



Clarifying Habitat Use



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Use of Young and Old Forests By Black-tailed Deer

If deer could choose the best habitat for their survival needs, would they prefer young or old forests? That key question helped to define a significant investigation of Columbian black-tailed deer on Vancouver Island.

“One of our chief goals was to clarify how young and old forests are used by deer,” says Scott McNay, a member of the Vancouver Island Deer Project team. The research team considered this a first step towards developing habitat management options for black-tailed deer.

The deer project was conducted through the Integrated Wildlife-Intensive Forestry Research (IWIFR) program, formed to investigate which forestry practices would maintain or enhance deer and elk populations. The program was a co-

operative endeavour of the Ministry of Environment, Lands and Parks, the Ministry of Forests, and the University of British Columbia. Three forest companies aided in this effort: Canadian Forest Products, TimberWest Forest, and MacMillan Bloedel.

Research in the 1940s showed that forests greater than 250 years old were relatively poor habitat for deer. Increased use of the abundant forage found in young forests appeared to support this notion. However, during the late 1960s and early 1970s, black-tailed deer populations in many areas on the Island experienced rapid declines. Research carried out during severe winters (see Harestad 1979, 1985, and Schoen et al. 1985) revealed how important older forests could be for deer.

Predictions about the value of different habitats flowed from this and other

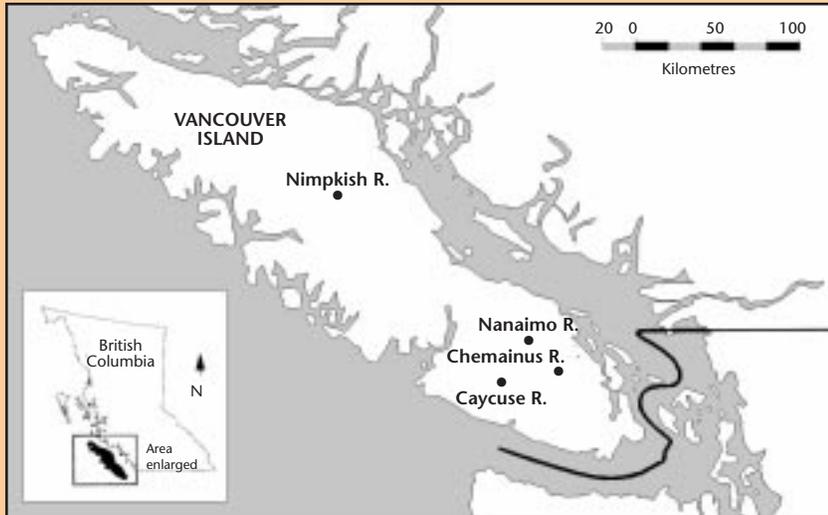
research on ungulate behaviour. For instance, deer were expected to be free to choose high-quality habitats that would best enhance their survival and reproduction. Old forests were assumed to be best for deer during winter, while young forests would be used for only brief periods and limited to areas of low snowfall.

Deer Generally Prefer Young Forests

The IWIFR team started their research project with many of these assumptions in mind. Weekly monitoring of 72 radio-collared deer began in February 1982 at Nanaimo River and in February or March 1989 at the Nimpkish, Chemainus, and Caycuse river study areas. The team estimated habitat use in these areas by cross-referencing deer locations with forest cover and topographic



Watersheds Studied Typical of Coastal Logging



The Nanaimo and Chemainus are neighbouring river valleys 43 km north-east of the Caycuse and 202 km southeast of the Nimpkish river valleys. The Chemainus, Nanaimo, and Nimpkish river valleys are relatively open, flat-bottomed and U-shaped. The Caycuse River valley is V-shaped, with steeper slopes and less flat area of low elevations.

Mountain peaks range between 1249 m at Caycuse and 1821 m at Nimpkish, with valley bottoms in all study areas located at 200-300 m above sea level.

Lower elevations on Vancouver Island are dominated by the Coastal Western Hemlock biogeoclimatic zone, while at higher elevations the Mountain Hemlock zone is most common. While these ecosystems are represented at each study site, the Caycuse River valley has only minor amounts of mountain hemlock.

The habitats studied are typical of coastal logging. Valley bottoms have young (6-45 year old) forests, most mid-slopes are deforested, and higher elevations and headwaters contain old forests (more than 250 years old).

Climate on Vancouver Island is temperate and wet. Average temperatures seldom dip below 0°C in winter or rise above 17°C in summer. There are usually 291 frost-free days per year, and a mean precipitation of 2140 mm, with an average of 820 mm of snow.

maps. After nine years of monitoring, a total of 8533 deer locations were plotted.

Some interesting and consistent trends emerged from the analysis of their research results. Deer generally used young (6-45 years old) rather than old forests. The black-tails used young forests 65-75% of the time at all sites except at Caycuse, where young forests were used

about 45% of the time. The balance of deer locations on Caycuse occurred in open habitats (0-5 year-old forests). Use of open habitat elsewhere ranged from only 7-15%. The lack of locations in open forests was most apparent at Nimpkish River, where little of this habitat type occurred. Use of old forests ranged from 7% at Chemainus to 14% at Nimpkish.

Habitat use differed seasonally. In general, less old forest was used as summer habitat, while young forests and open habitat combinations were used more. Migratory deer showed a strong preference for higher elevation habitats in summer (greater than 600 m), but during winter usually moved away from these to lower areas. Resident deer stayed in their low-elevation habitats all year.

Winter habitats of migratory and resident deer were similar in elevation (between 400-600 m), but differed in forest characteristics. Migratory deer in all study areas—all 12 deer that migrated regularly and 10 of 16 irregular migrants—preferred to use old forests during winter.

Resident deer, by comparison, lived in a zone of greater forest harvest. Therefore, they did not have as much access to old forests, with only 25 of 44 residents using this habitat type. The exception was at Nimpkish River, which had a larger proportion of old forest at the valley bottom.

Family Bonds Restrict Deer Habitat Choices

After tracking the movements of black-tailed deer, it became apparent to the research team that the deer were not entirely free to choose their habitats and that their preferred habitats were often not ideal.

The black-tailed deer in the sample appeared to be strongly influenced by family bonds. They were also creatures of habit, using specific sites year after year. These two behavioural traits greatly affected their decision-making activities and, therefore, their habitat use.

The IWIFR team observed a decided lack of similarity in habitat choices and found little correlation between the habitats that were preferred by deer and the habitat's assumed value. McNay considers that these findings could be related to the deer's habitual approach to resource use.

"Home range settlement was usually based on the mother's historical choice. If



Because deer are ruminants, they require time to process food consumed during foraging activities. The areas where these activities take place are generally referred to as resting and foraging habitats.

those ranges were subjected to persistent, rapid changes from logging, then access to habitats, and tactics for using them, would vary greatly,” McNay suggests. “This affects the amount of habitat available to individual deer and restricts them to a limited number of habitat types.”

Deer Habitat Selection Tactics Out of Sync with Habitat Change

The research team detected strong seasonal patterns in the way deer select habitats. Migration was set in motion by seasonal changes in the deer’s energy needs. For example, deer born at high elevations ultimately need to select lower elevation winter habitat. Forage quantity and quality on their home ranges becomes limited in winter because of the topographic and climatic conditions there. These deer migrated annually, away from natal ranges to alternate ranges that contained a considerable proportion of old forest.

By contrast, deer living at low eleva-



Deer appear to seek security during daylight hours in the shelter of dense vegetation and prefer to be near other family members. This habitat is generally referred to as security cover.

tions did not migrate. Their ranges tended to be smaller and were generally less exposed. These sites normally included adequate forage supplies in broad expanses of young and open forest. And because these deer were resident, they were usually unaware of the condition of habitats outside their range.

The research team was concerned that these tactics for selecting habitat, especially those for winter habitat, were not in balance with rapid habitat changes on Vancouver Island. Logging transforms the basic pattern of deer habitat much faster than the more natural rate of change in an undeveloped forest. It reduces the total amount of old forests at low elevations and isolates those that remain into widely separated patches.

“The clearest example of this concern came from the case of resident deer. Most of these deer had little or no access to old forests in their home ranges. They consequently chose to establish activity centres in other forest types and in severe winter weather would not know where remnant patches of old forest were located,” says McNay.

Old Forests Offer Special Refuge During Severe Winters

Old forests offer many benefits for deer in winter. The tall, large-crowned conifers intercept snow, creating shelter and reduced snowpacks. This cover enables deer to move around and to find food more easily. Old forests also provide more abundant and higher-quality forage at this time of year, offering an alternative food supply in arboreal, tree-based lichens and litterfall, which are seldom found in young forests.

Migratory deer showed consistent changes in their seasonal habitat choices during severe winters, preferring south-facing old forests at elevations of 400–600 m. “One could argue that the use of old forests is only related to the need for lower elevation habitat during winter,” says McNay. However he quickly points



COASTAL BLACK-TAILED DEER STUDY

out that logging patterns in coastal forests produce a marked lack of old forests at these elevations. "We therefore concluded that migratory deer specifically select this habitat type during winter."

McNay believed that if deer migrated solely to seek lower, less-exposed elevations during winter, then most of the monitored deer should have migrated and some migratory deer should have been located in young or open forests in winter. Instead, the team found that all deer occurring in young or open forests at lower elevations during severe winter conditions were residents; none were migratory. As well, the team discovered that in periods of mild weather (which sometimes could last a number of years) some otherwise migratory deer failed to migrate. So while old forests may have been a highly preferred component of winter habitat, the research team believed that they were relatively avoided in all but snowy weather.

"Old forests seem to represent a special type of refuge for deer in coastal climates—a habitat that is needed primarily when winter weather is severe," says McNay. "During summer and mild winters, open and young forests appear to be preferred and if these occur at mid-to low elevations, the need to migrate seems to be removed."

Deer Populations Will Decrease As Open and Young Forests Age

McNay suggests that at least two possibilities could arise as less old forest exists at mid-to low elevations:

- more deer will become residents and fewer deer will establish home ranges at high elevations; and
- deer populations will be less able to withstand severe winter weather.

The IWIFR team concluded that the role of migratory deer in the overall population must be considered before relaxing any harvest restrictions on old forests. They also believe that deer popu-



In the absence of habitat that provides sufficient cover from deep snow, energy demands can be extreme and survival through the winter unlikely. Forests that function to intercept snow and alleviate these conditions are generally referred to as snow-interception habitats.

lations will decrease as young forest grow older and the abundance and quality of forage in them inevitably declines.

Therefore, future management of forest should incorporate careful planning to maintain a balance of forest age classes.

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Other brochures in this series deal with deer movement, winter range removal, habitat and predator concerns, and habitat planning.



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