Elk Migration and Dispersal Revealed by Satellite Technology

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Elk on winter range in the Porcupine Hills of southwest Alberta.
- photo D. Paton

Many elk in Alberta migrate from low elevation winter ranges to summer ranges in the mountains. Seasonal migration allows elk access to forage that cannot be accessed during winter because of deep snow. The fidelity of elk, especially females, to seasonal ranges is high. For example, a cow elk might have her calf within a few hundred metres of the same place every year. Likewise, migration routes, winter range, and summer pastures are used year after year. Elk calves learn migration routes from their mothers, passing migration route information on from generation to generation. So, if you find elk in late summer just before the hunting season opens, they are likely to be in the same general vicinity every year.

Fall migration is usually prompted by deep snow, typically in November. During summer elk find lush forage at high elevations but when snow becomes too deep they are forced to move downhill to areas with better food availability. Hunters learn this behaviour and can hunt migration routes successfully during or immediately following a heavy snowfall in the high country. Elk will often move in large groups during fall migration, following single file along traditional migration routes. Migration routes for the fall migration can be different from routes followed in spring, and depending on weather and snow conditions, elk may move considerable distances even after their initial arrival on the winter range. However, timing is critical for the elk hunter because the entire migration can occur in a matter of hours, and sometimes at night. Bull elk are more reluctant to move onto winter ranges than are the cows and calves. Often bulls will hole up in thick timber until forced to move onto the winter ranges by a lack of access to forage. Aerial counts of elk on winter ranges usually are higher after a winter of heavy snowfall because a higher proportion of the herd will be forced out of the timber and higher elevation ranges. Spring migration is prompted by snow melt and green up. In the mountains, elk will follow the snow melt to feed on the highly

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nutritious new sprouts of forbs and grasses. During most years elk leave their winter ranges by late April or early May and begin their migration to higher elevations. This year, 2010, was early with some elk leaving winter range in March. Sometimes the cows will give birth during the migration, or after they have reached their summer ranges, in late May and early June.

For the past three years we have been studying a partially migratory population of at least 4,300 elk that overwinter in seven herds in southwest Alberta. Our methods involved capturing elk with a large net shot by a specialized net-gun from a helicopter. Once netted, the elk becomes tangled and falls to the ground. To protect the animal and the researchers, legs are tied together before samples of blood, hair, fecal pellets, and a tooth are collected for various research projects. A radio collar programmed to take GPS locations every two hours is attached to the animal's neck. Within 20 minutes the elk is back on its feet. This method of capture has proven to be efficient and less stressful to the animal than immobilization with drugs. All research protocols for handling the animals must be approved by provincial and university Animal Care Committees.

We've known that a portion of southwest Alberta herds migrate each year, and we also know that some elk are resident and do not migrate. Some elk simply shift their home ranges seasonally but do not undertake true migrations. But we were surprised to learn the extent of migration by some of these elk.

Evidence indicates that migration of elk is motivated mostly by the seasonal availability of high-quality forage. For some species predators also appear to influence migration. Because wolves are tied to a den site, caribou that migrate can keep ahead of the predators. This might apply to elk as well, but this has seen little study. Migration of elk in herds surrounding Yellowstone National Park have been studied for more than 50 years, and studies subsequent to the 1995 wolf reintroduction suggest that elk move away from areas near wolf dens. Bears also can be effective predators learning to hunt elk calving grounds and in some areas bears are known to kill 50% of the calves. Wintering elk from the National Elk Refuge near Jackson, Wyoming will migrate up to 100 kilometres into Yellowstone National Park summer ranges. But these migrations are dwarfed by some Alberta elk that winter in the Porcupine Hills.

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Migration provides a means for more elk to meet their nutrient and energy requirements by increasing available range beyond wintering areas. The area of summer range is typically much larger than the winter range. However, the area occupied by individual elk on the summer range might be smaller than the area occupied on winter range, because summer range contains areas of highly nutritious forage resulting in a reduction in the need to move as much to satisfy their requirements.

Advances in radio telemetry have made studies of migration and dispersal much easier. In migration the animals return to seasonal ranges, sometimes covering long distances. Dispersal, however, can be permanent with the elk never returning. Even five years ago, it was very risky to place a radio collar on a spike (yearling) bull for fear that the animal might disperse and you’d never see the expensive radio collar again. We now have Lotek radio collars that record precise GPS locations within 5-10 metres, and the data are beamed to a satellite and back to a receiving station. Ultimately these data are sent to our computers where we can plot the locations in Google Earth or other mapping software. The elk can go anywhere on the planet and we will be able to track their movements. No longer do we need to get within a few hundred metres to get a single fix on the animal. We now get locations every two hours and it's all done remotely by satellite saving thousands of dollars in helicopter and staff time.

Dispersal by some young bulls (age 1-2 yrs) from southwest Alberta has been remarkable. We have had young bulls leaving the resident Beauvais herd west of Pincher Creek moving north to an area just north of Chain Lakes. Another went from Waterton Lakes National Park to Whitefish, Montana, and others have dispersed from the Beaver Mines area west of Pincher Creek, Alberta to the Wigwam Flats south of Elko, BC. Clearly it is the yearling bulls that ensure the genetic mixing among elk herds whereas cows have traditional seasonal ranges passed on from generation to generation. Always there are exceptions, for example, we have had radio-collared cows move from the Livingstone Range into BC.

Elk calves are born late May and early June, sometimes during migration to summer range. - photo L. Keeler

Management of migratory elk is particularly challenging because we need to be attentive to winter range, summer range, and the migration corridors in between. Our new telemetry equipment permits accurate mapping of migration corridors so that wildlife managers can ensure unimpeded movement of elk to critical big-game winter ranges.

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