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YA HA TINDA ELK HERD: PERSISTENCE OR DOOM?

Ya Ha Tinda Ranch is one of the most spectacular places on the planet to hunt elk. Awe-inspiring landscapes adjacent to Banff National Park add a special dimension to the hunting experience.

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Unfortunately, the elk herd has dwindled from an all-time high of about 2,200 wintering animals in 1992, to only about 350 elk now. Elk were so abundant in the early 1990s that they were trapped for relocation elsewhere because of concern for the rare rough fescue grasslands of Ya Ha Tinda. A long-term research program is trying to understand the reasons for the decline of this important elk herd.

The Ya Ha Tinda elk herd consists of both resident and migratory animals. Not only has the overall herd declined in numbers, but a long-term collaring program has shown that the number of elk migrating westward to summer in Banff National Park has declined steadily, with the ratio of migrant to resident elk dropping from about 12:1 in the 1980s to 5:1 in 2002 to 1:1 in 2010. Currently, there are about as many resident as migratory elk at Ya Ha Tinda during winter.

Since 2000, researchers at the Universities of Alberta and Montana have been studying elk responses to the mixture of predators, humans, and vegetation change in this area. Research has focused on how migrant and resident elk differ in trading off foraging opportunities and predation risk on summer and winter ranges and resulting population consequences.

By migrating into the higher elevations of Banff National Park in summer, migrant elk benefit from a longer period of higher-quality forage than those elk that stay at Ya Ha Tinda because they follow a wave of green-up into the mountains. For migratory elk, this has translated into higher pregnancy rates and heavier calves. In contrast, resident elk staying at the Ya Ha Tinda Ranch avoid wolf predation by using "refuges" associated with human activities, and have slightly higher adult survival rates.

Population models using field data from 2000 to 2011 predicted that the herd might level off at ~500 elk due to density-dependent predation, which occurs when the elk population decline is followed by declines in predators and predation rates so the population can stabilize at a new but lower population level. However, the herd is continuing to decline and it remains unclear if the herd numbers at Ya Ha Tinda are actually leveling off.



"The Ya Ha Tinda is a 44-km² Parks Canada ranch used for training and wintering of ~100 of Banff Park's horses." © Parks Canada

We have several hypotheses about what is happening to the herd. First, increasing populations of white-tailed and mule deer may be sustaining high predation pressure on both adult and juvenile elk by a mix of predators. Predator populations now supported by abundant deer may further reduce elk; a phenomenon that many researchers think explains declines in caribou in northern Alberta where moose and deer have increased.

Alternatively, over 24,400 hectares of the area has been altered by wildfire and/or prescribed burning since the late 1980s. Since the start of our studies, there has been increased eastward movement by elk. Our initial explanation was that they moved there for the improved forage availability in the Dogrib burn, a burn of 10,200 hectares that occurred in the fall of 2001. Instead, radio-collared elk actually avoided burns shortly afterwards, which we attributed to increased risk of predation by wolves.

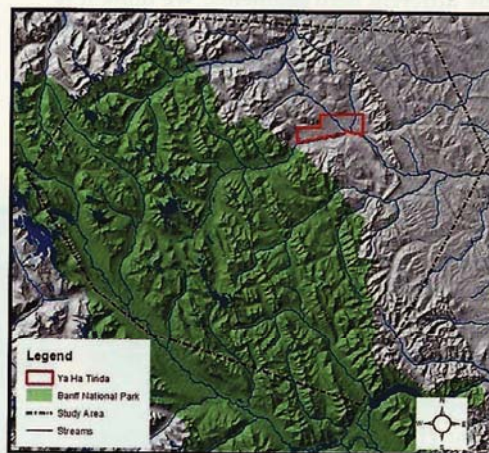
- Celle Interling photo



Grizzly bears are effective predators of elk calves during the neonatal period.

Resampling forage in mid-summer 2012 in the same plots sampled in 2003 showed that there has been little improvement in forage three years after the burn. But we did not compare timing of forage green-up on- and off-burn. Forage on burns often green-up earlier and can provide an important source of high-quality forage during a critical time when cows face the demands of late pregnancy and lactation. Our understanding of the emerging eastward migration is limited, yet it might create a "rescue effect" to the population decline if calf survival is higher in this area, as our preliminary counts of cows and calves indicate.

This past summer, we initiated a pilot program to monitor survival of calves of radio-collared cows to assess how the



"The study area spans across both Parks Canada and provincial lands."



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"Newborn calves spend their first ~10 days in hiding" — Todd Berg

trade-offs that migrant and resident cow elk face might influence recruitment into the different herd segments. We think it is a combination of two factors affecting the differential recruitment.

First, the vast size of the Dogrib burn allows elk migrating to the east of the Ya Ha Tinda Ranch to use burned areas in early spring more than resident elk that remain on the Ya Ha Tinda, because they can stay near the edges of forests and take advantage both of early spring green-up and hiding cover in close proximity. Secondly, if survival of calves born east of the Ya Ha Tinda is high, it might be due to elk finding new "refuges" that predators are not yet targeting or avoid due to humans, or there could be a different mix of predators.



"Calves are left in their beds within 10 minutes of capture and ear-tagging so that mothers can quickly return to find them" — Todd Berg

Bears likely play a key role in the survival of calves when they are first born. Grizzly bears, in particular, are efficient at searching for calves and their predation may be additive, meaning no matter how low the elk population drops or what other predators are around, grizzly bears will continue to kill the same number of calves.

As a result, we have been monitoring not only the survival of calves directly, but also collecting and analyzing the scat of bears, cougars, wolves, and coyotes in this area to determine how predation on elk might change across the landscape.

As part of our pilot efforts, we tagged 16 calves with radio ear tags this spring. Radio tagging the calves is important because it allows us to monitor them one to three times daily from a distance that does not disturb them. If a calf does not move for more than four hours, the tag emits a mortality signal that puts us on alert. If the mortality signal continues, we are able to locate the dead calf and determine cause of death. In the past, we have monitored recruitment into the population from counts of cow and calves, but these data

do not identify what is killing the calves.

At the end of August, six of the 16 tagged calves were still alive. What happened to the other ten? There was no evidence of calf abandonment or harm due to our handling. We wear gloves, lightly blindfold the animal, are silent and handling lasts less than 10 minutes. Calves died due to predation



"Todd Berg performing a rectal palpation on a cow elk to determine pregnancy" — Todd Berg

with about an equal mix of bears, wolves, and a cougar, all looking for a tasty meal. There is always some uncertainty that a calf died of other causes and then was scavenged by a predator, but use of the radio tags and close monitoring minimizes this possibility. We hope to continue these efforts in the coming years to improve our understanding of the factors affecting calf recruitment into the elk herd segments. If funding permits, we will expand the study to what we now view as the three segments of the Ya Ha Tinda herd: Banff migrants, eastern migrants, and resident elk that remain near the winter range at Ya Ha Tinda during summer.

This calf survival study, together with our long-term research on the Ya Ha Tinda elk population, represents one of the longest population studies of elk in an intact system containing all natural predators including wolves and grizzly bears, as well as human hunting. This long-term monitoring has uniquely poised us to better assess the adaptability of elk in shaping new migratory patterns in the face of dynamic conditions, and what this means in terms of the persistence of this herd into the future.

Thanks to Parks Canada, Alberta ESRD, Alberta Conservation Association, SCI Foundation, SCI – Northern Alberta Chapter, TD Friends of the Environment, Minister's Special Licence, and Alberta Sport, Recreation, Parks & Wildlife Foundation for making this work possible. ■



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