Habitat and Predator Concerns

Joan Voller

McNay and Voller Investigate Deer Survival

Older intact forests a low elevations are essential to rebuild dwindling populations of Columbian black-tailed deer on Vancouver Island. So concluded Scott McNay and Joan Voller, who worked on the Integrated Wildlife—Intensive Forestry Research Program's (IWIFR) Vancouver Island Deer Project. The results of their nine-year study appeared recently in the *Journal of Wildlife Management*.

Since the late 1970s, black-tailed deer populations continued to decline in most areas on the Island, despite the efforts of wildlife managers to reverse this trend. Predators, particularly wolves, were thought to be the major cause of the declining populations. Therefore, arguments in favour of preserving winter range for deer were difficult to support, especially when this meant deferring large areas of old forests from logging.

Instead, wildlife managers were forced to reduce the number of deer deaths before addressing concerns about habitat loss. Managers lowered hunter bag limits on Vancouver Island and wolf control programs were started in some areas. However, without detailed knowledge about why deer populations fluctuate, these changes offered only ad hoc solutions.

Some information about birth rates in black-tailed deer populations on the Island did exist, but estimates of death and survival did not. The IWIFR research team recently filled this void. "We investigated survival rates and the cause of death for adult female deer in four areas on Vancouver Island," says McNay. Their results also offer important data about environmental and behavioural factors. McNay and Voller worked on the project with a team of researchers from the Integrated Wildlife—Intensive Forestry Research Program, 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.

Radio-collar Data Yields Mortality and Survival Estimates

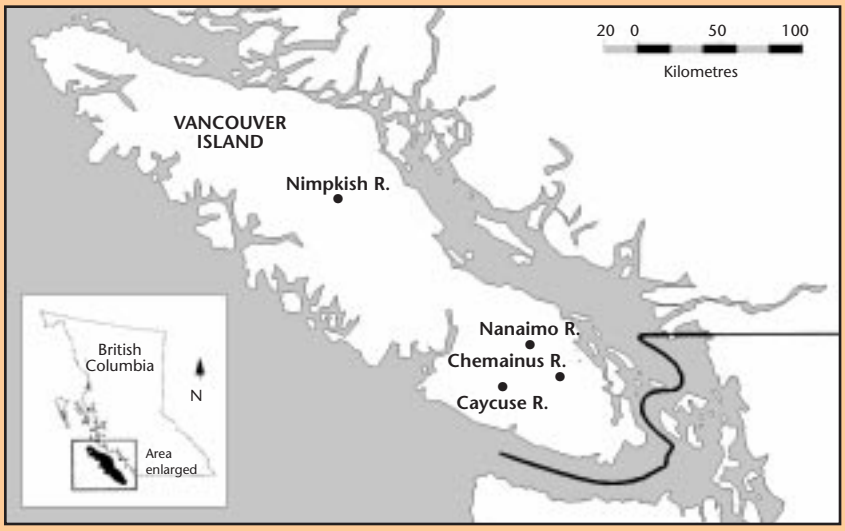
The IWIFR research team studied ninety-five adult black-tailed deer from February 1982 to June 1991 in the Nanaimo, Chemainus, Nimpkish, and Caycuse river valleys. During this time, ten other deer aged into the adult class and were included in the sample. These 105 deer yielded 2182 deer-months of data.

From 1982 to 1988, adult female deer in the Nanaimo valley received radio

transmitters with mortality sensors. Deer capture and collaring continued in the Nimpkish and Caycuse valleys in 1989–90, and in the Chemainus valley in 1989.

The IWIFR team monitored the collared deer at least once a week for four years after capture or until death. When the sensors signalled a death, the animal's carcass was located and examined. By classifying the type of injury and the dispersal of the remains, the biologists determined the likely cause of death.

Watersheds Studied Typical of Coastal Logging



The Nanaimo and Chemainus rivers are in neighbouring valleys 43 km northeast 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 at low elevations.

The Caycuse and Nanaimo study areas cover 111 and 145 km, respectively, while the Chemainus and Nimpkish sites cover 33 and 41 km. 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.

The habitats studied are typical of coastal logging. Valley bottoms have young (6–45 years old) forests, most mid-slopes are deforested, and higher elevations and headwaters contain old forests (more than 250 years old). The Chemainus River valley had the greatest proportion of young forest.

Some wolves were removed from all study areas as part of an ongoing predator management program, with the greatest effort occurring in the Nanaimo and Nimpkish valleys.

All areas were open for buck and cougar hunting seasons. Each November a limited entry weekend hunt for antlerless deer took place in the Nanaimo River valley.

Cougars and Wolves Shown to be Major Predators

The IWIFR research team tallied fifty-four deaths among their deer sample over the nine years that the study took place. Most of these (64%) occurred either from April through June, or during November.

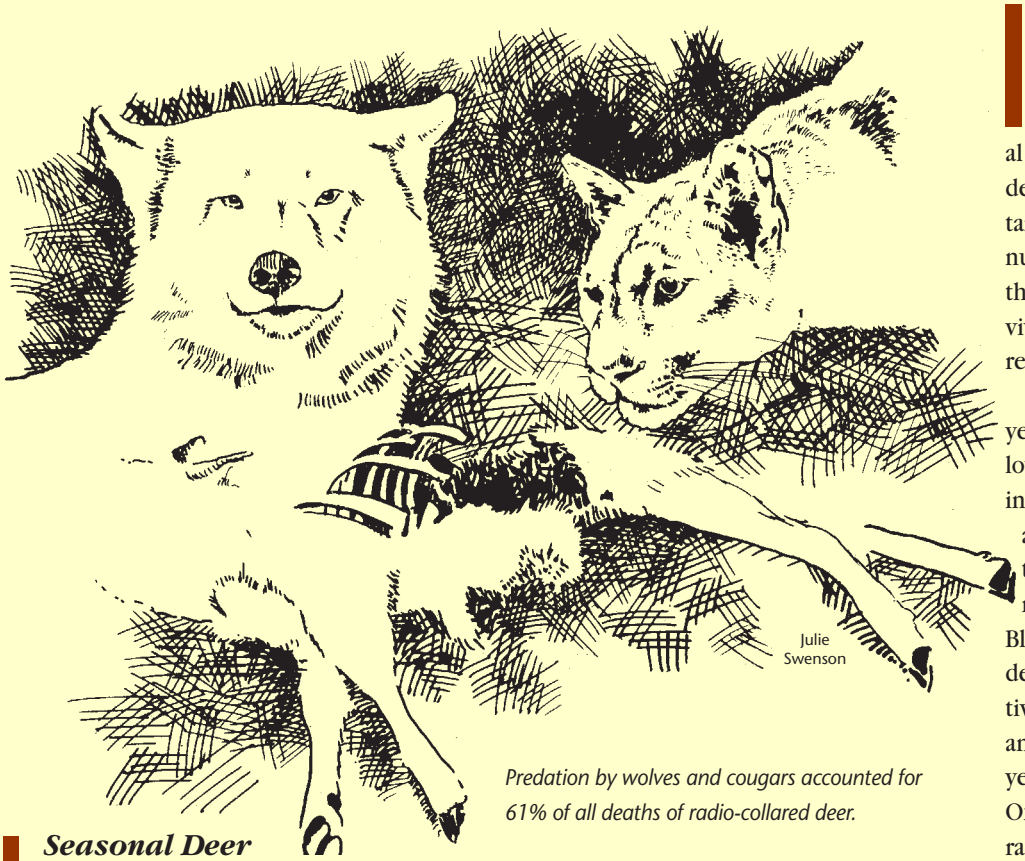
Death was by one of six causes:

- wolves
- cougars
- legal hunting or poaching
- malnutrition
- accident
- unknown

Wolves and cougars accounted for 61% of all deaths. Of the two predators, cougars were the most important cause of death. McNay and Voller observed that cougar-related deaths were more prevalent in the Caycuse and Chemainus river valleys than in the Nanaimo or Nimpkish river valleys. These fatalities occurred mainly from March through May. Those related to wolves happened in February and April–July. Very few adult deer died during the summer when it is likely that both wolves and cougars prey on vulnerable fawns.

The more territorial cougars established "activity centres" and killed deer in isolated stands of old-growth forest. Most of these stands were reserved as winter habitat for deer. "In the past, predation by cougars wasn't considered to be that important," says McNay, "but our data show cougars can have strong local effects, particularly in late winter." Wolves, by comparison, range more freely and are less seasonal in their kills.

McNay offers a couple of reasons why cougar-related deaths may have increased: "It is tempting to assume that cougars are taking over from the wolves that had been removed from our study areas. Other researchers are doubtful that this kind of response occurs though," he says. "On the other hand, we may simply notice predation by cougars more now because kills occur in winter ranges that are becoming more isolated through continued forest harvesting."



Predation by wolves and cougars accounted for 61% of all deaths of radio-collared deer.

Seasonal Deer Movement Best Explains Mortality and Survival

McNay and Voller found that seasonal movements of deer (that is, whether the population was resident or migratory) provided the simplest and most acceptable explanation for their death and survival estimates. Elevation also played a role in explaining some of the patterns they observed.

The overall annual survival rate for black-tails was 74%. Survival was lower for resident deer (77%) than for migratory deer (90%). Deer with unknown movement behaviour had the poorest survival (71.2%), but these deer formed only a small portion of the sample.

Resident deer remaining at low elevations were most prone to predation. In August and September, and December through March, the monthly survival of all deer rarely dropped below 99%. However, from April through July, survival for low-elevation resident deer rarely exceeded 97%. By comparison, monthly survival for migratory deer at low elevations fell below 97% only during April.

The high survival rates of migratory deer are particularly relevant when both the primary causes and timing of death are considered. McNay and Voller's research shows that predators concentrate on adult, female deer from February through July. This coincides with the months when the differences between survival rates of migratory and resident deer are greatest.

An earlier study of deer movement patterns on northern Vancouver Island found that most migratory deer left winter ranges during March, before predators became most active. After March, migratory deer moved to habitat with less road access in steeper terrain at higher elevations. "Most migratory deer, either by coincidence or on purpose, reduced their risk of predation by leaving low-elevation winter ranges in early spring," McNay suggests.

Current Survival Rates Show Low-elevation Deer at Risk

McNay and Voller argue that the annual survival rates they observed for resident deer at low elevations (73%) will not sustain their populations. They estimated the numbers of fawns required to stabilize the population by combining their survival rates with birth rates from earlier research.

At the upper level of fawn survival to yearling status (about 25%), all but the low-elevation resident population would increase. They concluded that a 30% addition of fawns would be necessary to stabilize that population—a level rarely observed on Vancouver Island. Black-tailed deer are not as fertile as other deer species and are therefore more sensitive to adult fatalities. Although McNay and Voller did not estimate fawn and yearling survival, it was judged to be low. Of the 24 female fawns and yearlings with radio collars, only one fawn and nine yearlings lived to become adults.

Forest Harvesting Indirectly Creates Easy Access for Predators and Isolates Winter Ranges

Forest-harvesting operations can enhance deer habitat quality. The early seral forests created by clearcuts offer abundant high-quality forage for deer populations. However, logging road systems built throughout lower valley elevations also provide easy access to deer by wolves, cougars, and humans. McNay and Voller concluded that the resulting risk of mortality to adult deer probably outweighs any potential benefit from improved habitat quality.

Forest harvesting also continues to isolate old-growth winter ranges. These sites act to concentrate deer in specific areas and to focus predator attention toward them. This could directly influence mortality, especially during late winter when deer are most vulnerable.

COASTAL BLACK-TAILED DEER STUDY

Unstable Deer Populations Require Low Elevation Old-growth Forests

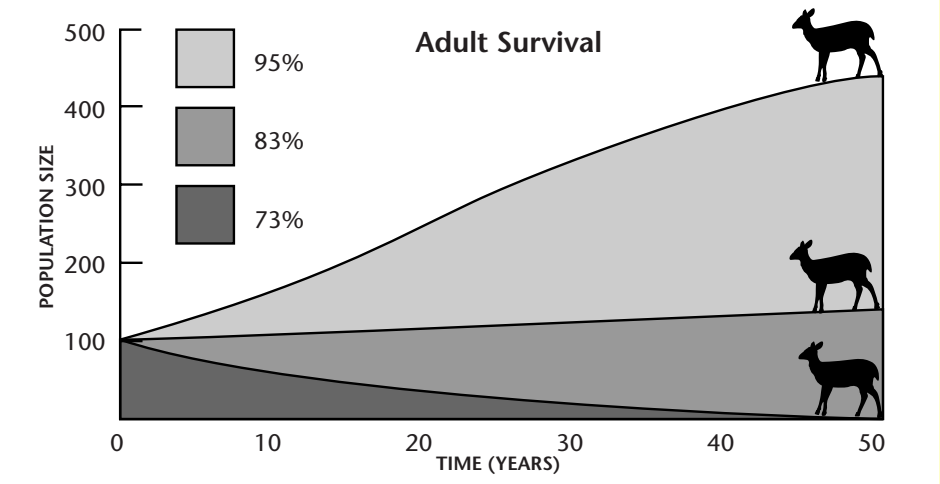
Birth and survival of fawns to yearling status is unlikely to sustain populations of resident deer with their high adult mortality.

McNay and Voller believe this isolation of winter habitat is a particularly important issue because they found no migratory black-tailed deer in young forests during severe winter weather. They speculate that this absence could imply one or a combination of several processes:

- migratory deer concentrate increasingly in diminishing old-growth areas, which eventually reduces their survival because range conditions deteriorate there;
- fawn and yearling mortality for migratory deer is high; or
- fawns and yearlings occupying young forests abandon migratory tactics in favour of resident habitat selection patterns.

So while migratory deer had high annual survival (95%), McNay and Voller remain suspicious about the vitality of this segment of the deer population. "Loss of migratory deer could lead to a less resilient population because the resident deer that remain will be prone to even higher predation," McNay stresses.

McNay and Voller recommend that blocks of older, intact forests, particularly at lower elevations, should be set aside because they are essential to rebuild deer populations. They suggest that forest harvesting, with the accompanying road building and isolation of winter habitat, may intensify predation in the resident deer population. Forest harvesting may also indirectly lessen increases in the migratory deer population. This could result in declines in black-tailed deer populations and an overall loss of population resiliency.



A simple model of population growth assuming adult survival rates of 73% (low-elevation resident deer), 83% and 95% (high-elevation migratory deer).

References

McNay, R.S. and J.M. Voller. 1995. Mortality causes and survival estimates for adult, female Columbian black-tailed deer. Journal for Wildlife Management, Vol. 59, pp. 138–146.

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

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