

**Ingenika Elk
Ungulate Winter Range (UWR)
(U-7-008) Report**

**Mackenzie Forest District
Omineca Region**

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June 2003

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Background

South facing slopes in the vicinity of Ingenika Crag and adjacent Ingenika valley contains critical winter habitat for Elk (*Cervus elaphus*). The Ingenika River area supports a resident population of 75 elk (Watts per. Com., 2002). The slopes were subjected to a wildfire in 1970, and are dominated by early seral stage of aspen, and young pine, with older patches of pine, spruce or aspen especially at lower elevations near the riparian zone. The higher mountainous summer range exists to the north and west of the area. Prescribed burning has been conducted north of the Ingenika area, the south slopes of Pelly Lake were burned in the spring of 1993. Elk have been observed in the Pelly Creek area, and it is anticipated that the burned slopes will encouraged the elk to expand their range further.

In reference to the small elk herds currently existing in the Omineca Sub-Region, it was stated in the Elk Management Plan of B.C. 1992-1997 that “these populations are expanding only slowly, and supplemental elk transplants may be required to stimulate population growth” (Demarchie et al, 1992). To this end, the Ingenika River Elk Transplant Proposal (Wood, 1993) was submitted to the B.C. Environment Wildlife Branch in 1993, for approval to transplant 50 to 60 Rocky Mountain elk (*Cervus elaphus nelson*) from the Peace Region to this wintering range. The objective of the transplant was to establish a viable population of elk in the area. After several consultation meetings, Tsay Keh Dene Band verbally agreed that they would do what they could to assist the elk population to grow.

Results of the elk transplants have been documented in Peace/Williston Fish and Wildlife Compensation Program Reports No. 185 (Wood, 1998) and No. 208 (Hengeveld and Wood, 2000).

Ingenika Site Description

The proposed Ungulate Winter Range includes the extensive south facing slopes on the north side of the valley between 700 and 1050 metres in elevation and along the south side of the Ingenika valley (Map 1, appendix 2). The Ingenika River valley lies within the BWBSdk1 cool dry Biogeoclimatic zone, in the Natural Disturbance Type (NDT) 3. Areas over 1100 metres in elevation lie within the ESSFmv4 moist very cold 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

Three years of radio telemetry data (Appendix 4 – Elk Location Data Table) from 1996, 1997 and 1998, have helped locate the core winter use areas. Also a number of aerial

ungulate surveys have been conducted, which have confirmed Elk winter use of this area. Habitat selection was based 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
<i>Acer glabrum</i>	<i>Agropyron spp.</i>	<i>Astragalus spp.</i>	<i>Equisetum spp.</i>
<i>Amelanchier spp.</i>	<i>Elymus spp.</i>	<i>Delphinium spp.</i>	<i>Lycopodium spp.</i>
<i>Artemesia spp.</i>	<i>Agrostis scabra</i>	<i>Draba spp.</i>	<i>Selaginella spp.</i>
<i>Betula papyrifera</i>	<i>Bouteloua spp.</i>	<i>Epilobium spp.</i>	
<i>Ceanothus spp.</i>	<i>Bromus spp.</i>	<i>Galium spp.</i>	
<i>Cornus stolonifera</i>	<i>Carex spp.</i>	<i>Geranium spp.</i>	
<i>Juniperus spp.</i>	<i>Cyperaceae</i>	<i>Geum spp.</i>	
<i>Pinus spp.</i>	<i>Danthonia spp.</i>	<i>Hedysarum spp.</i>	
<i>Picea spp.</i>	<i>Deschampsia spp.</i>	<i>Lupinus spp.</i>	
<i>Populus spp.</i>	<i>Eleocharis spp.</i>	<i>Medicago sativa</i>	
<i>Prunus virginiana</i>	<i>Festuca spp.</i>	<i>Mertenesia spp.</i>	
<i>Purshia tridentata</i>	<i>Juncus spp.</i>	<i>Penstemon spp.</i>	
<i>Pseudotsuga spp.</i>	<i>Koeleria cristata</i>	<i>Petasites spp.</i>	
<i>Rubus spp.</i>	<i>Poa spp.</i>	<i>Potentilla spp.</i>	
<i>Salix spp.</i>	<i>Schizachne</i>	<i>Saxifraga spp.</i>	
<i>Sambucus spp.</i>	<i>purpurascens</i>	<i>Senecio triangularis</i>	
<i>Shepherdia canadensis</i>	<i>Stipa spp.</i>	<i>Smilacina racemosa</i>	
<i>Symphocarpos albus</i>		<i>Stellaria spp.</i>	
<i>Elaeagnus commutata</i>		<i>Taraxacum spp.</i>	
<i>Vaccinium spp.</i>		<i>Trifolium spp.</i>	
		<i>Valeriana sitchensis</i>	
		<i>Vicia spp.</i>	

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 Disturbance - 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 proposed UWR is located within the Zone #19 Ingenika – General Resource Management Zone (RMZ), Sub-zone #19A Ingenika - Special Resource Management Zone (RMZ), Zone #11 Buffalohead – Enhanced Resource Management Zone (RMZ) and Zone #20 Chunamon – Enhanced Resource Management Zone (RMZ) of the Mackenzie Land and Resource Management Plan.

Sub-zone #19A Ingenika - Special Resource Management Zone (RMZ) - The intent of this Sub-zone is to manage for First Nations' historical and traditional values as a priority to minimize adverse impacts from resource development. This Sub-zone is also to be managed for moose and moose habitat and elk and elk habitat to assist in sustaining viable populations. This area also has a specific objective to manage wildlife populations at sustainable levels to meet both consumptive and non-consumptive use levels, consistent with the management direction of each RMZ to:

- identify important elk winter range, and

- in areas identified as having important elk winter range, manage seral stage distribution to provide long-term elk habitat.

Within a “Special” RMZ, the LRMP as 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 #19 Ingenika – 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&gas development balanced against other values such as wildlife and wildlife habitat, fish and fish habitat, heritage and culture, scenic areas and recreation. As this RMZ is adjacent to a protected area, resource development should be sensitive to the intended objectives of the Protected Area. This area has known occurrences of Elk a regional significant species and has also been identified a species of concern in Ingenika Valley in the “Tsay Keh Dene Land and Resource Conservation and Management Plan”.

Within a “General” RMZ the LRMP has 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 #11 Buffalohead – Enhanced Resource Management Zone (RMZ) - The intent of this zone is to optimize timber growth and utilization with the recognition that other industrial users such as mineral development may also benefit in the zone. There are fewer restrictions on industrial development, but not the absence of restrictions where there may be small areas of special values with respect to wildlife and wildlife habitat, fish and fish habitat, heritage and culture, scenic areas and recreation. As this RMZ is adjacent to a protected area, resource development should be sensitive to the intended objectives of the Protected Area. This area has known occurrences of Elk a regional significant species and has also been identified a species of concern in Ingenika Valley in the “Tsay Keh Dene Land and Resource Conservation and Management Plan”.

Within an “Enhanced” RMZ the LRMP has identified that connectivity of important habitats, connectivity **must not** have a timber supply impact during the term of this 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	>19	>19
NDT 2	SBS	>15	>9
	ESSF & SWB	>14	>9
NDT 3	SBS & BWBSa	>11	>11
	ESSF	>14	>14

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

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 – 5000 ha *
NDT 3	10 – 20	10 – 20	60 - 80

Zone #20 Chunamon – Enhanced Resource Management Zone (RMZ) - The intent of this zone is to optimize timber growth and utilization with the recognition that other industrial users such as mineral development may also benefit in the zone. There are fewer restrictions on industrial development, but not the absence of restrictions where there may be small areas of special values with respect to wildlife and wildlife habitat, fish and fish habitat, heritage and culture, scenic areas and recreation. As this RMZ is adjacent to a protected area, resource development should be sensitive to the intended objectives of the Protected Area. This area has known occurrences of Elk a regional significant species and has also been identified a species of concern in Ingenika Valley in the “Tsay Keh Dene Land and Resource Conservation and Management Plan”.

This zone has the same connectivity, seral stage retention targets, and patch size objectives as Zone #11 Buffalohead RMZ (above).

Forestry Resource Impacts

Catagory A approval can not be revoked, the harvest prescription can be changed to fit the desired future forest condition (eg clear cut to partial cut) if an SP has not been issued. I am also working on the assumption that there is a 4 month "known" provision on accommodating UWR objectives in new cut-blocks. Also assume we can change anything with voluntary cooperation of the licensee (eg if they feel it is important for certification etc).

The proposed area has a gross area of 6,963.3 ha, of which 2,645.4 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 harvesting¹ (40% netdown) within this UWR, we will use 1,058.2 ha of that ESA budget.

Ingenila Elk UWR Timber Impact Summary (ha)

UWR Unit No.	Gross Area	THLB	% Net Down ¹	THLB Budget Used
IE-001 & IE-002	4,213.0	1,472.7	40	589.1
IE-003	2,750.3	1,172.7	40	469.1
Total	6,963.3	2,645.4		1,058.2

¹Base upon UWR management objectives

Other Resource Impacts

There has been past and current mineral development within this area just north of Delkluz Lake. Current mineral tenures include DEL Properties (Tenure Number 379605) which includes the Ferguson Development Prospect occurrence, thought to be a replacement-type Manto deposit (Polymetallic manto Ag-Pb-Zn deposit type). The Lookout Hill Showing a Hadrynian Ingenika Group limestone deposit underlies a 1300 by 760 metre area on Lookout Hill (UTM 10 6284400 367027) and the Burden Showing a calcareous talc sericite schist, located due east of the Ferguson workings are also found within this winter range area. 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 conditions above, 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.
- Limit fire suppression within winter range units, which do not pose a significant risk to adjacent forest lands.
- Reflect UWR objectives in the Ministry of Forest District Fire Management Plan.
- Allow 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.

Appendix 1 - Summary of Consultation

Contact Name	Response / Comments
Romona Blackwell MRSM – Mineral Planner Omineca-Peace Region	<ul style="list-style-type: none"> • Designation of this UWR would not conflict with mineral tenure development
Dan Boulianne – Senior Planning Forester Abitibi Consolidated	<ul style="list-style-type: none"> • 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 24/03) indicating the this UWR indicating they don't really have any concerns, • No further response from Abitibi expected.
Lars Hulstein – Slocan Mackenzie Operations	<ul style="list-style-type: none"> • Report sent for review and comment (June 2/03)
Bill Warner – Manager BC Timber Sales Office Prince George	<ul style="list-style-type: none"> • 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 with forestry.
Dave Francis – District Manager Mackenzie Forest District	<ul style="list-style-type: none"> • 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 Ingenika Elk UWR. • Received an e-mail from Bruce Armstrong (April 22, 2003, the district didn't have any specific concerns with the proposal.
Chief Johnny Pierre – Tsay Key Dene Firest Nation	<ul style="list-style-type: none"> • 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?)

Contact Name	Response / Comments
	<ul style="list-style-type: none"> • 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 Ingenika UWR's • July 2, 2003 received a FAX from Trevor Toma, where they outlined known elk habitat along the upper-lower Ingenika Trench. The majority of that identified area is included within the UWR proposal.

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. <i>Personal communication.</i>
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).	

Appendix 3 – Literature Cited

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Appendix 4 – Elk Location Data Table

Date	Elka	Loc'nb	Zone	East	North	Elv (m)	Slp (%)c	Aspc	BGZd	Forest Cover	Habe	B / Lf	SEASON	Group size
28/02/1996	801	DF	10	367572	6282545	800	0	0	BWBS	PIsb 823 P4	C			2
28/02/1996	812	DF	10	365636	6285280	760	0	0	BWBS	PIA 110 P1	Imm	B70		4
28/02/1996	823	DF	10	365636	6285280	760	0	0	BWBS	PIA 110 P1	Imm	B70		4
28/02/1996	832	IS	10	364983	6287529	920	15	180	BWBS	NPA 512-2	SG			7
28/02/1996	842	DF	10	365636	6285280	760	0	0	BWBS	PIA 110 P1	Imm	B70		4
28/02/1996	851	IS	10	364983	6287529	920	15	180	BWBS	NPA 512-2	SG			7
28/02/1996	861	IS	10	364983	6287529	920	15	180	BWBS	NPA 512-2	SG			7
28/02/1996	872	IS	10	364983	6287529	920	15	180	BWBS	NPA 512-2	SG			7
28/02/1996	941	IS	10	368345	6289260	1020	5	225	BWBS	NSR -/M	Imm	B84		1
28/02/1996	951	IS	10	365310	6287871	1030	15	180	BWBS	NPA 512-2	SG			n/s
28/02/1996	xx	IS	10	366372	6287650									6
07/03/1996	801	DF	10	367209	6285267	830	0	0	BWBS	Sp meadow	SG			>3
07/03/1996	812	DF	10	365504	6285006	770	30	180	BWBS	PIA 110 P1	Imm	B70		2
07/03/1996	823	DF	10	365504	6285006	770	30	180	BWBS	PIA 110 P1	Imm	B70		2
07/03/1996	832	IS	10	365507	6287939	1040	10	180	BWBS	NPA 512-2	SG			3
07/03/1996	842	DF	10	367209	6285267	830	0	0	BWBS	Sp meadow	SG			>3
07/03/1996	851	IS	10	365696	6287785	920	0	0	BWBS	NPA 512-2	SG			4 or 5
07/03/1996	861	IS	10	365696	6287785	920	0	0	BWBS	NPA 512-2	SG			4 or 5
07/03/1996	872	IS	10	365696	6287785	920	0	0	BWBS	NPA 512-2	SG			4 or 5
07/03/1996	941	IC	10	370314	6284929	710	0	0	BWBS	S 741 G5	C			1
07/03/1996	951	IS	10	364222	6287999	1110	10	180	SWB	NPA512-2/ BS(PI)832P4	SG/C			
25/04/1996	801	IS	10	366786	6288047	890	Oct-15	180	BWBS	NPA 512-2	SG		LW	2
25/04/1996	812	IS	10	367220	6287885	780	5	180	BWBS	A 522 P4	D		LW	2
25/04/1996	823	IS	10	366681	6287957	870	Oct-15	180	BWBS	NPA 512-2	SG		LW	8
25/04/1996	832	IS	10	366681	6287957	870	Oct-15	180	BWBS	NPA 512-2	SG		LW	8
25/04/1996	842	IS	10	367285	6288012	800	05-Oct	180	BWBS	A 522 P4	D		LW	2
25/04/1996	851	IS	10	367285	6288012	800	05-Oct	180	BWBS	A 522 P4	D		LW	2
25/04/1996	861	IS	10	366681	6287957	870	Oct-15	180	BWBS	NPA 512-2	SG		LW	8
25/04/1996	872	IS	10	366786	6288047	890	Oct-15	180	BWBS	NPA 512-2	SG		LW	2
25/04/1996	941	IC	10	371801	6284790	780	99	999	BWBS	PIA 220 M1	Imm	B58	LW	DEAD

25/04/1996	951	other	10	356362	6290118	690	25-30	180	BWBS	PIA 110 P1	Imm	B70	LW	4
06/07/1996	801	FC	10	387777	6285613	975	10	90	BWBS	PIS 831 M4	C		S	2
06/07/1996	812	DF	10	365104	6279857	840	5	180	BWBS	PIA 733 M3	M		S	n/s
06/07/1996	823	IC	10	371342	6277137	1060	30	90	BWBS	PIS(B) 733 M4	C		S	n/s
06/07/1996	832	IC	10	371137	6278796	1040	25	315	BWBS	PI 210 P1	Imm	B58	S	1
06/07/1996	851	IS	10	368504	6288457	790	40	180	BWBS	NSR -P	Imm	B84	S	1
06/07/1996	861	IC	10	371800	6281430	1230	20	270	SWB	PI 210 P1	Imm	B58	S	1
06/07/1996	872	DF	10	359450	6281500	870	0	0	BWBS	SA(PI) 741 G5	M		S	n/s
06/07/1996	951	other	10	376100	6315200	680	0	0	BWBS	ASPI 731 M5	M		S	n/s
04/10/1996	801	FC	10	383110	6292182	850	99	360	BWBS	PIS 731 G3	C		F	n/s
04/10/1996	812	IC	10	372180	6275590	1000	99	270	BWBS	API 531 M5	M		F	n/s
04/10/1996	823	IS	10	365870	6286500	690	0	0	BWBS	SA 640 G4	M		F	>8
04/10/1996	832	IC	10	371224	6281299	1040	99	270	BWBS	PI 210 P1	Imm	B58	F	n/s
04/10/1996	842	FC	10	387947	6286221	970	99	90	BWBS	SBi(PI) 110 M1	Imm	L78S79	F	1
04/10/1996	851	DF	10	362793	6284160	800	0-5	360	BWBS	A(PI) 531 M5	D		F	2
04/10/1996	861	DF	10	367958	6283777	795	0-5	360	BWBS	A 420 P4	D		F	1
04/10/1996	872	IS	10	365870	6286500	690	0	0	BWBS	SA 640 G4	M		F	>8
12/03/1997	801	FC	10	386095	6289854	925	20	45	BWBS	ASPI(Bi) 631 P3	M		LW	4
12/03/1997	812	IS	10	375577	6290506	670	0	0	BWBS	meadow	SG		LW	9
12/03/1997	823	IS	10	366105	6286528	690	99	999	BWBS	SA 640 G4	M		LW	1
12/03/1997	832	DF	10	367135	6279300	860	99	180	BWBS	PI(S) 823 P4	C		LW	DEAD
12/03/1997	842	FC	10	386095	6289854	925	20	45	BWBS	ASPI(Bi) 631 P3	M		LW	4
12/03/1997	851	IC	10	370783	6284580	760	0	0	BWBS	PI(A) 733 M3	C		LW	1
12/03/1997	861	IS	10	365750	6287580	820	99	999	BWBS	NPA 512-2	SG		LW	DEAD
12/03/1997	872	IS	10	375577	6290506	670	0	0	BWBS	meadow	SG		LW	9
12/03/1997	xx	IS	10	364535	6287246									2
12/03/1997	xx	IS	10	366423	6286889									2
12/03/1997	xx	IS	10	364258	6287534									1
06/05/1997	801	FC	10	386963	6289886	740	05-Oct	90	BWBS	SBi(A) 110 M/P1	Imm	L78P80	C	2
06/05/1997	812	DF	10	370095	6283153	730	0	0	BWBS	PI 210 P1	Imm	B58	C	1
06/05/1997	823	IS	10	365314	6287667	940	30	180	BWBS	NPA 512-2	SG		C	1
06/05/1997	842	FC	10	386668	6289133	900	05-Oct	90	BWBS	ASPI(Bi) 631 P3	M		C	3
06/05/1997	851	IS	10	362689	6287641	920	30-40	999	BWBS	PIA 110 P1	Imm	B70	C	2

06/05/1997	872	IC	10	370220	6282932	730	0	0	BWBS	NPBr	SG		C	6
06/06/1997	801	FC	10	384978	6291205	900	30	135	BWBS	ASPI 831 M3	M		C	4
06/06/1997	812	IS	10	372752	6289532	730	0	0	BWBS	NSR -/M	Imm	B85	C	1
06/06/1997	823	IS	10	371227	6276398	850	30	270	BWBS	API 531 M5	M		C	1
06/06/1997	842	FC	10	384978	6291205	900	30	135	BWBS	ASPI 831 M3	M		C	4
06/06/1997	851	IS	10	371145	6290000	870	15	180	BWBS	AS(PI) 622 P4	M		C	3
06/06/1997	872	IS	10	374226	6289310	720	99	999	BWBS	NSR -/M	Imm	B85	C	2
11/08/1997	801	FC	10	389590	6283090	950	10	90	BWBS	PIS(Bi) 110 M1	Imm	L77S79	S	3
11/08/1997	812	IC	10	374784	6287522	740	99	999	BWBS	PIA 220 M1	Imm	B58	S	>3
11/08/1997	842	FC	10	387588	6286157	1050	20	45	BWBS	PI(S) 823 P3	C		S	1
11/08/1997	851	IC	10	374677	6287358	745	99	999	BWBS	PIA 220 M1	Imm	B58	S	5
11/08/1997	872	IC	10	374784	6287522	740	99	999	BWBS	PIA 220 M1	Imm	B58	S	>3
16/10/1997	801	FC	10	388608	6283828	1070	99	999	BWBS	NSR -/M MS80	Imm	L79	F	7
16/10/1997	812	IC	10	371967	6288554	690	99	999	BWBS	PIA 220 M1	Imm	B58	F	3
16/10/1997	823	IS	10	363695	6287793	1020	99	999	BWBS	PIAS 731 M3	M		F	6
16/10/1997	842	FC	10	388608	6283828	1070	99	999	BWBS	NSR -/M MS80	Imm	L79	F	7
16/10/1997	851	IS	10	363695	6287793	1020	99	999	BWBS	PIAS 731 M3	M		F	6
16/10/1997	872	IC	10	371967	6288554	690	99	999	BWBS	PIA 220 M1	Imm	B58	F	3
10/01/1998	801	FC	10	389999	6282733	850	99	999	BWBS	PI(A) 741 G5	C		EW	4
10/01/1998	812	IC	10	373006	6286127	765	99	999	BWBS	PIA 220M1	Imm	B58	EW	15
10/01/1998	823	IC	10	373006	6286127	765	99	999	BWBS	PIA 220 M1	Imm	B58	EW	15
10/01/1998	842	FC	10	387014	6287230	1050	99	999	BWBS	SPI(A) 831 M4	C		EW	n/s
10/01/1998	851	IC	10	373006	6286127	765	99	999	BWBS	PIA 220 M1	Imm	B58	EW	15
10/01/1998	872	IC	10	373006	6286127	765	99	999	BWBS	PIA 220 M1	Imm	B58	EW	15
10/01/1998	xx	IS	10	364523	6287525									12
21/03/1998	801	FC	10	385982	6290172	900	99	999	BWBS	PI 631 M5	C		LW	4
21/03/1998	812	IC	10	372707	6287046	740	99	999	BWBS	PIA 633 M3	M		LW	16
21/03/1998	823	IC	10	372707	6287046	740	99	999	BWBS	PIA 633 M3	M		LW	16
21/03/1998	842	FC	10	381573	6292615	750	99	999	BWBS	PIA 220 M2	Imm	B58	LW	2
21/03/1998	851	IC	10	372707	6287046	740	99	999	BWBS	PIA 633 M3	M		LW	16
21/03/1998	872	IC	10	372707	6287046	740	99	999	BWBS	PIA 633 M3	M		LW	16

Appendix 5 – Ingenika Elk UWR Area Maps

- Map 1 – Ingenika Elk UWR (scale 1:130,000)
- Map 2 – Ingenika Elk UWR (THLB) Map (scale 1:130,000)

