Peace Arm Elk
Ungulate Winter Range (UWR)
(U-7-005) Report

Mackenzie Forest District
Omineca Region

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Background

The south facing slopes in the vicinity of Peace Arm of Williston Reservoir contains core winter habitat for Rocky Mountain Elk (*Cervus elaphus*) use this area. The Peace arm area currently supports a estimated resident population of 590 elk (Hengeveld – Wood, 2001).

Peace Arm Site Description

The Ungulate Winter Range (UWR) includes the extensive south facing slopes on the north side of the Peace Arm between 675 and 1000 metres in elevation from the east of the Nabesche River to the Mackenzie district boundary. The UWR lies mainly within the SBSwk2 wet cool and BWBSmw1 moist warm Biogeoclimatic zone with the upper elevation portion is the BWBSwk2 wet cool Biogeoclimatic zone. The BWBSmw1 and wk2 are in the Natural Disturbance Type (NDT) 3, where the SBSwk2 is within NDT2. Areas over 1000 metres in elevation lie within the BWBSwk2 wet cool zone. Snow depths are low to moderate: measurement taken in the winter of 1990 showed 53 cm at 740 meters elevation (Wood, 1993).

General Assessment Methodology

Also a number of aerial ungulate survey and radio telemetry fights have been conducted which has confirmed Elk winter use of this area (Hengeveld – Wood, 2001), (Backmeyer, 2000). Habitats selection was base upon the species account for Elk within British Columbia.

Species Account Information

Scientific Name:	*Cervus elaphus nelsoni*
Species Code:	M_CEEL
Status:	Yellow-listed (any indigenous species or subspecies (taxa) which is not at risk in British Columbia).

Provincial Range - Rocky Mountain Elk are found in all of the ecoprovinces in British Columbia except the Coast and Mountains, Georgia Depression, Central Interior, and the Taiga Plains. They are widely distributed in the southeastern and northeastern part of the province and occur in other isolated populations in several parts of the southern interior.

They occur in the greatest numbers along the western side of the Rocky Mountains from the International boundary to the Kicking Horse River valley and west to the Kootenay Valley (Cowan and Guiguet 1965). Elk are also found in the Omineca-Peace region of the province. Additional populations are widely scattered throughout the central and southern interior.

Ecology - The primary characteristics for elk habitat are the requirements for forage associated with security cover and thermal cover. Generally, foraging habitat is located in open habitats, security cover in dense forests often with well developed shrub layers, and thermal cover in coniferous forest stands.

Elk may be found in coniferous forests of all ages, as well as in deciduous stands and non-forested habitats such as wetlands, vegetated slides, and rock outcrops (Nyberg and Janz 1990). Elk prefer wet areas such as wetlands, meadows, estuaries, seepage sites, and riparian areas adjacent to streams and in alluvial floodplains of major river valleys. The moist, rich soils that typically occur in these areas provide abundant sources of preferred forage species. Elk primarily forage on grasses and herbs and take advantage of early seral vegetation from disturbance caused by fire, clearing, agriculture and forest harvesting. Elk are associated with edges, especially between forest and grassland. They prefer early seral stages as foraging habitat, as these provide an abundance and variety of herbaceous and woody plant material; they also thrive in edaphic or disclimax vegetation stages (such as found along riverbars) where herbaceous plant material is abundant.

The elk breeding season (rut) occurs in September and October. During the rut, mature bulls defend harems of up to 30 cows. Spike bulls, although sexually mature, are usually kept from breeding by the dominant bull. Antler size is a key factor affecting the status and social order of bulls. Female elk give birth in seclusion and birthing takes place in late May to early June (Boyd 1978). Cover is an important habitat feature for young calves. They will blend in with tall grasses and low or tall shrub cover. Therefore, habitats such as floodplains and riparian zones, or grassy meadows on the edges of forests provide suitable cover for cows and calves during the calving period.

Living Habitat - The living life requisite for elk is satisfied by the presence of suitable feeding, security and thermal habitat, which are described in detail below.

Feeding Habitat - Food habits of elk have been extensively reviewed (see Morgantini and Russell 1983, Nietfeld 1983, Fargey 1988, Fargey and Hawley 1989, Stelfox *et al.* 1991, Renecker and Hudson 1992). The diets of elk are extremely variable and largely dependent upon local forage availability. While Kufeld (1973) found that 159 forbs, 59 grasses, and 95 shrub species have been reported as elk forage, grasses are the preferred forage, although browse is commonly used throughout the year and are consumed in both succulent and dry seasons. Morgantini (1979), working in the Rocky Mountain east slopes and foothills of Alberta, reported that deciduous shrubs and saplings, including Saskatoon (*Amelanchier alnifolia*), water birch (*Betula occidentalis*), and trembling

aspen were important fall and winter forage. Stelfox (1980) added other important elk browse species such as willow (*Salix spp*.), rose (*Rosa spp*.), red-osier dogwood (*Cornus stolonifera*), dwarf birch *(Betula glandulosa*), and low-bush cranberry (*Viburnum edule*).

The following table summarizes the key forage species preferred by Rocky Mountain elk, incorporating information from Berg (1983), Blower (1982), Kufeld (1973), Morgantini and Hudson (1983), Morgantini and Russell (1983), Morgantini and Olson (1983), and Salter and Hudson (1980).

Key Forage Species for Elk

Trees and Shrubs	**Graminoids**	**Forbs**	**Horsetails, Mosses and Lichens**
Acer glabrum *Amelanchier spp.* *Artemesia spp.* *Betula papyrifera* *Ceanothus spp.* *Cornus stolonifera* *Juniperus spp.* *Pinus spp.* *Picea spp.* *Populus spp.* *Prunus virginiana* *Purshia tridentata* *Pseudotsuga spp.* *Rubus spp.* *Salix spp.* *Sambucus spp.* *Shepherdia canadensis* *Symphocarpos albus* *Elaeagnus commutata* *Vaccinium spp.*	*Agropyron spp.* *Elymus spp.* *Agrostis scabra* *Bouteloua spp.* *Bromus spp.* *Carex spp.* *Cyperaceae* *Danthonia spp.* *Deschampsia spp.* *Eleocharis spp.* *Festuca spp.* *Juncus spp.* Koeleria cristata *Poa spp.* *Schizachne purpurascens* *Stipa spp.*	*Astragalus spp.* *Delphinium spp.* *Draba spp.* *Epilobium spp.* *Galium spp.* *Geranium spp.* *Geum spp.* *Hedysarum spp.* *Lupinus spp.* *Medicago sativa* *Mertenesia spp.* *Penstemon spp.* *Petasites spp.* *Potentilla spp.* *Saxifraga spp.* *Senecio triangularis* *Smilacina racemosa* *Stellaria spp.* *Taraxacum spp.* *Trifolium spp.* *Valeriana sitchensis* *Vicia spp.*	*Equisetum spp.* *Lycopodium spp.* *Selaginella spp.*

Elk generally forage within 200 m of cover (Thomas *et al.* 1979, Churchill 1982, Thomas and Toweill 1982).

Snow depth and condition are major determining factors of elk diets on winter ranges. Skovlin (1982) refers to snow depth as the factor most limiting to elk distribution and movement; as snow depths of 46 to 71 cm have caused elk to switch from grazing to browsing, while depths of over 76 cm have been considered detrimental to travel (Nietfeld *et al*. 1984). Therefore, snow depth is a major factor when elk are selecting for winter foraging sites.

Winter Habitat - During the winter, elk prefer south and southeast facing slopes that have low snow accumulations (Skovlin 1982). Snow depths over 40 cm result in elk moving to areas with high forage availability and reduced snow cover due to slope and aspect. Slopes used during the winter tend to be <18% (Makie 1970). Winter range habitats consist of grasslands, open Douglas fir, Ponderosa pine, and lodgepole pine forests (Jamieson and Hebert 1993, Halko and Hebert 1997). Crown closure of forested habitats tends to be less than 55% (Halko and Hebert 1997). Elk winter range is the most critical habitat for elk. During winter, forage is scarce and of poor quality, energetic demands are high, and snow restricts movement. Elk must rely on fat reserves built up over the previous summer and fall. Adult bulls, weakened by the fall rut, and calves are the most susceptible to malnutrition and winter mortality because of their small fat reserves. Important winter range includes floodplains and other riparian areas as well as south-facing slopes with low snowpack levels. Grasses and sedges are important winter food items and are available mostly on steep, south-facing grassland slopes. In addition to the herb layer, shrubs are used, including Saskatoon, willow, twinberry, red-osier dogwood, rose, and aspen.

Security habitat - Security cover provides elk with a sense of security or a means of escape from the threat of predators or harassment (Skovlin 1982). It is widely accepted that a minimum standard for adequate security cover is vegetation capable of hiding 90% of a standing adult elk from view at a distance of 200 feet (61 m) (Black *et al*. 1976, McNamee *et al*. 1981). Many coniferous stands will perform this function if they are more than 3 m tall and 100 m wide. Thick forested habitats provide security habitat for elk. Security cover tends to be structurally complex with 75-100% canopy closure (Marcum 1975).

Thermal cover - Upper north-facing forested slopes provide the coolest habitat during the summer. Older stands with pruned lower branches permit wind movement. These features provide elk with shade, cooling wind, and good visibility.

Winter thermal sites consist of conifer stands with closed canopies and understory vegetation, which provides a windbreak. Forest cover influences snow depth, density and surface hardness (Nyberg and Janz 1990), and elk typically expend most energy walking through crustless, dense, deep snow (i.e., sinking depths greater than 25 cm). Conditions that produce favourable snow conditions include dense young-growth (>10 m tall) and old-growth forests (Nyberg and Janz 1990). Canopy closure (i.e., stands taller than 10 m

with greater than 60% crown completeness) exerts the most influence on snow interception, and creates areas with snow conditions that don't limit elk movement (Bunnell *et al*. 1985). Winter thermal cover requirements are met by coniferous stands with a minimum height of 10 – 12 m and canopy closure of at least 70% (Nietfeld *et al*. 1984, Smith 1985, Thomas *et al*. 1979); these stands must be a minimum of 4 ha in size (Wisdom *et al*. 1986). Recommended habitat requirement for thermal/escape cover and foraging habitat is 40:60 by area (Thomas *et al*. 1979)

Access Management and Human Distrurbance - A number of studies have shown elk are sensitive to human disturbances including the presence of roads and skiing (Morrison *et al*. 1995, Cole *et al.* 1997). Cole *et al*. (1997) found that limited vehicular access (using gates) reduced human disturbances, which resulted in increased survival of elk by reduced poaching and elk movement. Habitat effectiveness was reduced by the presence of open roads used by motorized vehicles (Wisdom et al. 1986, Thomas and Bryant 1987). Roads through forage areas could reduce elk use by up to 90% for 500 m when hiding cover is unavailable (Lyon 1979). When roadside hiding cover is present the zone of influence may be reduced to approximately 100 m. Lyon (1982) also observed habitat suitability declined by 40% when open road densities were greater than 0.62/km2. Cow elk responded similarly to disturbances by cross-country skiers (Cassirer *et al*. 1992). Ferguson and Keith (1982) noted elk moved away from heavily used ski trails.

Range and Agricultural Conflicts - Elk challenges managers in all areas of North America where agriculture and range conflicts occur. In the Omineca Region, elk winter range objectives should largely focus on Peace Arm of Williston Reservoir and the Ingenika Valley where transplants have taken place and elk habitat use is not confounded by agriculture and cultivated fields.

Land Designation

This UWR is located within the Mackenzie Timber Supply Area and is within the operating area of Abitibi Consolidated Company of Canada – Mackenzie Division. There are no Wood Lot Tenures or Tree Farm Licences within the UWR area.

Mackenzie Land and Resource Management Plan LRMP – Resource Direction

This UWR is located within the Zone #36 Selwyn – Special Resource Management Zone (RMZ), Zone #26 Schooler - General Resource Management Zone (RMZ), Zone #24 Nabesche – General Resource Management Zone (RMZ) of the Mackenzie Land and Resource Management Plan**.**

Zone #36 Selwyn - Special Resource Management Zone (RMZ) - The intent of this zone is to manage for the conservation on non-extractive values such as wildlife and wildlife habitat, fish and fish habitat, heritage and culture, scenic areas and recreation as a priority while maintaining opportunities for timber, mineral and oil and gas development. With specific management objectives to:

Objective - Maintain habitat needs of all naturally occurring wildlife species.

- Identify critical ungulate winter range in this RMZ.

Objective - Maintain of enhance habitat for threatened and endangered (red-listed), vulnerable (blue-listed) and regionally important wildlife species, not to the detriment of the ecosystem as a whole.

- Consider the enhancement of potential elk habitat along the north side of the Peace Arm from Bevel Creek to Wicked River.

Within a "Special" RMZ, the LRMP identified that connectivity of important habitats, **may have** a timber supply impact during the term of that plan.

With the seral stage retentions targets:

Seral stage retention targets for mature and old forests by biogeoclimatic variant subzone within each natural disturbance type is to be achieved within the RMZ as detailed in the following table.

Natural Disturbance Type (NDT)	Biogeoclimatic Zone	Mature and Old Forest (%)	Old Forest (%)
NDT 2	ESSF	>42	>13
NDT 3	BWBSa	>34	>16

a. Retention for BWBS in this zone may vary depending on whether deciduous is predominant. Refer to Biodiversity Guidebook.

Plan patch size distribution to emulate natural disturbance patterns as detailed in the following table.

Patch Size Distribution

Natural Disturbance Type (NDT)	<40 ha	40 – 80 ha	80 – 250 ha *
NDT 2	30 - 40	30 - 40	20 - 40

Natural Disturbance Type (NDT)	<40 ha	40 – 250 ha	250 – 1000 ha *
NDT 3	10 – 20	10 – 20	60 - 80

* or larger if required for caribou management, forest health or if natural disturbance pattern dictates.

Zone #26 Schooler – General Resource Management Zone (RMZ) – The intent of this zone is to manage for a wide array of extractive and non-extractive uses and values where emphasis may shift from time to time in specific areas to maintain opportunities for timber, mineral and oil and gas development balanced against other values such as wildlife and wildlife habitat, fish and fish habitat, heritage and culture, scenic areas and recreation. With specific management objectives to:

Objective - Manage wildlife populations at sustainable levels to meet both consumptive and non-consumptive use levels, consistent with the management direction of each RMZ.

- Identify important elk winter range.

- Establish guidelines for seral stage distribution to allow for maintenance of long-term elk habitat (with an emphasis on winter range).
- In areas identified as having a high elk habitat value, manage seral stage distribution as per the established guidelines.

Within a "General" RMZ, the LRMP identified that connectivity of important habitats, **must be** designed at the landscape level to ensure that there is no impact to timber supply during the term of that plan.

With the seral stage retentions targets:

Seral stage retention targets for mature and old forests by biogeoclimatic variant subzone within each natural disturbance type is to be achieved within the RMZ as detailed in the following table.

Natural Disturbance Type (NDT)	Biogeoclimatic Zone	Mature and Old Forest (%)	Old Forest (%)
NDT 1	ESSF	>36	>19
NDT 2	SBS	>31	>9
	ESSF & SWB	>28	>9
NDT 3	SBS & BWBSa	>23	>11
	ESSF	>23	>14

Plan patch size distribution to emulate natural disturbance patterns as detailed in the following table.

Patch Size Distribution

Natural Disturbance Type (NDT)	<40 ha	40 – 80 ha	80 – 250 ha *
NDT 1	30-40	30-40	20-40
NDT 2	30-40	30-40	20-40

Natural Disturbance Type (NDT)	<40 ha	40 – 250 ha	250 – 1000 ha *
NDT 3	10 – 20	10 – 20	60 - 80

* or larger if required for caribou management, forest health or if natural disturbance pattern dictates.

Zone #25 Nabesche – General Resource Management Zone (RMZ) - The intent of this zone is to manage for a wide array of extractive and non-extractive uses and values where emphasis may shift from time to time in specific areas to maintain opportunities for timber, mineral and oil and gas development balanced against other values such as wildlife and wildlife habitat, fish and fish habitat, heritage and culture, scenic areas and recreation. With specific management objectives to:

Objective - Manage wildlife populations at sustainable levels to meet both consumptive and non-consumptive use levels, consistent with the management direction of each RMZ.

- Consider the enhancement of potential elk habitat from Bevel Creek to 'Joe Pierre Bay '.

Note: This zone has the same connectivity, seral stage retention targets and patch size objectives as Zone #26 Schooler RMZ (above).

Forestry Resource Impacts

There is one proposed and one approved category A cut blocks within the proposed UWR area, both these cut blocks do not conflict with the recommend harvesting objective. The proposed area has a gross area of 4,447.3 ha, of which 1,114.9 ha is within the Timber Harvesting Land Base (THLB). There is an Environmental Sensitive Area (ESA) impact budget of 4,045 ha for the Mackenzie TSA. We are recommending modified forest harvesting[1] (40% netdown) within this UWR, we will use 445.9 ha of that ESA budget.

Peace Arm Elk UWR Timber Impact Summary (ha)

UWR Unit No.	Gross Area	THLB	% Net Down[1]	THLB Budget Used
E-001	2868.0	818.3	40	327.3
E-002	1579.3	296.6	40	118.6
Total	4447.3	1114.9		445.9

[1]Base upon management objectives

Other Resource Impacts

This is a moderate geothermal potential east of Schooler Creek, the Mineral Title Map showed no active mineral tenures within this UWR. A data search (August 2002) show no known gas fields within the area of the UWR, the "Butler" field is located east of this area. There was historical placer activity in this area (Branham Flats between 1931 to 1940), which is now flooded by the Williston Reservoir The designation of this UWR should not present any conflicts to this claim or other mineral development.

Management Objectives - Desired Habitat Condition

Warning

The following planning objectives are a unofficial consolidation of the management objectives established within the legal order pertaining to this Ungulate Winter Range. Official ungulate winter range orders may be accessed and downloaded from this Web Site http://wlapwww.gov.bc.ca/wld/uwr/ungulate_app.html .

While every attempt has been made to ensure accuracy and completeness, these management objectives cannot be guaranteed. Users should always refer to the official order, which maybe amended from time to time,

Maintain elk winter ranges to provide high suitability foraging opportunities (desired habitat attributes include: burns, south-facing slopes dominated by grasses, riparian shrub communities), screening and snow interception cover. This will be accomplished by applying the following specific management objectives to the proposed UWRs:

Habitat Condition
Maintaining a minimum of 40% of winter range area forested stands in age class 6 (>100 years) or greater with a crown closure >40%.

Forest Health
Manage forest health to reduce conflicts between elk and bark beetle management.
In the event of a bark beetle outbreak, limit harvesting for forest health sanitation or salvage activities to within the limits set by the Habitat Condition objective and Range Management objectives, unless a variance is approved by the MWLAP Statutory Decision Maker.

Range Management
For all UWR units

- Manage for elk habitat to reduce conflicts between elk and livestock.
- Livestock use will not exceed more than 10% of current year's shrub growth.
- Maintain a minimum stubble height of 25cm for preferred grass species including, but not limited to, western porcupine grass, western wheat grass, northern wheat grass, hairy wild rye, and bluejoint. Maintain a minimum stubble height of 35 cm for riparian sedge species.
- Manage for a desired plant community to provide a dense cover of willows and sedges in riparian areas. On uplands and south facing slopes manage for plant communities that include, but are not limited to, willow, rose, snowberry, poplar regeneration, red osier dogwood, blueberry, choke cherry, low bush cranberry, saskatoon and native perennial grass species.
- Avoid concentrating livestock in riparian areas through appropriate management tools.

Fire Management
For all UWR units minimize the amount of shrub encroachment on grazing areas by:

- Limiting fire suppression within winter range units, which do not pose a significant risk to adjacent forest lands.
- Reflecting UWR objectives in the Ministry of Forest District Fire Management Plan.
- Allowing for prescribe fires or natural fires within winter range units area to reduce loss of grazing habitat due to encroachment of woodlands/shrubs.

Access Management
For all UWR units:

- Maintain elk winter range by minimizing human disturbance and access.

• Where reasonable alternatives exist, plan the location and design of major/secondary access routes to avoid the winter range units.
• Where road/trails are constructed within this winter ranges, de-build or plant road/trails to limit access to open south facing slopes, forested movement trails and licks.
• Where reasonable alternative exist, plan and locate infrastructure development (i.e. reload area, airstrip, logging camp and ferry landing) to avoid the area east of Schooler Bay (UWR unit number E-002), to reduce human disturbance.

Appendix 1 - Summary of Consultation

Contact Name	Response / Comments
Romona Blackwell MRSM – Mineral Planner Omineca-Peace Region	• Designation of this UWR would not conflict with mineral tenure development
Dan Boulianne – Senior Planning Forester Abitibi Consolidated	• Report sent for Review and comment (Feb. 7/03) • E-mail to Dan Boulianne (March 14/03) requesting comments from Abitibi. • Received a e-mail from James Rockwood – Planning Forester (March 17/03) advising me they review the proposal and would be responding soon. • Received a e-mail from Dan Boulianne (March 23/03) indicating the this UWR was now not in their operating area and had sent the report to Slocan for comments. • No further response from Abitibi expected.
Lars Hulstein – Slocan Mackenzie Operations	• Received the report (March 24/03) from Dan Boulianne due to changes in re-alignment of operating areas between Slocan and Abitibi. • Phone Lars on April 2/03, he has received the reports and will comment soon. • Received detailed comments on Peace Arm Stone Sheep UWR on April 11, 2003. - Would like to see a adaptive management feedback loop to insure the UWR area and objectives get updated as our understanding and information improves. - Limited support for the UWR. Recommend using a process like the current "Ospika" goat project procedures for this area, and management via that approach. - Existing infrastructure area next to the Nabesche camp has been exclude from the UWR - Concern with new infrastructure related to the development of the Schooler Bay and future access to the valley have been addressed. - The limit to permanent road access within 2 km of the UWR has been removed.
Bill Warner – Manager BC Timber Sales Office Prince George	• Report sent for Review and comment (Feb. 7/03) • Jim Reid – BC Timber Sales, e-mail response (March 26/03), where he does not see any real issues with this UWR and only limited conflicts

Contact Name	Response / Comments
	with forestry.
Dave Francis – District Manager Mackenzie Forest District	• Report sent for Review and comment (Feb. 7/03) • E-mail to Bruce Armstrong (operations manager) March 14/03 requesting comments from the Mackenzie District. • Meet with Bruce Armstrong (March 31/03) requesting comments from Mackenzie District. • Phone call to Stefan Tack – Zone Officer (April 2/03) requesting comment on the UWR. • E-mail sent to Bruce Armstrong on April 22, 2003, requesting comments, if no response back by April 28, 2003, we will assume there are no conflicts with the Peace Arm UWR. • Received an e-mail from Bruce Armstrong (April 22, 2003, the district didn't have any specific concerns with the proposal.
Chief Bernie Metecheah – Halfway River First Nation	• Report sent for Review and comment (Feb. 7/03) • Contacted the Halfway River First Nation office on April 2/03, we will have to resend the report due to change in the chief position. It is now Chief Joyce Morin. • FAX sent April 2/03 requesting confirmation of UWR areas are within traditional territory. • No response back. • May 15, 2003 a final letter was sent to Chief Joyce Morin requesting comments/input within two weeks, No response back.
Chief Johnny Pierre – Tsay Key Dene First Nation	• Report sent for Review and comment (Feb. 7/03) • Contact from Trever Toma – TKD Band Office (Feb 25/03) to setup a presentation to Chief and Council (April?) • 2 Messages left for Trever Toma to contact me. • FAX sent April 22, 2003 requesting confirmation of UWR areas are within traditional territory and for any comments • May 15, 2003 a final letter was sent to Chief Johnny Pierre requesting comments/input within two weeks, No response back. • Meeting June 5, 2003 with Robert and Trever Toma to review UWR for Northern Caribou and talk about the Peace Arm UWR's • June 18, 2003 received a phone call from Robert Toma, where they support the establishment of the

Contact Name	Response / Comments
	three UWR along the Peace Arm

Appendix 2 – Rational for Management Objective

Rational - All Subzones		
Objective	Assumptions	Supporting Evidence
Maintaining a minimum of 40% of winter range area stands in age class 6 (>100 years) or greater. Crown closure >40%	60:40 ratio adequate Crown closure within range of site series capability (BWBS, ICH, SBS)	Thomas 1979 DeLong 1993
Maintaining at least 15% in High suitability foraging habitat - grazing/browsing habitat (grasses, saskatoon etc) Enhancing forage productivity through prescribed burns	Elk require a constant supply of early seral foraging habitat	Professional judgement
Limit vehicular road access to reduce human disturbance and illegal harvest (access restrictions, gates, deactivation)	Open road density results in increased mortality risk and habitat displacement	Cole, E.K., M.D. Pope and R.G. Anthony. 1997. Lyon 1979, 1982
Consider the use of prescribed fire to reduce understory fuel loading and improve UWR forage characteristics.	Prescribed fire is an invaluable tool for reducing fire hazard and as a silviculture prep. Successful regeneration can occur on coarse textured soils on very dry, south slopes that burn more frequently.	Graham, R. 1999, DeLong, C. 1999.
Reflect UWR objectives in Ministry of Forests District Fire Management Plans	If the season is suitable and burn conditions favourable (eg. early spring), a low intensity ground fire may be of benefit to habitat, and in some areas should be allowed to burn. During unsuitable burning conditions, an aggressive first response, (which may include a full and rapid response to a “light hands on the land” policy) would be utilised to prevent stand destroying events.	Mike Pritchard, Ministry of Forests, Vanderhoof, BC. *Personal communication.*
Manage bark beetle populations through prevention and suppression treatments to maintain high suitability winter habitat attributes.	Sanitation or salvage activities acceptable within the limits of available volumes and stand structural attribute requirements. Beetle Management Plans should reflect an aggressive control objective within UWRs, with a sanitation emphasis. Maintain Low attack levels. ("Maintain Low" = goal to reduce beetle populations to an acceptable	

	level).	

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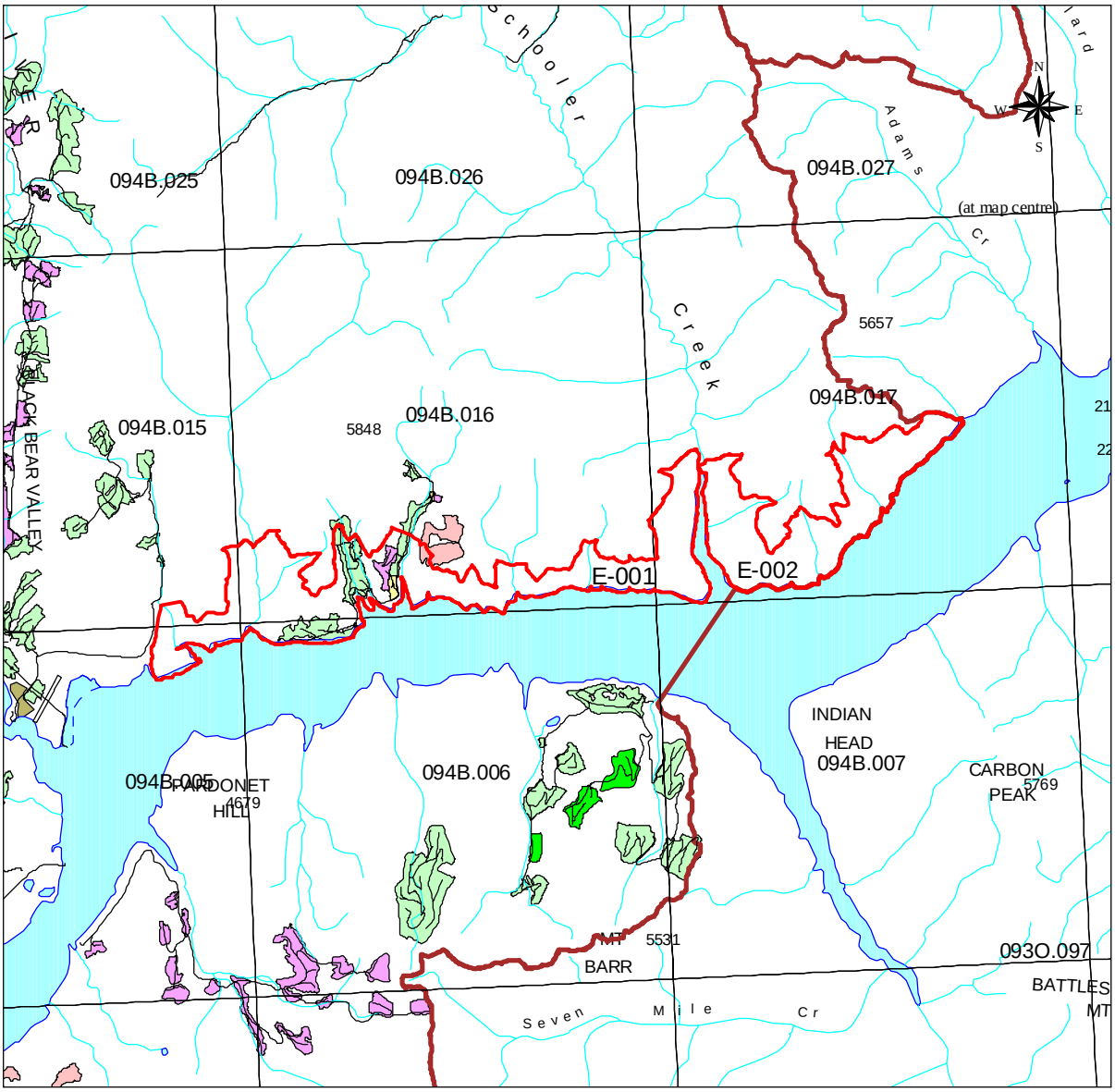
Appendix 4 – Peace Arm Elk UWR Area Maps

- Map 1 – Peace Arm Elk UWR (scale 1:200,000)
- Map 3 – Timber Harvesting Land Base Map (scale 1:200,000)

Map 1 - Peace Arm Elk UWR



1:200,000

2 0 2 Kilometers

Peace Arm Elk UWR

Peace Arm Elk UWR

Nabesche Roads

Nabesche Roads

FOR, Ministry of Forest Districts - Outlined, 1:20K

Forest District

Nabesche Blocks.shp

Approved Cat A

Proposed Cat A

Logged

Logged - Recently

Logged - SR <3m

Free To Grow

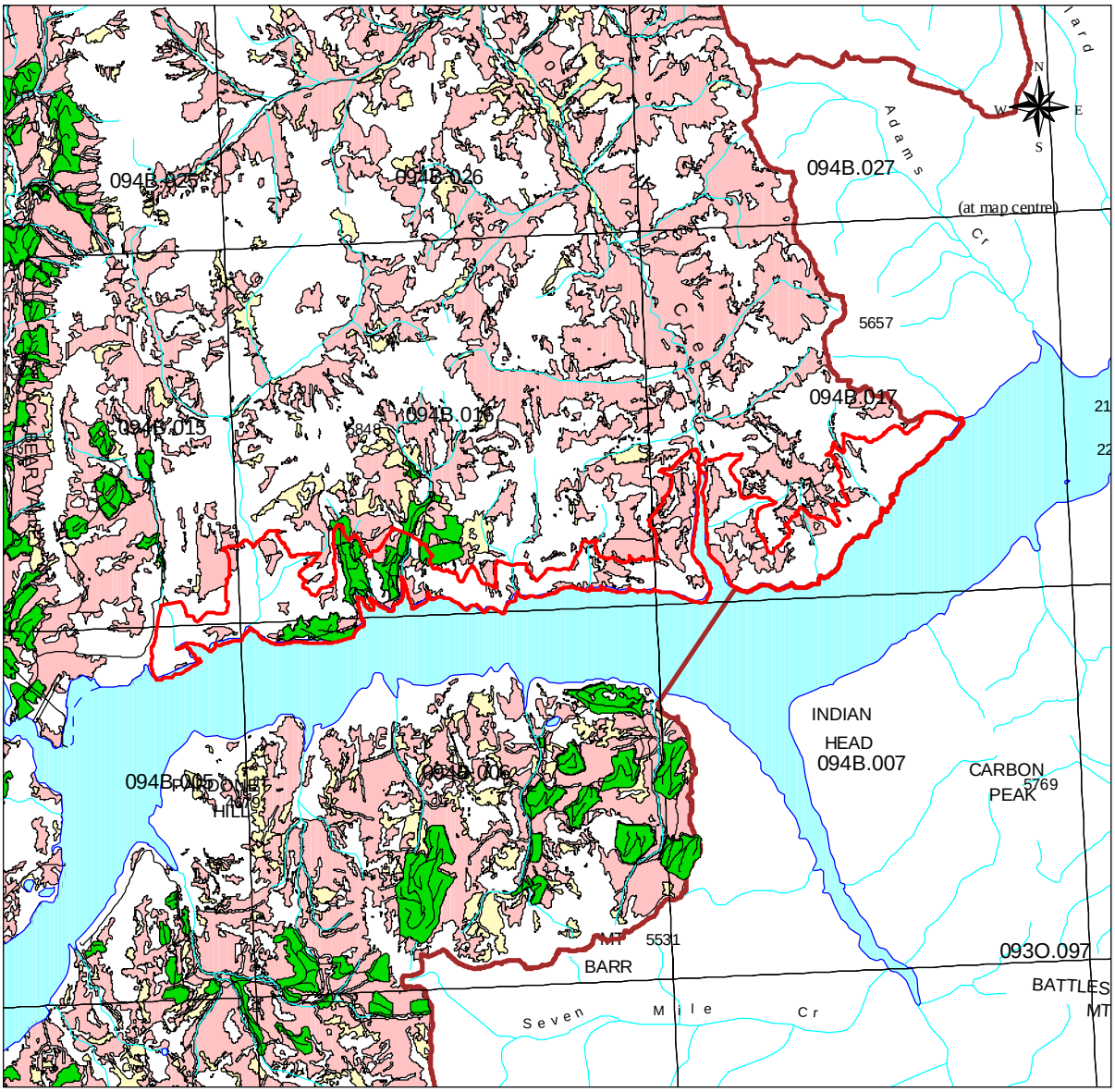
Infrastructure

Road Landing

Ministry of Land, Water and Air Protection
Omineca Region
May 28, 2003

BRITISH COLUMBIA

Map 3 - Peace Arm Elk UWR



1:200,000

2 0 2 Kilometers

Peace Arm Elk UWR

Peace Arm Elk UWR

Nabesche Roads

Nabesche Roads

Nabesche Blocks.shp

Nabesche Blocks.shp

FOR, Ministry of Forest Districts

- Outlined, 1:20K

Forest District

Peace dmk thlb.shp

Contributing

Partially Contributing

Ministry of Land,
Water and Air Protection
Omineca Region
May 28, 2003

BRITISH COLUMBIA