



ORDER – UNGULATE WINTER RANGE # U-2-010

The following order applies to the area identified within the attached Schedule A and takes effect on the 17 day of MAR, 2005.

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

The Deputy Minister of Water, Land and Air Protection orders that:

1. the ungulate winter range shown in the map set out in the attached Schedule A (#U-2-010) is established;
2. the ungulate winter range in the attached Schedule A is established for moose (*Alces alces*);
3. the general wildlife measures outlined in Schedule 1 are established for the ungulate winter ranges in the attached Schedule A; and

Schedule 1 – General Wildlife Measures for Moose


A. Core Moose Winter Range

1. Road construction is not to occur within the designated ungulate winter ranges unless there is no other practicable option and an exemption is approved by the MWLAP delegated decision maker.
2. An exemption is not required for road maintenance, road deactivation, felling of danger trees or brushing and clearing on existing roads within the CMWR. These activities are to be conducted in a manner that does not render ineffective the ungulate winter range habitat within the designated ungulate winter range.
3. Harvesting is not to occur within the designated ungulate winter ranges unless an exemption is approved by the MWLAP delegate decision maker. An exemption would be considered for the purposes of enhancing the quality of the winter range.
4. An exemption is not required for harvesting within the designated ungulate winter ranges when it is required to address worker safety: felling of danger trees, felling for guy line anchors, felling of tail hold anchor trees within a CMWR along adjacent cutblock boundaries. Harvesting is to be conducted in a manner that does not render ineffective the ungulate winter range habitat within the designated ungulate winter ranges.

5. Trees that must be felled within a CMWR will be left onsite to provide coarse woody debris, unless the felled tree lies outside the CMWR.
6. Salvage harvesting is not to occur within the designated ungulate winter ranges unless the planned salvage operations are reconciled with all other resource values identified within the CMWR, and an exemption is approved by the MWLAP delegated decision maker.

B. Moose Winter Range Management Zone [Outside of the Core Moose Winter Range]

1. Timber harvesting, reforestation and stand tending operations in Moose Winter Range Management Zone should be conducted in a manner that is generally consistent with the TFL 38 Moose Winter Range Management Strategy in Appendix 1.
2. Road construction is permitted in the portion of the Moose Winter Range Management Zone that is outside the CMWR.



Signed this 17 day of MAR, 2005
Gordon Macatee, Deputy Minister
Ministry of Water, Land and Air Protection

Appendix 1

TFL 38 Moose Winter Range
Management Strategy



International Forest Products Limited
Empire Logging Division
Squamish, B.C.

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Acknowledgements

The TFL 38 Moose Winter Range Management Strategy completed under the guidance of Jeff Fisher, RPF.

Significant contributors to the development of this strategy include the following:

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Cover photo: Bull and cow moose in the Elaho Valley (Photo: Dave Southam)

Introduction

The Elaho River floodplain, located in Tree Farm Licence 38 (TFL 38), is home to a small coastal population of moose (*Alces alces andersoni* Peterson). The floodplain develops near the junction of Chadwick Creek and the Elaho River, and extends south to the junction of Ponor Creek and the Elaho River, and includes portions of Clendinning Provincial Park. BC Fish and Wildlife first identified this area as moose habitat through survey work in the late 1970's and reassessed it in 1982. The most recent assessment of moose winter habitat in the Elaho Valley was in 1988 by the BC Ministry of Environment, Lands and Parks.

It is believed that a southerly migration of moose from the Lillooet Valley via the Meager Creek or Ryan River drainages established the small herd in the Elaho Valley in the early 1930's (McCammon, 1977). The last official population estimate is from the late 1970's at a herd size of approximately 50-60 moose (McCammon, 1977). Anecdotal evidence suggests that a wolf/moose, predator/prey relationship has evolved in the Elaho Valley and the current population is estimated at approximately 25 animals.

The Elaho moose herd is a relatively closed or isolated population given the mountainous nature of the terrain. Several factors influence the population size, the main ones in the Elaho Valley being predation and food supply (McCammon, 1977). Predation by wolves and cougar does have a downward pressure on the population but levels are not documented. Adequate habitat (both in quantity and quality) is the more important factor limiting the moose population (McCammon, 1977). The size and increase of virtually any population is limited by the carrying capacity of its environment.

The Elaho Valley is classified as the Coastal Western Hemlock [CWH] biogeoclimatic zone with the Mountain Hemlock zone occurring at higher elevations. The floodplain is CWHms1 characterized by relatively dry summers and moist, cool winters with moderate to heavy snowfall. Winter is the most critical time of year for any species and winter is the most critical time for survival of the moose in the Elaho. To support a moose population through the winter, the floodplain must produce ample forage and provide thermal shelter, which are the key attributes of ungulate winter range (Schwab, 1986). In winter, moose eat approximately 11-18kg of twigs per day from a variety of deciduous species including red-osier dogwood (*C. stolonifera*), willow (*Salix* spp.), and black cottonwood (*P. balsamifera* spp. *trichocarpa*) (Petticrew and Munro, 1979) which are readily available on the floodplain and in particular abundance in recently (the last 20 years) harvested areas. Western redcedar (*T. plicata*), Douglas-fir (*P. menziesii*) and balsam (*A. amabilis*) are also food sources for moose as noted from the browse on such species in young plantations. When snowfall covers ground forage, the energy expended in seeking food increases.

Over winter, when food is less available and of a lower quality, it is critical for wildlife to reduce energy outputs. To conserve energy when conditions become increasingly harsh or when movement becomes increasingly restricted with snow depths >90cm, moose tend to seek shelter under forest canopies (Hogan 1998, Schwab 1986). Snow interception and other thermal cover attributes are provided in mature and old seral forests on the floodplain and in managed stands with old-growth characteristics. The spatial distribution of forage and cover is important to maintaining the moose population through the winter (Hogan 1998, Rempel *et al.* 1997). To minimize moose energy expenditures, forage areas should be located close to mature/old seral forest cover.

The Elaho moose herd is likely the most southwestern coastal moose population in BC and is currently managed by the Ministry of Water, Land and Air Protection for non-consumptive purposes. Hunting of the Elaho moose population is not permitted. The location and relative accessibility [3 hours by road from Vancouver] of the Elaho moose herd give it a great potential to be developed as an eco-tourism wildlife viewing opportunity during the summer months.

As winter survival is the most critical issue for the Elaho moose herd, Interfor's management strategy focuses on winter habitat.



Figure 1. TFL 38 moose forage habitat. (Photo: J. Webb)

OBJECTIVES

There are two primary objectives to Interfor's TFL 38 Moose Winter Range Management Strategy.

1. The first objective is to manage the moose winter range habitat in the Elaho River valley so that it is capable of supporting a stable moose population of up to 50 moose. Although the objective is to manage the habitat to support up to 50 moose, the actual moose population will probably fluctuate between the historic levels of 10-60 animals based on predator/prey cycles and natural factors such as severe winters.
2. The second objective of this strategy is to achieve the first objective within the overall context of sustainable forest management. This means that the moose winter range habitat is managed for the conservation of the moose herd and a socio-economically viable forest industry continues to function within TFL 38; specifically in the general area of the Moose Winter Range Management Zone.

It should be noted that Interfor's objectives focus on habitat management, and not actual moose management, as Interfor only has a mandate to manage the habitat. Other moose management issues such as hunting regulations are managed by the Ministry of Water, Land and Air Protection [WLAP]. In 1989 the Ministry of Environment, Wildlife Branch stated its intent to continue to manage the Elaho moose herd for non-consumptive purposes [ie. no hunting] and this is still the management intent of the Ministry of Water, Land and Air Protection.

STRATEGIES

According to Heatherington et al. (1989) moose population growth within the Elaho watershed is limited primarily by winter browse availability. The BC Ministry of Forests and the BC Ministry of Environment also state that the maintenance of sufficient areas of suitable mature and old seral forests in proximity to suitable forage areas is considered to be critical for the winter survival of moose, especially during severe winters (BCMOF, 1999). Henceforth, the objectives of managing moose winter range habitat in the Elaho River valley so that it is capable of supporting a stable moose population, and a sustainable forest industry are to be accomplished by the implementation of the following strategies which focus on the management of winter moose habitat.

1. Defining a Moose Winter Range Management Zone.

As the management of winter range is deemed to be the critical factor in managing a moose population the first strategy is to define the Moose Winter Range Management Zone [MWRMZ] in which the other strategies will apply. The area defined as the Moose Winter Range Management Zone is based on sector boundaries as identified in the 1988 study, *An Investigation of Moose Winter Habitat, Elaho Watershed* (Heatherington *et al*, 1989.) and it includes most of the Elaho River floodplain that extends south from the junction of Chadwick Creek and the Elaho River to the junction of Ponor Creek and the Elaho River. The current MWRMZ has been slightly modified from the 1989 version and it now excludes some sidehills with low winter range values and includes some additional floodplain areas with high winter range values. The Moose Winter Range Management Zone as defined on the attached maps has a gross area of approximately 2244 ha including the river and associated sandbars, and winter range areas within Clendinning Park.

2. Protection of Core Moose Winter Range within the Moose Winter Range Management Zone.

To conserve energy when conditions become increasingly harsh or when movement becomes increasingly restricted with snow depths >90cm, moose tend to seek shelter under forest canopies (Hogan 1998, Schwab 1986). Utilizing the work of Heatherington *et al.*(1989) and McCammon (1977), Interfor has identified and protected a mosaic of mature and old seral forest stands distributed throughout the MWRMZ. These stands are being protected as Core Moose Winter Range [CMWR] and have been identified as having very high winter forage values and/or good snow interception properties and include or are close to good forage values. Generally the stands are mature deciduous (primarily black cottonwood) or mature western redcedar/ black cottonwood mixes or western redcedar dominated stands located next to the Elaho River and close to high forage value areas. There are a total of 682 ha identified as CMWR, with 370 ha inside Clendinning Park and 312 ha protected within TFL 38. Additional or alternate CMWR areas will be recruited from areas that were previously logged, but are now Riparian Reserve Zones and are not available for future timber harvest.

Operating Guidelines:

- No harvesting is permitted within Core Moose Winter Range [CMWR] areas.
- Road construction is not permitted within CMWR areas unless it is the most practicable location for the road and the road construction plan is designed to minimize disturbance to the CMWR. Road construction should generally not be a significant issue as most of the identified CMWR areas are between the mainlines and the Elaho River so they should not normally need to be roaded to access timber.
- Existing roads and infrastructure are not required to be changed or removed to accommodate CMWR areas as the existing roads are not generally used during the peak of winter and hence their impact on moose is relatively low. Although predators may use the roads, observation seems to suggest that the moose receive a net benefit from the roads as they seem to use them as travel corridors during periods of low to moderate snowpack.
- Danger trees may be removed from CMWR areas adjacent to block boundaries and along roads where necessary for the safety of forestry workers or the public. The effect of danger tree removal on the CMWR is considered relatively minor and should not significantly alter the functionality of the CMWR. Small openings may even temporarily “brush in” and increase forage supply.
- It is preferable to fall away from the CMWR areas when harvesting an adjacent stand, but falling into the CMWR and retrieving the logs is permitted if the trees cannot be felled away.
- Although small scale salvage from CMWR areas is permitted, it should be noted that the opportunities are severely limited as the vast majority of the CMWR areas are otherwise constrained as Riparian Reserve Zones [RRZ] and Old-Growth Management Areas [OGMA] under the Elaho Landscape Unit Plan which do not normally allow for salvage operations. Large scale salvage may be considered if the CMWR area has been disturbed to such a degree that it no longer functions as CMWR [ie. large forest fire or catastrophic blowdown]. Salvage or other treatments may also be considered as part of a program to control a serious pest epidemic [ie. a catastrophic bark beetle outbreak]. Any planned salvage operation will have to be reconciled with all the other resource values [ie. OGMA, RRZ etc.] that are also being supplied by the CMWR.



Figure 2. Core Moose Winter Range in TFL 38. (Photo: D. Southam)

3. Management of the Timber Harvesting Landbase within the Moose Winter Range Management Zone for the production of winter moose forage.

As the supply of winter forage is one of the primary limiting factors on the Elaho moose population, this strategy is designed to ensure a long run stable supply of forage opportunities distributed across the Moose Winter Range Management Zone [MWRMZ]. Many of the best forage areas are protected within Core Moose Winter Range [CMWR] areas. This part of the strategy is designed to regulate the forage supply within the MWRMZ, but outside of the protected CMWR areas. Of the 717 ha of MWRMZ within Clendinning Park, the 370 ha with high value forage and shelter habitat have been identified as CMWR areas. The remaining 347 ha within the MWRMZ inside Clendinning Park offer excellent snow interception/shelter habitat, but probably only moderate winter forage values. Within the TFL portion of the MWRMZ there are 312 ha of the best shelter/forage production areas protected as CMWR and 242 ha classified as natural non-productive which will provide a reasonably stable [ie. natural level] of forage over the long run. In addition there are 651 ha of operable, potentially loggable stands referred to as the Timber Harvesting Land Base [THLB] within the TFL MWRMZ.

In summary; out of a total Moose Winter Range Management Zone of 2244 ha, approximately 1593 ha [71%] will remain in their natural state and it is the 651 ha [29%] of THLB, on which forest management practices have the most significant potential to impact long-term winter forage supply.

The rate of cut of these potentially loggable stands is not really an issue once the most valuable moose winter range areas are protected as CMWR. According to McCammon (1977), logging in the valley will probably benefit moose as in winter, moose eat approximately 11-18kg of twigs per day from a variety of deciduous species including red-osier dogwood (*C. stolonifera*), willow (*Salix* spp.), and black cottonwood (*P. balsamifera* spp. *trichocarpa*) (Petticrew and Munro, 1979) and all of these species are in particular abundance in recently (the last 20 years) harvested areas. Immature western redcedar (*T. plicata*), Douglas-fir (*P. menziesii*) and balsam (*A. amabilis*) are also winter browse species.

Currently, about 500 ha of the THLB within the MWRMZ have been harvested and are in a state of relatively high value winter forage production. This strategy focuses on maintaining at least 150 ha of the 651 ha in a high forage production status. It is estimated that the winter forage production of the regenerating stands will start to decline significantly as crown closure of the regenerating stands increases beyond 70% which is predicted to be around age 25-30 based on TIPSy [a forest growth and yield model] runs for 800-1000 stems per hectare redcedar stands. It should be noted that these operating guidelines only apply within the TFL 38 portion of the MWRMZ and that for ease of implementation the operating guidelines for this strategy have been organized into three subgroups. The purpose of these strategies is to allow the forest land manager a wide array of "tools" ranging from harvesting to reforestation to stand tending to use to accomplish the goal of keeping 150 ha of the THLB in a high forage production status.

Moose Winter Range Management Zone Area Summary

Habitat	TFL 38 (ha)	Clendinning Provincial Park	Total
Core Moose Winter Range (ha)	312	370	682
Natural Forage Production Stands [NP forest types](ha)	242	72	314
Elaho River and Sandbars (ha)	322	121	443
Timber Harvesting Land Base (ha)	651	0	651
Other Mature Forest Types	0	154	154
Total Moose Winter Range Management Zone (ha)	1527	717	2244

Harvesting Operating Guidelines

- Harvesting is permitted within the Moose Winter Range Management Zone as long as it is not within the Core Moose Winter Range.
- Harvesting may utilize a suite of harvesting/silviculture systems including clearcutting, variable retention, selective logging and commercial thinning.
- Harvesting plans should include the retention of some small clumps of mature trees to provide snow interception/shelter for moose while they are utilizing the forage on a block. These small clumps can be retained as retention patches or groups [varying from a few trees to 0.2 ha] in retention blocks or as Wildlife Tree Patches [WTP] in clearcut blocks or a combination of the two.
- Special attention is to be paid to including at least a minor component of mature western redcedar within any planned retention as redcedar appears to provide better snow interception than other species.
- Early harvesting [ie. before culmination age is achieved] is permitted as a technique to put a closed canopy stand back into the high forage value status associated with a recently logged [ie. early seral] vegetative community.
- Commercial thinning can be used to reduce crown closure and stimulate the production of herbaceous forage species. Commercial thinning may be done uniformly across a stand or involve removal of small groups to target a mosaic of mature trees and forage areas on the floodplain in the future.
- Commercial thinning in combination with delayed or extended rotation final harvest may also be considered. Multiple entry commercial thinning may be considered as apart of this strategy.
- Road construction is permitted within the THLB portion of the MWRMZ.
- There is no formal limit on block size, but blocks should be designed so that significant areas of forage production are not more than 200m from a retention patch or WTP that can serve as a “fair weather” micro-shelter for the moose utilizing the forage area. It is accepted that the moose will still have to retreat to the CMWR during severe winter weather.

Reforestation Operating Guidelines

- Generally, reforestation strategies which optimize timber production and forage production are to be used within the THLB portion of the MWRMZ .
- Reforestation prescriptions should include options such as cluster planting or lower density stocking so that crown closure is delayed and forage production is maintained further into the rotation.
- Western redcedar should be preferred for reforestation as it seems to provide better snow interception characteristics as it matures and it is ecologically suited to the Elaho floodplain ecosystem.
- Brush control prescriptions should focus only on control of brush that is directly competing with crop trees and should specifically avoid incidental or broadcast brushing of high value forage species such as red-osier dogwood, black cottonwood and willow.

Stand Tending Operating Guidelines

- Juvenile spacing may be used to reduce crop tree density and thereby increase light to the forest floor and stimulate forage production.
- Pruning prior to crown closure may be used to increase light penetration and maintain forage production longer into the rotation.
- In stands where stand establishment has been achieved, consider manual brushing to promote sprouting to increase the forage supply.



Figure 3. Retention of mature redcedar and cluster planting with browse protectors in a recently logged block in the Moose Winter Range Management Zone. (Photo: S. Gabriel)

Clendinning Provincial Park contributes 717 ha or 32% of the MWRMZ. The habitat in the park is classified as CMWR or mature conifer capable of providing shelter and a small amount of natural forage production areas. Though outside the boundary of TFL 38, the contribution of the park to moose management cannot be ignored. Forage and shelter values provided by the park are taken into consideration in Interfor's moose winter range management strategy.

In order to optimize timber and winter moose forage production in the THLB portion of the MWRMZ and maintain at least 150 ha of the THLB in a high forage production status, a moose winter forage monitoring program is to be established. The monitoring program involves regular [2-5 year cycle] assessments [ocular, walkthrough or formal survey] of the forage production status of all of the blocks within the THLB portion of the MWRMZ. Initially, stands will be assumed to be in a high forage production status up until crown closure exceeds 70% and TIPSY [a forest growth and yield model] will be used to forecast the age at which crown closure is expected to exceed 70%. Forage production value ratings are currently subjective and poorly defined, but they will be refined as the monitoring program evolves over time.

It should be noted that currently 500 ha of the THLB portion of the MWRMZ are less than 30 years stand age and are therefore assumed to be in a relatively high state of winter forage production. This assumption is borne out by regular silviculture assessments of these blocks, which indicate a high biomass of red-osier dogwood, black cottonwood and willow to varying degrees dependent on site. These silviculture assessments also indicate that there is fairly heavy winter [and summer] browsing of these stands by moose.

4. General Operating Guidelines for in and around the Moose Winter Range Management Zone

- Forestry and logging practices within the MWRMZ should be planned and implemented in the interest of managing for timber and moose. Alternate or innovative strategies should be considered with the objective of maintaining or increasing overall forage production for moose.
- When winter logging operations are conducted within the MWRMZ, road snow plowing must include the construction of “moose escape routes” every half kilometer on the mainline as moose will use the plowed roads as travel corridors, and high, unbroken snow banks will prevent them from leaving the road and avoiding a collision (Heatherington et al. 1989).

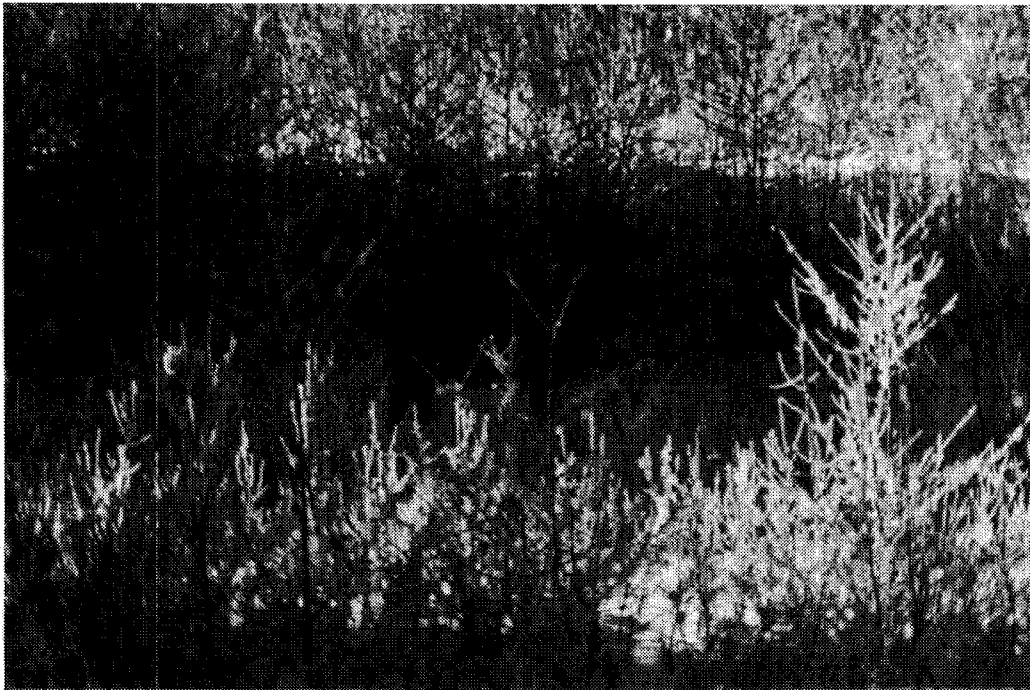


Figure 4. Bull Moose in TFL 38 Moose Winter Range. (Photo: F. Bizlin)

Monitoring and Adaptive Management

It should be recognized that this strategy has been developed based on current information, a review of the literature, discussions with the Ministry of Forests and the Ministry of Water, Land and Air Protection and consideration for the values of society. New information may come forward, society's values and goals may change, and our understanding of moose habitat requirements may change. In recognition of all these factors, the success of the strategy should be monitored, and formally reviewed every five years with consultation from the Ministry of Forests, Ministry of Water, Land, and Air Protection and the Ministry of Sustainable Resource Management, and the strategy should be modified if necessary.

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