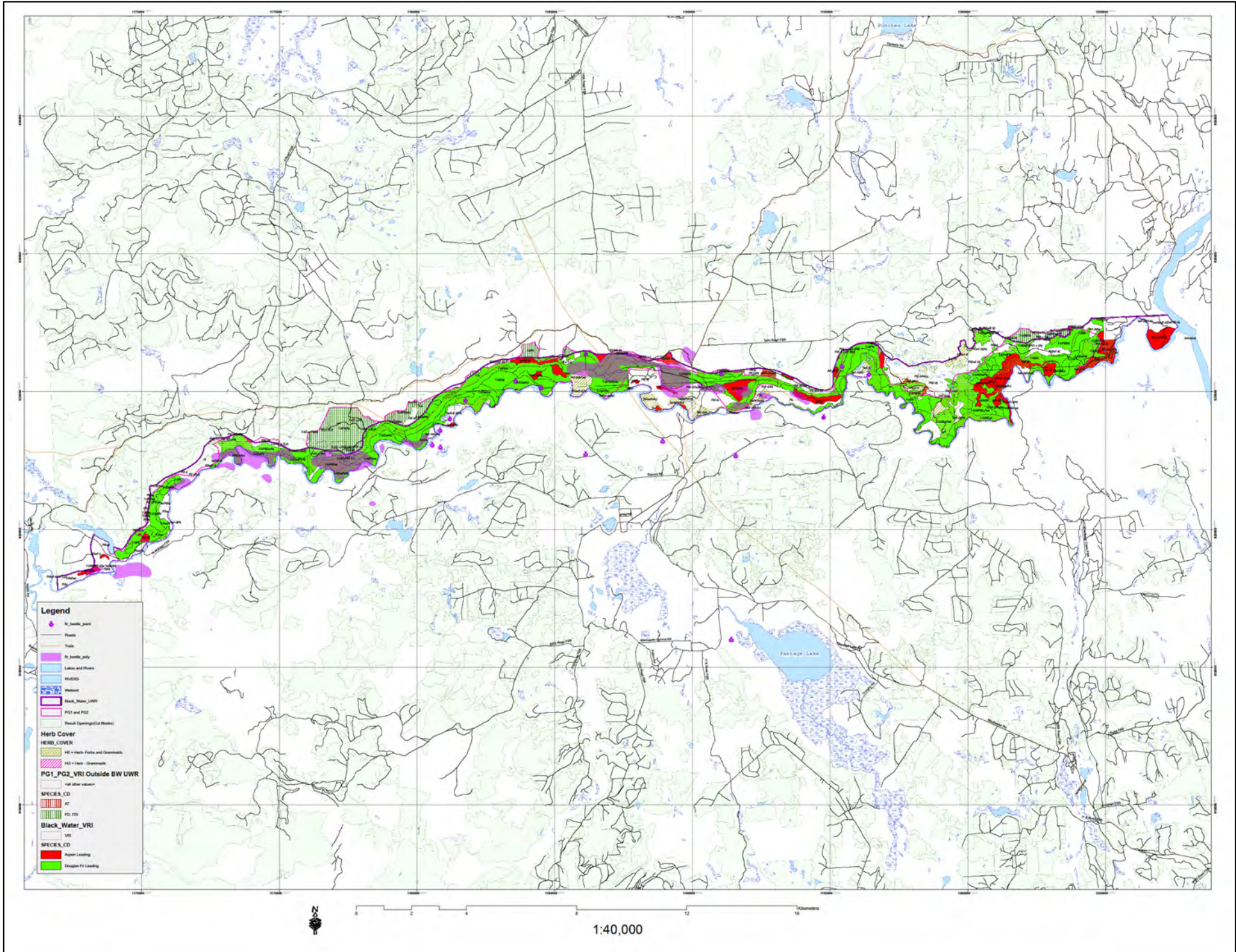
Plot BW007 is representative of small unique grassland sites that are not well described in the Prince George site identification field guide, and are found in multiple locations in site10, at sites 6A and 6B, and potentially at other sites that we were not able to visit during the field portion of the project. These sites have some the attributes of BGxw2, IDFxM/04, SBSdk2/81, and SBSdk2/82, however none of these site series describes precisely the vegetative species and structure that is present at these sites. The author suspects that these sites may be a unique and likely threatened site series which is in danger of being lost due to forest encroachment. It is unknown but presumed that these sites may have been maintained by anthropogenic First Nations burning of the south facing slopes along the Blackwater River before the era of intensive fire control, and have since been reverting back into forests in the absence of fire. These areas are of particular interest as they may benefit greatly from ecological restoration efforts and provide important wildlife habitat in the Blackwater UWR.

6 References

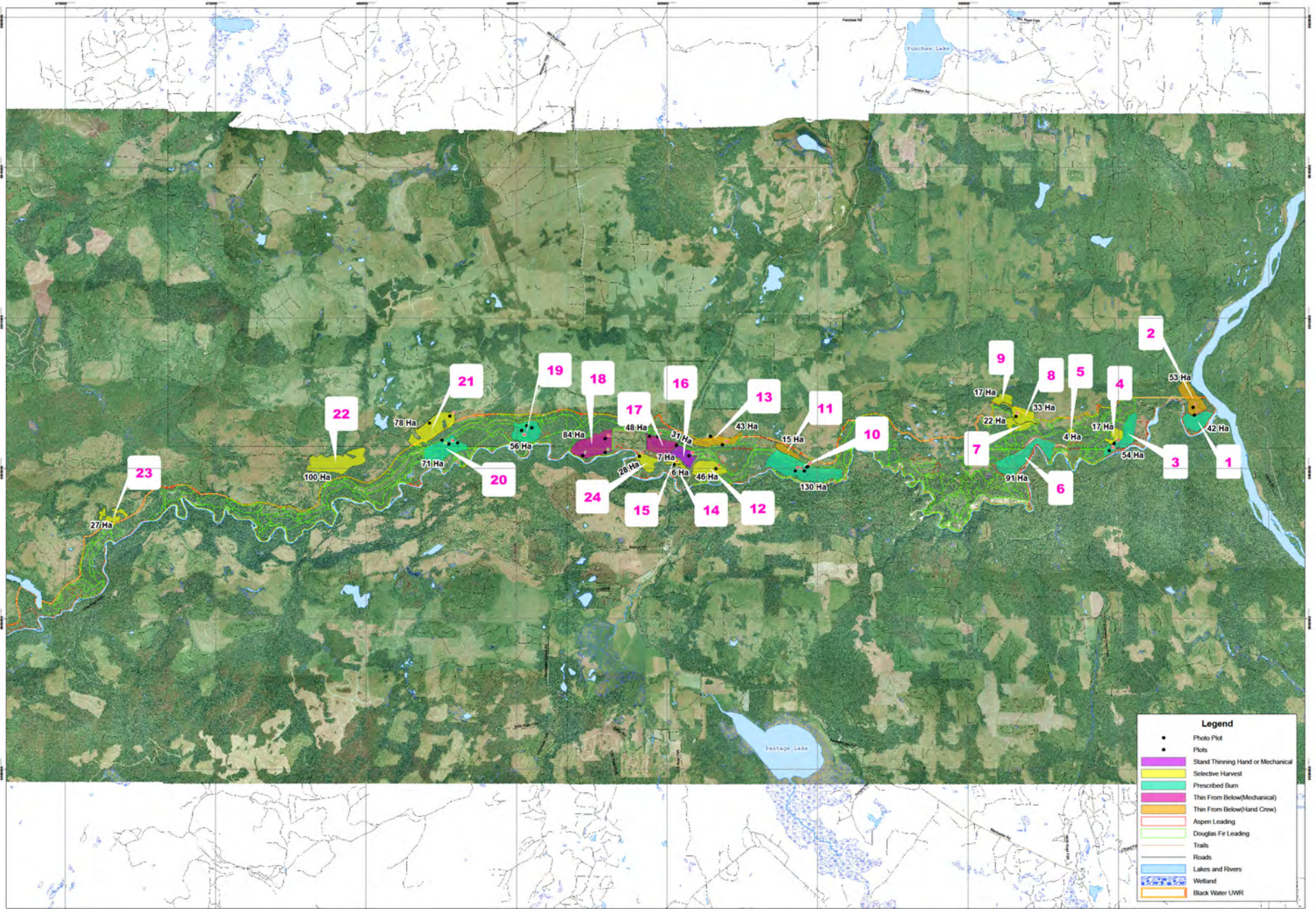
- Amended Order #U-5-001, U-5-002 and U-5-003 – Ungulate Winter Ranges Cariboo Chilcotin Land Use Plan, Transition and Deep Snowpack.
- Armleder, H. M., M. Waterhouse, D. Keisker, and R. Dawson. 1994. Winter habitat use by mule deer in the central interior of British Columbia. *Can. J. Zool.* 72:1721-172
- Brade, B, D. Stevenson. 2003. Mule Deer Ungulate Winter Range (U-7-013) Report - Prince George Forest District, Omineca Region. Ministry of Water Land and Air Protection.
- Day, J.K. 1998. Selection management of interior Douglas-fir for mule deer winter range. Masters Thesis, UBC Faculty of Forestry. Vancouver, B.C. 116 pp.
- Day, J.K. 2007. Management and working plan #3. UBC/Alex Fraser Research Forest. 168 pp.
- Dawson, R., H. Armleder, B. Bings, and D. Peele. 2007. Land Management Handbook 60. Management Strategy for Mule Deer Winter Ranges in the Caribou-Chilcotin Part 1a: Management Plan for Shallow and Moderate Snowpack Zones.
- Dawson, R., H. Armleder, B. Bings, and D. Peele. 2006. Land Management Handbook 59. Management Strategy for Mule Deer Winter Ranges in the Caribou-Chilcotin Part 1b: Management Plan for Transition and Deep Snowpack Zones.
- Delong, C., D. Tanner and M. Jull. 1993. A field guide for site identification and interpretation for the southwest portion of the Prince George Forest Region. Land Management Handbook No. 24. Ministry of Forests, Prince George Region.
- Hayden, J., G. Ardt, M. Fleming, T. W. Keegan, J. Peek, T. O. Smith, and A. Wood. 2008. Habitat Guidelines for Mule Deer: Northern Forest Ecoregion. Mule Deer Working Group, Western Association of Fish and Wildlife Agencies. USA.
- McCulloch, L. 2011. The Vanderhoof Ecosystem Restoration Strategic Plan.
- Sulyma, S , Vinnedge, J. 2003. Mule Deer Ungulate Winter Range (U-&-002) Report . Fort St. James Forest District, Omineca Region. Ministry of Water Land and Air Protection.
- Yaremko, L . 2003. Mule Deer Ungulate Winter Range for the Vanderhoof Forest District (U-7-011) Report. Vanderhoof Forest District, Omineca Region. Ministry of Water Land and Air Protection.
- Waterhouse, M.J., Armleder, H.M. and R.J. Dawson. 1994. Winter Food Habits of Mule Deer in the Central Interior of British Columbia. Research Note No. 113. Ministry of Forests, Victoria, BC. 30p.

7 Appendices

**Appendix 1 -
VRI Data used in selecting potential treatment sites**



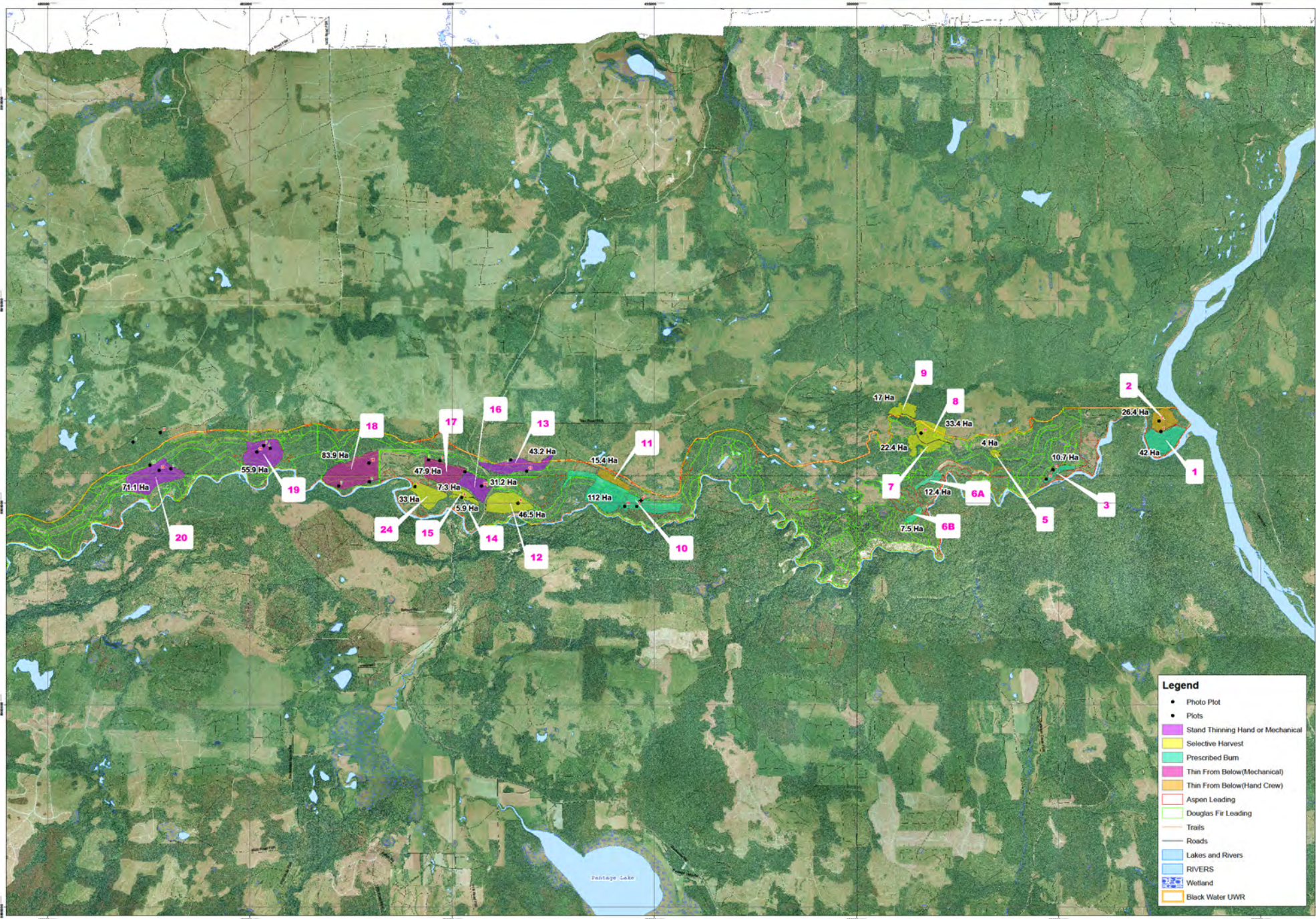
**Appendix 2 -
Map of Selected Potential Treatment Sites to be Field Sampled**



1:40,000



**Appendix 3 -
Map of Selected Potential Treatment Sites Following Reconnaissance Sampling**



Legend

- Photo Plot
- Plots
- Stand Thinning Hand or Mechanical
- Selective Harvest
- Prescribed Burn
- Thin From Below (Mechanical)
- Thin From Below (Hand Crew)
- Aspen Leading
- Douglas Fir Leading
- Trails
- Roads
- Lakes and Rivers
- RIVERS
- Wetland
- Black Water UWR



1:30,000



**Appendix 4 -
Field Data Forms for Each Plot**

Plot BW 001 (10U 507526 5906772) – At Site 1

Ecological Restoration Field Card

Date: 08/26/13 Completed By: _OA/DZ Location Description: Confluence of BW and Fraser River

Ecosystem Type				BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access	
BW-001	Fd	10U	507526	5906772	SBSdw2	4		4(N,E,S,W,G)	ATV Trail With in 200 m	

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spc Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
S	L	2	(Fd, 75%)	50%	81-100	25.59	24.60	173.88	100.00	9.89	117.03

Understory (3.99m radius plot)								Tree Regeneration			
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
All	17	All	25	All	60	All	10	Fd	2	2-10m	200
								Ep	2	2-10m	200

Wildlife Evidence			Habitat Use									
Wildlife Spp	Brwse Spp (Y/N) (Fd,Lichen,Amal,Salix,Cose,Vied,Ar uv,Pamy,Roac,Syal)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)					UWR (Y/N)	Other Comment
						Moose	Deer	Elk				
Mule Deer	Old skull			Wi	L	0	0	0			Y	
Moose	Salix spp.	1%		Su	L							

Fire Risks			Fuel							Soils	
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity	Fuel	Ht to Live Crwn	Distance to	Humus	Soil
			CWD %	7-12 cm diam %	<7 cm %	(C, SC, P, D)	Depth (cm)	(m)	Fuel Break	Depth (cm)	Texture
Fd Stands	5km	N	5-10	5	25	SC	35	15	1km	12	Sandy

forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, mestic animals, Excessive roading)

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
Lack of Browse Species	Low understory, Lack of Wildlife Use				Summer	Decrease Crown Closure	

Plot #	Tree/Piece #	Species	Trees (>12.5 cm dbh, 5.64 m radius plot)						CWD (30m transect)						
			Age Class	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam (cm)	Intersec Diam (cm)	Tilt Angle (%)	Decay Class	D²²
	1	Fd	5	34		27	L	1	Pb	4.5	10	9	2	9	81
Live BAF #	2	Fd	5	18		20	L	1	Sx	10	15	2	1	5	4
0.052	3	Fd	5	21		27	L	1	Pb	7	12.5	16	2	6	256
Trees/Swp	4	Fd	5	25.5		25	L	1	Sx	25	32	30	2	4	900
14	5	Fd	5	30.6		28	L	1	Sx	25	35	32	2	4	1024
Snag BAF #	6	Fd	5	23.7		24	L	1	Sx	10	13	12	3	4	144
0.042	7	Fd	5	17.5		12	L	2	Sx	10	11	3.5	3	5	12.25
Snags/Swp	8	Fd	5	22.5		24	L	1	Sx	13	18	12	6	5	144
1	9	Fd	5	23		25	L	1	Sx	18	22	6	3	6	36
	10	Sx	5	23		23	D	4	Sx	6	13	12	2	9	144
	11	Fd	5	28.5		28	L	1	Pb	12	16	10	6	6	100
	12	Fd	5	30		28	L	1							
	13	Sx	5	30		28	L	1							
	14	Fd	5	22		22	L	1							
	15	Fd	5	34.5		28	L	1							
Average (Live)				25.77		24.60									
Average (Snag)				23.00		23.00				12.77					2845.25

Plot BW 002 (10U 507481 5907031) – At Site 1

Ecological Restoration Field Card Date: 08/26/13 Completed By: OA/DZ Location Description: Confluence of BW and Fraser River

Ecosystem Type				BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access	
BW-002	Fd	10U	507481	5907031	SBSdw2	1		5	Good Rd - ATV trail	

Topography		Trees (5.64m radius plot)									
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spp Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
s	L	4	(Fd,60), (SX,25), (At,5), (Pb,10)	40%	L1	28.90	24.40	78.72	100.00	2.69	52.46

Understory (3.99m radius plot)						Tree Regeneration					
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
All	5	All	40	All	60	All	0	(Sx,3)	3	1-2 m	300

Wildlife Evidence			Habitat Use							
Wildlife Spp	Brwse Spp (Y/N)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)			UWR (Y/N)	Other Comment
	(Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)					Moose	Deer	Elk		
Moose	Mountain Maple	30		Su	L	0	0	0	Y	No Ungulate Pellets

Fire Risks			Fuel						Soils		
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity	Fuel	Ht to Live Crwn	Distance to	Humus	Soil
			CWD %	7-12 cm diam %	<7 cm %	(C, SC, P, D)	Depth (cm)	(m)	Fuel Break	Depth (cm)	Texture
Fd	5 km	N	30	10	15	P	40	15	1 km	10	Fine Sandy Loam

Forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, nestic animals, Excessive roading)

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
Lack of Wildlife Use	Lack of Functionality		M	Thin From Below	Su, Fa, Early Wi	Open Canopy allow more light for understory species	

Plot # BW-002	Tree/Piece #	Species	Trees (>12.5 cm dbh, 5.64 m radius plot)						CWD (30m transect)						
			Age Class	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2
	1	At	6	25.5		25	L	1	Sx	28	35	15.6	2	4	243.36
Live BAF #	2	Fd	6	22		25	L	1	Sx	28	40	16	2	4	256
0.066	3	Fd	6	35		28	L	1	Sx	8	10	7	1	6	49
Trees/Swp	4	Fd	6	50		32	L	1	Sx	25	33	16	3	4	256
4	5	Sx	2	12		12	D	2	Sx	15	18	11	2	7	121
Snag BAF #	6								At	10	10	9	3	8	81
0.011	7								Sx	10	15	13	3	7	169
Snags/Swp	8								Sx	10	15	10	3	7	100
1	9														
	10														
	11														
	12														
	13														
	14														
	15														
Average (Live)				28.9			24.4								
Average (Dead)				12			12								1275.36

Draft

Plot BW 003 (10U 489698 5906052) – Near Site 17

Ecological Restoration Field Card Date: 09/03/13 Completed By: OA Location Description: Blackwater River UWR

Ecosystem Type				BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access	
BW-003	Fd	10 U	489698	5906052	SBSdw2	1		5	Old Road	

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spp Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
S	L	23	(Fd, 70), (Pl, 10), (Sx, 10), (At, 10)	50%	L1	21.33	16.58	31.10	300.00	134.70	103.20

Understory (3.99m radius plot)								Tree Regeneration			
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Prickly Rose	30	False Solomons Seal	10	Feather Moss	80	Pine Grass	60	Fd	10	5cm-1.3m	1000
Soopalalie	20	Wildlife Strawberry	10			Blue Wild Rye	30				
Saskatoon	10	Creamy Peavine	10								
Trailing Raspberry	10	Fire weed	10								
		Showy Aster	10								

Wildlife Evidence			Habitat Use							
Wildlife Spp	Browse Spp (Y/N) (Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)				
						Moose	Deer	Elk	UWR (Y/N)	Other Comment
Moose			Escape	Su	L	0	0	0	Y	

Fire Risks			Fuel							Soils	
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity (C, SC, P, D)	Fuel Depth (cm)	Ht to Live Crwn (m)	Distance to Fuel Break	Humus Depth (cm)	Soil Texture
			CWD %	7-12 cm diam %	<7 cm %						
Fd UWR	2	N	30	25	5	P	35	5		5	Sandy Loam

Forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, nestic animals, Excessive roading)

Degradation Type				Treatment Requirements			Constraints
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	(descriptive, e.g. IBD)
Fir Beetle	Beetle killed trees	Doesn't meet UWR specs		Part Cut		UWR Thinning Guidelines	

Plot #	Trees (>12.5 cm dbh, 5.64 m radius plot)									CWD (30m transect)						
	Tree/Piece #	Species	Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2	
Live BAF # 0.012	1	Fd	40	11		9	L	1	Fd	5	7	6	2	1	36	
	2	Fd	40	11		9	L	1	Fd	15	18	12	10	1	144	
	3	Fd	40	10		7	L	1	Fd	25	35	25	10	1	625	
Trees/Swp 9	4	Fd	40	12		9	L	1	Fd	9	15	8	12	1	64	
	5	Fd	150	62.5		30	D	3	At	15	30	25	15	4	625	
Snag BAF # 0.189	6	Fd	25	6		5	L	1	At	8	18	15	15	4	225	
	7	Fd	150	54.5		28	D	3	At	8	17	12	15	4	144	
Snags/Swp 3	8	Fd	50	19.5		20	L	1	Fd	11	16	12	40	1	144	
	9	Fd	45	15		19	L	1	At	5	20	14	15	4	196	
	10	Sx	20	6		3	L	1	Fd	10	17	15	35	1	225	
	11	Pl	80	30		30	D	3	Fd	11	16	9	10	1	81	
	12	Fd	150	18.5		30	L	1								
	13															
	14															
	15															
Average (Live)			69.17	12.11		12.33										
Average (Dead)				49.00		29.33							16.27		2509.00	

Draft

Plot BW 004 (10U 491628 5904993) – At Site 12

Ecological Restoration Field Card Date: 09/04/13 Completed By: OA Location Description: Blackwater River UWR

Ecosystem Type		UTM Zone	Long (X coord)	Lat (Y coord)	BEC Unit	Site Series	FHF	Photos	Comments on Access
Identifier	(Fd, Grass, Wetl, Berry)				(Z,S,V)	(2)			
BW004	Fd, Berry	10U	491628	5904993	SBSdw2	6		6	Close to Blacwater Rd, Good Access

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spp Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
160-220 (S)	Level	0	(Pl,50), (Fd,40), (Sx,10)	30%	L1	23.07	19.57	46.66	300.00	32.76	242.85

Understory (3.99m radius plot)						Tree Regeneration					
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Velvet leaved Blueberry	40	Fireweed	10	Feathermoss	70	Pinegrass	70	Fd	3	1.7-4m	300
Kinnikinnick	40	Creamy Peavine	10								
Saskatoon	10	Buch Berry	<10								
Salix	10										

Wildlife Evidence			Habitat Use							
Wildlife Spp	Brwse Spp (Y/N) (Fd,Lichen,Amal,Salix,Cose,Vied,Aru v,Pamy,Roac,Syal)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)			UWR (Y/N)	Other Comment
Moose	Salix	10	Forage	Wi	M	Moose	Deer	Elk	Y	
						0	0	0		

Fire Risks			Fuel						Soils		
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	CWD %	Fuel Load (% Cover) 7-12 cm diam %	<7 cm %	Continuity (C, SC, P, D)	Fuel Depth (cm)	Ht to Live Crwn (m)	Distance to Fuel Break	Humus Depth (cm)	Soil Texture
Fd Forest	3 km across river	N	40	100	0	SC	25	5	500m	12	Sandy

forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, mestic animals, Excessive roading)

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
High Fuel loading	High CWD content/Blowdown	Prevent Stand Changing Event	M	Part Cut	Preferably Winter	Reduce Fuel Load, Promote Fd growth	Leave all Fd, Sx, Follow UWR Guidelines

Plot #	Tree/Piece #	Species	Trees (>12.5 cm dbh, 5.64 m radius plot)						CWD (30m transect)						
			Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2
	1	Sx	80	28.5		20	L	1	Pl	15	18	17	5	3	324
Live BAF #	2	Fd	60	18.5		18	L	1	Pl	23	25	23	3	1	625
0.039	3	Fd	60	18		18	L	1	At	6	11	9	3	3	121
Trees/Swp	4	Pl	80	20		22	D	3	Pl	22	20	17	10	1	400
4	5	Pl	80	31		23	D	3	Pl	22	23	21	5	1	529
Snag BAF #	6	Pl	60	21.5		18	D	3	Pl	20	21	19	6	1	441
0.046	7	Sx	60	24		18	L	1	Pl	21	21	19	10	1	441
Snags/Swp	8								At	7	19	16	8	3	361
3	9								Pl	23	28	20	10	1	784
	10								Sx	12	18	9	6	1	324
	11								Pl	15	20	12	3	2	400
	12								Pl	20	25	19	3	1	625
	13								Pl	20	23	18	3	2	529
	14														
	15														
Average (Live)			68.57	22.25		18.50									
Average (Dead)				24.17		21.00									5904.00

Draft

Plot BW 005(10U 489084 5905404) – At Site 24

Ecological Restoration Field Card Date: 09/04/13 Completed By: _OA Location Description: Blackwater River UWR

Ecosystem Type				BEC Unit	Site Series	FHF	Photos	Comments on Access
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)		
BW005	Fd/Berry	10U	489084	5905404	SBSdw2	6	6	Old road to site

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spp Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
180-230 (S)	Level	2	(Pl,40), (Fd,30), (Sx,10), (At,20)	30%	L1	22.45	14.09	30.19	800.00	80.00	232.86

Understory (3.99m radius plot)						Tree Regeneration					
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Velvet Leaved Blueberry	20	Bunch Berry	10	False Polytrichum	15	Pine Grass	80	Fd/Sx	3	1.5-5m	300
Soopalalie	20	Wild Stawberry	10	Feather Moss	50						
Saskatoon	10	One Sided Wintergreen	5								
Prickly Rose	15	Northern Sandwart	1								
Kinnikinnick	30	Queens Cup	10								
Salix spp.	5										

Wildlife Evidence			Habitat Use							
Wildlife Spp	Browse Spp (Y/N) (Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)			UWR (Y/N)	Other Comment
Moose	Salix	10	Browse	Wi	L	Moose	Deer	Elk	Y	
						0	0	0		

Fire Risks			Fuel				Soils				
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity (C, SC, P, D)	Fuel Depth (cm)	Ht to Live Crwn (m)	Distance to Fuel Break	Humus Depth (cm)	Soil Texture
Fd Forest	3 km across river	N	CWD %	7-12 cm diam %	<7 cm %	SC	23	1 - 3	200m	15	Sandy

forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, mestic animals, Excessive roading)

Degradation Type			Treatment Requirements				
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
High Fuel loading	High CWD content/Blowdown	Prevent Stand Changing Event	M	Part Cut	Preferably Winter	Reduce Fuel Load, Promote Fd growth	Leave all Fd, Sx, Follow UWR Guidelines

Plot #	Tree/Piece #	Species	Trees (>12.5 cm dbh, 5.64 m radius plot)						CWD (30m transect)						
			Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D*2
Live BAF # 0.034	1	Pl	80	28.5	4.3	16	D	3	Pl	15	21	15	3	1	441
	2	Sx	80	26.5	5.6	17	L	1	Pl	7	15	13	3	2	225
	3	Pl	80	26.5	4.6	16	D	3	Pl	12	22	19	3	1	484
Trees/Swp 3	4	Pl	20	12.5	4.6	8	D	3	Pl	14	23	20	4	2	529
	5	Pl	30	26.5	5	16	D	3	Pl	12	14	12	5	2	196
Snag BAF # 0.042	6	Pl	80	26.5	4.6	16	D	3	Pl	16	20	17	5	2	400
	7	Fd	80	21.5	5.6	14	L	1	Sx	19	23	10	3	1	529
Snags/Swp 8	8	Pl	80	21.5	4	15	D	3	Pl	15	19	15	5	1	361
	9	Pl	80	17	4.2	14	D	3	Pl	17	23	19	5	1	529
	10	Pl	80	26	5.6	17	D	3	Pl	9	18	8	4	2	324
	11	Sx	30	14	5.2	6	L	1	Pl	16	20	12	3	1	400
	12								Pl	17	21	14	0	1	441
	13								Pl	18	21	15	3	1	441
	14								Pl	17	19	14	6	1	361
	15														
Average (Live)			65.45	20.67		12.33									
Average (Snag)				23.13		14.75									5661.00

Dra

Plot BW 006 (10U 490236 5905134) – At Site 14

Ecological Restoration Field Card Date: 09/04/13 Completed By: OA Location Description: Blackwater River UWR

Ecosystem Type					BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access		
BW006	Fd	10U	490236	5905134	SBSdw2	6		6	Road through area		

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spc Comp (Sp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
200-240 (S)	Level	1	(Pl,30),(Sx,30),(Fd,30),(At,30)	30%	5	34.25	27.50	25.66	300.00	67.42	256.63

Understory (3.99m radius plot)						Tree Regeneration					
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Kinnikinnick	60	Wild Strawberry	20	Step Moss	60	Pine Grass	80	At,Sx,Pl,Fd	20	.3-4M	2000
Saskatoon	30	Yarrow	10	Pipe Cleaner	30						
Sx	15	Northern Sandwart	5								
Pl	10	Bunchberry	10								
At	25										
Prickly Rose	20										
Twinflower	50										
Velvet Leaved Blueberry	10										

Wildlife Evidence			Habitat Use							
Wildlife Spc	Brwse Spc (Y/N) (Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)				
						Moose	Deer	Elk	UWR (Y/N)	Other Comment
Moose	Salix/At	10	Forage	Wi	L	0	0	0	Y	
Mule deer	Saskatoon/At	20	Forage	Wi	L					

Fire Risks			Fuel						Soils		
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity	Fuel	Ht to Live Crwn	Distance to Fuel Break	Humus	Soil
			CWD %	7-12 cm diam %	<7 cm %	(C, SC, P, D)	Depth (cm)	(m)	Depth (cm)	Texture	
Fd Forest fire	2 km across river	N	40	80	20	SC	41	1m	50m	9	Sandy

forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, mestic animals, Excessive roading)

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
High Fuel loading	High CWD content/Blowdown	Prevent Stand Changing Event	M	Part Cut	Preferably Winter	Reduce Fuel Load, Promote Fd growth	Leave all Fd, Sx, Follow UWR Guidelines

Plot #	Tree/Piece #	Species	Trees (>12.5 cm dbh, 5.64 m radius plot)						CWD (30m transect)						
			Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2
	1	Pl	80+	41.5	3.6	30	D	3	Pl	30	41	39	3	1	1681
Live BAF #	2	Sx	70	33	4	25	L	1	Pl	30	40	26	6	1	1600
0.086	3	Pl	60	21	4	25	D	3	Sx	23	38	24	3	1	1444
Trees/Swp	4	Pl	80+	41.5	4.4	30	D	3	Pl	7	35	31	3	2	1225
1	5								Pl	5	17	16	3	3	289
Snag BAF #	6														
0.094	7														
Snags/Swp	8														
3	9														
	10														
	11														
	12														
	13														
	14														
	15														
Average (Live)				33.00		25.00									
Average (Snag)				34.67		28.33									6239.00

Draft

Plot BW 008 (10U 494646 5905040) – At Site 10

Ecological Restoration Field Card Date: 08/26/13 Completed By: OA Location Description: Blackwater River UWR

Ecosystem Type				BEC Unit	Site Series				
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access
BW008	At/Fd	10U	494646	5905040	SBSdw2	4		6	Road Approx 300 m to North

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spp Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
210 (220-240) (S)	Mid	68	(At,90), (Fd,10)	60% leaved	L1 (41-60)	20.17	11.22	86.24	0.00	0.00	3.33

Understory (3.99m radius plot)							Tree Regeneration				
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Saskatoon	70	Showy Aster	20	Step Moss	20	Pine Grass	30	Sx	1	3-5	100
Prickly Rose	30	Yarrow	<5	Lungwort	on At <5	Rough-Leaved Ricegrass	30				
Common Juniper	10	Northern Bedstraw	<5								
		Wild Strawberry	<5								
		American Vetch	<5								
		Creamy Peavine	10								
		False Solomons Seal	<5								

Wildlife Evidence			Habitat Use							
Wildlife Spp	Brwse Spp (Y/N)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)			UWR (Y/N)	Other Comment
MD	Amal (Saskatoon)	70	Forage	Wi, Su, Au	M	Moose	Deer	Elk	Y	Lots of Amal and Fd forage
						1 pile	20 (1 pile)	0		

Fire Risks			Fuel					Soils			
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity (C, SC, P, D)	Fuel Depth (cm)	Ht to Live Crwn (m)	Distance to Fuel Break	Humus Depth (cm)	Soil Texture
Grass uplands	5 km	N	CWD %	7-12 cm diam %	<7 cm %	C (Amal)	100	7	1 km to river	6	Sandy Loam

orest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, nestic animals, Excessive roading)

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
Grass uplands	Aspen encroachment	Northern extent of ecosystem	H	Burn	Spring	Reduce Aspen Encroachment	Timing and Contatintment

Plot #	Tree/Piece #	Species	Trees (>12.5 cm dbh, 5.64 m radius plot)					CWD (30m transect)								
			Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2	
Live BAF # 0.032	1	At	70	19.5	4	10	L	1	Fd	2.5	9	5	70	2	81	
	2	At	70	21.5	1	11	L	1								
	3	At	60	17	1.1	10	L	1								
	4	At	60	17	2.2	9	L	1								
	5	At	70	22	1.4	12	L	1								
	6	At	70	20	4.4	12	L	1								
	7	At	60	17	5.3	12	L	1								
	8	At	70	25	5.6	13	L	1								
	9	At	70	22.5	5.5	12	L	1								
	10															
	11															
	12															
	13															
	14															
	15															
Average (Live)				20.17		11.22										
Average (Snag)															81.00	

Draft

Plot BW 009 (10U 494565 5904913) – At Site 10

Ecological Restoration Field Card Date: 09/05/13 Completed By: OA Location Description: Blackwater River UWR

Ecosystem Type				BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access	
BW009	Grass, Fd	10U	494565	5904913	SBSmh	1		6	1 km North to Road	

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Sp Comp (Sp%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
210 (140-220) (S)	Lowerslope	20	(Pl,25), (At,40), (Sx,25), (Ep, 5)	20%	5	26.50	19.67	18.47	200.00	12.40	0.00

Understory (3.99m radius plot)								Tree Regeneration			
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Beaked Hazelnut	90	Wild Sasperilla	10	Stepmoss	<5	Pinegrass	40				
Prickley Rose	20	Showy Aster	10								
		False Solomons Seal	10								
		Northern Bedstraw	10								
		Wild Strawberry	10								
		Creamy Peavine	10								
		Tall Oregon Grape	<5								
		Western Meadowrue	<5								
		Fireweed	<5								

Wildlife Evidence			Habitat Use							
Wildlife Spp	Brwse Spp (Y/N)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)			UWR (Y/N)	Other Comment
Moose	(Y) Hazelnut	90	Forage	Wi	H	Moose	Deer	Elk	Y	Hazelnut browsed extensively
						1 pile	0	0		

Fire Risks			Fuel					Soils			
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity (C, SC, P, D)	Fuel Depth (cm)	Ht to Live Crwn (m)	Distance to Fuel Break	Humus Depth (cm)	Soil Texture
Unknown	5km	N	CWD %	7-12 cm diam %	<7 cm %	C (Hazelnut), SC(Pl)	40	1m (Sx)	0.5km	11	Clay Loam

orest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, nestic animals, Excessive roading)

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
Up slope grasslands	Forest encroachment	Restore up slope grasslands	H	Burn	Spring	Grassland restoration/reduce aspen encroachment	Timing and containment

Plot #	Tree/Piece #	Trees (>12.5 cm dbh, 5.64 m radius plot)								CWD (30m transect)					
		Species	Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D²
	1	Pl	80+	26	2	18	D	3	Pl	20	29	23	10	1	841
Live BAF #	2	At	80+	28	5.6	22	L	1	Pl	18	18	16	10	1	324
0.062	3	Pl	80+	25.5	4.8	19	D	3	Pl	25	25	22	10	1	625
Trees/Swp	4								Pl	31	31	22	15	1	961
1	5								Pl	21	21	18	10	1	441
Snag BAF #	6								At	17	17	10	10	1	289
0.052	7								Pl	36	36	33	15	1	1296
Snags/Swp	8								Pl	33	33	28	15	1	1089
2	9								Pl	31	31	22	20	1	961
	10								Pl	28	28	19	21	1	784
	11														
	12														
	13														
	14														
	15														
Average (Live)				28.00		22.00									
Average (Snag)				25.75		18.50									7611.00

Draft

Plot BW 010 (10U 494267 5904918) – At Site 10

Ecological Restoration Field Card Date: 09/05/13 Completed By: OA Location Description: Blackwater River UWR

Ecosystem Type				BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access	
BW010	Fd, Berry	10U	494267	5904918	SBSdw2	6		7	Road 1km uphill to North	

Topography		Trees (5.64m radius plot)									
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spc Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)	
210 (S)	Toe (terraced)	5-20	(Pl,40),(Sx,30),(Fd,30),(Ep,10)	30%	(Pl,80+), (Fd,80)	17.40	42.08	500.00	38.15	117.76	

Understory (3.99m radius plot)				Tree Regeneration							
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Velvet-leaved Blue Berry	40	Bunchberry	20	Stepmoss	70	Pine Grass	50	Fd	3	1.5	300
Salix spp.	10	Creamy Peavine	<10	Cround Cedar	20			Sx	3	1.5	300
Soopalalie	20	Northern Bedstraw	<5					Pl	2	1.5	200
Kinnikinnick	10	Wild Lily of the Valley	<5								
Prickly Rose	30	Wild Strawberry	<5								
Common Juniper	<5	Princes Pine	<5								

Wildlife Evidence			Habitat Use								
Wildlife Spp	Brwse Spp (Y/N) (Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)					Other Comment
Moose	(Y) Salix	10	Forage	Wi	L	Moose	Deer	Elk	UWR (Y/N)	No pellets observed	
						0	0	0	Y		

Fire Risks			Fuel						Soils			
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity (C, SC, P, D)	Fuel Depth (cm)	Ht to Live Crwn (m)	Distance to Fuel Break	Humus Depth (cm)	Soil Texture	
Fd forest	5km	N	CWD %	7-12 cm diam %	<7 cm %	SC	40	1	300m to River	9	Sand	

forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, domestic animals, Excessive roading)

Degradation Type			Treatment Requirements				
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
High Fuel Loading	High CWD content MP killed PI	Reduce Fuel loading	M		Spring	Reduce Fuel loading, encourage Fd and berry regen	Low intensity burn, timing, and containment

Trees (>12.5 cm dbh, 5.64 m radius plot)										CWD (30m transect)					
Plot #	Tree/Piece #	Species	Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2
Live BAF #	1	PI	80	19	4.2	20	D	3	PI	18	19	5	1	1	361
0,028	2	Sx	50	17	3.2	18	L	1	PI	12	17	6	1	2	289
Trees/Swp	3	PI	80	21.5	4.6	20	D	3	Sx	10	19	19	1	3	361
5	4	PI	80	19	3.5	18	D	3	PI	12	17	10	1	3	289
Snag BAF #	5	PI	60	15	3	18	D	3	PI	20	20	12	5	1	400
0.032	6	Fd	60	21	3.6	18	L	1	PI	19	19	16	6	1	361
Snags/Swp	7	Sx	60	15.5	4.1	17	L	1	PI	20	21	12	3	1	441
5	8	Sx	60	18.5	3.7	7	L	2	PI	19	19	18	2	1	361
	9	Fd	60	22.5	5.6	18	L	1							
	10	PI	80	26.5	3	20	D	3							
	11														
	12														
	13														
	14														
	15														
Average (Live)				18.90		15.60									
Average (Snag)				20.20		19.20									2863.00

Draft

Plot BW 012 (10U 504696 5905591) – At Site 3

Ecological Restoration Field Card Date: 09/12/13 Completed By: OA Location Description: Blackwater River UWR

Ecosystem Type					BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access		
BW012	Fd, Grass, Berry	10U	504696	5905591	SBSmh	1		7	Site 100m from ATV road		

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spp Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
160 (140-200)	Lower Slope	40	(Ep,25),(At,30),(Sx,20),(Fd,25)	80% with Deciduous	4	23.67	18.33	106.32	100.00	79.14	83.09

Understory (3.99m radius plot)						Tree Regeneration					
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Beaked Hazelnut	70	Showy Aster	40	Step Moss	10	Rough-Leaved Ricegrass	30	Sx	1	.75	100
Prickly Rose	30	Clasping Twistedstalk	25			Blue Wild Rye	10				
Soopalalie	25	Trailing Raspberry	20								
Red Osier Dogwood	<5	Wild Strawberry	30								
Saskatoon	20	Northern Bedstraw	30								
Highbrush Cranberry	5	Tall Oregon Grape	20								
Kinnikinnick	20	Heart Leafed Arnica	10								
		Western Yarrow	<5								
		Wild Saspirilla	10								

Wildlife Evidence			Habitat Use							
Wildlife Spp	Brwse Spp (Y/N)	Habitat Use	Season of Use	Use Level	Pellet Count (30m trans)			UWR (Y/N)	Other Comment	
(Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)	(Y/N)	(DEITF Categ)	(Wi, Sp, Su, Au)	(H, M, L, None)	Moose	Deer	Elk			
Elk	Tracks	Escape	(Wi, Sp, Su, Au)	M	0	0	0	Y	High veg, difficult to see pellets	
Moose	Tracks	Escape	(Wi, Sp, Su, Au)	L						
Moose	At, Hazelnut	Forage	Wi	M						

Fire Risks			Fuel					Soils			
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity	Fuel	Ht to Live Crwn	Distance to	Humus	Soil
Open Forests, Grasslands	1km from decrepid cabin	N	CWD %	7-12 cm diam %	<7 cm %	(C, SC, P, D)	Depth (cm)	(m)	Fuel Break	Depth (cm)	Texture
			25	25	35	P	0.25 - 1m	5	200m to river	9	Sandy

forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, mestic animals, Excessive roading)

Degradation Type			Treatment Requirements				
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
Open Forest	Forest Encroachment		M	Burn	Spring	More open forests, grasslands	Timing, containment

Trees (>12.5 cm dbh, 5.64 m radius plot)									CWD (30m transect)						
Plot #	Tree/Piece #	Species	Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2
	1	Ep	70	24.5	2.5	18	L	1	At	10	21	17	15	2	441
Live BAF #	2	Ep	70	23	2.3	17	L	1	At	15	20	15	17	2	400
0.044	3	Ep	30	12	3	12	L	1	At	17	23	12	15	2	529
Trees/Swp	4	Ep	70	16	1.6	12	L	1	At	17	17	12	15	2	289
8	5	Ep	70	23.5	1.7	19	L	1	Sx	6	19	13	10	2	361
Snag BAF #	6	Ep	70	30	3.5	20	L	1							
0.042	7	Ep	70	30	3.5	21	L	1							
Snags/Swp	8	Ep	70	31	3.7	21	L	1							
1	9	Ep	70	23	3.8	25	D	3							
	10														
	11														
	12														
	13														
	14														
	15														
Average (Live)				23.75		17.50									
Average (Snag)				23.00		25.00									2020.00

Draft

Plot BW 016 (10U 485173 5906262) – At Site 19

Ecological Restoration Field Card Date: 09/25/13 Completed By: DZ Location Description: Blackwater River UWR

Ecosystem Type				BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access	
BW016	Fd,At,Grass,Berry	10U	485173	5906262	SBSdw2	06/01		7	300 m from old logging road	

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spc Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)	
180	undulating with steps down to river	10 (10-50)	(At,40),(Fd,30),(Sx,15),(Pl,15)	40%	5 with a few Fd vetrans	37.08	25.25	242.48	100.00	14.87	46.60

Understory (3.99m radius plot)						Tree Regeneration					
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Prickly Rose	10	Twinflower	5	Red-stemmed Feathermoss	30	Pinegrass	30	Sx	4	.3-10	400
Velvet Leaved Blueberry	10	Bunchberry	10	Step moss	15			At	3	.3-3	300
Birch Leaf Spirea	10	Yarrow	5	Knights Plume	10			Fd	6	.3-10	600
Aspen Regen	5										
Soopalalie	5										
Kinnikinnick	5										

Wildlife Evidence			Habitat Use							
Wildlife Spp	Browse Spp (Y/N) (Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)	% Cover (decile)	Habitat Use (DEITF Categ)	Season of Use (Wi, Sp, Su, Au)	Use Level (H, M, L, None)	Pellet Count (30m trans)			UWR (Y/N)	Other Comment
Moose	At regen, willow	05-Oct	Forage	Winter	L	Moose	Deer	Elk	Y	Not much sign
Bear	Berries, forbs, grasses	20-40	Forage	Sp/Au	M					

Fire Risks			Fuel					Soils			
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity	Fuel	Ht to Live Crwn	Distance to	Humus	Soil
Fd		N	CWD %	7-12 cm diam %	<7 cm %	(C, SC, P, D)	Depth (cm)	(m)	Fuel Break	Depth (cm)	Texture
			15	7	8	SC	20	3-20	River to south	12	Sandy Loam

forest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, mestic animals, Excessive roading)

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
Lack of Wildlife Use	Little wildlife sign	Low deer population		Burn	Spring, good burn conditions		

Plot #	Trees (>12.5 cm dbh, 5.64 m radius plot)								CWD (30m transect)						
	Tree/Piece #	Species	Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D^2
	1	At	60+	26.2	4.3	22	L	1	At	10	15	12	3	4	225
Live BAF #	2	At	60+	27.3	4.1	23	L	1	At	8	10	10	5	3	100
0.115	3	At	60+	25.4	3.5	23	L	1	At	12	18	16	5	3	324
Trees/Swp	4	At	60+	27.8	2.3	23	L	1	Pl	21	22	17	2	3	484
7	5	Sx	100+	37.2	4.4	27	L	1							
Snag BAF #	6	Fd	100+	64.8	5.1	30	L	1							
0.062	7	Fd	100+	59.7	1.2	30	L	1							
Snags/Swp	8	Pl	80+	28.2	0.8	24	D	4							
1	9														
	10														
	11														
	12														
	13														
	14														
	15														
Average (Live)				38.34		25.43									
Average (Snag)				28.20		24.00									1133.00

Draft

Plot BW 019 (10U 482756 5905811) – At Site 20

Ecological Restoration Field Card Date: 09/26/13 Completed By: DZ Location Description: Blackwater River UWR

Ecosystem Type				BEC Unit	Site Series					
Identifier	(Fd, Grass, Wetl, Berry)	UTM Zone	Long (X coord)	Lat (Y coord)	(Z,S,V)	(2)	FHF	Photos	Comments on Access	
BW019	Fd,Pl,Grass	10U	482756	5905811	SBSdw2	4		7	Poor access, rough quad trail to SE, or Old rd 1.5km to N	

Topography			Trees (5.64m radius plot)								
Aspect (Azimuth)	Slope Pos (C,U,M,L,T,G,F)	Slope (%)	Tree Spp Comp (Spp,%)	Crown Clos. (decile)	Age (L1)	DBH (cm)	Ht (m)	Live L1 Tree Vol (m3/ha)	Snags L1 per Ha	Snag Vol (m3/ha)	CWD Vol (m3/ha)
165	Mid,level,upper	10 (0-60)	(Fd,80),(Pl,20)	60%	3	30.52	26.78	187.93	100.00	9.13	324.99

Understory (3.99m radius plot)						Tree Regeneration					
Shrubs (5)	% Cover	Herbs (4)	% Cover	Mosses Lichens	% Cover	Grasses	% Cover	Species Mix	Stocking (5.64m radius plot)	Ht Range	Stocking (sph)
Prickly Rose	15	Creamy Peavine	2	Red-stemmed Feathermoss	70	Pinegrass	30	Fd	12	.3-8	1200
Saskatoon	5	Fireweed	5	Wavy Leafed Moss	5						
At Regen	2	Bunchberry	10	Knights Plume	10						
Soopalalie	10	Wild strawberry	2								
Common Juniper	2										
Kinnikinnick	15										

Wildlife Evidence			Habitat Use							
Wildlife Spp	Browse Spp (Y/N)	Habitat Use	Season of Use	Use Level	Pellet Count (30m trans)					Other Comment
(Fd,Lichen,Amal,Salix,Cose,Vied,Aruv,Pamy,Roac,Syal)	% Cover (decile)	(DEITF Categ)	(Wi, Sp, Su, Au)	(H, M, L, None)	Moose	Deer	Elk	UWR (Y/N)		
Moose	At	2	Forage	Wi, Au	L	1 pile	0	0	Y	Little wildlife sign

Fire Risks			Fuel						Soils		
Values At Risk	Proximity (km from infrast)	Interface? (Y/N)	Fuel Load (% Cover)			Continuity	Fuel	Ht to Live Crwn	Distance to Fuel Break	Humus	Soil
Fd forest	3-5 km	N	CWD %	7-12 cm diam %	<7 cm %	(C, SC, P, D)	Depth (cm)	(m)	1.5km to N, 1km to S	Depth (cm)	Texture
			25	15	10	SC	30	3 - 10		12	Sandy Loam

orest with low understory cover, Low percent cover of berry species, Lack of wildlife use, High fuel loading, Invasive species, nestic animals, Excessive roading]

Degradation Type				Treatment Requirements			
Type (descriptive)	Indicator	Rationale	Level	Type (B, S&B, Veg, PartCut)	Timing (Yr/Mo/Conditions)	Objective (target org, outcome)	Constraints (descriptive, e.g. IBD)
l sign, understory, berries, fuel loading				Partial Cut/Pile/Burn	Spring/Fall	Open Forest/Reduce prob of stand changing event	Cost/Fd beetle management

Plot #	Tree/Piece #	Trees (>12.5 cm dbh, 5.64 m radius plot)								CWD (30m transect)						
		Species	Age	DBH	Distance	Ht	L/D?	Decay Class	Species	Length	Butt Diam	Intersec Diam	Tilt Angle	Decay Class	D*2	
Live BA	1	Fd	80+	37.2	3.2	31	L	1	Fd	25	80	75	2	3	6400	
	2	Fd	60	24.8	3.7	27	L	1	Fd	15	20	11	2	3	400	
	3	Fd	50	31.3	4.1	26	L	1	Fd	10	16	12	0	5	256	
Trees/Swp	4	Fd	50	34.2	3.5	27	L	1	PJ	11	14	14	2	5	196	
	5	Fd	50	31.8	2.2	27	L	1	Pl	12	18	6	2	3	324	
Snag BA	6	Fd	80+	39.1	1.1	32	L	1	Fd	2	10	4	2	3	100	
	7	Fd	50	27.8	1.9	26	L	1	Fd	6	15	13	2	1	225	
Snags/Swp	8	Fd	50	26.4	2	25	L	1								
	9	Fd	50	22.1	5.1	20	D	4								
	10															
	11															
	12															
	13															
	14															
Average (Live)				31.58		27.63										
Average (Snag)				22.10		20.00									7901.00	

Draft

**Appendix 5 -
Reconnaissance Pictures of Each Plot**

Plot BW 001 (10U 507526 5906772) – At Site 1

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Plot BW 002 (10U 507481 5907031) – At Site 1

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Plot BW 003 (10U 489698 5906052) – Near Site 17

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Plot BW 004 (10U 491628 5904993) – At Site 12

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Humus Depth



Plot BW 005(10U 489084 5905404) – At Site 24

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Humus Depth



Plot BW 006 (10U 490236 5905134) – At Site 14

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Humus Depth



Plot BW 007(10U 494695 5905078) – At Site 10

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Humus Depth



Plot BW 008 (10U 494646 5905040) – At Site 10

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Humus Depth



Plot BW 009 (10U 494565 5904913) – At Site 10

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground

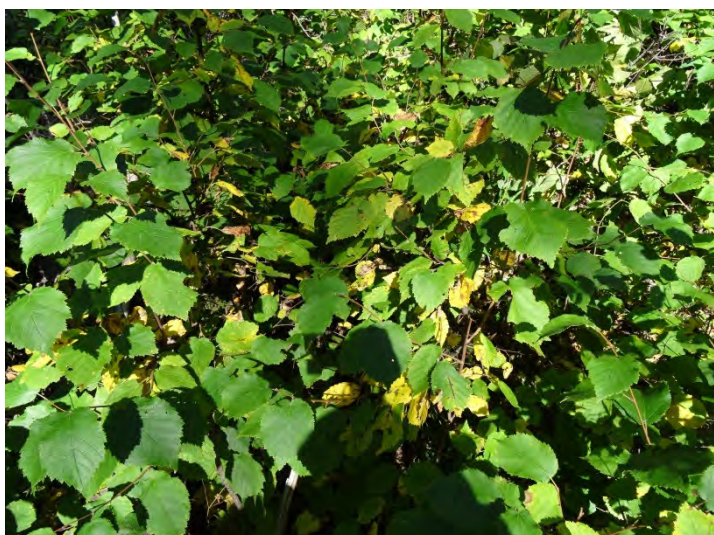


Photo 6: Humus Depth



Plot BW 010 (10U 494267 5904918) – At Site 10

Photo 1: North



Photo 2: East



Photo 3: South

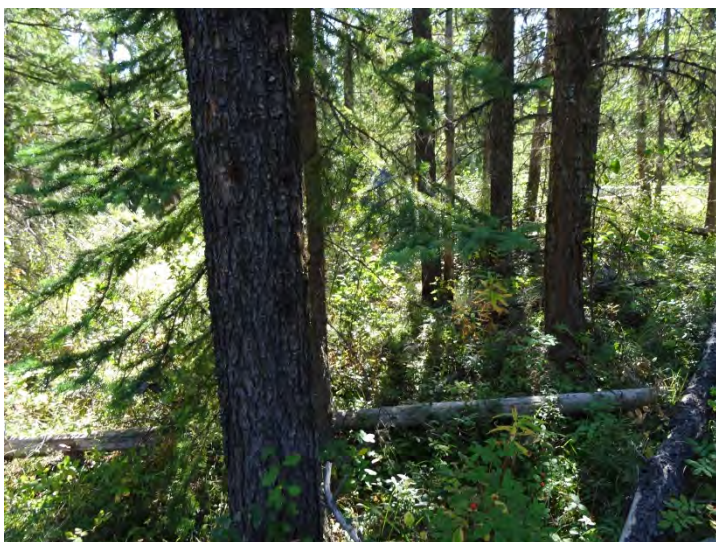


Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Humus Depth



Plot BW 011 (10U 501596 5906730) – At Site 8

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Humus Depth



Plot BW 012 (10U 504696 5905591) – At Site 3

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Soils



Plot BW 013 (10U 504860 5905825) – At Site 3

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: Plot Centre/Ground



Photo 5: Humus Depth



Photo 6: Soil



Plot BW 014 (10U 490726 5905419) – At Site 16

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Plot Centre/Ground



Photo 6: Soils



Plot BW 015 (10U 491845 5905788) – At Site 13

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Soils

Plot BW 016 (10U 485173 5906262) – At Site 19

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Soils



Plot BW 017 (10U 482788 5906743) – At Site 21

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Soils



Plot BW 018 (10U 487946 5905990) – At Site 18

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Soils



Plot BW 019 (10U 482756 5905811) – At Site 20

Photo 1: North



Photo 2: East



Photo 3: South

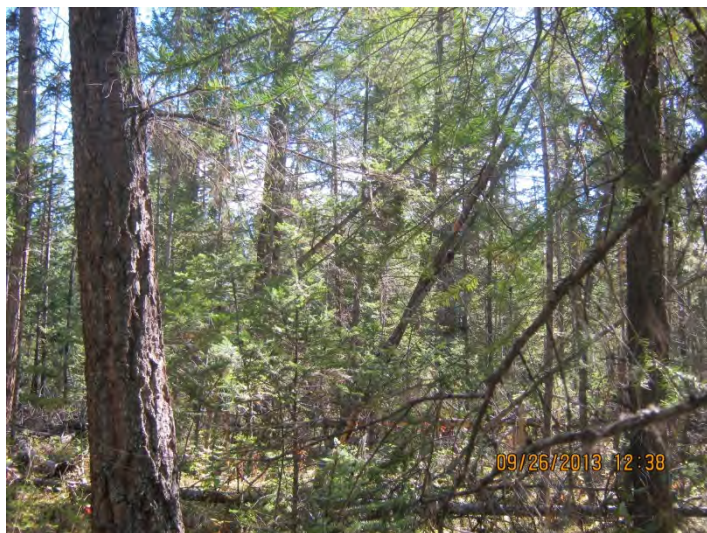


Photo 4: West



Photo 5: Crown Closure



Photo 6: Soils



**Appendix 6 -
Photo Plot Pictures**

Photo Plot BW 001 (10U 490318 5905775) – At Site 17

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 002 (10U 489418 5906067) – At Site 17

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 003 (10U 491451 5905733) – At Site 13

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 004 (10U 485508 5906354) – At Site 19

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 005 (10U 485341 5906420) – At Site 19

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 006 (10U 482111 5906508) – At Site 21

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West

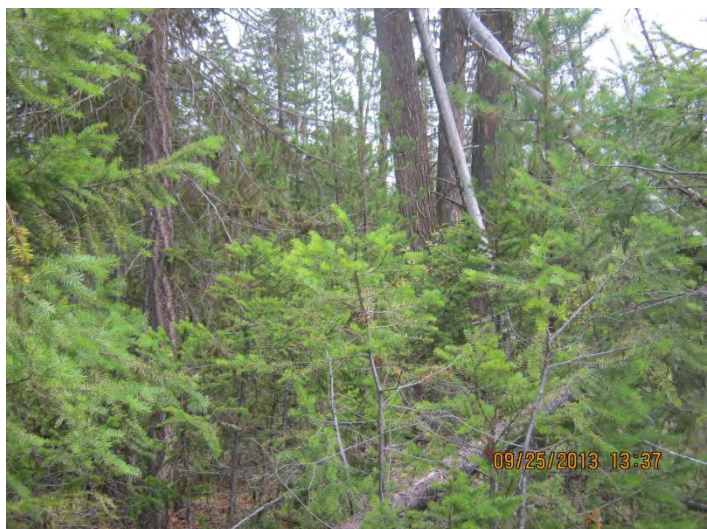


Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 007 (10U 487200 5905421) – At Site 18

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West

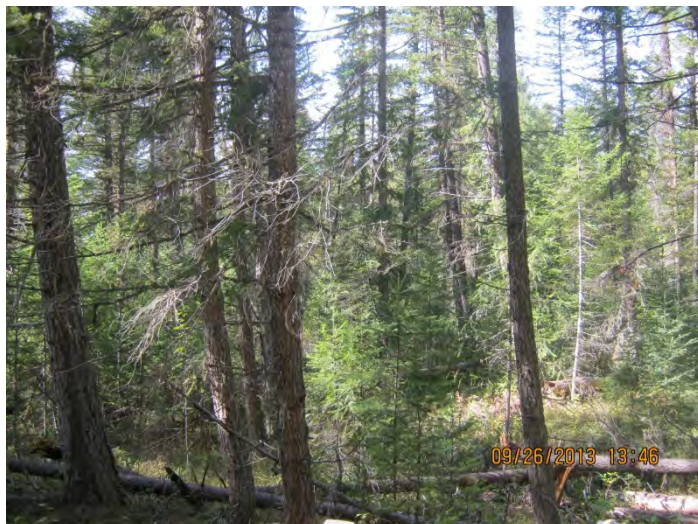


Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 008 (10U 487952 5905527) – At Site 18

Photo 1: North



Photo 2: East



Photo 3: South

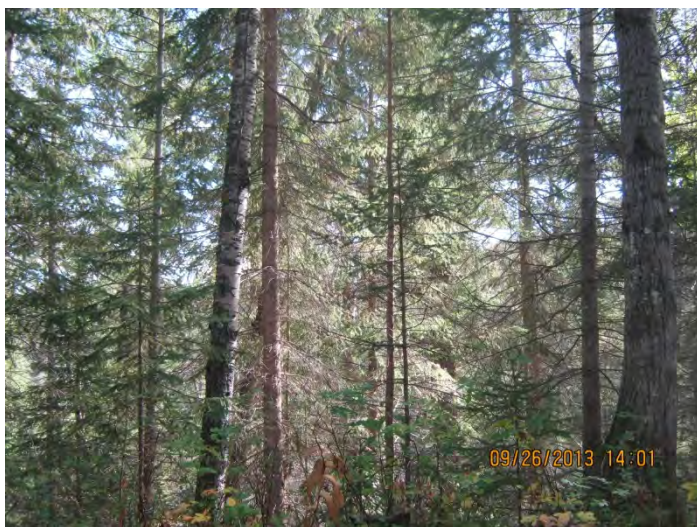


Photo 4: West

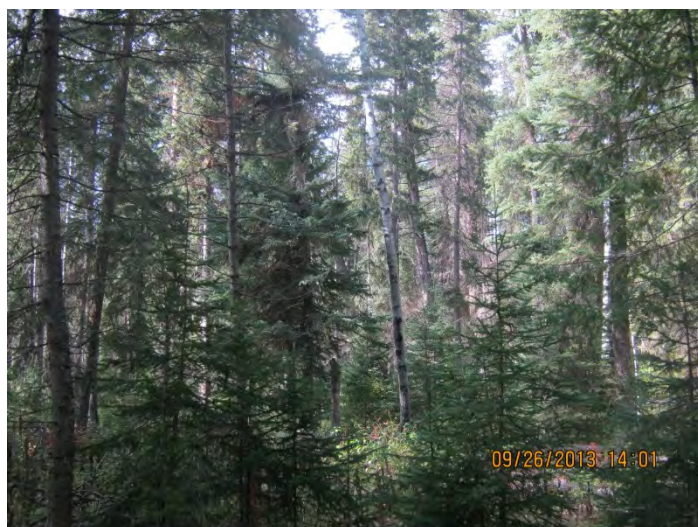


Photo 5: Crown Closure

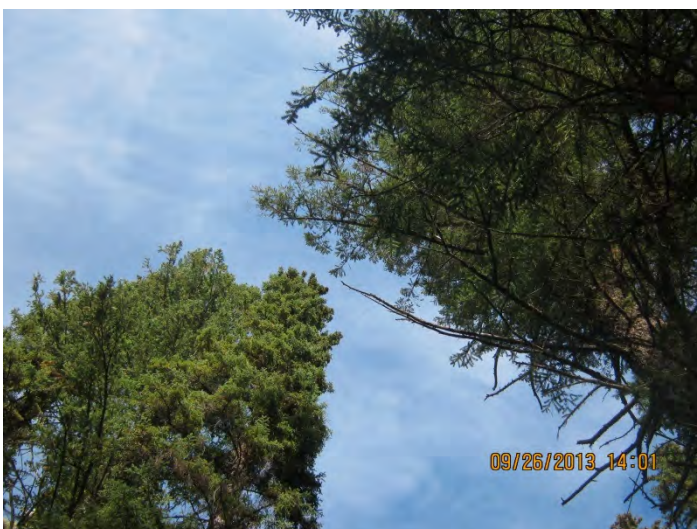


Photo 6: Plot Centre/Ground



Photo Plot BW 009 (10U 483047 5905850) – At Site 20

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



Photo Plot BW 009 (10U 482532 5905938) – At Site 20

Photo 1: North



Photo 2: East



Photo 3: South



Photo 4: West



Photo 5: Crown Closure



Photo 6: Plot Centre/Ground



**Appendix 7 -
Blackwater UWR - Potential ER Treatment Site Prioritization Table**

Blackwater UWR - Potential ER Treatment Site Prioritization				Treatment aligns with Management Strategies for MD UWR (High, Moderate, Low)	Rarity or Threatened, Vulnerable, or Degraded Ecosystem	Vulnerability of site (Vulnerable, Threatened, Degraded)	Treatment Timing Needs (Long Term, Short term, Immediate)	Proximity to Other Similar Potential Treatment Sites (Poor, Adequate, Good)	Functionality of Site (Poor, Moderate, Good)	Potential Project Costs by Type (Prescribed Fire, Harvest, Thinning)	Access to site (Good, Moderate, Poor)	Likelihood of Successful Treatment (High, Moderate, Low)	Points	Final	Priority Ranking
Site ID		Easting	Northing	Potential Treatment Prescription Category	(3,2,1)	(3,2,1)	(3,2,1)	(3,2,1)	(3,2,1)	(3,2,1)	(3,2,1)	(3,2,1)	(3,2,1)	Point Total	High(≥19), Mod(16-18), Low(≤15)
1	10U	507649	5906560	Prescribed Fire	1	2	2	1	2	1	2	3	2	16	Moderate
2	10U	507474	5907330	Thin From Below (Hand Crew)	3	1	1	1	2	2	2	1	3	16	Moderate
3	10U	509952	5905750	Prescribed Fire	1	2	1	1	2	2	2	3	2	16	Moderate
5	10U	503424	5906220	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High
6A	10U	501800	5905960	Prescribed Fire	1	3	2	2	2	2	2	3	2	19	High
6B	10U	501403	5904730	Prescribed Fire	1	3	2	2	2	2	2	3	2	19	High
7	10U	501763	5906420	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High
8	10U	501902	5906750	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High
9	10U	501142	5907300	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High
10	10U	494527	5905080	Prescribed Fire	1	3	2	2	2	2	2	3	2	19	High
11	10U	494011	5905580	Thin From Below (Hand Crew)	3	1	2	3	3	3	3	1	3	22	High
12	10U	491438	5905000	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High
13	10U	491564	5905990	Stand Thinning (Hand or Mechanical)	3	1	1	2	2	3	3	1	3	19	High
14	10U	490293	5905070	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High
15	10U	490227	5905250	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High
16	10U	490552	5905380	Stand Thinning (Hand or Mechanical)	3	1	1	2	2	3	3	2	3	20	High
17	10U	489864	5905760	Thin From Below (Mechanical)	3	1	1	2	2	3	3	2	3	20	High
18	10U	487502	5905820	Thin From Below (Mechanical)	3	1	1	2	2	3	2	2	3	19	High
19	10U	485339	5906210	Thin From Below (Mechanical)	1	1	1	1	2	2	1	3	3	15	Low
20	10U	482667	5905660	Thin From Below (Mechanical)	1	1	1	1	2	2	1	3	3	15	Low
24	10U	489401	5905180	Selective Harvest	2	1	1	3	2	3	3	2	3	20	High

**Appendix 8 -
Amended Order #U-5-001, U-5-002 and U-5-003 – Ungulate Winter Ranges
Caribou Chilcotin Land Use Plan, Transition and Deep Snowpack**

**AMENDED ORDER #U-5-001, U-5-002 and U-5-003 – Ungulate Winter Ranges
Cariboo Chilcotin Land Use Plan, Transition and Deep Snowpack**

This order is given under the authority of sections 9(2) and 12(1) of the *Government Actions Regulation* (B.C. Reg. 582/2004).

The Deputy Minister of Environment orders that:

1. This order replaces the order established on December 07, 2006 titled "AMENDED ORDER #U-5-001, U-5-002 and U-5-003 – Ungulate Winter Ranges Cariboo Chilcotin Land Use Plan, Transition and Deep Snowpack";
2. Within Ungulate Winter Ranges U-5-001, U-5-002, U-5-003 established on December 13, 2004, in the area of the Cariboo Chilcotin Land Use Plan, the:
 - a) Stand Structure Habitat Classes
 - b) Topographic Buffers,are established as identified on the attached maps (Ungulate Winter Range No. U-5-001, including Habitat Stand Structure Classification, Topographic Buffers and Habitat Management Zones; Ungulate Winter Range No. U-5-002, including Habitat Stand Structure Classification, Topographic Buffers and Habitat Management Zones; Ungulate Winter Range No. U-5-003, including Habitat Stand Structure Classification, Topographic Buffers and Habitat Management Zones);
3. where there is any discrepancy between the ungulate winter range boundaries as shown in the December 13, 2004 Schedule A's (U-5-001, U-5-002, U-5-003) and the GIS file *tuwra_bc*, the boundaries as detailed in the GIS file will take precedent. Where there is any discrepancy between the attached maps and the linework identified in the GIS files for Stand Structure Habitat Classes or Topographic Buffers, as stored on the FTP site ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/uwr/r5/, the GIS files stored on the FTP site will take precedent. The centre point of the line on the map denoting the ungulate winter range is what establishes the boundary;
4. The General Wildlife Measures outlined in Schedule 1 are established for mule deer (*Odocoileus hemionus hemionus*) within the Transition and Deep Snowpack Zones of the following ungulate winter range units:
 - (a) in Ungulate Winter Range U-5-001: Alix Honeyburn (dqu_3), Australian Alix (dqu_7), Baker Creek (dqu_8), Dragon Australian (dqu_30), General Tingley (dqu_38), Gerimi (dqu_39), Lower Quesnel (dqu_60), Narcosli (dqu_64), Nazko (dqu_65), Upper Quesnel (dqu_80), West Road South (dqu_87); Blackwater (dqu_14)
 - (b) in Ungulate Winter Range U-5-002: Mosley Creek (dwl_1), Antoine Lake (dwl_6), Beaver Valley North (dwl_9), Beaver Valley South (dwl_10), Big Lake North (dwl_12), Borland Valley (dwl_16), Farwell (dwl_34), Hart-Marguerite (dwl_42), Hawks Creek (dwl_43), Horsefly Lake (dwl_45), Horsefly River (dwl_46), Jones Creek (dwl_49), Knife Creek (dwl_50), Likely (dwl_56), Little Lake (dwl_57), McLeese Lake (dwl_62), Niquidet (dwl_66), Quesnel Forks (dwl_70), Rose Lake (dwl_72), Skelton (dwl_74), Tatloyoko (dwl_78), West Arm (dwl_84); and
 - (c) in Ungulate Winter Range U-5-003: 111 Mile-Forest Grove (dmh_2), Bonaparte River (dmh_15), Bradley Creek (dmh_17), Bridge Lake North (dmh_18), Buffalo Creek (dmh_19), Canim Lake North (dmh_20), Canim Lake West (dmh_21), Drewry Lake North (dmh_31), Fawn Lake (dmh_35), Horse Lake (dmh_44), Howard Lake

Transition and Deep Snowpack MDWRs General Wildlife Measures

- North (dmh_47), Lac La Hache North (dmh_53), The Lakes (dmh_55), Roserim Lake (dmh_73), Timothy-Rail (dmh_79), Watch Lake North (dmh_83);
5. (a) The General Wildlife Measures set out in Schedule 1 are also established for the following ungulate winter range units in the Moderate Snowpack Zone:
- 111 Mile-Forest Grove(dmh_2), Alix-Honeyburn(dqu_3), Australian-Alix(dqu_7), Borland Valley(dw1_16), Buffalo Creek(dmh_19), Enterprise(dw1_33), Fawn Lake(dmh_35), Hawks Ck(dw1_43), Horse Lake(dmh_44), Jones Creek(dw1_49), Knife Creek(dw1_50), Lac La Hache North(dmh_53), Lac La Hache South(dmh_54), McLeese Lake(dw1_62), Narcosli(dqu_64), Williams Lake-Hawks Creek(dw1_81), Watch Lake North(dmh_83).
- (b) for the purposes of 5(a) (Moderate Snowpack Zone), the area of forest to which the General Wildlife Measures will apply must be:
- (i) subject to primary forest activities over an area greater than 10 ha, and
- (ii) 70% or more of the area subject to primary forest activities must be comprised of:
- north-facing aspects between 315 and 60 degrees, and
 - slope greater than 20%;
7. For the purposes of section 2(3)(a) of the *Government Actions Regulation*, these General Wildlife Measures also apply to minor tenures; and
8. These General Wildlife Measures do not apply for the purposes of exploration, development or production activities when these activities have been authorized for the purpose of subsurface resource exploration, development or production under the *Mineral Tenure Act*, the *Coal Act*, the *Mines Act*, the *Petroleum and Natural Gas Act*, the *Pipeline Act* or the *Geothermal Resources Act*.

Definitions:

A primary forest activity is defined as per the definition included in the *Forest Planning and Practices Regulation*

Transition and Deep Snowpack MDWRs General Wildlife Measures

Schedule 1 – General Wildlife Measures
Mule Deer Winter Ranges in the Transition and Deep Snowpack Zones

1. Except for stands on ungulate winter ranges that are subject to GWMs 14, 15, or 16, the group selection harvest system described in GWMs 6 through 11 must be applied during timber harvest entries into a stand of trees within ungulate winter ranges to which this order applies.
2. For stands of trees in ungulate winter ranges that are subject to GWMs 14, 15 or 16, group selection management will begin on the next harvest pass following the initial harvest treatment.
3. After one rotation, all stands of trees in an ungulate winter range to which this order applies will be managed using a group selection silviculture system consistent with GWMs 6 through 12, except:
 - o Old Growth Management Areas, or other “no-harvest” land use designations
 - o Sub-hygric sites with stand composition <40% Douglas-fir

Definitions pertaining to GWMs 3, and 4:

- o Douglas-fir stand composition is calculated as the proportion of basal area of Douglas-fir trees >12.5 cm diameter at breast height.
4. The applicable silviculture systems for stands with $\leq 40\%$ lodgepole pine by composition, and all other mixed stands that are mesic and drier, or that have $\geq 40\%$ Douglas-fir by composition will be thinning from below (described in GWM 16) or group selection (described in GWMs 6 through 10).
 5. Primary forest activities will result in:
 - o Protection of existing Douglas-fir regeneration to the extent practicable
 - o Retention of Douglas-fir in juvenile spacing treatments.
 - 6.(a) The first pass of group selection is to be applied when the stand basal area is:
 - (i) $\geq 45\text{m}^2$ in Interior Cedar Hemlock (ICH), or
 - (ii) $\geq 40\text{m}^2$ in other Biogeoclimatic Zones.
 - (b) No timber harvesting is to occur where the conditions set out in 6(a) are not met, and GWMs 14, 15 or 16 do not apply.

Definition pertaining to GWM 6:

- o Basal area is to be calculated as the total live conifer basal area of trees greater than 12.5 cm dbh.
7. (a) Group selection forest activities planned for each cutblock area in an ungulate winter range to which this order applies, must result in a condition where the 0-40 year age component for the Stand Structure Habitat Class set out in Column 1 of Table 1 does not exceed the percentage of cut block area set out in Column 2 of Table 1.
 - (b) Skid trail area must be included in the percentage area for the 0-40 year age category. Roads and landings are excluded.
 - (c) The percent in Column 2 includes any previously harvested area or natural disturbance which created openings of 0.1 ha or greater within the last 40 years.

Transition and Deep Snowpack MDWRs General Wildlife Measures

Table 1.

Stand Structure Habitat Class	Maximum percent of cutblock area to be in Age Class of 0 – 40 years
Low	33
Moderate	25
High	20

Definitions pertaining to GWM 7:

- “Group selection” is a selection silviculture system in which small groups of trees are periodically harvested, resulting in an uneven-aged forest stand made up of a mosaic of small even-aged patches. Stand structure is regulated in group-selection harvesting by cutting a specified proportion of the total area of the cutblock at each harvest entry and by specifying the group size and cutting cycle. The parameters for the group selection system designed for mule deer winter range are provided in GWM 6 through 11.
 - “Stand Structure Habitat Class” is a stand level classification used to define three different stand structure management objectives for mule deer winter habitat (Low, Moderate and High). For transition and deep snowpack zones, differences between the classes are based on differences in the proportion of various age classes within managed cutblocks. All habitat classes have common objectives to maintain or create multi-storied, uneven-aged stands dominated by Douglas-fir. The long-term objectives map for each winter range shows the distribution of the three habitat classes on the winter range.
 - Polygons depicting the spatial distribution of low, moderate and high Stand Structure Habitat Classes are available from the following FTP site: ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/uwr/r5/. Files are located in each of the folders “tuwra_U-5-001.zip”, “tuwra_U-5-002.zip” and “tuwra_U-5-003.zip”. The specific files are titled “Stand_struc_hab_class_5-001”, “Stand_struc_hab_class_5-002”, “Stand_struc_hab_class_5-003”.
8. Primary forest activities in stands of trees on the ungulate winter ranges to which this order applies, where the group selection silviculture system is to be employed, will result in the harvest proportions and cutting cycles for each Stand Structure Habitat Class set out in Column 1 of Table 2 that are consistent with the specifications of Columns 2 through 5 of Table 2.

Table 2.

Stand Structure Habitat Class	Area Harvested Per Pass (%)	Minimum Cutting Cycle (years)	Effective Rotation (years)	Number of Different Aged Patches in the Stand Mosaic After a Full Rotation
Low	33	40	120	3
Moderate	25	40	160	4
High	20	40	200	5

See definitions pertaining to GWM 7 above, for the location of polygons depicting the spatial distribution of low, moderate and high Stand Structure Habitat Classes.

Transition and Deep Snowpack MDWRs General Wildlife Measures

9. (a) Primary forest activities on sites ecologically capable of growing Douglas-fir must achieve at least an additional 20% in post-harvest Douglas-fir composition as compared to the pre-harvest Douglas-fir composition. For an example see Appendix 3.
- (b) Despite 9(a), no further increase in post-harvest Douglas-fir composition is required beyond 60% for sites in the following Biogeoclimatic units: ICH, SBSwk, SBSmc, SBSmw.
- (c) Despite 9(a), no further increase in post-harvest Douglas-fir composition is required beyond 80% for sites in all Biogeoclimatic units except those specified in 9(b).
- (d) Sites with a pre-harvest Douglas-fir composition of less than 40% and a frost hazard class rating of high or very high are not required to meet the Douglas-fir composition requirements in 9(a), but existing Douglas-fir should be maintained where possible.

Definitions pertaining to GWM 9:

- Post-harvest Douglas-fir stand composition is defined as the percent of live conifer stems greater than 1.3 meters in height measured at the earliest of: a) the time of the free to grow declaration, where applicable or b) at twenty years.
 - Pre-harvest Douglas-fir composition is the percent Douglas-fir estimated by pre-harvest measurements of merchantable Douglas-fir by basal area in the areas to be harvested.
 - Sites are deemed to be ecologically capable for Douglas-fir regeneration if: 1) Douglas-fir is included as a preferred species in the 2002 Ministry of Forests FDP stocking standards for the applicable Forest Region or 2) the pre-harvest stand is composed of 40% or more Douglas-fir by basal area.
 - Frost hazard rating classes are to be defined based on the process documented in Chapter 3 of Steen et al. 1990. *Identification of Summer Frost-prone Sites in the Cariboo Region*. FRDA report #157.
10. Primary forest activities in the Snowpack Zones set out in column 1 of Table 3 will result in a range of opening sizes and an average opening size consistent with the specifications for the types of forest sites set out in columns 2 through 4 of Table 3.

Table 3.

Snowpack Zone	Opening Size (ha)		
	Warm aspect sites	Other aspects	Frost prone sites
Transition	0.1 – 0.4 (0.3)	0.1 – 0.7 (0.4)	0.1 – 0.3 (0.2)
Deep	0.1 – 0.4 (0.3)	0.1 – 1.0 (0.6)	0.1 – 0.4 (0.3)

The bracketed numbers in Columns 2 through 4 refer to the recommended average opening size.

Definitions pertaining to GWM 10:

- Opening sizes are measured from tree stems on the outside of the opening. It includes the total contiguous opening area which could be made up of any combination of currently harvested openings, natural openings and openings from any previous harvest within the past 40 years.
- Warm aspect sites have slopes >10% and aspect between 136° and 270°.
- Sites with a summer frost hazard class of medium, high or very high (Steen, O. *et al.*, 1990) are considered frost prone.
- Snowpack zones are defined in Appendix 2.

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11. The construction of the skid trail network and the location, orientation and shape of group selection openings on ungulate winter ranges will result in:
- the total area affected by road and landing areas for current and future passes being minimized so as to not materially impact the continuity of forested habitat.
 - not more than 10 % of the block area (excluding roads, landings and Wildlife Tree Patches) being in skid trails.
 - skid trails being located at least 30m from ridges or topographic breaks, except for trails perpendicular to the feature that are required to access otherwise inaccessible timber.
 - having no concentration of openings from any one pass within 30m either side of a ridge or topographic break.
 - a residual stand with minimal windthrow risk.
 - relatively uniform distribution of openings throughout the block for each pass.
 - maintenance of wildlife tree patches.
12. (a) Primary forest activities must not result in the construction of roads or landings within:
- Topographic buffers identified along major topographic features as delineated in the files "topo_buffer_U-5-001", "topo_buffer_U-5-002" and "topo_buffer_U-5-003" located on the FTP site ftp://ribftp.env.gov.bc.ca/pub/outgoing/cdc_data/uwr/r5/, or
 - 100m of minor ridges or minor topographic breaks identified in the field.
- (b) Despite (a), perpendicular road crossings may be constructed across the topographic breaks where there is no other practicable alternative for access to isolated timber.

Definitions pertaining to GWM 11 and 12:

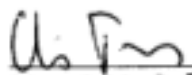
- Minor topographic breaks and ridges are defined as features requiring special management where the slope is greater than 15% when measured from the apex of the feature to a point 15m perpendicular to the feature or to the nearest gully bottom if this is less than 15m away. Ridges have a slope >15% on both sides while topographic breaks have a slope of >15% on only one side.
13. Subject to section 92(1) of the *Forest Planning and Practices Regulation*, primary forestry activities must not result in the construction of roads within Old Growth Management Areas in ungulate winter ranges to which this order applies.
14. Primary forest activities for the purposes of Douglas-fir bark beetle sanitation to remove currently infested stems will result in:
- The volume of non-target, non-infested stems greater than 27.5 cm diameter at breast height removed being less than 10% of the total volume of infested stems removed.
 - No harvesting of green un-infested Douglas-fir trees that are >37.5cm diameter at breast height except as required for safety.
 - No salvage of dead trees within Old Growth Management Areas or Wildlife Tree Patches established in ungulate winter ranges to which this order applies except as required for safety.
15. In stands with >40% lodgepole pine where greater than 50% of the pine component is dead or at high risk of mountain pine beetle mortality, primary forest activities will result in:
- a) No harvest or damage (including skid trail development) to Douglas-fir trees that exceeds:
- 15% for stems 22.5 to 37.5 cm dbh, and

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- 5% for stems >37.5 cm dbh of the pre-harvest basal area of Douglas-fir stems in each of the two diameter categories.
 - b) No cutting of Douglas-fir stems >22.5 cm dbh to access lodgepole pine located in patches less than 0.1 ha.
 - c) Protection of established Douglas-fir regeneration where regeneration is of good form and likely to produce a timber resource of good value.
 - d) Use of Wildlife Tree Patches to maintain and recruit snags.
16. Timber harvesting practices that employ thinning-from-below for stems from 12.5 to 37.5 cm dbh will result in:
- Harvest or damage to Douglas-fir stems >37.5cm dbh that does not exceed 10% of the pre-harvest basal area of the Douglas-fir trees >37.5cm dbh.
 - Retention of a minimum residual basal area of 75% of the pre-harvest conifer basal area (counting stems >12.5cm dbh).
 - The area covered by skid trails not exceeding 10% of the net harvested area.
 - Harvesting priority on species other than Douglas-fir in mixed species stands.
 - Location of landings in non-fir areas and in areas with little or no Douglas-fir >37.5cm dbh unless there is no other practicable option.

Definitions pertaining to GWM 15 and 16:

- Damage is defined as
 - (1) loss of one-quarter or more of the photosynthetic volume of the crown, or
 - (2) loss of either 1000cm² of bark or loss of bark from one-third of the circumference of the tree.
 - Note: the damage definition applies to all harvest types.
- Residual basal area is the average for the net harvested area (excluding roads, landings and wildlife tree patches).


 Signed this 20th day of Feb, 2007
 Chris Trumpy, Deputy Minister
 Ministry of Environment

Appendix 1

Note that the appendix is not part of this legal Order. It is intended to provide guidance for meeting the General Wildlife Measures addressed in the order.

Exemptions from General Wildlife Measures

1. Authority to consider an exemption from the requirement to comply with these General Wildlife Measures (GWM) is provided in Section 92(1) of the Forest Planning and Practices Regulation. Where it is not practicable to comply with these GWM, a person proposing to conduct forestry activities may choose to seek an exemption from the requirements to comply with the applicable GWM. The requisite official may grant an exemption, with conditions.

An exemption application should be submitted to the Minister's delegate for the Region where the Ungulate Winter Range is located (Regional Manager - Ministry of Environment), with a rationale describing the nature of the problem, why it is impracticable to comply with the GWM, and options to integrate winter range conservation with proposed forest practices. This submission of information with the request for exemption will assist in timely consideration of the matter, and will inform the conditions, if any, of the exemption. The applicant must not proceed with activities until the exemption is received by the applicant.

The exemption process is meant to apply in cases where it is found to be impracticable to comply with GWM given the specific situation and circumstances pertaining to compliance with a specific GWM applicable to a specific area of land, in this case, an area located within a specific ungulate winter range. Exemptions are a special administrative process that allows a person the authority to operate in a manner not otherwise allowed under law, due to the special circumstances identified at a specific site, or on a specific area of land. These provisions should not be used broadly to alter the true intent of the law applicable to winter ranges established by order under authority of the Government Actions Regulation. The exemption provision is not applicable for the purposes of broad or blanket exemption from the requirement to comply with GWM across numbers of winter ranges, unless it can be demonstrated to the satisfaction of the requisite official that it is impracticable for practices being carried out at specific locations in each winter range to comply with the GWM.

Salvage of dead (non-infectious) timber resulting from severe natural disturbance may be proposed as an exemption if the proposal results in a net benefit to the Ungulate Winter Range species being managed for, as opposed to taking no action.

Appendix 2

Note that the appendix is not part of this legal Order. It is intended to provide guidance for meeting the General Wildlife Measures addressed in the order.

Snowpack Zones in the Cariboo-Chilcotin

A map of mule deer winter ranges and snowpack zones in the winter ranges in the Cariboo-Chilcotin can be accessed at the following ftp site:

ftp://wmlftp.env.gov.bc.ca/pub/outgoing/mdwr/all_tsa_region_maps/mdwr_snowpck_cclup.pdf

Note: The UWR polygon in the Blackwater (dqu_14) is missing from this map. This polygon is located entirely within the transition snowpack zone.

TABLE A1. Definition of snowpack zones for mule deer winter range management in the Cariboo-Chilcotin, based on biogeoclimatic units.

Snowpack Zone	Biogeoclimatic zones and subzones^a	Applicable General Wildlife Measure Order	Applicable Management Plan
Shallow	BG-all, IDFXm, IDFXw		<i>Management Plan for Shallow and Moderate Snowpack Zones (2002)</i>
Moderate	IDFdk 3 & 4, IDFDw, SBPSxc, MSXk, SBSmh ^b	Order for Shallow and Moderate Snowpack Zones ^c	<i>Management Plan for Transition and Deep Snowpack Zones (2005)</i>
Transition	SBSdw1 & 2, SBPSmk, SBPSdc, MSXv, SBSmh ^b	Order for Transition and Deep Snowpack Zones	
Deep	IDFmw2, ICH-all, SBSwk, SBSmc, SBSmw		

^aBiogeoclimatic zones: BG=bunchgrass, IDF=Interior Douglas-fir, SBPS=Sub-Boreal Pine-Spruce, MS=Montane Spruce, SBS=Sub-Boreal Spruce, ICH=Interior Cedar Hemlock

Subzones: x=very dry; m=moist; w=warm; d=dry; k=cool; c=cold; h=hot; v=very cold

^bNote that the SBSmh is shown in two snowpack zones. The portion of the SBSmh south of Quesnel is in the moderate snowpack zone while the portions of the SBSmh north and east of Quesnel City are in the transition snowpack zone.

^cNote that there are some exceptions, depending on slope and aspect, for some areas within winter ranges in the moderate snowpack zone, as described in the Order.

Some mule deer winter ranges are located within more than one snowpack zone. When a winter range is situated partially within both the moderate and transition snowpack zones, for example, the General Wildlife Measures Order for Shallow and Moderate Snowpack Zones and the *Management Plan for Shallow and Moderate Snowpack Zones* would apply to the area within the moderate snowpack zone, while the General Wildlife Measures Order for Transition and Deep Snowpack Zones and the *Management Plan for Transition and Deep Snowpack Zones* would apply to the winter range area within the transition snowpack zone.

Appendix 3

Note that the appendix is not part of this legal Order. It is intended to provide guidance for meeting the General Wildlife Measures addressed in the order.

Additional Information

1. The *Management Strategy for Mule Deer Winter Ranges in the Cariboo-Chilcotin Part 1b: Management Plan for Transition and Deep Snowpack Zones* (2005) is available at:
ftp://ftpwml.env.gov.bc.ca/pub/outgoing/SRMP/report_documents/

2. The maps of Spatial Distribution of Stand Structure Habitat Classes (Long-term Objectives) for individual mule deer winter ranges are available at:
ftp://wmlftp.env.gov.bc.ca/pub/outgoing/mdwr/all_mdwr_hab_classes/

Note: The Blackwater UWR polygon (dqu_14) is missing from this map. The Blackwater polygon is designated as a High Stand Structure Habitat Class.

3. For purposes of interpreting GWM 7 and GWM 8, Table A2 outlines the age distribution for each cutblock area, to be achieved after a full rotation.

Table A2.

Stand Structure Habitat Class	Age Class Categories (years)				
	0-40	41-80	81-120	121-160	161-200+
High	20%	20%	20%	20%	20%
Moderate	Age Class Categories (years)				
	0-40	41-80	81-120	121-160+	
	25%	25%	25%	25%	
Low	Age Class Categories (years)				
	0-40	41-80	81-120+		
	33%	33%	33%		

4. The following information regarding mule deer winter range management can be found at
http://wlapwww.gov.bc.ca/car/env_stewardship/ecosystems/mdwr_strat/mgmtplan.html :

- o *Management Strategy for Mule Deer Winter Ranges in the Cariboo-Chilcotin Part 1a: Management Plan for Shallow and Moderate Snowpack Zones.*(2002)

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5. For consideration of forest health on mule deer winter ranges, refer to the *Management Strategy for Mule Deer Winter Ranges in the Cariboo-Chilcotin Part 1b: Management Plan for Transition and Deep Snowpack Zones*.
6. The Regional Biodiversity Conservation Strategy Update Note #7 *Integration of the Biodiversity Strategy with a Douglas-fir Beetle Suppression Strategy – Interim Direction December 2005* outlines the process and conditions to follow when considering sanitation harvest for Douglas-fir bark beetle in Old Growth Management Areas. Biodiversity Strategy Updates are located at:
<http://ilmbwww.gov.bc.ca/ilmb/lup/lrmp/northern/cc/lup/biodiv/biodiv7.pdf>
7. For further interpretation of GWM 10, determination of hazard ratings for frost prone sites is described in *Identification and Management of Summer Frost-prone Sites in the Cariboo Forest Region*, Steen, O. et al., 1990 FRDA Report 157.
8. For the purposes of determining the post-harvest Douglas-fir composition requirement of GWM 9, here is an example: If the pre-harvest stand composition is determined to be 99% pine, 1% Douglas-fir, the required post harvest stand composition of Douglas-fir would be 21%. Definitions of pre and post-harvest composition are described following GWM 9.
9. Table A3 shows the sequence of management steps required to address various stand conditions and to move various stand structures towards the desired long-term condition while maintaining adequate habitat quality.

TABLE A3. Timing and sequence of management actions for various stand types and conditions.

Applicable stand type or situation	Progression towards long-term stand structure objectives		
	1 st pass	2 nd pass	3 rd and subsequent passes
Stands with significant current Douglas-fir beetle	Apply Douglas-fir beetle sanitation (Harvest Type A). Then apply harvest treatments appropriate to the stand type in column 1 of this table.		
Stands with greater than 40% lodgepole pine where greater than 50% of the pine component is dead or at high risk of mountain pine beetle (mpb) mortality.	Harvest of mpb infested stems with minimal damage to Douglas-fir. (Harvest Type B)	Apply first pass of group selection when stand basal area $\geq 45\text{m}^2$ in ich or $\geq 40\text{m}^2$ in other zones (Harvest Type D)	At 40-year intervals apply subsequent group selection passes. (Harvest Type D)
Stands with less than or equal to 40% lodgepole pine and all other mixed stands that are mesic and drier or that have 40% or greater Douglas-fir	Apply "thinning from below." (Harvest Type C) or Apply first pass of group selection when stand basal area $\geq 45\text{m}^2$ in ich or $\geq 40\text{m}^2$ in other zones (Harvest Type D)	After 40 years apply 2 nd pass of group selection. (Harvest type D)	
Subhygric or wetter sites with < 40% Douglas-fir	Do not need to manage for mule deer winter range stand structure values. (Harvest Type E)		

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Old Growth Management Areas	No harvest except very limited bark beetle sanitation or trap tree use as directed by the Ministry of Forests and Range.
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Appendix 4

Note that the appendix is not part of this legal Order. It is intended to provide guidance for meeting the General Wildlife Measures addressed in the order.

Guide to Planning within Mule Deer Winter Range

The following information, along with Table A3, were written to provide guidance when planning forest activities in mule deer winter range.

1. How do I know if I am within the boundaries of a mule deer winter range in the Cariboo-Chilcotin?

Mule deer winter range boundaries were established under the Government Actions Regulation of the Forest and Range Practices Act and can be found at:

http://www.env.gov.bc.ca/wld/uwr/ungulate_app.html

2. There are two General Wildlife Measure orders for mule deer winter range in the Cariboo-Chilcotin. How do I know which order applies?

One of the orders contains General Wildlife Measures for those areas within winter ranges that are in the shallow and moderate snowpack zones, while the other applies to the areas within winter ranges that are in the transition and deep snowpack zones. Appendix 2 defines the snowpack zones by biogeoclimatic zones, and will direct you to the appropriate order. Some winter ranges are located entirely within one of the snowpack zone categories and therefore only one of the GWM orders will apply, while others may be located within multiple snowpack zones and require the use of the appropriate measures from both orders.

The first page of both orders list which winter range the order applies to. For winter ranges in multiple biogeoclimatic zones and multiple snowpack zones, both orders are to be reviewed to determine if one or both orders apply.

In some winter ranges within the moderate snowpack zone, there are exceptions where the Order for the Transition and Deep Snowpack zones will be applied instead of the Order for the Shallow and Moderate Snowpack zones. The specific winter ranges where the exceptions occur are listed in the orders, and will apply on treatment units greater than 10 ha, in which 70% or more of the area is on north-facing aspects (between 315 degrees and 60 degrees) and has slopes greater than 20%.

3. What are the steps for planning a forestry activity within a mule deer winter range?

The Order for the Transition and Deep Snowpack Zones contains one Schedule. Schedule 1 contains the General Wildlife Measures 1 - 16, some of which apply to all forest activities and others that are designed specifically by activity. Maps of individual mule deer winter ranges that are covered by the Order are located at the ftp site noted in the Order. These maps show the spatial distribution of stand structure habitat classes that are (described) in the GWMs of Schedule 1. Locating your area of interest on one of the maps will show which stand structure habitat class you are managing towards, and which targets to apply from the corresponding GWMs in Schedule 1.

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The Order for the Shallow and Moderate Snowpack Zones is similar to the Transition and Deep Snowpack Order but contains 13 General Wildlife Measures.

To help determine which particular GWMs within an Order apply, the map files on the ftp site also show biogeoclimatic zones, topographic buffers and Habitat Management Zones, as well as the stand structure habitat class.

The Order for the Transition and Deep Snowpack Zones, identifies six different stand conditions that require different types of treatment:

1. GWM 4 identifies stand conditions to be managed for group selection or thinning from below using the direction in GWMs 6-11.
2. GWM 14 identifies and specifies management requirements for sites requiring sanitation harvest treatments for Douglas-fir bark beetle.
3. GWM 15 identifies and specifies management requirements for sites requiring salvage treatments for pine mortality due to Mountain pine beetle.
4. GWM 16 identifies and specifies management requirements for sites suitable for thinning from below.
5. GWM 3 identifies subhygric sites for which no specific silviculture requirements for mule deer management are required.
6. GWM 3 identifies Old Growth Management Areas as no-harvest areas. Additional requirements and exceptions relating to Old Growth Management Areas within the winter range are provided in GWM 13.

The direction in GWM 12, relating to location of roads and landings, applies to harvest of all stand types and treatment types within the winter range.

The Order for the Shallow and Moderate Snowpack Zones identifies the following different types of stands and treatments:

1. Requirements and exceptions relating to forest activities in Old Growth Management Areas within the winter range are provided in GWM 4.
2. GWM 9 identifies and specifies management requirements for sites suitable for thinning from below.
3. GWM 10 identifies and specifies management requirements for sites suitable for the clumpy single tree selection method of Douglas-fir harvesting. This is to be used in conjunction with Table 3 until the year 2026, after which time Table 3 will no longer apply.
4. GWM 7 identifies and specifies management requirements for sites requiring salvage treatments for pine mortality due to Mountain pine beetle and for the non-fir harvest in mixed species stands.
5. GWM 6 identifies and specifies management requirements for sites requiring sanitation harvest treatments for Douglas-fir bark beetle.

The direction in GWMs 1-5 apply to harvest of all stand types and treatment types within the winter range.