ARROWSMITH TSA
UNGULATE WINTER RANGE PLAN
U-1-017

Prepared by:

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Nanaimo, B.C.

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Executive Summary and Endorsement

The Operational and Site Planning Regulation (OSPR) describes the formal legislative basis for establishing ungulate winter ranges (UWRs). Within that regulation, an UWR is defined as *"an area that is identified as being necessary for the winter survival of an ungulate species"*. The intent of this report is to provide the background and biological rationale for 33 ungulate winter ranges proposed for confirmation in the Arrowsmith Timber Supply Area (TSA) under Section 69 of the OSPR of the Forest Practices Code of BC Act. Of the 33 proposed ungulate winter ranges, there are 29 ranges proposed for Columbian black-tailed deer and 4 for Roosevelt elk. This report describes the assessment methodology used in the refinement of winter range boundaries and includes specific information on each of the winter ranges.

This report will:

1) Propose ungulate winter ranges for approval under OSPR section 69(2);
2) Describe the methodology used to identify, assess and delineate the UWR polygon boundaries;
3) Provide the biological rationale for the proposed UWRs;
4) Provide an operational analysis for each winter range and an overall summary;
5) Provide objectives and goals for managing the UWR in the Arrowsmith TSA.
6) Provide summaries of stakeholder and First Nation comments on the proposed UWR.

Over the last few years, representatives from the Ministry of Water, Land and Air Protection (MWLAP) and the Ministry of Forests (MOF) have been working together to determine which ungulate winter ranges on the Arrowsmith TSA will be proposed for confirmation.

The intent of the ungulate winter range confirmation process is to delineate the best possible winter ranges, taking into account habitat suitability/capability, distribution across the landscape and impacts to timber harvesting operations. Historically, UWRs were proposed and mapped on an individual basis as areas were encountered during review of forest development. Since the historic winter ranges were not assessed in a strategic manner when they were established, MWLAP determined that a review of all existing historical UWRs was necessary prior to areas being proposed for confirmation. Existing winter ranges with less value were to be removed and replaced with higher value habitat elsewhere.

In 2001, the Ministry of Water, Land and Air Protection initiated a project to conduct an extensive review of 35 UWRs on the Arrowsmith TSA. The assessments were completed in 2001-2002 and the results are summarized in the report entitled *South Island Forest District Arrowsmith TSA Ungulate Winter Range Assessment* completed by Randy Dolighan (MWLAP) and Joe Materi (Ursus Environmental) in June of 2002. Subsequent to this report, winter range boundaries were further refined and a small amount of additional field work was completed. Refinements to winter ranges included adjusting

boundaries, deleting ranges and portions of ranges which were not of high value and replacing deleted ranges with higher value areas of interest.

Three types of UWR and objectives are recognized by the May 23, 2003 *Memorandum of Understanding on Establishment of UWR and Related Objectives*. All of the proposed UWR areas within the Arrowsmith TSA fall into the Type 1 UWR category. As such, they were either previously mapped as wildlife management (Ew) areas in Timber Supply Review 1 (TSR 1) or TSR 2, or are UWRs proposed in place of other areas netted down as Ew in TSR 1 or TSR 2. For the Arrowsmith TSA, the policy direction in determining the amount of Type 1 UWR that is agreed to go forward for confirmation is that the UWRs, once confirmed, should have no greater impact on timber supply today than could be attributable to UWR in TSR 1. Since the TSR 1 data was difficult to re-create, TSR 2 data was used as the base for impact calculations. The MOF determined the impact from UWRs in TSR 2 to be 1200 ha of the Timber Harvesting Land Base (THLB). This THLB impact is loosely termed the 'budget'.

MWLAP revised the proposed winter ranges to meet the budget allowance of 1200 ha and selected 33 areas to be proposed for confirmation within the Arrowsmith TSA. The profile of forest in the proposed UWR was found to be similar to the profile of forest netted down for ungulates in TSR 2, with the majority of the THLB affected in the 41-80 years age class.

Within the Arrowsmith TSA, there were very few options for establishing high quality old-growth ungulate winter ranges in certain landscape units due to the fragmented nature of the land base. Significant portions of Crown land on the east coast of Vancouver Island are considered part of a 'fragmented' land base, as Crown parcels are often small and surrounded by private land. On the east coast in particular, logging activity over the past century has resulted in progressive elimination of old-growth forest habitat, which has reduced the suitability of numerous high capability ungulate winter ranges.

Due to the lack of old growth on high capability winter habitat sites within much of the Arrowsmith TSA, many of the proposed UWRs contain primarily high capability second-growth forests of various ages. Many of these sites offer some value in mild winters, as they are within older age class second-growth forests. Although these areas are not fully functional as critical winter range due to their age, their suitability will improve as they mature. These areas should be considered, in part, as a long term rebuilding strategy in conserving ungulate populations across the landscape.

The 33 UWRs proposed for confirmation have a total THLB impact of 1213 ha. The overall impact on the Arrowsmith TSA's current Allowable Annual Cut (ACC) is expected to be minimal. The net difference between the area recommended for confirmation and the area accounted for in TSR 2 is 13 THLB ha. This 13 ha variance was agreed to by the MOF. A joint letter endorsing this UWR plan follows:

Signed endorsement letter to be inserted here.

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Joe Materi (Ursus Environmental)

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1.0 INTRODUCTION

1.1 Purpose

The intent of this report is to provide the background and biological rationale for 33 ungulate winter ranges (UWRs) proposed for confirmation in the Arrowsmith Timber Supply Area (TSA) under Section 69 of the Operational and Site Planning Regulation (OSPR) of the Forest Practices Code of BC Act. Of the 33 ungulate winter ranges, there are 29 ranges proposed for Columbian black-tailed deer and 4 for Roosevelt elk. This report describes the assessment methodology used in the refinement of winter range boundaries and includes specific information on each of the winter ranges.

This report will:

1) Propose ungulate winter ranges for approval under OSPR section 69(2);
2) Describe the methodology used to identify, assess and delineate the UWR polygon boundaries;
3) Provide the biological rationale for the proposed UWRs;
4) Provide an operational analysis for each winter range and an overall summary;
5) Provide objectives and goals for managing the UWR in the Arrowsmith TSA.
6) Provide summaries of stakeholder and First Nation comments on the proposed UWR.

2.0 BACKGROUND

2.1 Legislative Framework

While there are a number of policies in place relating to ungulate winter ranges in the South Island Forest District (Appendix A), it is the Forest Practices Code of BC Act Operational and Site Planning Regulation which describes a formal administrative process for establishing UWRs. Within that regulation, an UWR is defined as *"an area that is identified as being necessary for the winter survival of an ungulate species"*. A two-step process was approved for the establishment of UWR under the Regulation. Existing, mapped winter ranges that were part of a wildlife management plan and/or strategy and were managed as UWR were "grandparented" in October, 1998. Remaining candidate areas included:

1) those that were previously mapped but not grandparented by October 15, 1998, and
2) those that were accounted for in TSR1 but not mapped.

With some exceptions, all of the UWRs identified in the Arrowsmith Timber Supply Rationale (December 30, 1996), outside the Clayoquot Sound Land Use Decision Area, were grandparented on October 16, 1998. The remaining UWRs were covered by a MOF/MWLAP Memorandum of Understanding. A copy of the grandparenting letter is included in Appendix H.

All Forest Practices Code candidate and grandparented UWRs were to be confirmed by October 15, 2003. The overall intent of the confirmation process is to: (1) identify the areas that are necessary for the winter survival of ungulates; (2) ensure that these areas are distributed in the most effective way for maintaining ungulates across their natural range; and (3) ensure that the timber supply impacts do not exceed those included in Timber Supply Review 1 (TSR1).

Three types of UWR and objectives are recognized by the May 23, 2003 *Memorandum of Understanding on Establishment of UWR and Related Objectives*. All of the proposed UWR areas within the Arrowsmith TSA fall into the Type 1 UWR category. As such, they were either previously mapped as wildlife management (Ew) areas in Timber Supply Review 1 (TSR 1) or TSR 2, or are UWRs proposed in place of other areas netted down as Ew in TSR 1 or TSR 2.

The May 23, 2003 Memorandum of Understanding defines Type 1 as:

UWR and objectives that have been identified and incorporated in TSR1 and/or TSR2 and were:
(a) identified in a wildlife management plan or strategy approved before October 15, 1998, or
(b) mapped before April, 1998 but not included in a wildlife management plan or strategy, or
(c) included in TSR1 or TSR2 before April, 1998 but not mapped.

The May 11, 2000 Memorandum of Understanding specifies that in order to be acceptable as an ungulate winter range, the mapped area must meet at least one of the following criteria:

1. a combination of topographic and vegetative features defining high-quality winter range, as appropriate for the species and the locality, as determined by regional wildlife or habitat staff of MWLAP;
2. a documented history of winter use, as determined by regional wildlife or habitat staff of MWLAP; or
3. in localities that are regularly occupied by an ungulate species during the winter but that do not have sufficient high-quality winter range as defined under point 1 above, a combination of topographic and vegetative features that provide the most suitable habitat for winter range. This is the least preferred of these three criteria and should be used relatively infrequently.

Typical topographic and vegetative features to be used in delineating winter ranges are:

- slope
- aspect
- elevation
- topographic shading
- presence of rock outcrops or cliffs
- forest cover type (species composition, height, age, volume or basal area, canopy closure of overstory)
- species composition and abundance of understory vegetation
- species composition and abundance of arboreal and terrestrial lichens
- stand heterogeneity

- size and configuration of area.
- adjacency of other important habitats such as early winter and spring ranges
- proximity to other winter ranges

The legislative background surrounding the confirmation process for UWRs is described in detail within Appendix A.

2.2 Columbian Black-Tailed Deer Winter Range Requirements

A comprehensive review of Columbian black-tailed deer winter habitat requirements can be found in the handbook entitled *"Deer and elk habitats in coastal forests of southern British Columbia"* edited by Nyberg and Janz (1990). This handbook summarizes the findings of extensive deer and elk research carried out as part of the 'Integrated Wildlife-Intensive Forestry Research' (IWIFR) program of the 1980's and includes detailed information on deer ecology, habitat requirements, and forestry interactions.

The following summary for Columbian black-tailed deer has been drawn largely from Bunnell (1990). Winter range assessment variables with associated rankings are also summarized (Table 1).

Winter is the most critical season for black-tailed deer. During mild winters or in the shallow snowpack zone, deer may find forage and cover in a wide variety of forest conditions. While older second growth stands may satisfy winter range requirements in the shallow snowpack zone, old-growth habitats are required to satisfy critical winter habitat requirements in the moderate and deep snowpack zones (Nyberg and Janz 1990).

Critical stand structure features of winter range are: large, well-developed crowns; small openings within a variable overstory canopy that averages 65-90% closure; and, multiple canopy layers with an understory of shade tolerant conifers. These features are particularly important for deer survival during harsh winters because they influence snow depth, availability of forage, and security cover (Bunnell 1990).

Topographic features also influence deer survival by influencing snow depth and distribution. Topographic features important to critical winter range include: southerly aspects; moderate to steep slopes (40-100%); low elevations (< 1000 m); and minimal shading from adjacent mountains. The presence of rock outcrops or bluffs is also beneficial (Bunnell 1990).

Winter Forage

Western redcedar, Douglas-fir, deer fern, red huckleberry, salal and arboreal lichens are all key forage species during the winter. Taller forage species such as salal and huckleberry become important when shorter forage species are covered by snow. Arboreal lichen and conifer litterfall are very important food sources when snow depth restricts the availability of rooted forage species. During severe winters, arboreal lichens and the lower branches of western redcedar and Douglas-fir may be the major sources of food (Bunnell 1990).

Winter Cover

Winter cover requirements to ensure the survival of black-tailed deer focus on the interception and amelioration of snowfall events.

Snow Interception Cover: Snow interception cover is defined as coniferous stands at least 10 m in height with a canopy closure of 60-90% that provide relatively shallower snow depths than occur in openings. Shallower snow depths reduce the amount of energy expended in travelling and provide access to forage that would otherwise be buried in more open habitats. Old-growth coniferous forests, particularly those with a significant component of Douglas-fir, provide the best snow interception. These stands have a branch structure that is superior to second-growth stands at intercepting and holding snow in the canopy (Brunt 1990).

Seasonal Movements

Three distinct groups of deer may occur in a given watershed: resident deer who always stay close to the areas they were raised (termed 'natal' ranges); regular migrators, who spend long periods away from their natal ranges each year; and, irregular migrators, who move away from their natal ranges less regularly and for shorter periods of time. Regular migrators are known to have natal ranges at relatively high elevations. These deer travel an average of 5.5 km to their winter ranges. Irregular migrators have been found to move to winter ranges only after snow accumulates on their natal ranges, traveling an average of 3 km to a winter range (McNay 1995).

Because deer are not strongly territorial and home ranges of different deer overlap, large numbers of deer can become concentrated in areas of favourable habitat. Winter deer densities exceeding 100 deer per square kilometre may be reached on critical old-growth winter ranges (Bunnell 1990).

Table 1. Vancouver Island Columbian black-tailed deer winter range assessment variables.

VARIABLE	VALUE	RANK	COMMENTS
% SLOPE	<40; >100 40-50; 90-100 50-90	LOW MOD HIGH	Moderate to steep slopes preferred
ASPECT	NW-NE; flat NE-ESE; WSW-NW ESE-WSW	LOW MOD HIGH	Generally south aspect slopes preferred; west usually better than east
ELEVATION (m)	<300; >1000 300-600; 800-1000 600-800	LOW MOD HIGH	
OVERSTORY COMPOSITION	LOW *HIGH* MOD *MOD* HIGH *LOW*	LOW MOD HIGH	Non-italicized=Relative amounts of Douglas-fir and hemlock to other areas within watershed *Italicized=Relative amounts of cedar (red or yellow) and balsam to other areas within watershed*
STAND VOLUME	LOW MOD HIGH	LOW MOD HIGH	Relative to average stand volumes within the watershed
% CANOPY CLOSURE	<50; >90 50-90* 50-90*	LOW MOD* HIGH*	 If relatively uniform throughout the stand If relatively variable throughout the stand
LICHEN LOAD	LOW MOD HIGH	LOW MOD HIGH	Relative to amounts within the watershed
UNDERSTORY COMPOSITION	LOW MOD HIGH	LOW MOD HIGH	Relative amounts of *Vaccinium,* salal, Douglas-fir and western redcedar to other sites within the watershed
UNDERSTORY	LOW MOD HIGH	LOW MOD HIGH	Relative to amounts within the watershed
OTHER FACTORS:	***The following factors are not currently quantified during DWR assessments but they can significantly influence the overall ability of an area to satisfy DWR requirements***		
TOPOGRAPHIC SHADING	The amount of shading from adjacent hillsides is a critical factor influencing winter range suitability (the more shaded, the less valuable the area).		
HETEROGENEITY	Topographic heterogeneity ("benchiness") is preferable to a uniform slope. *Overstory heterogeneity (variations in canopy closure) provides enhanced forage production and thickets for hiding in open canopy areas, and greater snow interception in areas of more closed canopy.		
ROCK OUTCROPS	Rock outcrops provide topographic security cover (vantage points), favourable thermal conditions on sunny days, and areas that lose snow more readily during snow ablation periods.		
RELATIVE DEER USE	Pellet groups, tracks, trails, sightings, beds, rubs and shed antlers all indicate relative amounts of use. Shed antlers conclusively indicate winter use; rubs indicate late summer or fall use. Current deer population levels in the area need to be known before the relative level of use can be determined (i.e. what is heavy use during a period of low deer population levels may only be considered moderate or low use during high deer density periods).		
LANDSCAPE FACTORS	Important landscape level considerations affecting the relative value of an area as a deer winter range include the following: a) position in the watershed (low, mod, or high snowfall area - DWR more critical in areas of higher snowfall); b) distance to other winter ranges (greater distances between winter ranges increases their individual importance); c) adjacency to high quality spring and summer range; d) the capability of adjacent stands to satisfy deer habitat requirements; and e) factors affecting local climatic conditions such as exposure to dominant winds or marine influences.		

Source: K. Brunt, Ministry of Water, Land and Air Protection, Nanaimo, B.C.

2.3 Roosevelt Elk Winter Range Requirements

A comprehensive review of Roosevelt elk winter habitat requirements can be found in the handbook entitled *"Deer and elk habitats in coastal forests of southern British Columbia"* edited by Nyberg and Janz (1990). This handbook summarizes the findings of extensive deer and elk research carried out as part of the 'Integrated Wildlife-Intensive Forestry Research' (IWIFR) program of the 1980's and includes detailed information on elk ecology, habitat requirements, and forestry interactions.

The following summary for Roosevelt elk has been drawn largely from Brunt (1990). Winter range assessment variables with associated rankings are also summarized (Table 2).

Winter is the most critical season for Roosevelt elk. Winter range for elk on Vancouver Island is generally found in low elevation river valleys and the lower part of watersheds. During mild winters or in the shallow snowpack zone, elk forage extensively in openings (natural openings and recent clearcuts) and open forests, especially those on rich, moist sites. When snow conditions preclude feeding in more open areas (snow depth >30 cm or snow crusted), elk will shift to densely canopied mature or old-growth forests on floodplains or moderately steep southerly slopes where snowpacks are lower (Brunt 1990). While older second growth stands may satisfy winter range requirements in the shallow snowpack zone, old-growth habitats are required to satisfy critical winter habitat requirements in the moderate and deep snowpack zones (Nyberg and Janz 1990).

Winter Forage

Elk diets in the winter are usually much less diverse than those of other seasons. Annual plants have died completely back and many short forage plants are buried by snow. In mild winters with little or no snow, elk rely heavily on grasses, sedges, deer fern, and twinflower. Willows, cottonwood, elderberry and devil's club are commonly eaten throughout winter along with common shrubs such as salal, dull Oregon-grape, and huckleberry. When snow accumulations exceed about 30 cm, much more conifer foliage is eaten. Western redcedar and western hemlock can make up to 40% of the late winter diet (Brunt 1990).

Because Roosevelt elk are large, herding animals, they require habitats with concentrated sources of high quality, preferred forage species. Typically, these are located on moist sites with deep rich soils. Key yearlong feeding habitats include open conifer stands (<70% canopy closure), deciduous-dominated stands (>50% deciduous) and natural openings including wetlands, marshy meadows, seepage sites, and estuaries. Riparian areas adjacent to lakes, streams and floodplains of major river valleys also have very high value. In winter and spring, borders of south aspect (110-250º) rock outcrops are high value due to warming effects and early initiation of spring forage (Brunt 1990).

Winter Cover

Winter cover requirements to ensure the survival of Roosevelt elk focus on the interception and amelioration of snowfall events.

Snow Interception Cover: Snow interception cover is defined as coniferous stands at least 10 m in height with a canopy closure of 60-90% that provide relatively shallower snow depths than occur in openings. Shallower snow depths reduce the amount of energy expended in travelling and provide access to forage that would otherwise be buried in more open habitats. Old-growth coniferous forests, particularly those with a significant component of Douglas-fir, provide the best snow interception. These stands have a branch structure that is superior to second-growth stands at intercepting and holding snow in the canopy (Brunt 1990).

Seasonal Movements

Both migratory and non-migratory (resident) elk occur on Vancouver Island. Migratory elk occupy distinct seasonal ranges during the winter, summer/fall and, sometimes, spring seasons. Migratory elk benefit from shallower snow depths on low-elevation winter ranges and abundant, diverse forage on higher elevation summer/fall ranges. Seasonal ranges of migratory elk are usually within the watershed of a single river, but can be separated by as much as 40 km. Individual seasonal ranges may be up to 30 km^2 in size. Non-migratory or resident elk also occur in favourable low-elevation habitats on Vancouver Island. Resident elk occupy single annual home ranges of about 5-10 km^2 at lower elevations that sometimes overlap the winter ranges of migratory elk herds (Brunt 1990).

Table 2. Vancouver Island Roosevelt elk winter range assessment variables.

VARIABLE	VALUE	RANK	COMMENTS
% SLOPE	70+ 50-70 0-50	LOW MOD HIGH	Flat to moderate slopes preferred
ASPECT	NW-NE NE-SSE; WSW-NW Flat; SSE-WSW	LOW MOD HIGH	Generally south aspect slopes preferred; west usually better than east
ELEVATION (m)	>1000 <200; 700-1000 200-700	LOW MOD HIGH	
OVERSTORY COMPOSITION	LOW *HIGH* MOD *MOD* HIGH *LOW*	LOW MOD HIGH	Non-italicized=Relative amounts of Douglas-fir and hemlock to other areas within watershed *Italicized=Relative amounts of cedar (red or yellow) and balsam to other areas within watershed*
STAND VOLUME	LOW MOD HIGH	LOW MOD HIGH	Relative to average stand volumes within the watershed
% CANOPY CLOSURE	<50; >90 50-60; 80-90 60-80	LOW MOD HIGH	
LICHEN LOAD	LOW MOD HIGH	LOW MOD HIGH	Relative to amounts within the watershed
UNDERSTORY COMPOSITION	LOW MOD HIGH	LOW MOD HIGH	Rank relative amounts of sword fern, skunk cabbage, deer fern and salmonberry to other sites within the watershed. They are associated with rich, moist sites which produce the best forage for elk.
UNDERSTORY	LOW MOD HIGH	LOW MOD HIGH	Relative to amounts within the watershed
OTHER FACTORS:	***The following factors are not currently quantified during EWR assessments but they can significantly influence the overall ability of an area to satisfy EWR requirements***		
TOPOGRAPHIC SHADING	The amount of shading from adjacent hillsides is a critical factor influencing winter range suitability (the more shaded, the less valuable the area). Preferably shaded for less than 2 hours per day.		
HETEROGENEITY	Topographic heterogeneity ("benchiness") is preferable to a uniform slope. Overstory heterogeneity (variations in canopy closure) provides enhanced forage production and thickets for hiding in open canopy areas, and greater snow interception in areas of more closed canopy. Gullies, wetlands, and hummocky terrain also increase value of elk winter range.		
ROCK OUTCROPS	Rock outcrops provide topographic security cover (vantage points), favourable thermal conditions on sunny days, and areas that lose snow more readily during snow ablation periods.		
RELATIVE ELK USE	Pellet groups, tracks, trails, sightings, beds, rubs and shed antlers all indicate relative amounts of use. Shed antlers conclusively indicate late winter/spring use; rubs indicate late summer or early fall use. Current elk population levels in the area need to be known before the relative level of use can be determined (i.e. what is heavy use during a period of low elk population levels may only be considered moderate or low use during high elk density periods).		
LANDSCAPE FACTORS	Important landscape level considerations affecting the relative value of an area as a elk winter range include the following: a) position in the watershed (low, mod, or high snowfall area - EWR more critical in areas of higher snowfall); b) distance to other winter ranges (greater distances between winter ranges increases their individual importance); c) adjacency to high quality spring and summer range; d) the capability of adjacent areas to satisfy elk habitat requirements; and e) factors affecting local climatic conditions such as exposure to dominant winds or marine influences.		

Source: K. Brunt and R. Dolighan, Ministry of Water, Land and Air Protection, Nanaimo, B.C.

2.4 Study Area

The Arrowsmith TSA is located within Vancouver Island Region 1 of the Ministry of Water, Land and Air Protection (MWLAP), within the Vancouver Region of the Ministry of Sustainable Resource Management (MSRM) and within the South Island Forest District of the Ministry of Forests (MOF). The following is a general description of the Arrowsmith TSA as found in Dolighan and Materi (2002).

The Arrowsmith TSA, located on the southern half of Vancouver Island and the Gulf Islands, is administered by the Ministry of Forests in cooperation with other Provincial agencies, including the Ministry of Water, Land and Air Protection. It occupies only 7 % of the South Island Forest District, as the majority of the productive forest land in this District is held as Tree Farm Licenses or is privately owned (Ministry of Forests 2002). Relative to other forest management units on southern Vancouver Island, the Arrowsmith TSA represents a relatively small and disjointed timber harvest land base, covering approximately 200,000 ha or 13% of the South Island Forest District Timber Harvest Land Base (THLB). Roughly 112,000 ha (56%) are considered productive forest land (Ministry of Forests 2002). Significant portions of Crown land on the east coast of Vancouver Island are considered part of the "fragmented" land base, where Crown parcels are often small and surrounded by private land.

3.0 METHODS

3.1 Winter Range Assessments

The intent of the ungulate winter range confirmation process is to delineate the best possible winter ranges within the allocated 'budget', taking into account habitat suitability[1]/capability[2], distribution across the landscape and impacts to timber harvesting operations. The historic UWRs were proposed and mapped on an individual basis as areas were encountered during review of forest development. Since the historic winter ranges were not assessed in a strategic manner when they were established, MWLAP determined that a review of all existing historical UWRs was necessary prior to areas being proposed for confirmation. Existing winter ranges with less value were to be removed and replaced with higher value habitat elsewhere. The 'budget' was calculated based on impacts to timber supply and was determined to be 1200 hectares of the Timber Harvesting Land Base (THLB) (see Section 4.0 for budget details).

In 2001-2002, the Ministry of Water, Land and Air Protection conducted an extensive review of grandparented and other recognized ungulate winter ranges on the Arrowsmith TSA. Additional high capability areas of interest (AOIs) were also identified and reviewed. The results of this assessment are presented in detail in *South Island Forest*

[1] Suitability is defined as the ability of the habitat in its current condition to provide the life requisites of a species (RIC 1999).
[2] Capability is defined as the ability of the habitat, under the optimal natural (seral) conditions for a species to provide its life requisites, irrespective of the current condition of the habitat (RIC 1999).

District Arrowsmith TSA Ungulate Winter Range Assessment (Dolighan and Materi 2002; Appendix B).

The UWR assessments were based on a review of existing information sources, limited field investigation, and interviews with Ministry of Water, Land and Air Protection personnel familiar with the region. File and map reviews were used to develop a general understanding of habitat features and forest development activities within existing/potential winter ranges in the study area. Sources consulted in the course of the review included: Ministry of Forests and MWLAP UWR maps, forest cover maps, sensitive ecosystem inventory maps, habitat capability maps, air photos, forest development plans, terrestrial ecosystem maps and various ungulate winter range field assessment reports. Field activities included ground-based and aerial reconnaissance, deer winter range foot transects, and elk winter survey plots. Standard criteria were used for evaluating deer and elk winter ranges. To determine each site's overall ranking, individual habitat variables were rated for their relative importance to winter survival. The most highly weighted variables for deer included: slope, overstory species composition, arboreal lichen load, understory species composition, shading, outcrops, spatial distribution, and relative use (where applicable). Heavily weighted variables for assessing elk habitat included wetland/riparian proximity, understory composition, spatial distribution, and relative use. A main result of the habitat assessment report was a list of 35 UWRs suggested for confirmation (Dolighan and Materi 2002).

Subsequent to this report, winter range boundaries were further refined and a small amount of additional field work was completed. MOF personnel then reviewed the budget details and completed timber supply impact calculations for the proposed UWRs. MWLAP personnel again reviewed the UWRs and revised the areas to meet the budget allowance of 1200 ha. This process resulted in 33 UWRs being selected for confirmation within the Arrowsmith TSA.

3.2 Consultation

The stakeholder consultation process is described and stakeholder comments are included in Appendix C. Mineral information relevant to the proposed UWRs and maps showing mineral tenure and UWR overlaps are included in Appendix D. First Nations interests were addressed by formal consultation (Appendix E).

4.0 UWR Budget and Impact Analysis

4.1 UWR Budget and Impact Analysis

The policy direction in determining the amount of UWR that is agreed to go forward for confirmation is that the UWRs, once confirmed, should have no greater impact on timber supply today than could be attributable to UWRs in Timber Supply Review (TSR) 1. TSR 1 therefore sets the maximum allowable impact on timber supply, providing these impacts are biologically justifiable. Since the impact analysis that was performed in TSR 1 was difficult to re-create, MOF and MWLAP agreed to use TSR 2 data - the most current timber supply data set - as the base for impact calculations. The same assumptions were used to define the timber harvesting land base as in TSR 1.

The allowable impact was measured as the number of hectares of THLB removed from the land base to manage solely for ungulates incremental to that removed for other constraints including, but not limited to, non-forested land, non-productive land and Environmentally Sensitive Areas. This impact was determined to be 1200 THLB ha.

In the confirmation process MWLAP proposed areas to utilise this 1200 ha or what was loosely termed the 'budget'. A similar process as that used to determine the budget was used to see how much was utilised. The data set from TSR 2 was used to determine THLB impacts of the UWRs proposed for confirmation. The final 33 UWRs proposed for confirmation used 1213 ha, 13 ha over the budget allowance of 1200 ha.

John Sunde (G.I.S. Forester, Ministry of Sustainable Resource Management, Nanaimo) completed the initial impact assessments of the proposed ungulate winter ranges for the Arrowsmith TSA. The final UWR budget calculations and impact analysis were completed by Jim Brown (Timber Supply Analyst, Ministry of Forests, Nanaimo). Jim Brown's final report is entitled *Timber Supply Impacts of Proposed Ungulate Winter Ranges in the Arrowsmith Timber Supply Area* (June 26, 2003) and is included in the following section.

4.2 MOF Timber Supply Impact Assessment Report

The following report presents the findings of the MOF timber supply impact assessment that was completed for the 33 proposed UWRs within the Arrowsmith TSA. It was completed by Jim Brown (Timber Supply Analyst, Ministry of Forests) on June 26, 2003.

Timber Supply Impacts of Proposed Ungulate Winter Ranges in the Arrowsmith Timber Supply Area

June 26, 2003

The following is an assessment of the timber supply impacts of Ungulate Winter Range (UWR) proposed for confirmation and establishment within the Arrowsmith Timber Supply Area (TSA). These include 33 separate UWR areas for either Roosevelt elk or Columbian black tailed deer proposed by Ministry of Water, Land and air Protection (MWLAP).

All of the proposed areas fall into the Type 1 UWR category as per the *Memorandum of Understanding on Establishment of Ungulate Winter Ranges and Related Objectives.* As such, they were either previously mapped as wildlife management (Ew) areas in TSR-1 or TSR-2, or are UWRs proposed in place of other areas netted down as Ew in TSR-1 or TSR-2.

In accordance with the May 11, 2000 MOU, these UWRs are to be established up to the maximum levels of timber supply allowances that were identified in TSR-1 and TSR-2, where allowances have been identified above and beyond the TSR-1 levels. For the Arrowsmith TSA this level was previously established to be 1156 hectares of timber harvesting land base (THLB).

Table 1 lists the gross area, non-contributing forest area and THLB for each of the 33 proposed UWRs broken down by TSR-2 contribution classes. The UWRs are further grouped based by the proposed management regime: 100% reserve or modified management practices. Table 3 provides a summary of the area impacted by each proposed UWR broken down by age class.

Table 1. Timber harvesting land base in UWRs proposed for confirmation in the Arrowsmith TSA.[3]

UWR Name	Area to be reserved (100% netdown)						Area in Modified Management (no netdown)					
	Gross Area (ha)	Excluded Area (ha)	Non Contributing forest (ha)	Area removed as UWR in TSR-2 (ha)	THLB Area (ha)	**Total UWR Impact On THLB (ha)**	Gross Area (ha)	Excluded Area (ha)	Non Contributing forest (ha)	Area removed as UWR in TSR-2 (ha)	THLB Area (ha)	**Total UWR Impact on THLB (ha)**
Cameron East	43.1	19.6	23.2	-	0.3	**0.3**						-
Cameron West	36.2	7.4	28.8	-	-	**-**						-
Charters	17.8	12.8	3.2	0.4	1.4	**1.8**						-
Coronation A	58.9	7.5	6.0	14.7	30.6	**45.4**						-
Coronation B	14.5	-	7.9	1.9	4.7	**6.6**						-
Coronation C	218.9	2.0	41.5	56.4	119.0	**175.4**						-
Coronation D	45.2	0.7	15.7	6.3	22.4	**28.7**						-
Coronation E	35.1	-	23.6	-	11.5	**11.5**						-
Coronation F	58.9	53.5	1.5	1.6	2.3	**3.9**						-
Coronation G	82.7	5.3	75.0	-	2.3	**2.3**						-
Cowichan L. W.	47.7	2.4	0.7	39.1	5.4	**44.5**						-
Effingham	76.3	4.9	64.4	1.9	5.1	**7.0**						-
Escalante	83.6	1.5	57.7	-	24.5	**24.5**						-
Handy	56.9	5.6	24.7	-	26.6	**26.6**						-
Handy C	78.7	-	78.6	0.1	0.0	**0.2**						-
Handy E	53.3	0.0	(5.5)	36.0	22.8	**58.8**						-
Haslam	144.3	18.5	15.6	24.3	85.9	**110.3**	347.1	5.3	32.6	67.9	241.2	**309.1**
Hemmingsen A	42.3	0.0	3.2	21.8	17.3	**39.2**						-
Hemmingsen B	53.1	1.0	30.4	-	21.7	**21.7**						-
Horne Lake	39.6	-	10.7	-	28.9	**28.9**						-

[3] This assessment was revised from an original completed June 6, 2003. Revisions consisted of excluding portions of the Shawnigan East UWR and Coronation-A UWR and all of the Upper Rosewall UWR.

Table 1 *(continued)*. Timber harvesting land base in UWRs proposed for confirmation in the Arrowsmith TSA.

Koksilah	41.2	41.2	-	-	-	**-**						-
Loup A	61.7	1.9	5.9	21.9	32.0	**53.9**						-
Loup B[4]	46.4	1.7	13.0	-	31.8	**31.8**						-
Loup C[4]	37.3	1.0	13.0	-	23.2	**23.2**						-
Lower Rosewall	45.8	4.1	11.7	-	30.0	**30.0**						-
McKay	310.5	27.1	36.6	49.7	197.1	**246.8**	1,635.9	45.2	263.7	263.7	1,063.4	**1,327.1**
Mooyah	49.3	-	41.0	4.4	3.9	**8.3**						-
Mt. Prevost	44.5	0.8	7.9	19.0	16.8	**35.8**						-
Ragged Mountain	23.8	11.3	12.5	-	0.0	**0.0**						-
Shawnigan East	39.5	1.2	10.7	-	27.5	**27.5**						-
Toquart	102.9	3.0	98.5	-	1.3	**1.3**						-
Upper Qualicum	51.5	4.9	10.8	-	35.8	**35.8**						-
Veitch	32.1	6.5	25.5	-	-	**-**						-
Grand Total	2,173.6	247.6	793.9	299.5	832.6	**1,132.1**	1,983.0	50.5	296.3	331.6	1,304.6	**1,636.2**

Table 2. Area of THLB impacted by proposed UWRs broken down by age class.

Sum of THLB and UWR netdown area from TSR-2	Area to be reserved (100% netdown)					Area in Modified Management (no netdown)				Total Area
UWR Name	Age 0 to 40 years	Age 41 to 80 years	Age 81 to 100 years	Age 101 to 250 years	Age 250+ years	Age 0 to 40 years	Age 41 to 80 years	Age 81 to 100 years	Age 101 to 250 years	
Cameron East	0.00	0.00	0.00	0.28						0.28
Cameron West	0.00			0.00						0.00
Charters	0.00	0.88	0.22	0.68						1.78
Coronation A	11.44	33.94								45.37
Coronation B			2.54	4.04						6.57
Coronation C	18.55	123.53	31.63	1.70						175.41
Coronation D		0.82	26.27	1.62						28.71
Coronation E			3.80	7.74						11.55
Coronation F	0.00	1.25	2.64							3.89
Coronation G	0.00	2.33								2.33
Cowichan L. West	0.00	19.07	25.48							44.55
Effingham	0.00				7.00					7.00
Escalante	0.90				23.59					24.49
Handy	0.55			6.25	19.82					26.62
Handy C	0.05			0.01	0.10					0.17
Handy E	0.11				58.67					58.78
Haslam	0.00	110.28				0.00	309.13			419.40
Hemmingsen A	0.00				39.16					39.16
Hemmingsen B	0.00				21.69					21.69
Horne Lake		23.43			5.47					28.90
Koksilah	0.00	0.00								0.00
Loup A	0.11			8.97	44.82					53.90
Loup B[4]	28.07				3.74					31.80
Loup C[4]	5.44				17.76					23.21
Lower Rosewall	0.00	20.20		9.82						30.02
McKay	12.80	234.00				62.45	1,249.43	14.94	0.24	1,573.85
Mooyah				0.00	8.29					8.29
Mt. Prevost		35.79								35.79
Ragged Mountain	0.00	0.04			0.00					0.04
Shawnigan East		27.38	0.16							27.55

[4] Minor boundary revisions to Loup B and Loup C UWRs were completed subsequent to this report. Values within Table 1 and 2 have not been revised to reflect these changes. MOF agreed the boundary revisions were minor and timber supply impacts did not need to be recalculated.

Table 2 *(continued)*. Area of THLB impacted by proposed UWRs broken down by age class.										
Toquart	1.07			0.00	0.28					1.35
Upper Qualicum	10.06	25.79								35.85
Veitch	0.00	0.00		0.00						0.00
Grand Total	89.15	658.73	92.75	41.10	250.39	62.45	1,558.56	14.94	0.24	2,768.31

Timber Supply Impacts of 100% reserved areas

The gross area of the UWRs proposed for 100% reserve is 2174 hectares. Of this, approximately 1926 hectares is productive forest, which is approximately 1.7% of the total productive forest in the Arrowsmith TSA.

The timber supply impact of the proposed UWR reserve areas was estimated based on the amount forest affected that would otherwise be available for harvest under TSR assumptions. This includes the TSR-2 THLB plus the area previously netted out for ungulates in each proposed UWR. These sum to 1132 hectares, which is the total estimated impact on THLB for the Arrowsmith TSA.

A map review of the proposed UWR reserves identified three issues that affect the timber supply impact estimates.

Coronation-F UWR: This elk winter range overlaps a portion of the TSA for which no forest inventory information is available. Aerial photos indicate the area is forested and has a status suggesting it is eligible for logging. Although it did not contribute to the THLB in either TSR-1 or TSR-2, it should be considered contributing forest for the purpose of determining the UWR budget and impacts. Assuming the proposed UWR polygon is the same size as the Ew area mapped for TSR-1, the THLB is approximately 50 hectares. Of this, 40% (20 hectares) would have been removed as Ew in the TSR which is the estimated contribution to the UWR budget. The adjustments are then:

Arrowsmith UWR budget:	1156 ha + 20 ha = 1176 ha.
Proposed UWR Impacts	1132 ha + 50 ha = 1182 ha.

Koksilah UWR: This deer winter range falls entirely within a woodlot that was established in the period between TSR-1 and TSR-2. Since the woodlot was awarded without a requirement to manage for UWR, there is no equivalent 'budget' for UWR in the woodlot. Confirmation of this UWR may require land to be removed from the TSA and added to the woodlot, ultimately impacting the TSA land base. Because of this, adjustments should be made to both the budget and impact estimates. The original Ew area mapped in TSR-1 was approximately 63 hectares of which 75% is estimated be operable to which a 50% reduction for wildlife habitat was applied. The increase in the TSA budget is therefore about 24 hectares. The UWR proposed for confirmation is 41 hectares of which about 31 hectares is THLB. The adjustments are then:

Arrowsmith UWR budget:	1176 ha. + 24 ha. = 1200 ha.
Proposed UWR Impacts	1182 ha + 31 ha. = 1213 ha.

Proposed WHAs: Three proposed UWRs overlap proposed wildlife habitat areas (WHAs). Approximately 23 hectares of THLB is in the overlap area. Since the WHAs have not been legally established no adjustment were applied as a result of this overlap.

The net result of the above adjustments to the UWR budget and impact estimates for the proposed UWR reserves is as follows:

UWR Budget based on TSR-2	1200 hectares
UWR Impacts of proposed UWRS	1213 hectares

The impacts of the proposed UWR reserve areas exceed the budget for the Arrowsmith TSA by 13 hectares.

Timber supply Impacts of modified management area

In addition to the areas proposed for reserve, two large areas (McKay and Haslam) are proposed to be managed to enhance elk spring forage. Approximately 1636 hectares of THLB falls within these areas (including 332 hectares previously excluded as Ew area). The proposed management regime for each of these two areas is as follows:

- *plan the harvest sequence to ensure that the seral stage distribution will approximate 25% of the forested in 0-20 year old stands, 25% in 21-40 year old stands, 25% in 41-60 year old stands and 25% in 61-80 year old stands. This balanced age-class will be achieved over the next 60-80 years.*

In addition, the proposed specification allows commercial thinning in these areas to continue.

This management regime will delay harvest in these stands relative to harvest ages assumed in the TSR. Under the proposed regime, the average harvest age for the first rotation would be at least 92 years in the McKay block and 99 years in the Haslam block; later rotations could be harvested at 80 years. In comparison, the TSR minimum harvest age is 60 years under the clear-cut silvicultural system. However, the impacts of the delayed harvest will be offset if opportunities for commercial thinning in good and medium site Douglas fir continue. The majority of the stands in these two blocks fall within the analysis units targeted for commercial thinning. Typically, commercial thinning removes about one-third of a stand's volume at ages between 40 to 60 years with final a harvest 20 years after thinning. Application of commercial thinning would mean the final harvest in many stands would be between 60 and 80 years, which is close to the long-term rotation age required under this regime. Therefore, it is concluded that the timbers supply impacts of the modified management regime, when the application of commercial thinning is assumed, is minimal and no additional impact is applied.

No evaluation was made with respect to the impact of this management regime on the economic viability and/or scheduling of harvest in these blocks. Forest District and BC Timber Sales staff should be consulted regarding these implications.

Forest Profile Comparison:

The assumption that the timber supply impacts of the proposed UWR is within budget when the THLB affected is less than or equal to the TSR-2 reduction for UWR is valid only if the profiles of the forest between these two sets of areas are similar. The following figures compare the TSR-2 Ungulate Netdown and the Proposed UWR areas based on age and analysis unit groupings.

Figure 1 compares the age class distribution of the THLB within the proposed UWR and the TSR-2 ungulate netdown area. The distribution of the two sets of polygons is similar, although a slightly higher percentage of the THLB in the proposed UWR is in older age classes. In both cases the majority of the affected THLB is in the 41-80 years age class.

Figure 2 shows the distribution of THLB within the proposed and TSR-2 ungulate netdown areas among TSR analysis units. These analysis units were defined based on leading tree species and broad productivity classes. Comparison of the two sets of UWR indicates a very similar distribution. The conclusion is that the profile of forest in the proposed UWR is similar to the profile of forest netted down for wildlife in TSR-2.

Jim Brown RPF
Timber Supply Forester
Coast Forest Region

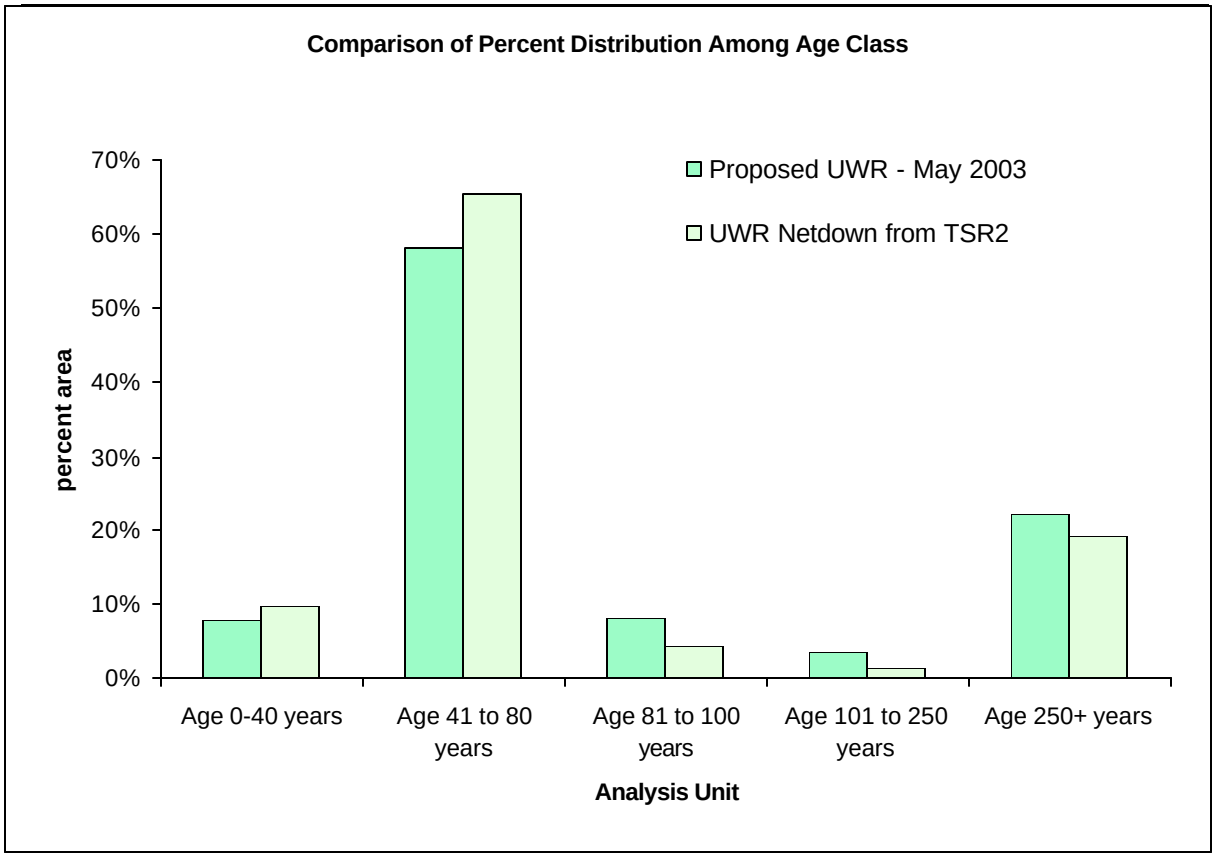

Figure 1. Age class distribution of Proposed UWR and TSR-2 UWR timber harvesting land base

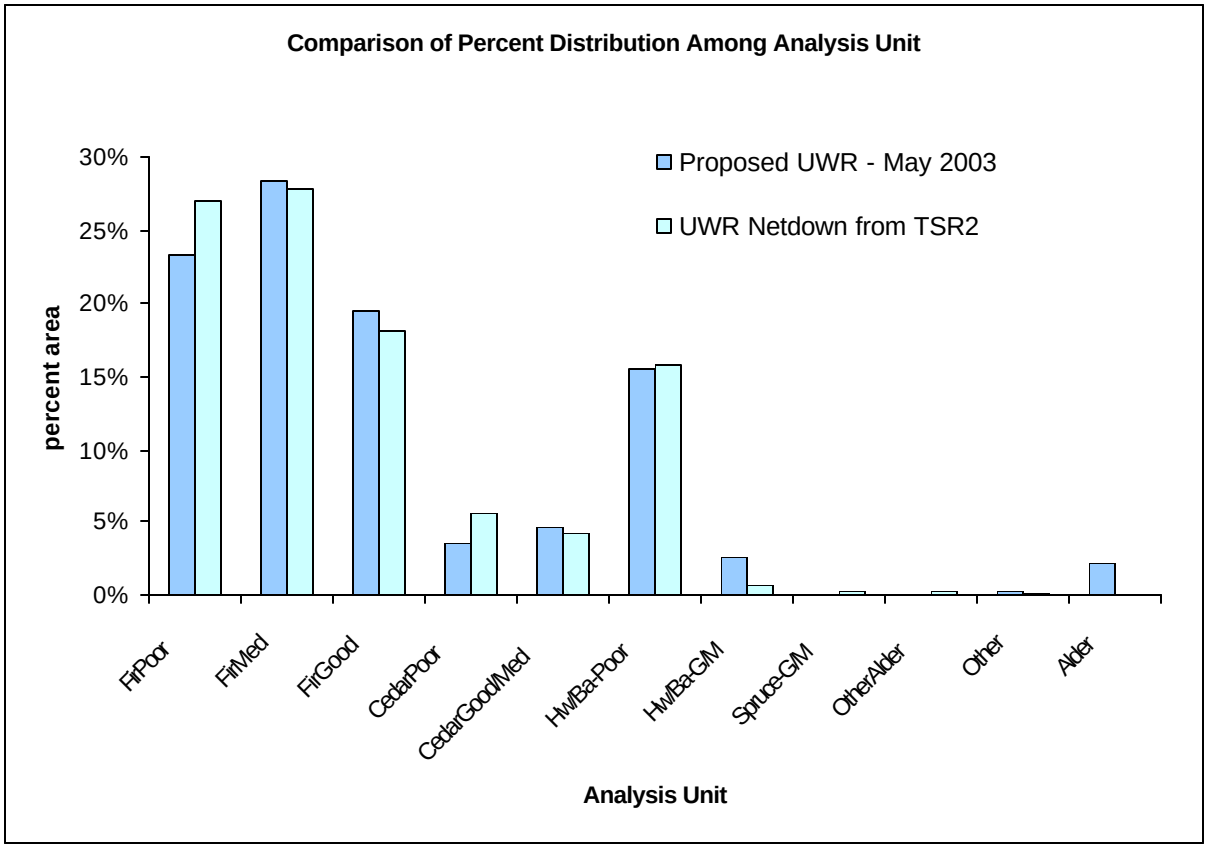

Figure 2. Distribution of Proposed UWR and TSR-2 UWR timber harvesting land base by TSR analysis units.

5.0 RESULTS AND DISCUSSION

5.1 UWRs for Confirmation

There are a total of 33 ungulate winter ranges including 29 deer winter ranges and 4 elk winter ranges proposed for confirmation within the Arrowsmith TSA. Specific information for each winter range including reference data, netdowns, gross areas, THLB impacts and biological rationales are presented (Table 3). Ungulate winter range boundaries are presented on 1:10 000 orthophotos (where available) or maps with TRIM reference features (Section 10). A 1:220 000 overview map is also included (Appendix F).

5.2 THLB Impact Summary

The 33 UWRs proposed for confirmation have a total THLB impact of 1213 ha. The overall impact on the Arrowsmith TSA's current Allowable Annual Cut (ACC) is expected to be minimal. The winter ranges used to determine the budget constrain 1200 ha of Timber Harvesting Land Base, while the ranges proposed for confirmation constrain 1213 ha. The net difference between the area recommended for confirmation and the area accounted for in TSR 2 is 13 THLB ha.

The 33 UWRs proposed for confirmation will remove approximately 1.7% of the total productive forested land base from the TSA.

5.3 Suitability / Capability

Within the Arrowsmith TSA, there were very few options for establishing high quality old-growth ungulate winter ranges in certain landscape units due to the fragmented nature of the land base. Significant portions of Crown land on the east coast of Vancouver Island are considered part of a 'fragmented' land base, as Crown parcels are often small and surrounded by private land. On the east coast in particular, logging activity over the past century has resulted in progressive elimination of old-growth forest habitat, which has reduced the **suitability** of numerous high **capability** ungulate winter ranges.

Due to the lack of old growth on high capability winter habitat sites within much of the Arrowsmith TSA, many of the proposed UWRs contain primarily high capability second-growth forests of various ages. Many of these sites offer some value in mild winters, as they are within older age class second-growth forests. Although these areas are not fully functional as critical winter range due to their age, their suitability will improve as they mature. These areas should be considered, in part, as a long term rebuilding strategy in conserving ungulate populations across the landscape.

Table 3. Arrowsmith TSA ungulate winter ranges proposed for confirmation.

UWR Name	Polygon Unit No.	Landscape Unit	Species	Netdown* (%)	Gross* Area (ha)	THLB* Area (ha)	Other Information Sources	Rationale [@]
Cameron East	1	Little Qualicum	Black-tailed deer	100	43.1	0.3	Dolighan and Materi (2002)	This UWR has high suitability/capability and is strategically placed in an area with few UWRs. Forest cover is predominantly older Douglas fir, with above average lichen loading and favourable slopes.
Cameron West	2	Little Qualicum	Black-tailed deer	100	36.2	0.0	Dolighan and Materi (2002)	This UWR has high suitability/capability and is strategically placed in an area with few UWRs. Forest cover is dominated by mature Douglas fir, with numerous rock outcrops present. This site has favourable slopes and aspect, moderate lichen loading, good understory diversity and contains patches of good snow interception.
Charters	3	Sooke	Black-tailed deer	100	17.8	1.8	Dolighan and Materi (2002) Overview flight (March 5, 2003)	Elevational range is less than optimal, however the UWR possesses a favorable aspect and good exposure. The mature forest cover comprises less than half of the UWR, as the majority of the site is non-forested rock outcrop.
Coronation A	4	Chemainus	Black-tailed deer	100	58.9	45.4	Dolighan and Materi (2002) Leigh-Spencer (2001a) – *B081-1*	This UWR is presently dominated by 30 year old forest. Moderate deer use was recorded during field surveys and the UWR has moderate capability to support deer during critical winters.
Coronation B	5	Chemainus	Black-tailed deer	100	14.5	6.6	Dolighan and Materi (2002) Leigh-Spencer (2001a) – *B081-3*	This advanced second growth site has high capability with steep slopes, rock outcrops, good forage and cover present. It is well below the preferred size, however it provides linkage to two larger areas.
Coronation C	6	Chemainus	Black-tailed deer	100	218.9	175.4	Dolighan and Materi (2002) Leigh-Spencer (2001a) – *B081-4*	This second growth UWR has moderate to high capability and was found to have high use by deer.
Coronation D	7	Chemainus	Black-tailed deer	100	45.2	28.7	Dolighan and Materi (2002) Leigh-Spencer (2001a) – *B081-5*	This advanced second growth UWR has moderate to high capability and shows high winter use by deer as indicated by numerous trails, tracks, pellet groups and bedding sites.
Coronation E	8	Chemainus	Black-tailed deer	100	35.1	11.5	Dolighan and Materi (2002) – *Coronation-AOI* Leigh-Spencer (2001a) – *AOI-1*	The capability of this site to support deer during periods of prolonged winter conditions was found to be excellent.
Coronation F	9	Chemainus	Roosevelt elk	100	58.9	53.9	Dolighan and Materi (2002) Leigh-Spencer (2001a) – *B081-10*	This UWR is dominated by second growth coniferous and riparian deciduous forest. Overall forage is presently limited however when the stands mature and open there will be a good mix of forage areas and cover.
Coronation G	10	Chemainus	Roosevelt elk	100	82.7	2.3	Dolighan and Materi (2002) Leigh-Spencer (2001a) – *B081-9*	The site has a good mix of second growth coniferous and deciduous forests providing both cover and forage. This elk winter range has high capability.
Cowichan L. West	11	Cowichan	Black-tailed deer	100	47.7	44.5	Dolighan and Materi (2002)	This second growth site has less than optimal elevation however it has other favorable attributes and there is few winter range options in the general vicinity.
Effingham	12	Effingham	Black-tailed deer	100	76.3	7.0	Dolighan and Materi (2002) Stini (2001a)	High quality site strategically located in relation to other TFL / TSA UWRs. Old-growth western hemlock dominate the canopy, with a minor Douglas fir component. Several deer tracks and browsing were noted during Stini (2001a) field assessment.
Escalante	13	Escalante	Black-tailed deer	100	83.6	24.5	Dolighan and Materi (2002)	This moderate suitability old-growth UWR is strategically placed in watershed which has been extensively logged.
Handy	14	Henderson	Black-tailed deer	100	56.9	26.6	Dolighan and Materi (2002)	Highest quality site in snow laden watershed. Possesses all the required attributes for winter survival.
Handy C	15	Henderson	Black-tailed deer	100	78.7	0.2	Dolighan and Materi (2002)	Site aspect is favourable, extending from south to southwest, with good exposure. Snow interception appears to be fairly poor overall, but adequate around clusters of western hemlock. This site has moderate suitability.
Handy E	16	Henderson	Black-tailed deer	100	53.3	58.8	Dolighan and Materi (2002)	Fairly good interspersion of rock outcrops within the site and average lichen loading in trees. Snow interception appears to be fairly poor overall, but better around clusters of western hemlock.
Haslam	17-20 (47-49)	Nanaimo	Roosevelt elk	100 (0)	144.3 (347.1)	110.3 (309.1)	Dolighan and Materi (2002) Materi and Dolighan (2002) Leigh-Spencer (2001b) – *G001-2*	Rated low suitability, however habitat values can be greatly improved through commercially viable stand manipulation and other enhancement techniques. This UWR contains several wetlands and riparian floodplain habitats. Forest cover is dominated by densely regenerating stands of Douglas fir, up to 60 years old.
Hemmingsen A	21	San Juan	Black-tailed deer	100	42.3	39.2	Dolighan and Materi (2002) – *Hemmingsen*	This UWR has favourable slopes with a canopy dominated by old-growth Douglas fir and western hemlock. Several hectares have been logged along east-aspect slopes within this UWR.
Hemmingsen B	22	San Juan	Black-tailed deer	100	53.1	21.7	Dolighan and Materi (2002) – *Hemmingson*	This UWR has moderate suitability and is strategically placed in watershed which has been extensively logged.
Horne Lake	23	Rosewall	Black-tailed deer	100	39.6	28.9	Dolighan and Materi (2002)	This UWR has high capability and is strategically placed in landscape unit with no UWRs. Considered high priority for the long-term viability of local deer populations. Approx. 2/3 of site is second growth which would benefit from stand manipulation. Surrounded by private forest land, much of which is being aggressively harvested. Unlogged area (on Private Land) above proposed UWR contains exceptionally high UWR values.

*Numbers in brackets refer to values for designated modified management areas within the UWRs.
[@]Habitat suitability / capability ratings are referenced from Dolighan and Materi (2002).

Table 3 *(continued)*. Arrowsmith TSA ungulate winter ranges proposed for confirmation.

UWR Name	Polygon Unit No.	Landscape Unit	Species	Netdown* (%)	Gross* Area (ha)	THLB* Area (ha)	Other Information Sources	Rationale [@]
Koksilah	24	Koksilah	Black-tailed deer	100	41.2	31.0	Dolighan and Materi (2002) Overview flight (March 5, 2003)	Regionally important UWR due to lack of other UWRs in area. Existing winter range qualities can be improved through stand manipulation.
Loup A	25	Gordon	Black-tailed deer	100	61.7	53.9	Dolighan and Materi (2002)	Old-growth UWR with high suitability/capability. This UWR has a western hemlock, Douglas fir overstory, with high lichen loading, and good snow interception. This site has good exposure, and an abundant and diverse understory. Strategically located in Loup Creek watershed which has been extensively logged in recent years.
Loup B	26	Gordon	Black-tailed deer	100	43.2	31.8[&]	Dolighan and Materi (2002)	Site is currently comprised of just two small old-growth patches (total area about 5 ha.), with most of the forest within the watershed in early seral stages. As the site capability is high, and the two small old-growth patches exhibit desirable deer winter range attributes, this would be a good site to manage for UWR over the long term.
Loup C	27	Gordon	Black-tailed deer	100	37.6	23.2[&]	Dolighan and Materi (2002)	Forest cover consists of about 15 ha of old-growth stands, with the remainder in early seral stages. Strategically located in the Loup Creek watershed which has been extensively logged in recent years.
Lower Rosewall	28	Rosewall	Black-tailed deer	100	45.8	30.0	Dolighan and Materi (2002)	Although this site has low elevation and has marine influence, it represents one of the few remaining “islands” of older forest in the watershed. It contains several rocky knolls, good snow interception, above average lichen loading and a good interspersion of cover and forage areas. With no designated UWRs in the region, it is considered an important addition from the landscape-level perspective.
McKay	29-39 (50-51)	Nanaimo	Roosevelt elk	100 (0)	310.5 (1635.9)	246.8 (1327.1)	Dolighan and Materi (2002) Materi and Dolighan (2002) Leigh-Spencer (2001b) – *G001-1*	This UWR consists of several broad benches interspersed with knolls and numerous wetland/riparian habitats. This site has high suitability / capability and moderate levels of elk winter use were observed.
Mooyah	40	Escalante	Black-tailed deer	100	49.3	8.3	Dolighan and Materi (2002)	High suitability / capability old-growth UWR is strategically placed in watershed which has been extensively logged.
Mt. Prevost	41	Cowichan	Black-tailed deer	100	44.5	35.8	Dolighan and Materi (2002) Leigh-Spencer (2001b) – *B082-1*	Forest cover in mid-seral stages, dominated by Douglas fir. Slopes are well below the preferred range, however other attributes are favourable. Retained for deer and general biodiversity values as there are no other options.
Ragged Mountain	42	Metchosin	Black-tailed deer	100	23.8	0.0	Dolighan and Materi (2002) Overview flight (March 5, 2003)	This UWR is relatively small and the elevational range is less than optimal, however, it possesses a favorable aspect and good exposure. It is one of the few sites in the area dominated by old-growth Douglas fir.
Shawnigan East	43	Shawnigan	Black-tailed deer	100	39.5	27.5	Field review (Dolighan, May 7, 2003) Overview flight (March 5, 2003)	Considered regionally important due to fragmented nature of forest lands in the vicinity of Shawnigan Lake. May be opportunities to conduct enhancement activities to improve forage and stand structure.
Toquart	44	Toquart	Black-tailed deer	100	102.9	1.3	Dolighan and Materi (2002) Stini (2001b) Stini (2001c)	High capability site. Slopes are favourable, and the UWR is dominated with old-growth western hemlock with moderate lichen loading.
Upper Qualicum	45	Rosewall	Black-tailed deer	100	51.5	35.8	Dolighan and Materi (2002)	Heavily logged watershed and few options available. This UWR is dominated by young stands interspersed with Douglas fir veterans, and is strategically located within the watershed.
Veitch	46	Metchosin	Black-tailed deer	100	32.1	0.0	Dolighan and Materi (2002) Overview flight (March 5, 2003)	Has some favourable attributes and is surrounded by older second-growth forest outside of the TSA. No areas of high capability were identified within TSA lands in the general vicinity of this UWR.
Grand Total					**2173.6**	**1213.0**		

*Numbers in brackets refer to values for designated modified management areas within the UWRs.
[@]Habitat suitability / capability ratings are referenced from Dolighan and Materi (2002).
[&]Loup B and Loup C UWR boundaries were amended during the final consultation stage at the behest of BC Timber Sales to match the polygon shapes to roads and other features. MOF agreed these revisions were minor and timber supply impacts did not need to be recalculated.

5.4 Boundary Description

Ungulate winter ranges were mapped on the basis of: (i) a combination of topographic and vegetative features defining high quality winter ranges; and/or (ii) documented historic and current use. Mapping was based on the best available digital information.

UWR boundaries are indicated on 1:10,000 orthophotos or maps with TRIM features for reference. Ungulate winter ranges and other features are mapped within the geographic limit of resolution for the map scale. Winter range boundaries are delineated to coincide on the ground with logical terrain, vegetative and anthropogenic features i.e. streams, old-growth/second-growth edge, vegetated/unvegetated edge, terrain breaks. In the event that the mapped UWR boundaries do not coincide with the physical features on the ground the intent is to manage the UWR to the logical physical boundary. This physical boundary will take precedence when determining the operational boundary of the UWR.

6.0 UWR MANAGEMENT OBJECTIVES

The following goal and management objectives are for polygon unit numbers 1 to 46 in the Arrowsmith TSA Ungulate Winter Range Plan U-1-017 (as identified in Table 3).

Goal

To maintain or enhance the existing combination of topographic and vegetative features within the designated ungulate winter ranges. Forest management activities should ensure that adjacent ungulate winter ranges are not adversely affected by foreseeable impacts including windthrow and fire.

Management Objectives

Objective 1

Road construction is not to occur within the designated ungulate winter ranges, with the exception of UWR unit 12 (Effingham), unless there is no other practicable option, the quality of the winter ranges will not be significantly affected and a variance is approved by the MWLAP Statutory Decision Maker or designate. For UWR unit 12 (Effingham), the MWLAP Statutory Decision Maker recognises that road access is required within this UWR and main road access will traverse through the UWR to reach timber in the Effingham valley beyond.

Objective 2

Harvesting is not to occur within the designated ungulate winter ranges unless a variance is approved by the MWLAP Statutory Decision Maker or designate. A variance would only normally be considered for the purposes of enhancing the quality of the winter range.

Objective 3

Salvage harvesting is not to occur within the designated ungulate winter ranges, unless a variance is approved by the MWLAP Statutory Decision Maker or designate.

Objective 4

Road maintenance, road deactivation, felling of danger trees or brushing and clearing on existing roads to address worker safety is allowed. Felling of danger trees, felling for guy line clearance, felling of tail hold anchor trees along cutblock boundaries to address worker safety is allowed. Any trees that must be felled within a UWR will be left onsite to provide coarse woody debris, unless the felled tree lies outside the UWR. Licensees will ensure that UWR values are maintained and incorporated when addressing worker safety concerns.

Note: The Deputy Minister of Water, Land and Air Protection wishes to acknowledge that UWR units 12, 13, 14, 15, 16, 40 and 44 are contained within areas undergoing an industry-led landscape unit planning process in the western portion of the Arrowsmith TSA and may be reviewed by professional biologists. Revisions to UWR units 12, 13, 14, 15, 16, 40 and 44 within the Effingham, Henderson, Toquart, Maggie and Escalante landscape units may be proposed to regional WLAP staff as a result of this process and will be evaluated and forwarded

for consideration by the Deputy Minister of Water, Land and Air Protection within 60 days of their receipt by regional staff.

Objectives Specific to the Haslam and McKay Elk Winter Ranges

The following goals and management objective are for polygon unit numbers 47-51 in the Arrowsmith TSA Ungulate Winter Range Plan U-1-017 (as identified in Table 3 & Figure 1). Polygons 47-51 are designated as 'modified management' areas within the Haslam and McKay Roosevelt elk winter ranges. These modified management areas have 0% netdowns, and are not intended to have an impact on timber supply. They are intended to be managed to provide for and maintain adequate forage and security values within the winter ranges.

Goals

Goal 1

Manage the UWR areas to have a continuous supply of early seral forage that will accrue from managing the areas on a sustained basis, rather than by planning periodic larger cuts with extended regeneration periods between entries.

Goal 2

Provide and maintain security cover (visual screening) for elk between major roads and foraging areas within the designated modified management areas. A visual screen is defined here as vegetation or topography capable of hiding 90% of a standing elk from the view of a human standing on the road in question.

Notes:
a. It is expected that any risk to timber supply that might potentially occur from holding some maturing stands beyond culmination during the first rotation might be offset by partial harvest (commercial thinning or equivalent) within the stands to generate intermediate harvest opportunities or by scheduling harvest elsewhere in the TSA. This would not be an issue in subsequent rotations in the balanced age class scenario.
b. Planning considerations around management issues such as block size, shape, visual cover and road deactivation should be guided by Materi and Dolighan (2002). These guidelines are not expected to result in additional long-term retention.

Management Objectives

Objective 1

Plan the harvest sequence to ensure the following approximate seral stage distribution is maintained within the timber harvesting land base (THLB) portion of the ungulate winter range: 25% in 0-20 year old stands, 25% in 21-40 year old stands, 25% in 41-60 year old stands and 25% in 61-80 year old stands. This balanced age-class will be achieved over the next 60-80 years.

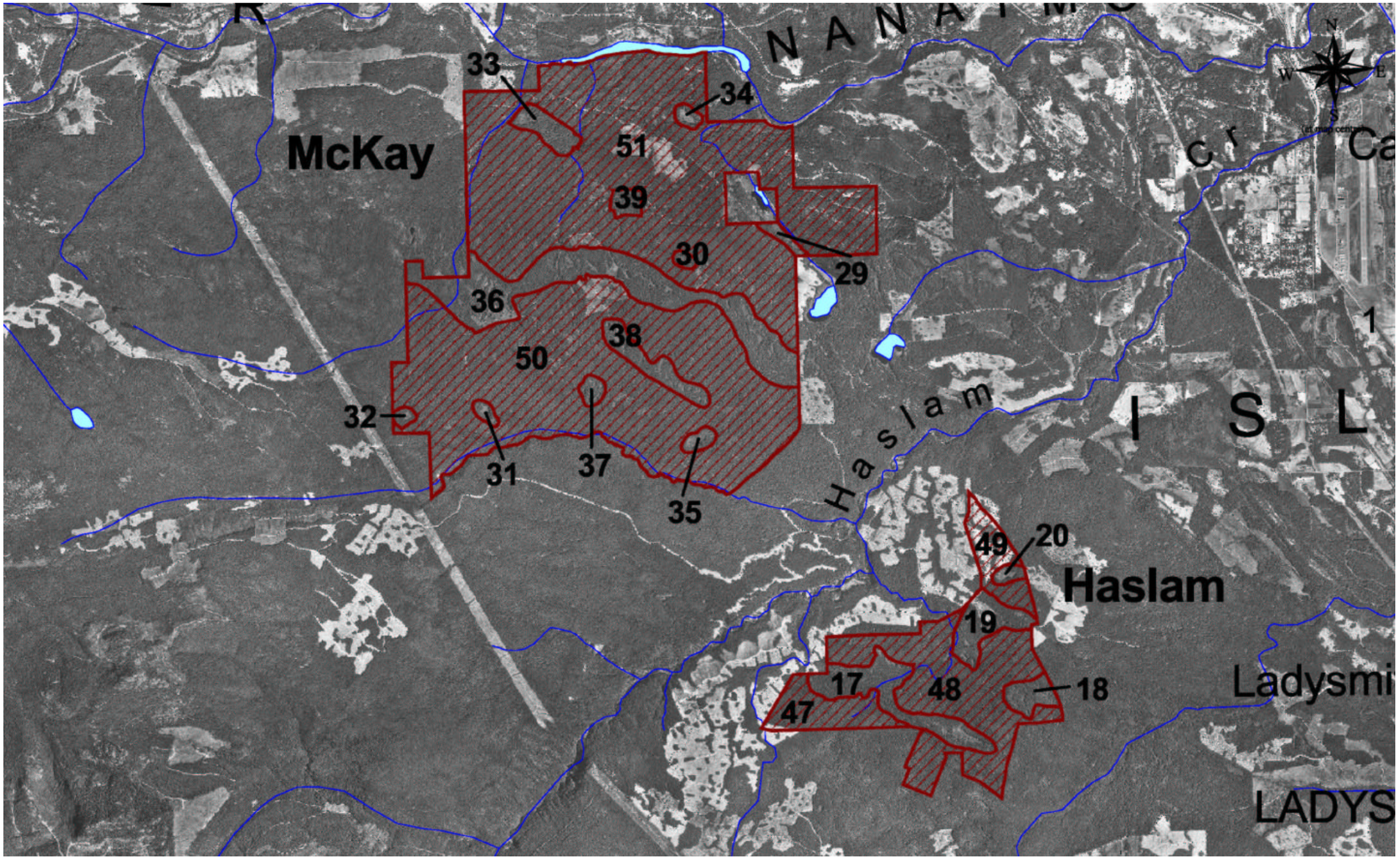

Figure 1. Management areas of the McKay and Haslam ungulate winter ranges. *Modified management areas are represented by cross-hatching. Map scale is approximately 1:50 000.*

7.0 MWLAP REGIONAL WINTER RANGE ISSUES

This section focuses on issues not officially addressed under the ungulate winter range confirmation process. This section contains views which are solely the position of the Ministry of Water, Land and Air Protection and does not necessarily represent the views of the Ministry of Forests, B.C. Timber Sales or the licensees operating in the Arrowsmith TSA.

7.1 Long-term Regional Ungulate Management Plan

The confirmation process undertaken by MWLAP and MOF has cooperatively identified the best Ungulate Winter Range according to the criteria described within this report. In the future, MWLAP's intent is to look at the region from a strategic perspective and identify the amount of ungulate winter range required and the best placement of this range to sustain viable ungulate populations. This assessment will take into account the present suitability of winter habitats, the inherent capability of the area to support ungulates and the spatial distribution/sizes of the existing UWRs versus the optimal spacing, optimal size requirements for the species across the landscape.

Once this 'sufficiency analysis' is complete, revision to current ranges and/or proposals for additional ranges may be identified and presented for establishment as identified in the *Memorandum of Understanding on Establishment of Ungulate Winter Ranges and Related Objectives, dated May 23, 2003.*

7.2 Windthrow

Susceptibility to windthrow is an important consideration of ungulate winter range management. Certain sites are inherently more prone to windthrow for a range of topographical and ecological factors (i.e. greater topographic exposure to damaging winds, poor root anchorage, a more susceptible stand structure and composition) (Stathers et al. 1994). Windthrow can be significantly reduced by recognizing sites where it is likely to be a problem and by using management practices to minimize its impact (Stathers et al. 1994). Expertise to effectively manage to reduce the risk of windthrow is available within the regional professional forestry community.

Goal:

Minimize the impact of windthrow within ungulate winter ranges by implementing mitigation measures in adjacent stands while conducting forest management activities.

7.3 Spring Forage

The availability of high quality forage in close proximity to UWRs is critical to the continuing survival of overwintering ungulate populations. Ungulates lose condition on winter ranges and spring forage is particularly important for the recovery of adults and to ensure that the physiological requirements of gestating does are met. The most important quality of spring ranges is their ability to produce large quantities of nutritious plant material early in the growing season (Nyberg and Janz 1990).

Spring forage production is a crucial component of ungulate winter range management. However, since management for spring forage occurs outside of winter range boundaries, objectives for spring forage production cannot be established under the legislation providing for UWR confirmation.

McDougall (2001) provides objectives and strategies to guide forest development planning, harvest activities, planting and subsequent silvicultural interventions to manage for critical spring forage.

There are a variety of approaches being taken by licensees throughout the region to manage for critical spring forage. These approaches can be assessed and monitored by MWLAP with the focus on meeting the goal of providing and maintaining critical spring forage in the vicinity of ungulate winter ranges. MWLAP will be available to provide more information as ungulate population management plans on a broader scale are completed.

Goal:

Provide and maintain critical spring forage in the vicinity of ungulate winter ranges.

8.0 LITERATURE CITED

Brunt, K. 1990. Ecology of Roosevelt Elk. Pg. 65-98. In: J.B. Nyberg and D.W. Janz, eds. Deer and Elk Habitats in Coastal Forests of Southern British Columbia. Special Report Series 5, B.C. Ministry of Forests, Victoria, B.C.

Bunnell, F. 1990. Ecology of Black-tailed Deer. Pg. 31-63. In: J.B. Nyberg and D.W. Janz, eds. Deer and Elk Habitats in Coastal Forests of Southern British Columbia. Special Report Series 5, B.C. Ministry of Forests, Victoria, B.C.

Dolighan, R. and J. Materi. 2002. South Island Forest District Arrowsmith TSA Ungulate Winter Range Assessment. Ministry of Water, Land and Air Protection, Nanaimo, B.C. and Ursus Environmental, Nanaimo, B.C.

Leigh-Spencer, S. 2001a. South Island Forest District Ungulate Winter Range Habitat Assessment Mount Coronation. Unpublished Report. Prepared for Ministry of Environment, Lands and Parks, Port Alberni, B.C.

Leigh-Spencer, S. 2001b. South Island Forest District Ungulate Winter Range Habitat Assessment Cowichan, Haslam, McKay, and Chemainus. Unpublished Report. Prepared for Ministry of Environment, Lands and Parks, Port Alberni, B.C.

Materi, J. and R. Dolighan. 2002. Assessment of McKay Lake and Haslam Creek Elk Winter Range Units, Arrowsmith Timber Supply Area. Unpublished Report. Prepared for Ministry of Forests, South Island Forest District, Port Alberni.

McDougall, I. 2001. Planning Criteria and Options for Sustained Forage Adjacent to Deer Winter Range. Ministry of Water, Land and Air Protection, Region 1.

McNay, R.S. 1995. The Ecology of Movements Made by Columbian Black-tailed Deer. Univ. B.C., Vancouver, B.C. Ph.D. thesis.

Ministry of Forests. 2002. Arrowsmith Timber Supply Review Analysis. B.C. Ministry of Forests, Victoria.

Nyberg, J.B. and D.W. Janz, eds. 1990. Deer and Elk Habitats in Coastal Forests of Southern British Columbia. B.C. Ministry of Forests, Special Report Series 5, Research Branch, Victoria, B.C.

Resources Inventory Committee (RIC). 1999. British Columbia Wildlife Habitat Rating Standards Version 2.0. Ministry of Environment, Lands and Parks, Resources Inventory Branch, Prepared for the Terrestrial Ecosystems Task Force.

Stini, M. 2001a. Ungulate Winter Range Assessments – Effingham Lake. February 6, 2001. Unpublished Report, Port Alberni, B.C.

Stini, M. 2001b. Ungulate Winter Range Assessments – Toquart Lake. February 13, 2001. Unpublished Report, Port Alberni, B.C.

Stini, M. 2001c. Ungulate Winter Range Assessments – Toquart Lake. February 14, 2001. Unpublished Report, Port Alberni, B.C.

Stathers, R.J., T.P. Rollerson, and S.J. Mitchell. 1994. Windthrow Handbook for British Columbia Forests. B.C. Min. For., Victoria, B.C. Working Paper 9401.

9.0 DEFINITIONS

Capability	Capability is defined as the ability of the habitat, under the optimal natural (seral) conditions for a species to provide its life requisites, irrespective of the current condition of the habitat (RIC 1999).
Suitability	Suitability is defined as the ability of the habitat in its current condition to provide the life requisites of a species (RIC 1999).

MWLAP Region 1 Winter Range Definitions:

Grandparented	Identified as necessary for winter survival of an ungulate species; previously mapped and operationally agreed to; incorporated into the last TSR.
AOI	Areas that are not legally recognized by MOF or the licensee but that MWLAP is interested in for winter range designation.
Netdown	The percent withdrawal from the timber harvesting land base assigned to a forest cover polygon to manage for other resource values. It is assumed that confirmed UWRs will be assigned a 100% netdown factor for future timber supply analyses.

10.0 INDIVIDUAL UWR MAPS

This section presents 1:10 000 maps of the 33 UWRs proposed for confirmation. UWR boundaries are shown on orthophotos where coverage was available (orthophoto date is August 2002), and are otherwise shown on shaded topographical maps. Maps are ordered alphabetically by UWR name, with the exception of the Haslam and McKay UWR map (1:20 000 scale) which is included following the 1:10 000 maps.

APPENDIX A

Legislation

May 23, 2003

MEMORANDUM OF UNDERSTANDING ON ESTABLISHMENT OF UNGULATE WINTER RANGES AND RELATED OBJECTIVES

A. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to expedite and facilitate the orderly confirmation and establishment of ungulate winter ranges (UWR) and related objectives across the province, in order to support the Forest and Range Practices Act (FRPA). This MOU clarifies general ministry roles and responsibilities and outlines procedures and considerations to facilitate timely delivery of this initiative. It replaces previous agreements concerning coordination, administrative processes, and consultation requirements. The intent is to facilitate, through due process, the cooperative development of objectives to support the FRPA while at the same time maintaining the foundation of stakeholder support, where UWR and objectives have been established through Cabinet-approved strategic land use planning processes.

A Procedures Manual for Establishing Ungulate Winter Ranges and Objectives, MWLAP 2003, will be distributed shortly by MWLAP and will provide guidelines on procedures that will be followed when establishing UWR in British Columbia. This manual will also describe the analysis and consultation requirements for UWR proposals, and guidance for the development of legal objectives.

B. GENERAL MINISTRY ROLES AND RESPONSIBILITIES WITHIN THE CONTEXT OF SERVICE PLANS

The Ministry of Water, Land and Air Protection (MWLAP), the Ministry of Forests (MOF), and the Ministry of Sustainable Resource Management (MSRM) all have agency responsibilities with respect to establishing UWR and objectives. Approved ministry service plans provide guidance & direction to the development and implementation of this MOU.

Ministry of Water, Land and Air Protection (MWLAP)
Currently, objectives for UWR are established under Operational Site Planning Regulation (OSPR) s.69. Pursuant to the OSPR (December 2002) the MWLAP Deputy Minister may establish UWR and objectives, through written orders.

Under the Forest and Range Practices Act (FRPA), objectives for UWR will be required to provide guidance to forest stewardship plans (FSPs), range use plans (RUPs), range stewardship plans (RSPs), and other operational plans; and to provide the foundation for monitoring and adaptive management. Under the FRPA, the authority to establish UWR and objectives within current limits i.e. parameters reflected in TSR1 and 2, and land use plan direction) will continue to be granted through regulation to the MWLAP Deputy Minister.

Ministry of Forests (MOF)
Under the FRPA, MOF will hold the authority for approval of FSPs, RUPs, RSPs, and other operational plans. These operational plans will be required to be consistent with objectives set by government, including those for UWR. An FSP, RSP, or other operational plan will be required before timber harvesting, road construction, or livestock grazing can occur on Crown land, unless otherwise prescribed or exempted in legislation.

MOF responsibilities also include assessing timber supply, forage supply for livestock, and operational implications (e.g., costs and access to timber and forage for livestock) of UWR proposals.

Ministry of Sustainable Resource Management (MSRM)
MSRM is responsible for balanced, integrated land use decisions that enhance economic development through timely and certain access to land and resources. Currently MSRM has the sole statutory authority under the Forest Practices Code to establish resource management zone objectives and landscape unit objectives. Under the proposed new forest management regime, the Minister of SRM will have authority under the Land Act to establish land use objectives, including objectives for UWR where appropriate, to support the FRPA. Whereas other

agencies' policies and activities must be constrained within provincial policy resource impact limits, MSRM, through stakeholder processes and economic and ecological analyses, will establish the social balance for land and resource use. In this respect, MSRM may establish or amend objectives, including objectives for wildlife habitat, that are equivalent to, above, or below current policy limits for timber supply impacts.

C. TYPES OF UWR AND OBJECTIVES

Three types of UWR and objectives are recognized and will be established according to the accompanying Procedures Manual for Establishing Ungulate Winter Ranges and Objectives, and according to the process and dispute resolution provisions below.

Type 1: ***UWR and objectives that have been identified and incorporated in TSR1 and/or TSR2 and were:***
(a) identified in a wildlife management plan or strategy approved before October 15, 1998, or
(b) mapped before April, 1998 but not included in a wildlife management plan or strategy, or
(c) included in TSR1 or TSR2 before April, 1998 but not mapped.

In accordance with the May 11, 2000 Memorandum of Understanding on Confirmation and Establishment of Ungulate Winter Ranges Previously Included in Timber Supply Reviews, MWLAP Environmental Stewardship Regional Managers will seek to establish Type 1 UWR and objectives up to the maximum levels of timber supply constraints (land base deductions or forest cover requirements) identified in TSR1, and in TSR2 where UWR allowances have been identified above and beyond the levels in TSR1. Where boundaries and objectives have not previously been refined and made spatially explicit, that will now be done. If further analysis to confirm or vary Type 1 UWR indicates that TSR1 and/or TSR2 allowances are exceeded, then establishment of this UWR will proceed as Type 3. Similarly, UWRs that were considered part of the inoperable or non-contributing land base at the time of TSR1 or TSR2, but now have timber supply impacts or significant operational impacts due to changes in operability, will be addressed as Type 3.

Type 2: ***UWR and objectives identified in Cabinet-approved strategic land use plans (e.g. LRMPs and regional plans) where:***
(a) UWR are specified by spatially explicit units that have been incorporated into TSR1 and/or TSR2, or where:
(b) UWR allowances have not been incorporated into TSR1 and/or TSR2 due to lack of specificity and spatially but are expected to fall within approved land use plan impact levels.

Environmental Stewardship Regional Managers will seek to establish UWR and objectives consistent with UWR and objectives and map boundaries from existing, Cabinet-approved strategic land use plans (SLUPs) or Higher Level Plans. Where necessary, objectives from SLUPs will be refined and made spatially explicit, while continuing to be consistent with the SLUP. New analyses of timber supply implications may be required to demonstrate that spatially explicit objectives remain consistent with the intended impacts of the SLUP. If further analysis to confirm or vary Type 2 UWR indicates that TSR1 and/or TSR2 allowances are exceeded, then establishment of this UWR will proceed as Type 3.

Type 3: ***New UWR and objectives that are identified by MWLAP, licensees or other parties, as necessary for the winter survival of ungulates.***
Where there is a biological need beyond that accommodated by TSR1 and/or TSR2 (Type 1, above), or beyond UWR allowances in Cabinet-approved SLUPs (Type 2, above) new UWR may be proposed by Environmental Stewardship Regional Managers. Proposals will require a detailed rationale describing the biological need, the proposed amount, distribution, and locations of the UWR; and why allowances in TSR1 and/or TSR2 or Cabinet-approved SLUPs are insufficient to adequately address requirements for wintering ungulates. Proposals must incorporate information from MOF and forest licensees on timber and livestock forage supply and operational implications, and where land use objectives have already been approved, information on consistency with those objectives. Wherever possible, Type 3 proposals for all areas and ungulate species within a district will be presented together in order to facilitate timber supply analysis.

If further analysis of Type 1 or Type 2 UWR indicates that TSR1 and/or TSR2 allowances are exceeded, then establishment of these UWR will proceed as Type 3. Similarly, UWRs that were considered part of the inoperable

or non-contributing land base at the time of TSR1, but that now have timber supply impacts or significant operational impacts due to changes in operability, will be addressed as Type 3.

Establishment of UWR: Types of UWR and links to legislation, policy, and ministry roles and responsibilities			
Type of UWR	**Origin of UWR**	**Provincial Policy**	**Ministry Roles and Responsibilities (abbreviated – see MOU for details)**
1(a)	UWR identified by a wildlife management plan or strategy approved before October 15, 1998 (OPR (c))	UWR and objectives have been identified and incorporated into TSR1 and/or TSR2 allowances. Where necessary objectives will be refined and made spatially explicit.	1. MWLAP prepares UWR and objectives 2. MOF provides operational and timber/forage supply implications 3. MWLAP presents UWR information package to IAMC as information for consideration 4. MWLAP establishes UWR and objectives consistent with TSR1 and/or TSR2 allowances for UWR
1(b)	UWR mapped before April, 1998 but not included in a wildlife management plan or strategy (OPR (b))		
1(c)	UWR included in TSR1 or TSR2 before April, 1998 but not mapped (OPR (b))		
2(a)	UWR and objectives identified in Cabinet-approved strategic land use plans (e.g. LRMPs and regional plans) that have spatially explicit units and are incorporated into TSR1 and/or TSR2 allowances.	UWR and objectives have been identified and incorporated into TSR1 and/or TSR2 allowances.	1. MWLAP prepares UWR and objectives consistent with SLUP direction. 2. MOF confirms consistency with SLUP TSR provisions 3. MSRM confirms consistency with SLUP, integration with other objectives 4. MWLAP presents UWR information package to IAMC as information for consideration 5. MWLAP or MSRM establish UWR and objectives (flexibility)
2(b)	UWR and objectives identified in Cabinet-approved strategic land use plans (e.g. LRMPs and regional plans where timber supply impacts have not been incorporated into TSR1 and/or TSR2 due to lack of specificity and spatiality.	UWR and objectives may not have been incorporated into TSR1 and/or TSR2 due to lack of specificity and spatiality. TSR budget will be confirmed and/or negotiated.	1. MWLAP prepares UWR and objectives consistent with SLUP direction. 2. MOF provides operational and timber/forage supply implications 3. MSRM confirms consistency with SLUP, integration with other objectives, and acceptable level of impacts 4. MWLAP presents UWR information package to IAMC as information for consideration 5. MWLAP or MSRM establish UWR and objectives (flexibility)
3	New UWR and objectives that are identified by MWLAP, licensees or other parties, as necessary for the winter survival of ungulates.	Biological need for new UWR may be beyond that accommodated by previous TSRs, so TSR budget will need to be decided.	1. MWLAP prepares proposal with detailed rationale describing biological need, why TSR1 and/or TSR2 allowances are insufficient; etc. 2. MOF provides operational and timber/forage supply implications 3. MWLAP presents UWR information package to IAMC as information for consideration 4. MSRM determines acceptable levels of impacts or determines whether senior government decision is needed 5. MWLAP or MSRM establish UWR and objectives (flexibility)

D. SCOPE AND TIMING

- The ministries agree to work together to establish UWR and objectives within the limits of available resources. Where lack of resources (staff or funds) present barriers to UWR confirmation and establishment, ministries will cooperate to document the shortfall and propose solutions that will allow establishment of UWR and objectives to proceed. This may include the initiation of timber and/or forage supply analysis from any of the three agencies and funding from outside the MOF budget allocation for timber and forage supply analysis.

- Where UWR proposals are easily shown to be consistent with UWR allowances in TSR1 or 2, or with a strategic land use plan and accompanying policy, the three ministries may agree to forego any further analysis of timber supply impacts.

- MSRM commits to developing a work plan for each region to address the establishment of a fully integrated suite of legal objectives to support the FRPA. Eventually, all UWR and objectives will be part of an integrated suite of land use objectives which balance economic, social and environmental values, consistent with approved strategic land use plans.

- MWLAP commits to developing and maintaining a Status Report on all UWR in the Province. This Status Report will assign Type 1, 2, or 3 to each UWR proposal on a preliminary basis which may need to be confirmed by further analysis.

- Type 1 UWR: Currently there is no change to the October 15, 2003 deadline for confirming UWR and objectives approved before October 15, 1998 (see Type 1(a) above). It is expected that this deadline will no longer exist in the FRPA regulations after June 2003. However, orderly establishment of UWR and objectives is expected to continue through the two-year transition period of the FRPA. Along with the work to expedite the establishment of all UWR and objectives, there will be a focus on confirming the highest priority Type 1 UWR and objectives.

- Expiry of Type 1(a) UWR which have not been confirmed by the October 15, 2003 deadline means that they will have no legal effect, however, this does not in any way affect the ability of the statutory decision maker to establish new UWR and objectives in the subject area after the October 15, 2003 expiry date.

- Type 2 UWR: UWR and objectives will be consistent with existing Cabinet-approved strategic land use plans and accompanying policy (e.g., the Cariboo-Chilcotin and Kootenay Boundary Higher Level Plan implementation policies). Where objectives are proposed by MWLAP that differ from the objectives in approved land use plans there shall be a commitment to honour the implementation and monitoring Terms of Reference of the land use plans with respect to amending approved strategic land use plan objectives. In all instances there will be consultation with the respective land use plan Implementation and Monitoring Committee (IMC) prior to the statutory decision maker considering the UWR and objectives for approval.

E. THE ROLE OF THE IAMC AND AGENCIES IN PROCESS, AND DISPUTE RESOLUTION

- A corporate and cooperative approach is desirable for establishing UWR and objectives, and where necessary this will be coordinated across agencies at the Inter-Agency Management Committee (IAMC) level - as directed/influenced by the IAMC Terms of Reference. The IAMC may establish a subcommittee of appropriate agencies, including the MWLAP Environmental Stewardship Regional Manager, to address all considerations and issues related to UWR. All proposals for UWR and objectives will be presented to the IAMC or subcommittee for information and consideration prior to these proposals being presented to the statutory decision maker for approval. Where agreement is not achievable between agencies through discussion at the IAMC or subcommittee, the dispute resolution process (below) will be followed.

- The role of the IAMC initially will be to review proposals for UWR and objectives for consistency with existing agreements (including approved strategic land use plans) and identify any additional options for reconciliation within existing legislative and policy direction. In addition, the IAMC shall highlight the known environmental, social and economic risks associated with the proposals, as identified by the agencies.

- For Type 1 UWR and objectives, associated timber impact allowances will continue to be recognized. In this respect, Type 1 UWR and objectives will be presented to the IAMC as information, but will not be renegotiated unless further analysis to confirm or vary Type 1 UWR indicates that TSR1 and/or TSR2 allowances are exceeded.

- For Types 2 and 3 UWR and objectives, the IAMC will coordinate the review of these UWR for consistency with existing strategic land use plans and to ensure that timber and forage supply and operational implications of these UWR are documented for consideration as part of the integrated planning processes coordinated by MSRM. Prior to proposals for Type 2 and 3 UWR and objectives being submitted to the statutory decision

- maker for approval, the Environmental Stewardship Regional Manager will document comments, information and issues raised by the IAMC.

- The process for resolving disputes concerning the development and establishment of UWR and objectives will depend on the type of UWR and objectives.
    - For UWR and objectives that fall within approved policy limits, and where there is no dispute regarding level of impact, the Environmental Stewardship Regional Manager (ESRM) will collaborate with the IAMC in describing points of departure and options for solution. The ESRM will provide this information to the MWLAP Deputy Minister who will resolve the dispute.
    - For UWR and objectives that fall outside approved policy limits, and where there is no dispute regarding level of impact, the Environmental Stewardship Regional Manager (ESRM) will collaborate with the IAMC in describing points of departure and options for solution. The ESRM will provide this information to the MSRM Regional Director who will resolve the dispute.
    - For UWR and objectives where there is a dispute regarding the level of impacts, the Environmental Stewardship Regional Manager (ESRM) will collaborate with the IAMC in describing points of departure and options for solution. The ESRM will provide this information to the Joint Steering Committee and, if necessary, the Deputies' Committee on Natural Resources and the Economy, who will resolve the dispute.

F. DEVELOPMENT OF LEGAL OBJECTIVES

- The Environmental Stewardship Regional Managers will be responsible for writing legal objectives associated with all three types of UWR. The level of detail of objectives is expected to be consistent with current guidance for writing resource management objectives, and any further guidance being developed by MSRM in consultation with the Forest Stewardship Working Group (FSWG). Generally, resource objectives are statements of desired future condition that apply to specific geographic areas and are measurable. (Note: the FSWG is an advisory group of forest industry and government, set up at the request of the Premier).

- Environmental Stewardship Regional Managers will be accountable for ensuring that existing policy is applied in preparation of UWR proposals. They will be responsible for setting the biological rationale and management goals and objectives for UWR within their regions, consistent with current land use decisions and direction. They will document the proposed amount, distribution, and locations of the proposed UWR and will ensure that timber and forage supply and operational implications of UWR establishment are documented for consideration by the appropriate statutory decision maker. Information demonstrating consistency with policy must accompany each proposal.

- Environmental Stewardship Regional Managers will also be responsible for leading the formal review and comment for all proposed UWR and objectives with agencies (MOF, MSRM, MEM), First Nations, and affected parties, and for ensuring that concerns and issues are documented.

- It is expected that agencies will be flexible in legally establishing UWR and objectives. Type 1 UWR and objectives will generally be established by MWLAP. The intent for Type 2 and 3 UWR and objectives is to ensure balanced objectives for land and resource management, within the context of existing SLUPs and HLPs, or within a sustainable resource planning process coordinated by MSRM, wherever possible. The IAMC will discuss whether it is most appropriate for MWLAP or MSRM to legally establish Type 2 and 3 UWR and objectives.

- Establishment of UWR and objectives will be coordinated and integrated with the establishment of other legal objectives (e.g., old growth management areas, wildlife habitat areas) wherever possible. However, based on a risk assessment, MWLAP may determine that establishment of UWR and objectives is required prior to the establishment of other land use objectives in some areas. In other areas, establishment of UWR and objectives may be deferred. Options for establishment or deferral of objectives will be discussed between agencies and affected parties, and will be based on the level of risk.

- Where UWR and objectives precede other land use objectives it is recognized that UWR and objectives may require amending at a later date. Amendments to UWR and objectives will be carried out within the same formal review and comment process used for establishing UWR, and will include assessment of biological implications by MWLAP and assessment of timber and forage supply implications by MOF. Minor amendments and/or variances to UWR and objectives will be carried out by the statutory decision maker or delegate responsible for initial establishment of the UWR and objectives. Major amendments to UWR and objectives that fall outside approved policy limits will proceed as Type 3 UWR and objectives.

_____ _____

Jon O'Riordan, Deputy Minister, MSRM Date

_____ _____

Gord Macatee, Deputy Minister, WLAP Date

_____ _____

Doug Konkin, Deputy Minister, MOF Date

Ministry of Forests
Ministry of Environment, Lands and Parks

MEMORANDUM

Date: May 11, 2000

To: Regional and District staff
Ministry of Forests
Ministry of Environment, Lands and Parks

Re: Confirmation and establishment of Ungulate Winter Ranges previously included in Timber Supply Reviews.

The Operational Planning Regulation of the Forest Practices Code creates a specific definition and regulations to provide the legal basis for management of ungulate winter ranges. In an August 6, 1998 letter to staff a two-step process was approved for the establishment of "existing" ungulate winter ranges under the Regulation; i.e., those plans and strategies that had already been approved prior to the date the Operational Planning Regulation was deposited. Grandparenting of many existing mapped winter ranges that had wildlife management plans and/or strategies, and were managed as ungulate winter range, was completed on October 15, 1998. The remaining candidate winter ranges include:

- those that were previously mapped but not grandparented by October 15, 1998, and
- those that were accounted for in TSR1 but were not mapped.

Attached are three documents that provide the agreed-to framework for establishment and confirmation, under the Forest Practices Code, of ungulate winter ranges previously included in Timber Supply Reviews:

1) Memorandum of Understanding on Confirmation and Establishment of Ungulate Winter Ranges previously included in Timber Supply Review, May 5, 2000;
2) Administrative Process for Mapping and/or Confirming under the Forest Practices Code those Ungulate Winter Ranges factored in TSR1, May 5, 2000;
3) Ungulate Winter Range Criteria, May 5, 2000.

All Forest Practices Code candidate and grandparented ungulate winter ranges are to be finalised as quickly as possible and on a priority basis. Those meeting the conditions of the attached framework are to be forwarded to the Chief Forester and the Deputy Minister of Environment, Lands and Parks for consideration prior to the October 15, 2003 confirmation date established by the Operational Planning Regulation.

_____	_____
Greg Koyl Assistant Deputy Minister Operations Division Ministry of Forests	Jon O'Riordan Assistant Deputy Minister Regional Operations Ministry of Environment, Lands and Parks
Date: _____	Date: _____

MEMORANDUM OF UNDERSTANDING

ON

CONFIRMATION AND ESTABLISHMENT OF UNGULATE WINTER RANGES PREVIOUSLY INCLUDED IN TIMBER SUPPLY REVIEWS

May 11, 2000

BACKGROUND

Recent amendments to the Operational Planning Regulation (OPR) of the Forest Practices Code have created a specific definition and regulations to provide the legal basis for management of ungulate winter ranges (UWR) on Provincial Forest land. A two-step process was approved (see letter of August 6, 1998 - attached) for the establishment of UWR under the Regulation. Grandparenting of existing mapped winter ranges that had wildlife management plans and/or strategies, and were managed as UWR, was completed on October 15, 1998. The remaining candidate winter ranges include:

1) those that were previously mapped but not grandparented by October 15, 1998, and
2) those that were accounted for in TSR 1 but were not mapped.

All Forest Practices Code candidate and grandparented ungulate winter ranges are to be finalised as quickly as possible, and those meeting the conditions of this MOU confirmed by October 15, 2003. The intent overall is to: (1) identify the areas that are necessary for the winter survival of ungulates; (2) ensure that these areas are distributed in the most effective way for maintaining ungulates across their natural range; and (3) ensure that timber supply impacts do not exceed those included in Timber Supply Review 1 (TSR1).

The biological principles behind establishment of UWR are that areas so designated:

- should be well distributed across the range of the species, so local populations are not extirpated,
- should provide areas of habitat that will sustain sufficient numbers of the ungulate species through severe winter conditions that local populations will be able to quickly recover, and
- should be located on sites that show evidence of high winter range value for the locality, as determined by evidence of past use or by topographic and vegetative characteristics defined for the locality by experienced biologists.

WITH THE ABOVE BACKGROUND, THE MINISTRY OF FORESTS (MOF) AND THE MINISTRY OF ENVIRONMENT, LANDS AND PARKS (MELP) HAVE AGREED TO THE FOLLOWING, WHICH APPLY TO ALL SUBSEQUENT SECTIONS OF THIS MEMORANDUM OF UNDERSTANDING (MOU):

A. Guiding Principles

1. Winter ranges are a forest resource requiring proper management.

2. Winter range designation and management is needed to provide certainty to ministries and stakeholders.

3. Protocols for winter range designation and management must be clear and specific in order for agency and industry staff to work co-operatively and reduce disputes at all levels.

4. Criteria for determining areas that are necessary for the winter survival of an ungulate species should be based on the biological needs of the species.

5. Consistent with Guiding Principle #4, when determining the location of candidate winter ranges and the ungulate management objectives to be applied within them, due consideration shall be given to economic as well as biological factors. The objective is ensure that cost increases are avoided wherever possible as per the intent of current memoranda of understanding among MOF, MELP, and forest industry associations. Where cost increases are unavoidable, they are to be minimised through local consultation between the agencies and licensees. Because the grandparented UWRs and some candidate UWRs covered by this MOU have been recognized in previous plans, we expect net cost increases will be negligible for most licensees.

6. Candidate winter ranges (grandparented or non-grandparented) should be identified as quickly as possible to ensure that habitat necessary for the winter survival of ungulate species can be identified, approved and protected.

7. Winter ranges may be proposed up to the maximum levels identified in TSR1 for Timber Supply Areas (or as noted in the most recent Management & Working Plans for Tree Farm Licences), providing they meet the definition in the OPR. Since the levels for UWR utilized for TSR1 reflected historical management decisions and were not set using the current UWR definition nor current principles, some grandparented and proposed UWR may not meet current criteria. TSR1 levels for UWR thus should not be regarded as a guaranteed amount of UWR "capital" to be used in this process. If lesser levels of UWR are satisfactory to achieve the conditions of this MOU and satisfy the intent of the OPR, an amount of UWR less than the TSR1 levels is appropriate.

8. The agencies recognize that there are certain situations where TSR1 allowances did not provide for ungulate winter ranges in the locations or to the extent needed to responsibly conserve ungulate values under the Forest Practices Code. Section 69(1) of the Operational Planning Regulation provides the opportunity for the Chief Forester and Deputy Minister of Environment, Lands, and Parks to establish "new"[5] UWRs where they are needed. The principles and process to be used in establishing these new UWRs will be dealt with separately from this MOU.

9. The process of UWR establishment will consider the availability of habitat suitable as winter range for ungulates that is provided by protected areas and other planning initiatives such as higher level plans, Landscape Unit Planning, and Land and Resource Management Plans.

B. Refinement and Confirmation of Grandparented Winter Ranges

1. Some of the winter ranges that were previously mapped by MELP and MOF at the district, regional, or provincial levels before the winter range regulation was deposited in April 1998, have been grandparented into the regulation as of October 15, 1998.

2. The five-year period from October 15, 1998, to October 15, 2003, has been provided to allow MOF and MELP with input from licensees and the Ministry of Energy and Mines (MEM) to refine, if necessary, the grandparented winter ranges by mutual agreement, so long as the net timber supply impact is not increased. Potential refinements, where agreed to by both MOF and MELP with input from licensees and MEM, may include:
   - adjusting boundaries,
   - deleting winter ranges, and/or
   - replacing deleted ranges with new ones.

   > Replacement UWR within the TSR1 maximum limits may be made on an area-for-area basis within the operable land base providing the refined UWR meet the biological criteria outlined above, and specifically are necessary for the winter survival of an ungulate species.

3. Grandparented winter ranges that do not need refinement should be taken forward for confirmation and approval as soon as possible. Those grandparented winter ranges that do need refinement should be taken forward for confirmation and approval only after agreement that these refinements are consistent with the definition of UWR in the OPR and the principles outlined above.

[5] "New" in the context of this MOU means not accounted for in TSR1.

C. Non-grandparented, Previously Mapped Winter Ranges

1. Previously-mapped winter ranges that were not grandparented as of October 15, 1998, will be formally established and confirmed as UWR as quickly as possible, and before October 15, 2003, according to the provisions outlined in the OPR. These areas will be accommodated in the interim according to Section E of this MOU.

2. These candidate UWR should continue to be included in the base case for the next round of Timber Supply Reviews. Such inclusion, however, will not necessarily imply subsequent confirmation by the Chief Forester and the Deputy Minister of the Ministry of Environment, Lands and Parks pursuant to Section 69 of the OPR.

3. Replacement UWRs within the TSR1 maximum limits may be made on an area-for-area basis within the operable land base providing the refined UWR meet the biological criteria outlined above.

D. Non-grandparented, Previously Unmapped Winter Ranges

1. Non-grandparented, previously unmapped winter ranges include winter ranges that were historically included in Timber Supply Reviews as a forest cover constraint or considered as another TSR sensitivity, but which were not specifically mapped or spatially defined. These previously unmapped winter ranges should be identified in accordance with Principles 4 and 5 as quickly as possible, and their approximate locations should be shown on operational-scale maps.

2. These candidate UWRs should continue to be included in the base case for the next round of Timber Supply Reviews. Such inclusion, however, will not necessarily imply subsequent confirmation by the Chief Forester and the Deputy Minister of the Ministry of Environment, Lands and Parks pursuant to Section 69 of the OPR.

E. Management of Non-grandparented, Winter Ranges (Sections C and D above)

1. Consistent with Guiding Principle 6, MELP and MOF will provide licensees and MEM with operational-scale maps that show approximate locations of candidate winter ranges. When these maps are provided to the licensees, licensees should be informed that this information is being made available to them for their consideration when developing operational plans, and if any of these conflict with existing licensee planning, that the licensee should discuss these with both agencies at the earliest possible time.

3. Licensees should be made aware that these areas are being actively reviewed for formal UWR designation, and that statutory decision-makers will consider this when reviewing and approving forest development plans.

Approved by:

_____	_____
Greg Koyl	Jon O'Riordan
Assistant Deputy Minister	Assistant Deputy Minister
Operations Division	Regional Operations
Ministry of Forests	Ministry of Environment, Lands and Parks
Date: _____	Date: _____

Attachments: Letter (August 6, 1998)
Sections from the OPR pertaining to Ungulate Winter Range
Administrative process for mapping and/or confirming under the Forest Practices Code those Ungulate Winter Ranges factored into TSR1
Ungulate winter range criteria

Extracts from the Operational Planning Regulation

The following are extracts from the Forest Practices Code, Operational Planning Regulation:

Definition:

"ungulate winter range" means an area that is identified as being necessary for the winter survival of an ungulate species by any of the following:

a) a higher level plan
b) the chief forester and Deputy Minister of Environment, Lands and Parks under section 69;
c) a wildlife management plan or strategy approved before October 15, 1998
   i) by
      (A) the district manager or regional manager, and
      (B) the designated environment official,
   ii) by the Chief Forester, or
   iii) by the ministers,

   but a wildlife management plan or strategy approved under this paragraph expires on October 15, 2003, unless

   iv) modified under paragraphs a) or b), or
   v) confirmed before that date under section 69

Section 69 Ungulate winter range

1) The chief forester and the Deputy Minister of Environment, Lands and Parks may, by written order, establish an ungulate winter range by identifying in the order

   a) an area of land that is necessary for the winter survival of an ungulate species, and
   b) objectives for the management of that area

2) An ungulate winter range that is identified in a wildlife management plan or strategy approved before October 15, 1998 ceases to be an ungulate winter range on October 15, 2003 unless confirmed before that date by the chief forester and Deputy Minister of Environment, Lands and Parks.

3) If an ungulate winter range identified in a wildlife management plan or strategy under paragraph c) of the definition of "ungulate winter range" has no objectives specified for the management of the winter range, the district manager and designated environment official may, by written order, establish objectives for the winter range.

Extract from the Operational and Site Planning Regulation

The following is an extract from the revised Operational and Site Planning Regulation:

Ungulate winter range

69. (1) The Deputy Minister of Water, Land and Air Protection may, by written order, establish an ungulate winter range by identifying in the order

(a) an area of land that is necessary for the winter survival of an ungulate species, and

(b) objectives for the management of that area

(2) An ungulate winter range that is identified in a wildlife management plan or strategy approved before October 15, 1998 ceases to be an ungulate winter range on October 15, 2003 unless confirmed before that date by the Deputy Minister of Water, Land and Air Protection.

(3) If an ungulate winter range identified in a wildlife management plan or strategy under paragraph (c) of the definition of "ungulate winter range" has no objectives specified for the management of the winter range, the designated environment official may, by written order, establish objectives for the winter range.

ADMINISTRATIVE PROCESS FOR MAPPING AND/OR CONFIRMING UNDER THE FOREST PRACTICES CODE THOSE UNGULATE WINTER RANGES FACTORED INTO TSR1

1. MELP Regional Habitat Protection Section Head[6](or designate) describes the winter needs for ungulate species in question in the region, based on biological criteria[7]. The Habitat Protection Section Head (or designate) may consult with other biologists in and outside of government as part of this process. The resulting criteria for winter ranges will be provided to district staff in both ministries, who will provide copies to local forest companies.

2. From information provided by district MELP and Forest Service staff, from forest companies, or from past field surveys or winter range plans, MELP Regional Habitat Protection Section Head (or designate) provides a map of the candidate or grandparented ungulate winter range(s).

    3. MELP will provide copies of maps and/or written materials that verify that this UWR and recommended objectives (including acceptable forest practices) are either the same as or equivalent to a UWR that had been identified (e.g., on ESA maps or in reviews of development plans) at the time of the timber supply review in period 1992-1996 (TSR1)[8]. Winter range boundaries or locations may be adjusted for biological reasons within the area covered by the specific TSR provided the overriding timber supply impacts recognized in TSR1 are not exceeded.
    4. The Forest Practices Code ungulate winter range proposal is vetted through District MoF and MELP staff and Regional Ministry of Energy and Mines (MEM) staff with respect to operational implications. If the proposed winter range poses significant operational constraints the Regional Habitat Protection Section Head (or designate) and District MoF and District MELP staff may agree to refine boundaries as long as biological values are maintained. Whether or not agreement is reached on refining boundaries to better meet operational needs, proceed to Step 5.
    5. The proposed ungulate winter range together with both a biological justification (provided by MELP) and operational analysis (provided by MoF, and in some

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[6] While the specific reference herein is to the MELP Habitat Protection Section Head, it is understood that the intent is that conclusions reached regarding the winter needs for ungulate species and spatial delineation of winter ranges will be based on a process of open communication between the Ministry of Environment, Lands and Parks, the Ministry of Forests and the forest industry throughout.

[7] General criteria for ungulate winter ranges throughout BC are attached.

[8] With respect to confirming and establishing ungulate winter ranges factored into TSR1, the cumulative effect of all designated and proposed winter ranges within a management unit (TFL or TSA) must not exceed the netdown amount from TSR1 (i.e., previously mapped winter ranges referred to in sections B and C of the May 11, 2000 Memorandum of Understanding, or the cover constraint or other TSR sensitivity referred to in section D of the Memorandum of Understanding). The timber supply information bases of TSR1 were not developed for tracking the impact of Ungulate Winter Ranges after the determination of the AAC. Information from TSR1 is complicated by shifting data bases and changes in forest management practices (e.g., operability). Where there is uncertainty about the TSR1 impact of UWRs in a specific management unit or Timber Supply Branch is not able to confirm the impact allowance, a local agreement between the agencies (MOF and MELP) will be reached. In cases where local agreement cannot be reached on the impact allowance for UWRs, the MELP/MoF Dispute Resolution Process shall be used to provide advice to the appropriate statutory decision maker.

cases by MEM; and with any input by MELP) is forwarded to Victoria. The operational analysis should state whether industry concurs with the proposal or not. Furthermore, if industry wishes to document objections, other professional biologist opinions, other proposed boundaries, or details of operational implications, that information should be included as part of this package.

6. Victoria staff ensure that package is complete and that adequate briefing materials have been completed for the statutory decision makers. The package is then forwarded to the Deputy Minister of MELP and the Chief Forester of MoF for confirmation as per Section 69 of the Operational Planning Regulation.

Approved by:

_____Date:_____	_____Date:_____
Greg Koyl	Jon O'Riordan
Assistant Deputy Minister	Assistant Deputy Minister
Operations Division	Regional Operations
Ministry of Forests	Ministry of Environment, Lands and Parks

UNGULATE WINTER RANGE CRITERIA

To be acceptable as an ungulate winter range, the mapped area must meet at least one of the following criteria:

4. a combination of topographic and vegetative features defining high-quality winter range, as appropriate for the species and the locality, as determined by regional wildlife or habitat staff of MELP[1];
5. a documented history of winter use, as determined by regional wildlife or habitat staff of MELP; or
6. in localities that are regularly occupied by an ungulate species during the winter but that do not have sufficient high-quality winter range as defined under point 1 above, a combination of topographic and vegetative features that provide the most suitable habitat for winter range. This is the least preferred of these three criteria and should be used relatively infrequently.

Typical topographic and vegetative features to be used in delineating winter ranges are:

- slope
- aspect
- elevation
- topographic shading
- presence of rock outcrops or cliffs
- forest cover type (species composition, height, age, volume or basal area, canopy closure of overstorey)
- species composition and abundance of understory vegetation
- species composition and abundance of arboreal and terrestrial lichens
- stand heterogeneity
- size and configuration of area.
- adjacency of other important habitats such as early winter and spring ranges
- proximity to other winter ranges

[1] The topographic and vegetative criteria appropriate for each ungulate species and region will be distributed to district staff of MoF and MELP. These criteria will be compiled from a variety of sources including published research reports and other research data, field inventories, and information from experienced biologists.

Memorandum of Understanding – Clarifications (listed by document)

Forest Practices Code, Operation Planning Regulation, Section 69

Under Section 69(1), Ungulate Winter Ranges (UWRs) can be established at any time by the chief forester and Deputy Minister of Environment, Lands and Parks. New UWRs can be established as needed to ensure the winter survival of ungulates. There are no time restrictions. This is mentioned under establishing "new" UWRs on page 3, A8 of the MoU (May 11/00). Section 69(2) is written to allow existing or budgeted UWRs to become formally recognized under the code. Details on this process are outlined in the MoU (May 11/00). If these UWRs are not formally recognized under the code by October 15, 2003, they can still be brought forward under Section 69(1). Note that it is best if existing UWRs that are budgeted in TSR1 be established under Section 69(2) as any timber impact allowance that would have been recognized for that UWR before the cut-off date would be foregone.

Letter August 17, 2000

Page 2, last sentence. It is suggested that proposed UWRs and all the accompanying information for them be submitted prior to October 15, 2003. It is recommended (not required) that these be submitted by April 2003 to allow time for the packages to be reviewed for completeness and have sufficient time to complete the confirmation process.

Memorandum of Understanding May 11, 2000

Page 2, A.6. Candidate UWRs may be packaged into meaningful groups before submission such as by Timber Supply Area or by Forest District. However, if immediate protection is deemed necessary to preserve the habitat in a proposed UWR, then these candidate winter ranges should be submitted as soon as they are completed.

Page 2, A.7, Last sentence. Only biologists can determine if lesser levels of UWR are satisfactory to achieve the conditions of the MoU and satisfy the intent of the OPR. If lesser levels are not deemed adequate, it is the budget given in TSR1 that is to be used. Note that input into this decision may come from biologists representing various groups such as MELP, industry, etc.

Page 3, A.8. Another process will be established to deal with "new" UWRs where they are needed. This may be in the form of another MoU.

Page 3, A.9. MELP and MoF staff agrees that a UWR established by a Higher Level Plan (HLP) should have the same effect as those established under section 69 of the OPR (if they are properly documented and spatially defined). However, UWRs are only "enforceable" on the ground to the extent that they have been incorporated into operational plans. UWR boundaries identified in a HLP should be as accurate as reasonably possible. An operational plan can be approved as long as it doesn't "materially conflict" with a HLP. This already provides licensees a certain amount of flexibility with respect to overlaying a cutblock over part of a UWR identified in a HLP. If the UWR boundaries in the HLP are themselves just a guesstimate, it would seem to make them less credible and less compelling when deciding what a "material conflict" is. Biologists should consider the availability of habitat suitable for UWR through these initiatives; however, the biologist may still want to have these UWRs confirmed under the process laid out by the MoU to ensure they receive the same legal designation under the FPC.

Page 3, B.1. Those UWRs that have been Grandparented fall under the regulation and thus its management plan must be followed (it is legally binding). This is continues to be true unless the Grandparented UWR fails to be confirmed by Oct 15/03.

Page 3, B2, last sentence. For criteria of what constitutes the "winter survival of ungulates" see bullets at the bottom of page 1 of the MoU (i.e. this statement refers to the survival of local populations, not just the survival of a species somewhere in BC).

Page 4, C2 & D2. Even if non-grandparented UWRs are not included in the base case for the next TSR, the maximum amount provided for candidate UWRs is set by TSR1. This is true even if less budget is provided for UWR in the next TSR.

Administrative Process May 11, 2000

Page 1, #3, footnote 3. The people at MoF's Forest District offices are likely the best people to contact for information regarding the "budget" given in TSR1. This may be complicated when conversions need to be done (e.g. volume or area needs to be determined from Ews included in TSR1). If MELP and MoF staff can not agree on the calculated budget set out in TSR1 then the MELP/MoF Dispute Resolution Process shall be used.

Page 1, #3, footnote 3. Although operability lines may have changed to include more area since TSR1, the TSR1 budget will remain the same (there will not be a proportionate increase in the budget). This may mean that allowances in TSR1 no longer provides for ungulate winter ranges in the location or to the extent needed to responsibly conserve ungulate values under the FPC. In these instances "new" UWRs may need to be established under Section 69(1) of the Operational Planning Regulation following section A8 of the MoU.

Page 1, #4. If all parties can not come to an agreement on the proposed ungulate winter range proposal, then the MELP/MoF Dispute Resolution Process shall be used. Excess time should not be spent trying to obtain agreement at the district level. These issues can be settled with the MELP/MoF Dispute Resolution Process.

Page 2, #5. Proposed UWRs packages should contain both the biological justification by MELP and the operational analysis by MoF (sometimes MEM) before it is sent to Victoria. It is expected that once MoF (and MEM) have received the UWR proposal they will complete the operational analysis in a reasonable time frame as not to delay the process set out in the MoU.
Note: If a party feels any step of this process is taking an excess amount of time, the situation should be brought to the attention of Greg McKinnon to bring it forward to the executive.

Page 2, #5 & 6. Proposed UWRs packages should be sent to Brian Nyberg (MoF Timber Management Branch) and Greg McKinnon (MELP Habitat Branch). These staff will ensure that the packages are complete and will then forward them to the Deputy Minister of MELP and the Chief Forester of MoF for confirmation.

Page 2, #6. It is not required that mapped UWRs be in digital format (although this is ideal).

Letter August 6, 1998

Section 2. Clarification – both steps 1 and 2 must be completed by October 2003.

Section 2, 3rd bullet, last sentence; and Step 1, last sentence. Clarification – it is TSR1 that is being referred to in these instances.

Section 2, Step 2. MELP and MoF staff agrees that a UWR established by a Higher Level Plan (HLP) should have the same effect as those established under section 69 of the OPR (if they are properly documented and spatially defined). However, UWRs are only "enforceable" on the ground to the extent that they have been incorporated into operational plans. UWR boundaries

identified in a HLP should be as accurate as reasonably possible. An operational plan can be approved as long as it doesn't "materially conflict" with a HLP. This already provides licensees a certain amount of flexibility with respect to overlaying a cutblock over part of a UWR identified in a HLP. If the UWR boundaries in the HLP are themselves just a guesstimate, it would seem to make them less credible and less compelling when deciding what a "material conflict" is. Biologists should consider the availability of habitat suitable for UWR through these initiatives; however, the biologist may still want to have these UWRs confirmed under the process laid out by the MoU to ensure they receive the same legal designation under the FPC.

APPENDIX B

South Island Forest District
Arrowsmith TSA Ungulate Winter Range Assessment

Prepared by Randy Dolighan, MWLAP and Joe Materi, Ursus Environmental
June, 2002

APPENDIX C

Consultation Summary - Stakeholders

Summary of Consultation - Stakeholders

Judy Teskey and Randy Dolighan of the MWLAP presented an overview of the Arrowsmith TSA Ungulate Winter Range Assessment project (Dolighan and Materi 2002) at the South Island Forest District All Licensee Meeting held on June 20, 2002. During this group session there were some general comments from the stakeholders, however there were no significant objections to the proposed plan. Interested parties were requested to provide input and asked to provide notice if they were interested in conducting a more detailed review of their specific areas of interest.

Subsequent to the All Licensee meeting, notification of the completion of the draft UWR plan (Dolighan and Materi 2002) was sent by letter to the following people (licensees and licensees' representatives). The letter specified that there may be operational implications associated with the proposed UWRs and provided for the opportunity to meet and work with MWLAP personnel to address any concerns. No responses to this letter were received. The following stakeholders were notified of the draft UWR plan:

South Island Forest District, Ministry of Forests, Port Alberni.

Small Business Forest Enterprise Program (B.C. Timber-Sales Program), South Island Forest District, Ministry of Forests, Port Alberni.

Weyerhaeuser Company Limited, West Island Timberlands, Sproat Lake Operations, Port Alberni.

Weyerhaeuser Company Limited, West Island Timberlands, Franklin Operations, Port Alberni.

Weyerhaeuser Company Limited, West Island Timberlands, Planning Office, Port Alberni.

Weyerhaeuser Company Limited, Nanaimo Woodlands, Nanaimo.

Northwest Hardwoods, Delta Division, Weyerhaeuser Company Limited, Delta.

Coulson Forest Products Limited, Port Alberni.

Coulson Group, Port Alberni.

International Forest Products Limited, West Coast Operations, Ucluelet.

TFL Forest Limited, Honeymoon Bay Operations, Crofton.

Western Forest Products Limited, Jordan River Operations, Jordan River.

Iisaak Forest Resources, Ucluelet.

Steeves Forest Consulting Limited, Victoria.

G.C. Gallinger & Associates Limited, Port Alberni.

Cowichan Lake Community Forest Co-operative, Lake Cowichan.

Echa - Peh Forest Resources Limited, Port Alberni.

Equis Forest Products Limited, Port Alberni.

Coast Forest Management Limited, Campbell River.

Hayes Forest Service Limited, Duncan.

Tashwin Resource Management Limited, Port Alberni.

Esock F.C., Tofino.

Department of Fisheries and Oceans Canada, Port Alberni District Office, Port Alberni.

Department of Fisheries and Oceans Canada, Duncan District Office, Duncan.

The following stakeholders either requested further review or had specific concerns regarding the proposed UWRs (Table 4). Issues resolved during the final review process are discussed in Table 5.

Table 4. Stakeholder consultation summary.

Stakeholder	Comments (MWLAP response in italics)
Ministry of Forests	• Dan Biggs, Planning Forester, SIFD provided comments pertaining to maintaining a uniform and consistent approach to MOF/MWLAP policy. His main areas of interest were adherence to the budget, stakeholder consultation process and operational interests. • Dan Biggs reviewed the September 12, 2003 draft UWR proposal and provided comment. Please see Table 5 for specific issues raised.
Ministry of Sustainable Resource Management	MSRM was notified of the proposed UWR locations for use in their Landscape Unit Planning.
Ministry of Energy and Mines	Although not able to officially comment for the Ministry of Energy and Mines, MRSM provided specific mineral information for the proposed UWRS and maps showing mineral tenure and ungulate winter range overlap (Appendix D). Seven of the proposed UWRs have overlap with mineral tenures.
B.C. Timber Sales Program (BCTS), previously known as Small Business Forest Enterprise Program (SBFEP), Ministry of Forests.	• Requested more information at the SIFD all licensee meeting on June 20, 2002 and asked for a further meeting to be arranged. • BCTS reviewed the September 12, 2003 draft UWR proposal and initially did not support the Loup A and Effingham UWR proposals. Extensive consultation eventually resolved these issues. Please see Table 5 for details.
Interfor	• Requested more information at the SIFD all licensee meeting on June 20, 2002. *Additional maps were provided and follow up phone discussions were held with Zoltan Schafer (Interfor Area Engineer) and Wayne Wall (Interfor Wildlife Biologist) with no specific objections presented.* Interfor representatives Wayne Wall, Don McMillan and Bob Craven attended a joint landscape unit planning meeting on Oct. 27, 2003. Concerns were raised regarding confirmation of the Effingham UWR prior to the completion of LU planning. Concerns were resolved by adding a note of clarification to the UWR objectives. Please see Table 5 for details.

Table 4 *(continued)*. Stakeholder consultation summary.

Stakeholder	Comments (MWLAP response in italics)
Coulson Group	• Requested more information at the SIFD all licensee meeting on June 20, 2002 regarding specific UWRs in their area of interest. *Meetings were held with Paul Pashnik and Bob Howie of Coulson Forest Products Ltd. in 2002 to discuss UWRs in the Toquart and Effingham LUs. There were no specific objections presented. It was noted that shifting the grandparented Toquart UWR from its original location to the new proposed site allowed for increased logging opportunity. The proposed UWR has higher winter range value and contains only 1.3 ha of THLB.* Paul Pashnik attended a joint landscape unit planning meeting on Oct. 27, 2003. *MWLAP gave Paul their assurance that road access into the Upper Effingham would not be blocked by the Effingham UWR. Please see Table 5 for details.*
Cow Lala Coop	• Requested more information at the SIFD all licensee meeting on June 20, 2002. *Mark Carter reviewed the UWR plan after the all licensee meeting and did not have any objections.*
Steeves Forest Consulting	• Requested more information at the SIFD all licensee meeting on June 20, 2002. *Pete Steeves reviewed the UWR plan after the all licensee meeting and did not have any objections.*

Table 5. Issues resolved during the final review process.

Issue	Stakeholders Involved, MWLAP response in italics
• Woodlot #1557 was sold to the licensee without the knowledge that there was an existing UWR (**Koksilah**) within the woodlot. There was concern over how this would affect the woodlot timber supply.	MOF – South Island Forest District Woodlot #1557 Licensee – Susan Paul *A meeting was held with Randy Dolighan (MWLAP), Susan Paul (Woodlot Licensee), her woodlot forester and Emma Neill (MOF Woodlot Forester) on April 2, 2003. MOF decided to take the proposed UWR (Koksilah) out of the woodlot license and put it into the Arrowsmith TSA. The woodlot owner was then to be adequately compensated with a different piece of property.* ***November, 2003 – The woodlot owner has agreed to a compensation package. Woodlot owner and MOF no longer have any concerns.***
• **Effingham UWR**– Appears that if confirmed this UWR would block road access into the upper Effingham valley. Latest BCTS proposed road location conflicts with the SW corner of the proposed UWR. Approximately 300 m of road is within the UWR, alienating approximately 3 ha of timber. TSA licensees operating in the area require operational certainty that a main road will be allowed to traverse through the UWR to reach timber in the Effingham valley beyond.	MOF – South Island Forest District BCTS Interfor Coulson Forest Products Ltd Eca-Peh Forest Resources Ltd. Equis Forest Products Ltd. *Meetings were held with MWLAP and BCTS representatives on Sept. 26, 2003 and Oct. 20, 2003 to discuss issues regarding the Loup A and Effingham UWRs.* *A joint meeting was held on Oct. 27, 2003 to discuss Landscape Unit planning issues within the Effingham watershed. Representatives from MWLAP, BCTS, Interfor, MSRM, SIFD, Coulson Forest Products Ltd, Eca-Peh Forest Resources Ltd., Equis Forest Products Ltd. and Keystone Wildlife attended the meeting. Licensees requested that confirmation of the Effingham UWR be delayed until such time as Landscape Unit planning was completed. MWLAP assured licensees that road access would not be blocked by the Effingham UWR and expressed their urgency to complete confirmation of this grandparented UWR.* ***The objective for road access has been revised to allow road development through the Effingham UWR. WLAP has also included a note in the order indicating that certain UWR polygons, including the Effingham, can be revisited following LU planning. TSA licensees no longer have any concerns.***

Table 5 *(continued)*. Issues resolved during the final review process.

· An industry-led **landscape unit planning** process is being completed within the Effingham, Henderson, Toquart, Maggie and Escalante landscape units in the western portion of the Arrowsmith TSA. Licensees requested that confirmation of the seven UWRs proposed within these LUs be delayed until such time as LU planning was completed.	MOF – South Island Forest District BCTS Interfor Coulson Forest Products Ltd Eca-Peh Forest Resources Ltd. Equis Forest Products Ltd. ***WLAP has included a note in the order indicating that the following seven UWR polygons can be revisited following LU planning: UWR units 12 (Effingham), 13 (Escalante), 14 (Handy), 15 (Handy C), 16 (Handy E), 40 (Mooyah) and 44 (Toquart). TSA licensees no longer have any concerns.***
• **Loup A UWR** - MWLAP proposed an expansion of the Loup A UWR into an adjoining 20 ha old-growth area with high deer winter range value. The 20 ha expansion area conflicted with a BCTS proposed cutblock**.**	MOF – South Island Forest District BCTS *A follow-up meeting was held with Ron Sorensen (Resource Officer, SBFEP), Laurie McCulligh (SBFEP Forester), Dan Biggs (MOF Planning Forester) and Randy Dolighan (MWLAP) on August 30, 2002. MWLAP discussed the rationale for the **Loup A** expansion and indicated that they would be going forward with the proposal.* Since the proposed UWR boundaries were not finalized at the time, SBFEP decided to leave the cutblock on their FDP amendment. • BCTS reviewed the September 12, 2003 draft UWR proposal and did not support the Loup A UWR proposal. They were planning to submit the cutblock as Category A as part of an FDP amendment to the Cowichan Operating Area plan. *In response to their concerns, meetings were held with MWLAP and BCTS representatives on Sept. 26, 2003 and Oct. 20, 2003 to discuss issues regarding the Loup A and Effingham UWRs.* BCTS also expressed concern that an area of timber was isolated between the Loup A UWR proposal and the Wildlife Habitat Area (WHA) 1-008 proposal. ***Both parties agreed that connectivity between these two proposals should be maintained and MWLAP agreed to work with wildlife staff on expanding the WHA proposal to include the area of timber. BCTS and MOF no longer have any concerns with the Loup A UWR polygon.***

Table 5 *(continued)*. Issues resolved during the final review process.

· BCTS requested that the **Loup B and Loup C UWR** boundaries be revised to match the polygon shapes to roads and other features.	BCTS ***MWLAP and BCTS subsequently revised the Loup B and C UWR boundaries accordingly.***

APPENDIX D

Arrowsmith TSA UWR Mineral Information and Tenure Overlap Maps

Note: The maps showing mineral tenure and UWR overlaps were produced on September 25, 2003. At the time of production, the mineral tenure data may have been up to six months out of date.

APPENDIX E

First Nations Record of Consultation Summary

First Nations Record of Consultation Summary

First Nations with asserted traditional territories within the Arrowsmith TSA were consulted to address First Nation interests regarding the proposed ungulate winter ranges. Consultation was done through a combination of mail-outs, phone calls, faxes, emails, and meetings. Formal letters that were received from First Nations are included.

Table 6. First Nations record of consultation summary.

First Nation	Response	Consultation Record
Beecher Bay Band Council	Verbal response – cannot offer any comments at this time.	File: 36470-40/FN-ARROW File: 20540-20/BEECH
Campbell River Indian Band	Verbal response – the deer and elk winter ranges are outside of the Campbell River Indian Band's traditional territory.	File: 36470-40/FN-ARROW File: 20540-20/CAMP
Cape Mudge Indian Band	Verbal response and written confirmation - Excerpt from emailed letter: *We at Cape Mudge do not have a problem with the winter habitat areas for tree farm license 39, block 2, except for the reduced in size paragraph. Usually when the area is reduced by forest companies, it means a considerable smaller sized winter range. Aside from that, the areas seem to be okay at this time. Also, we have no objections for the other maps that were sent early on. T.F.L. 25. There are also no objections to lot 44 Arrowsmith divisions.* (refers to TFL 44 and Arrowsmith TSA).	File: 36470-40/FN-ARROW File: 20540-20/CMUDGE
Chemainus First Nation	Verbal response - do not have anything to do with the areas.	File: 36470-40/FN-ARROW File: 20540-20/CHEM
Comox Indian Band	Written response – Excerpt from letter: *the Hamatla Treaty Society responds to referrals on behalf of the Comox Indian Band.*	File: 36470-40/FN-ARROW File: 20540-20/COMOX
Cowichan Tribes	Written response – Excerpt from letter: *We view the proposed UWRs as an initial step in protecting ungulate habitat. However, we feel that the "budget" for UWRs on the landbase falls severely short of the habitat necessary to restore and support the elk populations within the territory. The proposed UWRs will not protect enough habitat to allow Cowichan to pursue their aboriginal rights.*	File: 36470-40/FN-ARROW File: 20540-20/COWICHAN

Table 6 *(continued)*. First Nations record of consultation summary.

Ditidaht Indian Band	Response not received. MWLAP is expecting a written response, however Ditidaht representative is having problems getting the letter signed. The letter will be included in the consultation file when it is received.	File: 36470-40/FN-ARROW File: 20540-20/DITID
Halalt Indian Band	Verbal response – no comments.	File: 36470-40/FN-ARROW File: 20540-20/HALA
Hesquiaht Band	Verbal response – no input.	File: 36470-40/FN-ARROW File: 20540-20/HESQ
Homalco Band	Response not received.	File: 36470-40/FN-ARROW File: 20540-20/HOMAL
Hupacasath First Nation	Written response - Excerpts from letter: *We do use the areas shown on your map for numerous traditional uses and activities. However the uses practiced would have very little impact on wildlife (except hunting).* *We support your effort for the UWR and would like the confluence enlarged.* The confluence mentioned in the letter refers to an UWR in TFL 44. The concern regarding this UWR was addressed during the TFL 44 UWR consultation process.	File: 36470-40/FN-ARROW File: 20540-20/HUPAC
Huu-ay-aht First Nations	Response not received.	File: 36470-40/FN-ARROW File: 20540-20/HUU-AY
Lake Cowichan First Nation	Verbal response and written confirmation (email) – Unable to respond for capacity reasons.	File: 36470-40/FN-ARROW File: 20540-20/LAKE-COW
Lyackson First Nation	Formal response was not received. Indicated not interested in the mainland portion of Vancouver Island.	File: 36470-40/FN-ARROW File: 20540-20/LYACK
Malahat Indian Band	Response not received.	File: 36470-40/FN-ARROW File: 20540-20/MALAH
Mowachaht/Muchalaht Band	Written response (email) – no input or concerns for the Arrowsmith TSA, interested in protecting the area around Muchalaht Lake in TFL 19.	File: 36470-40/FN-ARROW File: 20540-20/MOW-MUCH
Nanoose First Nations	Response not received.	File: 36470-40/FN-ARROW File: 20540-20/NANO

Table 6 *(continued)*. First Nations record of consultation summary.

Pacheedaht First Nation	Written response – Excerpt from letter: *Pacheedaht supports the Ungulate Winter Range initiatives in principle, however; until Pacheedaht concerns regarding our constitutional aboriginal rights within the Ungulate Winter Ranges are clarified and economic interests are formally addressed we regret Pacheedaht is unable to formally endorse the Ungulate Winter Ranges.*	File: 36470-40/FN-ARROW File: 20540-20/PACH
Penelakut Indian Band	Written response (email) - *Apparently, some of the proposed protected area does indeed include our application for additions to reserve. We therfore are not able to support the proposed protected site.* In response to this comment, MWLAP sent an email to the Penelakut Indian Band clarifying how the designation of the deer and elk winter ranges will affect the land base. The email explained that, once designated, these areas will be secured from harvesting as long as they remain within the TSA. If the land were to come out of the Timber Supply Area, as would be the case if it were put into reserve, winter range designation would no longer apply. The land would not be constrained from use for other purposes. No response to this information was received	File: 36470-40/FN-ARROW File: 20540-20/PENEL
Qualicum Indian Band	Formal response was not received. Expressed concern that the entire consultation process was flawed because the First Nations do not have the money or staff to comment in a relevant manner.	File: 36470-40/FN-ARROW File: 20540-20/QUAL
Snuneymuxw First Nation	Formal response was not received. Indicated would be sending written response. The letter will be included in the consultation file when it is received.	File: 36470-40/FN-ARROW File: 20540-20/SFN
Tla-o-qui-aht First Nations	Response not received.	File: 36470-40/FN-ARROW File: 20540-20/TLAOQ

Table 6 *(continued)*. First Nations record of consultation summary.

Toquaht Band	Formal response was not received. Expressed concern that the Toquart UWR would impact logging opportunity. MWLAP explained to the Toquaht Band that only 1.3 ha of the Toquart UWR was THLB. No response to this information was received.	File: 36470-40/FN-ARROW File: 20540-20/TOQUAHT
Tseshaht Band	Formal response was not received.	File: 36470-40/FN-ARROW File: 20540-20/TSESH
T'Sou-ke First Nation	Verbal response – support the initiative.	File: 36470-40/FN-ARROW File: 20540-20/TSOUKE
Uchucklesaht Band	Formal response was not received.	File: 36470-40/FN-ARROW File: 20540-20/UCHUCK
Ucluelet First Nation	Formal response was not received.	File: 36470-40/FN-ARROW File: 20540-20/UCLUE
Treaty Groups		
Hul'qumi'num Treaty Group	Written response – Excerpt from letter: *As I am sure you are aware, elk and deer are extremely important to the Hul'qumi'num people. We are keenly interested in restoring habitat and managing these species to ensure the long term health and survival of their populations. We would like to see the protection and restoration of large areas of habitat, in order to assist these populations to rebuild. The creation of these UWRs is a small but important step in protecting habitat for deer and elk.* *As most of the Crown lands in our territory are potential treaty lands, the creation of UWRs may impact our economic opportunities post treaty. We would expect that the "costs" of protecting ungulate habitat should fall equally on the holders of the land, including private landowners. We would like to work with you to determine methods of protecting habitat on private lands. We would also expect that the costs of restoring habitat should fall on the shoulders of those responsible for its destruction.*	File: 36470-40/FN-ARROW File: 20525-20/HULQ

Table 6 *(continued)*. First Nations record of consultation summary.

Hamatla Treaty Society	Verbal and written response. Excerpt from letter: *We support protection of winter habitat areas for these species and agree that such protection is critical to their survival. Consequently, at this time we have no objection to the designation of the proposed areas as ungulate winter ranges.*	File: 36470-40/FN-ARROW File: 20525-20/HAMATLA

APPENDIX F

1:220 000 Overview Map

Arrowsmith TSA Proposed Ungulate Winter Ranges

APPENDIX G

Planning Criteria and Options for Sustained Forage Adjacent to Deer Winter Ranges

Planning Criteria and Options for Sustained Forage Adjacent To Deer Winter Range

Habitat Protection BC Environment – Region I

1: Background reference and legal direction:

In October 1990, the B.C. Ministry of Forests and the B.C. Ministry of Environment released the special series report **Deer and Elk Habitats in Coastal Forests of Southern British Columbia** (J.B. Nyberg and D.W. Janz, technical editors). This report is more colloquially referred to as the IWIFR (Integrated Wildlife Intensive Forestry Research) Handbook, resulting from 10 years of intensive field research on the habitat requirements and behaviour of deer and elk in coastal forests. The report deals with the fundamental habitat requirements of food and shelter for deer and elk. ***The importance of special winter habitats which provide snow interception cover and within-stand forage is described***. In addition, ***the importance of silvicultural management for provision of spring and summer forage for ungulates is also emphasized***.

Although neither the term "forage", nor the term "spring forage" are defined under the Forest Practices Code Act or Operational Planning Regulation, each document provides a supporting framework to allow planning and operations to be conducive to sustaining forage production for ungulates. Particular attention can be given to the following FPC references:

FPC Act:

41. (1) (b) the district manager is satisfied that the plan or amendment will adequately manage and conserve the forest resources of the area to which it applies.

FPC Operational Planning Regulation:

PART 2 - ADMINISTRATION

6 Site-specific variation within plans

A person required to prepare an operational plan must, when preparing the plan, provide detail for site-specific areas within the area under the plan if characteristics of that area result in
(a) different operations being proposed,
(b) similar operations being subject to different constraints, or
(c) different operations being subject to different constraints.

PART 3 - FOREST DEVELOPMENT PLANS

11. (3) Maximum cutblock size

Despite subsection (1), the district manager, or for areas referred to in section 41 (6) of the Act the district manager and designated environment official, may
(a) refuse to approve a forest development plan that includes a cutblock that meets the requirements of that subsection if the district manager, or the district manager and the designated environment official, as the case may be, are of the opinion that a cutblock smaller than that specified in subsection (1) is required
(i) for hydrological reasons,
(ii) to manage wildlife values,
(iii) to manage recreation or scenic values, or
(iv) for other similar reasons

19. Category I cutblocks for information purposes only

(1) A cutblock that does not meet the requirements of category A, under section 20, may be shown on a forest development plan only as a category I cutblock, and a category I cutblock is for information purposes only, and is deemed not to be part of the forest development plan.

PART 5 - SILVICULTURE PRESCRIPTIONS

39. (1) "stocking requirements"

(ix) the minimum pruning height that must be met by a crop tree at the end of the free growing assessment period if

(B) stand densities required to achieve wildlife habitat management objectives approved for the area in the forest development plan that applies to the area under the prescription are at least 30% lower than the minimum stocking levels set out in the Ministry of Forests' publication "Establishment to Free Growing Guidebook", as amended from time to time;

39. (1)(b) for commercial thinning, harvesting of poles, sanitation treatments and other intermediate cuttings that do not have regeneration objectives,
(i) the preferred and acceptable species of trees,
(ii) the stand structure and composition goals, including the planned residual basal area or density per hectare, and
(iii) the species and function of any trees that will be left standing to satisfy non-timber resource objectives;

39. (2) A person must ensure, for the area under the silviculture prescription, that the silviculture prescription describes the location of the following:
(a) areas from which timber is to be harvested;
(b) areas where timber was destroyed or damaged;
(c) for a contravention of section 96 of the Act, the area from which timber was cut, removed, damaged or destroyed in contravention of that section;
(d) Mapable reserves, including wildlife tree patches (*potential within-stand sustained forage sites if canopy and understory attributes are suitable*) and riparian reserve zones.

39. (3) A person must ensure, for the area under the silviculture prescription, that the prescription does the following:
(a) specifies
(i) the biogeoclimatic ecosystem classification,
(c) describes the silvicultural system to be used, including the species and function of any trees to be left standing;
(d) without limiting paragraph (c), for group selection silvicultural systems, contains a description of the range and approximate average size of openings;
(e) describes any critical site conditions that affect the timing of operations and the manner in which they affect them;
(f) describes the total area under the prescription, including areas of rock, water, swamp, reserves and any other area whether or not it is capable of growing a stand of trees;
(g) describes the net area to be reforested;

39. (3)(m)
(ii) the site conditions that must exist, if any, after a harvest or site treatment to accommodate forest resources identified in the forest development plan or, in the absence of a forest development plan, in any higher level plan that applies to the area,
(iii) the site conditions that must exist, if any, after a harvest or site treatment to accommodate:
(A) known non-timber forest resources on or adjacent to the area under the prescription that were not referenced in subparagraph (ii)
(B) resource features identified in the forest development plan or silviculture prescription

47. Review and comment
(1) By notice in writing, the district manager may require a person that submits a silviculture prescription or amendment for approval to make the proposed silviculture prescription or amendment available for review and comment in accordance with the notice.
(2) A notice under subsection (1) may specify requirements related to review and comment that the person submitting the silviculture prescription must meet, including, without limitation, the period for review and the requirements for dealing with comments.

48. Treatments and objectives for treatments

(1) For the purposes of section 24 (2.1) of the Act, the treatments may be one or more of the following:
(a) spacing;
(b) pruning;
(c) fertilization;
(d) other silviculture treatment approved by the district manager.

(2) For the purposes of section 24 (2.1) of the Act, the objectives for the treatments must be **to restore, maintain or enhance**
(a) the health, vigour or value of the stand of trees, or
(b) other forest resource values.

50. Content of stand management prescriptions
(2) (b)(i)(A) The location and area identifier of the treatment areas and approximate location of special areas.

50. (2) (b)(ii)(D) the approximate location of Mapable reserve areas, including wildlife tree patches;

50. (3) A stand management prescription must, for each standards unit, specify all of the following:
(a) the biogeoclimatic ecosystem classification;
(b) the post treatment site conditions and the proposed strategies, if any, to be taken to mitigate impacts on non-timber forest resources on or adjacent to the area under the prescription;

51. Review and comment

(1) By notice in writing, the district manager may require a person that submits a stand management prescription or amendment for approval to make the proposed stand management prescription or amendment available for review and comment in accordance with the notice.

68. Greened up

(5) If no higher level plan specifies a green-up requirement that applies to the cutblock, the cutblock is greened-up if it is
(a) adequately stocked and the average height of those trees that are
(i) the tallest tree in each 0.01 ha plot included in a representative sample, and
(ii) a commercially valuable species or other species acceptable to the district manager is at least 3 m or another height specified under subsection (8), or
(b) not adequately stocked, and
(i) the average height of those trees that are
(A) the tallest tree in each 0.01 ha plot included in a representative sample, and
(B) a commercially valuable species or other species acceptable to the district manager is at least 3.5 m or another height specified under subsection (8), and
(ii) either
(A) the cutblock is stocked with at least 500 trees per ha for the Coast or 700 trees per ha for the Interior, that are a commercially valuable species and at least 1.3 m in height, or
(B) the person proposing to harvest areas adjacent to the cutblock satisfies the district manager that the cutblock is **stocked with a sufficient number of trees per ha** of a species that will result in adequate management and conservation of hydrological, **wildlife,** recreational and scenic values.
(8) The district manager may vary an average height requirement referred to in subsection (5)
(a) to a height that is less than 3 m, if the district manager and designated environment official are satisfied that the reduced height will adequately manage and conserve the forest resources, or
(b) to a height that is greater than 3 m, if the district manager is satisfied that a greater height is necessary to adequately manage and conserve hydrological**, wildlife,** recreational and scenic values**.**

2. Harvest planning and silviculture guidelines:

The following recommendations are provided to guide forest development planning, harvest activities, planting and subsequent silvicultural interventions such as spacing, pruning and thinning. The management objective for the provision of forage for deer is to maintain a continuous supply of young seral plant communities in areas adjacent to deer winter ranges. Ideally, these will be planned in agreed-to management zones adjacent to deer winter ranges.

A. Planning Criteria and Special Considerations:

1. Delineate a Forage Management Zone (FMZ) up to 2 km on either side of a deer winter range, less than 800 m elevation, preferably on southerly aspects (SE-SW) on slopes ideally between 40-100%. Physical barriers such as large gullies or exceedingly rocky terrain may justify reducing the zones in size to address these limiting factors.

2. Evaluate topographic shading from adjacent mountains and delineate an FMZ to exclude areas shaded in March – April.

3. Consider the practicability of using a crown closure model to time harvest intervals. A crown closure model determines the preferred forage production opening size based on the size of the FMZ, the average rotation age for the SFMZ and the average time to crown closure (forage limiting conditions).

   FMZ (ha) divided by:

   $$\frac{\text{Mean Rotation Age}}{\text{Mean Crown Closure Interval}} = \text{\#ha/forage interval (harvest entry)}$$

Examples:

Regen Species	SFMZ (ha)	Rotation Age (yrs)	Crown Closure Interval (yrs)
Hemlock	160	80	10

160 divided by $\frac{80}{10}$ = 20 ha/10 yrs

Fir	160	40	20

160 divided by $\frac{40}{20}$ = 80 ha/20 yrs

4. Design openings to optimize solar input (round or square configurations). The minimum clear cut equivalent size is 2.5 ha (based on 40 m high trees), optimal size is 16 ha (400m x 400m). Single tree or small aggregate retention is the preferable VR strategy in openings 16 ha or smaller to maximize forage production.

5. Optimize forage production on best forage producing site series (see Nyberg & Janz 1991).

6. Optimize forage production over time by introducing silvicultural interventions, namely, spacing, pruning and thinning.

7. Assess opportunities for site specific forage enhancement from burning, but avoid any fertilization treatments until after stands have achieved crown closure.

B. Planning Options Based on Seral Conditions:

1. Where there is ample opportunity for harvesting within an FMZ in either old growth or advanced second growth, manage sustained forage through rotational harvest intervals and maximize production by optimizing block size and configuration.

2. Where there is limited harvest opportunity in an FMZ due to lack of old growth or advanced second growth, use rotational harvest intervals where possible, but initiate commercial thinning where feasible in older second growth or spacing/pruning entries in younger stands. Thinning the profile may be much better than simply "thinning from below" as it will open up more area to sunlight.

3. North facing winter ranges may, in some cases, warrant some site specific consideration, otherwise, spring forage management based on the criteria above does not apply, but seasonal forage management should be planned and implemented.

4. Winter ranges surrounded by inoperable forest do not qualify for designation of a forage management zones per se, but nearest harvest should be assessed site specifically for their forage value.

3. Toolbox for forage management:

1. Delineate a Forage Management Zone to guide planning.

2. Utilize a variety of cutblock sizes.

3. Reduce stocking after harvest.

4. Identify and protect Wildlife Tree Patches with productive understory plant communities.

5. Use juvenile spacing to prolong life of understory plant communities.

6. Prune young conifers to increase light penetration to understory plants while enhancing future timber quality.

7. Establish Permanent Forage Patches (PFPs) where appropriate.

8. Fertilize PFPs to enhance growth of young seral plants.

9. Plan for future conditions after harvest and consider opportunities for multi-pass variable retention.

10. Introduce commercial thinning to increase light penetration to understory plants.

11. Address crown closure levels across an FMZ by planning to not exceed specified and agreed-to maximums for each area.

12. Use prescribed burning where appropriate as a means to increase the abundance and persistence of young seral plant communities.

Ian McDougall, R.P.Bio.
Habitat Protection
Ministry of Environment, Lands and Parks
Region 1
First Draft May 9, 2000
Updated Oct 20, 2000
Updated Nov 16, 2000

APPENDIX H

Grandparenting Letter