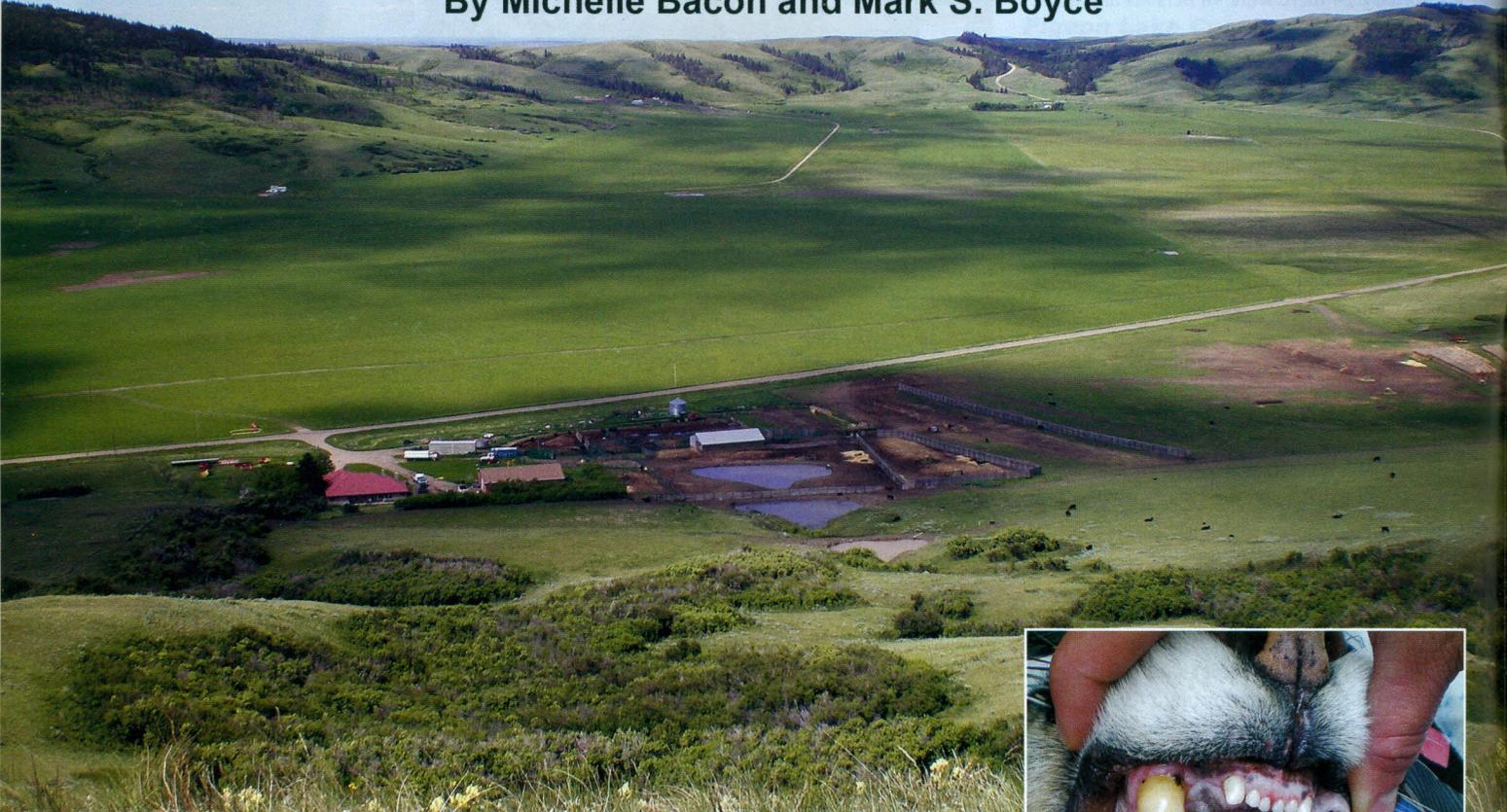


# Cougars Create a Landscape of **FEAR IN THE GYPRESS HILLS**

By Michelle Bacon and Mark S. Boyce



**W**hen a predator re-establishes in an area, we expect direct effects on ungulate population size from predation but also indirect effects on behaviour and distribution as they figure out how to deal with the new predation risk. After the re-introduction of wolves to Yellowstone National Park, for example, elk developed anti-predator tactics such as reducing their use of open grasslands during summer and aggregating into large herds during winter. Other studies have found that mule deer have increased group size, increased vigilance behaviour, and avoided locations with good food to steer clear of predators. The different responses by elk, mule deer, and white-tailed deer, and the amount of time it takes for each species to adapt to the predators can lead to significant changes in population sizes and distribution. The predators create a “landscape of fear” for naïve prey that previously enjoyed the paradise of a predator-free environment.

When Europeans settled Alberta over 100 years ago, predators were perceived as competitors for food and a risk to human safety



Dr. Mark S. Boyce

and their livestock. Predators were heavily hunted, trapped and poisoned, sometimes to the point of extirpation. During the past 20-30 years, large carnivore populations have begun to reclaim portions of their former range, rekindling some of the conflicts with human values. One such place is in Cypress Hills Interprovincial Park (CHIP), a unique forested region of 400km<sup>2</sup> in southeast Alberta and southwest Saskatchewan. Cougars were eliminated from the Cypress Hills nearly 100 years ago. Beginning in the late 1990s, cougar sightings were reported sporadically in the Cypress Hills region, but without tracks or carcasses the sightings could not be confirmed.



*Cougars are remarkably effective predators, killing moose, elk, and deer with these teeth. But there are hazards. This large male died in Cypress Hills Park after being kicked by an elk.*

Not until 2006, when a family of three cougars was captured on a wildlife camera and another family of three were caught in coyote snares just outside the park, could conservation officers confirm that a resident, breeding population of cougars had returned to the Cypress Hills.

Similar to other parts of North America where they have been expanding their range over the past few years, cougars have established most rapidly in places with an abundance of prey.

In CHIP, white-tailed deer and mule deer have reached high density with coyotes as the only predators for nearly 100 years. Although native to the area, elk were extirpated in the early 1900s and subsequently reintroduced in the 1930s. With the exception of a small annual elk hunt organized by Alberta Sustainable Resource Development and Saskatchewan Environment, there are few sources of mortality and elk have reached high densities as well. Elk frequently come into conflict with adjacent agricultural landowners by damaging fences, competing with livestock, and feeding on hay. These three ungulate species have existed with limited fear of predation from carnivores and very few interactions with hunters, especially



**White-tailed deer buck killed by one of our radio-collared cougars in fall 2008 in the forests of Cypress Hills Interprovincial Park. Puncture wounds on the neck, ribs that have been chewed, internal organs eaten first, and a large bed of hair are all signs of a cougar kill.**

inside the park where deer hunting is prohibited. Cougar sightings in CHIP increased during the mid-2000s, peaking in 2007/08 with 35 confirmed sightings, the majority of which occurred between October and April when tourist activity was lowest. Motion-activated wildlife cameras throughout the park also provided conclusive evidence of the return of cougars. Between June 2007 and December 2009, 73 photos of cougars were captured on cameras set on game trails. Two cameras on hiking trails near campgrounds and cabins in Elkwater townsite showed cougar activity was highest when tourist activity was lowest (October to April); this confirmed that cougars preferred to stay away from humans. This is ideal for a provincial park where humans and wildlife have high potential to interact, particularly during summer when visitor activity is highest. That's not to say this natural return of cougars to the Cypress Hills has been welcomed by everyone. Since 2004, 12 cougars have been shot or snared outside the interprovincial park boundaries, an area dominated by agriculture and livestock grazing. Concerns by Cypress Hills' residents

inside the park where deer hunting is prohibited.

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**Mule deer graze on private land outside Cypress Hills Interprovincial Park. The avoidance of forest appears to be an anti-predator tactic as they adjust to the presence of cougars in the park.**

about human safety and possible livestock depredation motivated our research to document the return of cougars to the region. During 2007 to 2009 we used GPS radio collars, wildlife cameras and snow tracking to estimate an interprovincial population of 15-20 resident adult cougars. When combined with the number of kittens that we identified in winter 2009, we estimated a density of 6.5-8.25 cougars/100km<sup>2</sup>, one of the highest cougar densities ever reported anywhere! GPS radio collars allow us to monitor cougar movements 24/7, and we have been surprised to discover that the cougars are almost always

very close to forest cover, seldom venturing onto grasslands outside of CHIP—even under the cover of darkness. By visiting clusters of GPS relocations we have been able to document over 300 prey killed by cougars, and remarkably no livestock have been killed. Deer and elk have been the primary prey.

During the three years of our cougar study in the Cypress Hills, several local ranchers have told us that more deer now move out of the park and onto their agriculture lands—a change they attributed to the return of cougars to the forest. This suggested that the deer

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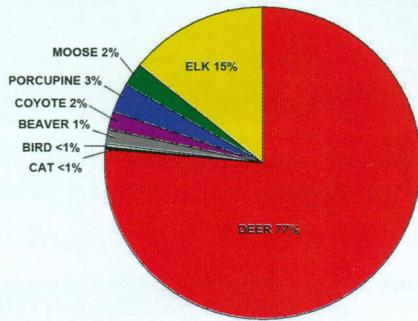
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were changing their habitats from forest to open fields to avoid the risk of predation by cougars. We examined aerial survey data collected each year by provincial biologists to see if we could find any changes in either the number or distribution of ungulates since cougars reappeared on the landscape. The cougar population has increased substantially since the mid-2000s, so we studied data on deer distribution from the past decade (2000-2009). We examined the proportion of elk, mule deer and white-tailed deer counted inside versus outside the park boundary. Indeed, of the mule deer counted during aerial surveys, the proportion counted on private lands outside the park has increased by 6% per year during the past decade.

Likewise, the number of white-tailed deer counted on private lands outside the park has increased steadily as cougar numbers have increased. Clearly cougars have specialized on deer inside the park, especially white-tailed deer, based on kill sites visited (see pie chart).



**GPS radio collars on six adult cougars in 2008 and 2009 helped us to locate 301 kill sites by visiting clusters of data points. We found no livestock kills, and deer made up the majority of cougar diet. Of the deer, 70% were white-tailed deer.**

- chart M. Bacon

When a new predator returns and their population explodes in a matter of five years, as

native prey the cougars will turn to domestic livestock. The biggest change the cougars have



- photo R. Benoit

**Graduate student Michelle Bacon works with project volunteers to attach a GPS radio collar and ear tag and record body measurements on an immobilized female cougar in Cypress Hills in April 2009. This female was radio-collared for two years and had a litter of kittens each summer. We believe her first litter was killed by a male cougar when they were about nine months of age—a risk when the population is so dense.**

caused appears to be increased movement of deer to more open—and safer—areas outside the park's forest. This could be beneficial for many reasons. The vegetation in the park likely has been over-browsed by abundant wild ungulates as well as cattle that graze inside the park during summer. If there are fewer deer in the park, the vegetation can recover and the ecosystem could regain a healthy balance. The movement of deer to open areas avoided by cougars also might help to limit the cougar population, because cougar numbers are limited by both space and food availability. If there are fewer deer in their preferred forested habitats, their numbers might be limited. Lastly, if a higher proportion of the deer herd is using areas outside the park then there will be more opportunities for deer hunters, because deer hunting is prohibited inside the park. This means that the deer herd will have population limitation both inside the park (by cougars) and outside the park (by hunters).

Cougars have restored a "landscape of fear" for deer in the Cypress Hills, causing deer to leave the security of forest cover that now harbours a highly effective predator. So long as cougars continue to behave themselves by killing native ungulates instead of cattle, there's reason to believe that cougars and humans can coexist in the Cypress Hills.

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