Extension Note

BC Journal of Ecosystems and Management

Coast Forest Region

Roosevelt Elk Wildlife Habitat Decision Aid

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Introduction

To conserve and maintain suitable elk winter range, forest companies are required to manage their road building, timber cutting, and other forestry activities. Regeneration and free-growing obligations must also be met when harvesting these areas. Harvesting and silvicultural strategies have significant effects on the incidence of Roosevelt elk (*Cervus elaphus roosevelti*) in an area and the damage elk inflict when browsing on regenerating trees. This Wildlife Habitat Decision Aid (WHDA) summarizes the information that forest managers, including silviculture planners and operational foresters, need to consider when managing for Roosevelt elk seasonal habitat requirements and conifer regeneration. This information was obtained through an extensive literature analysis and discussions with several foresters and researchers familiar with Roosevelt elk in the (Vancouver) Coast Forest Region.

The WHDA format has been used to extend information on the factors requiring consideration when managing forests in British Columbia. The first page of this WHDA provides information on habitat and important features of Roosevelt elk winter range, biogeoclimatic zones where elk are located, risks to consider when harvesting in Roosevelt elk range, and silvicultural risks and considerations. A map depicts the distribution of elk in the Coast Forest Region. The second page continues the discussion of silvicultural risks and considerations, and presents potential growth and yield implications associated with Roosevelt elk browse. Also included is a valuable resource and reference list that contains more detailed information. Most reference material that is not available on-line can be ordered through libraries or the Queen's Printer at: *www.qp.gov.bc.ca*

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KEYWORDS: *browse, browse barriers,* Cervus elaphus roosevelti (*Roosevelt elk), coastal British Columbia, elk winter range, forest planning, harvesting, silviculture, ungulate, wildlife habitat.*

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Roosevelt Elk – Coast Forest Region

Doug Janz, B.C. Ministry of Water, Land, and Air Protection

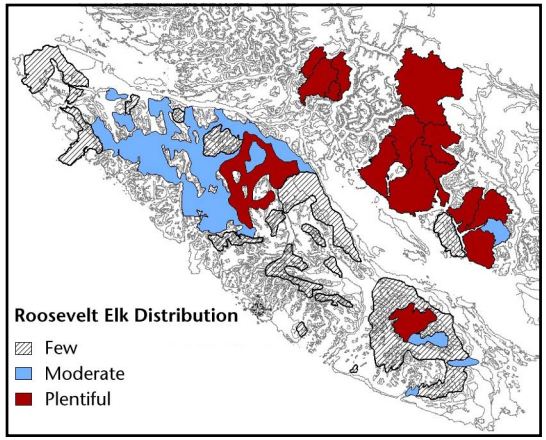
Biogeoclimatic Subzones Where Roosevelt Elk are Most Commonly Found

CDFmm CWHdm
CWHmm CWHvm
CWHxm

Important Habitat Features of Winter Range

- Topographic features that reduce snowpack
- Rock outcrops with forage on south-facing slopes
- Small openings scattered throughout the winter range that are used for foraging (e.g., wetlands; rock outcrops; and open forests, especially deciduous, riparian, and old-growth stands)
- Snow interception cover on floodplains and gentle to moderately steep south-facing slopes
- Security cover and thermal cover near forage areas
- Good interspersion of open-canopied foraging areas and cover areas
- Moist sites with deep rich soils

Roosevelt Elk in the Coast Forest Region



Adapted from Quayle and Brunt (2003)

Habitat

- For advice on appropriate management associated with landscape features that may be potential elk habitat, contact B.C. Ministry of Water, Land and Air Protection wildlife staff, or consult the Integrated Wildlife–Intensive Forestry Research handbook (Nyberg and Janz 1990).
- Elk use various habitats throughout the year. Riparian reserve zones may satisfy some habitat requirements.
- Most forested stands greater than approximately 3 m in height provide security cover.
- Forest stands greater than 10 m in height provide snow interception cover in low snowpack zones; in deep snowpack zones, only old-growth forest is capable of providing snow interception cover.
- Adequate interspersion of forage and cover areas is a critical feature of all seasonal ranges. Stands with deciduous overstories often provide abundant forage and adequate security cover.
- Old-growth community structure usually provides forage, security cover, thermal cover, and snow interception.
- Individual stands, evenly distributed throughout the seasonal range, usually satisfy cover and forage requirements.
- To determine recent elk use of an area, locate local movement trails and look for signs of animal use.
- Elk prefer edge habitat between relatively open areas with high-quality forage and forested stands that provide cover.
- Elk use of openings is concentrated within 80 m of a forest edge.

Diet

- Shrubs and herbs, such as deer fern, bunchberry, and sword fern, dominate the spring and summer diets. Young skunk cabbage shoots are highly preferred in the early spring.
- Fall and winter diets contain relatively higher proportions of shrubs and conifers; during low-snow periods, grasses, sedges, deer fern, and twinflower are also eaten.
- During winter, important shrubs browsed include willows, elderberry, devil's club, salal, dull Oregon grape, huckleberry, and blueberry.
- When conifers are browsed, western redcedar and western hemlock are usually favoured over Douglas-fir.

Harvesting Risks and Considerations

Forest companies must manage their forest management activities to conserve and maintain identified ungulate winter ranges.

Pattern

- Creating small clearcut openings at low elevations near riparian areas and existing elk herds usually attracts elk and poses a conifer seedling browse problem.
- Creating many clearcut openings at once in areas used by elk causes the elk to browse widely and thus limits severe browsing of any specific location. To limit browsing damage, consider harvesting all area cutblocks within the first season, rather than completing the harvest over a period of years.
- Single tree selection, where possible, avoids creating openings which tend to encourage elk foraging.
- Creating large clearcuts can have the result of reducing the incidence of elk browsing because of the diminished security cover provided to the elk.
- For information on creating visually effective buffers, refer to the following section on Plantation Maintenance.

Silviculture Risks and Considerations

- To achieve free-growing within the limitations of browse, at the planning stage group the regenerated blocks that are susceptible to elk damage. Stocking standards should be flexible for these areas. It may only be economically feasible to achieve 200–300 trees per hectare.
- In sites favoured by elk, elk may damage woody vegetation (including conifers), thereby prolonging the growth of forage.

Site Preparation

- Burning or piling to reduce slash cover can increase elk access; however, burning can discourage elk if it removes advanced growth or slash piles that provide cover in large open areas.
- Site preparation that removes competing vegetation likely reduces elk forage in the short term. After treatment, however, the rapid re-growth of vegetation that continues until the new stand canopy closes will likely attract elk to the site.

Roosevelt Elk – Coast Forest Region

Silviculture Risks and Considerations (continued)

Planting

- Western redcedar is the most susceptible conifer to elk browse, although elk will browse most other conifer species including Douglas-fir and western hemlock.
- Nursery seedlings are especially susceptible to browse because of their high nutrient content; therefore, provide protection for at least 2 years after planting. Established trees are more able to withstand browsing and usually recover in the following year.
- Trees planted along elk trails are particularly susceptible to antler rubbing damage.
- Planting large Douglas-fir stocktypes (512 to 615) should allow crop trees to grow above browse height after 2–3 years. While planting stocktypes larger then 615 (e.g., 1015) will further reduce the extent and severity of browse, planting of such large stock is not usually operationally feasible; however, in some areas prone to extensive elk browse planting of 1015 stocktypes is being considered.
- Plant seedlings in deep loamy soil wherever possible.
- Plant seedlings in late spring (to avoid the period of most heavy browsing) in clusters or against stumps. Grand fir is much less attractive to the elk and could be planted if acceptable, though this may not be appropriate because of the risk posed to the fir by woolly adelgid.

Plantation Maintenance

- Allow the brush to grow up and plant in the brush. If necessary, spot treat the brush around seedlings.
- Encourage a screen of red alder around planted trees. Pruning alder along elk trail corridors will encourage elk to use these trees for rubbing their antlers (Van Zwaaij 2003; Keystone Wildlife Research Ltd. 2004).
- Visually effective buffers (90% of a standing adult elk is hidden from the view of a human observer who is positioned on the road, or on either side of the visual buffer) can be left along the sides of and immediately adjacent to the cutblock.

Site Control Options

- Plan harvesting and access to avoid future browsing problems.
- The efficacy of seedling protectors and length of time seedlings will require protection will vary with the type of protector used and the circumstances under which it is used (e.g., site condition, potential for browse, tree species, stocktype planted, etc.).
- Metal cages, though expensive, are generally effective at protecting seedlings from browse. Sinocast® can be effective in some cases. Vexar®, a less expensive product, has not been successful in many circumstances. If all seedlings used are western redcedar, then fencing (250–300 cm tall) is an affordable and effective form of protection.
- Frightening devices have not worked as the elk habituate to the noise.
- Plantskydd® repellent can work well for the first two seasons; after that, elk seem to adapt to it and either browse or pull up the planted seedlings.
- Leaving coarse woody debris greater than 30 cm deep to reduce access and obscure trees has met with limited success.
- Providing alternate forage, by either allowing sites to green-up or by seeding grasses and legumes, may reduce seedling browse.

Growth and Yield Implications

- Deferring timber harvest in Roosevelt elk habitat has only a limit effect on timber supply and allowable annual cut (e.g., less than 1%); however this does not include the negative effect of elk browse, particularly to western redcedar regeneration.
- Growth and yield losses to conifers from elk damage have not been quantified.
- The preference to regenerate western redcedar in province's coastal forests will likely increase the incidence of elk damage. As a result, quantitative assessments of damage may be needed.

Resource and Reference List

B.C. Ministry of Water, Land and Air Protection. 2004. Silviculture guidelines and practices for maintaining or recruiting key habitat objectives. Biodiversity Branch, Victoria, B.C. Unpubl. Draft.

Booth, I. and J. Henigman. 1996. Seedling barrier protection from deer and elk browse. B.C. Ministry of Forests, Silviculture Practices Branch.

Brunt, K.R. 1987. Man-made forests and elk in coastal British Columbia. The Forestry Chronicle 63:155–158.

_____. 2002. Vancouver Island Roosevelt elk: Ecology and management overview. B.C. Ministry of Water, Land, and Air Protection, Nanaimo, B.C. Unpubl. Rep.

Deal, J.A. 2001. TFL 39 Ungulate Winter Range Plan. Canadian Forest Products Ltd., Coastal Operations, Englewood, B.C.

Green, R.N. and K. Klinka. 1994. A field guide to site identification and interpretation for the Vancouver Forest Region. B.C. Ministry of Forests, Victoria, B.C. Land Manage. Handb. No. 28.

Hanley, T.A. and R.D. Taber. 1980. Selective plant species inhibition by elk and deer in three conifer communities in western Washington. Forest Science 26(1):97–107.

Harmon, M.E. and J.F. Franklin. 1983. Age distribution of western hemlock and its relation to Roosevelt elk populations in the South Fork Hoh River Valley, Washington. Northwest Science 57(4): 249–255.

Houston, D.B., B.B. Moorehead, and R.W. Olson. 1987. Roosevelt elk density in old-growth forests of Olympic National Park. Northwest Science 61(4):220–225.

Janz, D., K. Brunt, J. Youd, and D. Becker. 1983. Vancouver Island Roosevelt elk: Intensive forestry interactions. Ann. Working Plan. Oct. 1983–Sept. 1984, B.C. Ministries of Environment and Forests.

Jenkins, K.J. and E.E. Starkey. 1993. Winter forages and diets of elk in old-growth and regenerating coniferous forests in western Washington. American Midland Naturalist 130:299–313.

Keystone Wildlife Research Ltd. 2004. Elk damage to forestry plantations: Literature review and management recommendations for Block 1 of TFL 39. Prepared for Weyerhaeuser Co. Ltd., Powell River, B.C.

Koshowski, D. and K. Brunt. 1998. Nimpkish Roosevelt elk project: Final report. Prepared for Forest Renewal BC, Canadian Forest Products, and B.C. Ministry of Environment, Lands, and Parks, Vancouver Region. Unpubl. Rep.

Nyberg, J.B. and D.W. Janz (editors). 1990. Deer and elk habitats in coastal forests of southern British Columbia. B.C. Ministries of Environment and Forests, Victoria, B.C. Special Report Series No. 5. URL: *www.for.gov.bc.ca/hfd/pubs/Docs/Srs/Srs05.htm*

Quayle, J.F. and K.R. Brunt. 2003. Status of Roosevelt elk (*Cervus elaphus roosevelti*) in British Columbia. B.C. Ministry of Water, Land and Air Protection, Victoria, B.C. Wildlife Bulletin No. B-106.

Rochelle, J.A. 1992. Deer and elk. *In* Silvicultural approaches to animal damage management in Pacific Northwest forests. J.C. Black (editor). U.S. Department of Agriculture Forest Service, Portland, Oreg. Gen. Tech. Rep. No. 287. pp 333–349.

Sullivan, T.P. 1997. Identification and management of wildlife damage in forests of the Pacific Northwest. Applied Mammal Research Institute, Summerland, B.C.

Van Zwaaij, R. 2003. Elk, *Cervus elaphus roosevelti*: Beauty or beast? Presentation at the B.C. Coastal Silviculture Committee meeting, June 18, 2003.

Witmer, G.W. and D.S. DeCalesta. 1985. Effect of forest roads on habitat use by Roosevelt elk. Northwest Science 59(2):122–125.

Test Your Knowledge . . .

Coast Forest Region: Roosevelt elk Wildlife Habitat Decision Aid

How well can you recall some of the main messages in the preceding extension note? Test your knowledge by answering the following questions. Answers are at the bottom of the page.

1. The average height of forested stands suitable for snow interception (in low snow pack zones) and security cover is generally greater than:
   A) 3 m
   B) 6 m
   C) 8 m
   D) 10 m

2. Given an operating area near existing elk herds, which of the following harvest methods is the most likely to attract elk and pose a conifer seedling browse problem?
   A) smaller clearcuts harvested over several years
   B) single tree selection
   C) larger clearcuts
   D) smaller clearcuts harvested in one season

3. Seedling damage or mortality due to browse is more likely when seedlings are planted:
   A) in clusters
   B) against stumps
   C) in deep soil
   D) in early spring

ANSWERS

1. D – While security cover is provided by most forested stands greater than 3 m in height, snow interception capability in low snowpack zones does not begin until stands are at least 10 m in height.

2. A

3. D – In areas prone to elk browse, seedlings should be planted in late spring when alternate forage is more readily available.