

# Cougar

## Occurrence Summary 2000 – 2018



Human-Cougar Coexistence in the Bow Valley

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# Executive Summary

The Bow Valley has experienced a significant increase in development and recreational use over the last 20 years. This increase in human use has been matched by a multitude of programs designed to reduce interactions between people and wildlife. These programs, many of which are focused on managing bears, in particular grizzly bears, are considered leading edge in North America. They include wildlife fencing, highway underpasses, wildlife corridors and attractant management programs. With the increasing levels of human activity, cougars have now begun to gain the attention of both the public and wildlife managers.

Cougar activity is becoming more common in and near developed areas within the Bow Valley. While segments of the public have become reasonably tolerant of bears, they are less comfortable with the idea of cougars living in close proximity to their homes.

Wildlife managers are dealing with an increase in cougar complaints, suggesting that more education and occurrence prevention programs need to be introduced, similar to what has been done with respect to bears.

# Introduction

Cougars are habitat generalists, making them among the most adaptable and wide ranging mammals in the world. Their range extends from northern Alberta and British Columbia to the southern tip of South America. Since 1971, when they were first declared a big game species, cougar populations have increased in numbers and expanded in distribution in Alberta. Approximately 2,050 cougars are estimated to exist in Alberta. Populations are highest in the mountains, foothills, and southern boreal forest (ESRD, 2012).

Male cougars have much larger home ranges than females. In Alberta, annual adult female cougar home ranges have been reported between 62 km<sup>2</sup> and 412 km<sup>2</sup> and annual adult male home ranges between 221 km<sup>2</sup> and 1,311 km<sup>2</sup> (Ross and Jalkotzy 1992, Knopff 2010). Female cougars are not territorial and substantial home range overlap is common (Logan and Sweanor 2009, Bacon 2010, Knopff 2010). Males actively defend territories and their access to females, with fights between males often resulting in severe injury or death (Logan and Sweanor 2001, Lotz 2005, Logan and Sweanor 2009).

Female cougars produce their first litters anywhere from 22 to 40 months of age (Logan and Sweanor 2001). Cougars can breed and produce young at any time of the year, although studies in western North America show that births tend to peak from July to September and are at their lowest during January and February (Cougar Management Guidelines Working Group 2005). Litters normally consist of two to three kittens (Ross and Jalkotzy 1992, Murphy 1998, Logan and Sweanor 2001). Kittens remain with their mothers until they are one to two years old. By this time, young males can be substantially larger than their mothers, and family groups are sometimes confused for mating associations or even a “pack” of adult cougars travelling together. (Ross and Jalkotzy 1992, Lindzey et al. 1994, Logan and Sweanor 2001).

Sufficient prey must be available to support a cougar population. Cougars hunt on the ground and rarely sit and wait for prey (Knopff 2010). They will stalk predators until they are close enough to attack (Seidensticker et al. 1973, Murphy and Ruth 2009, Knopff 2010). Cougars grasp prey with their powerful forearms and retractable claws and deliver a killing bite, generally on the throat immediately below the jaw. Smaller animals are sometimes killed by a bite to the back of the head or neck. Animal kills are typically cached in dense cover, often under the low boughs of a coniferous tree. They will often bury the carcass with available debris including dirt, grass, sticks, leaves, and snow. Cougars generally pluck hair from their prey before consuming meat. Cougars will remain in the area until they have consumed all edible material, which can take days or weeks for larger prey (Anderson and Lindzey 2003, Knopff et al. 2009). Ungulate stomach contents (rumen) are not consumed by cougars, and they will often bury it separately from the carcass.

Although cougar populations in Alberta subsist primarily by killing deer, a wide variety of prey is incorporated into cougar diets. In west central Alberta, cougars killed and fed on a variety of wild prey including white-tailed deer, mule deer, moose, elk, bighorn sheep, mountain goats, feral horses, other cougars, wolves, coyotes, red foxes, lynx, black cougars, marten, beavers, porcupines, snowshoe hares, red squirrels, hoary marmots, grouse, ducks, Canada geese, and ravens (Knopff et al. 2010a). In addition to hunting for live prey, cougars will also scavenge. Individual cougars may also specialize on a particular prey species (Knopff and Boyce 2007). Although cougars are often viewed positively, some surveys still indicate an almost irrational fear towards them (Knopff 2011). Recent research in Alberta has shown that cougars are capable of living in close proximity to human activity, perhaps more so than any other large carnivore in North America (Knopff 2011). Although people generally value cougars and want to conserve them, they also fear cougars and the potential threat posed to pets, livestock and people (Riley 1998, Thornton 2007, Knopff 2011). This fear of cougars generally means that people have a low tolerance for maintaining cougars in close proximity to their homes. Consequently, support for cougar conservation is high as long as the animals themselves and the threats they pose are distant (Manfredo et al. 1998, Riley and Decker 2002, Knopff 2011).

Interactions and potential conflict between people and cougars occurs where the two species share the same landscape. Domestic animals (livestock and pets) are often present in high numbers in many areas of cougar-human overlap and present an easy to kill source of prey. Cougars have been documented killing a wide variety of domesticated animals including: goats, sheep, cattle, horses, dogs, cats, turkeys, pigs, llamas, alpacas, and chickens (Cougar Management Guidelines 2005, Knopff 2010). Depredation events are more likely on properties abutting cougar habitat (Torres et al. 1996) and occur more frequently at night when cougars use habitat closer to rural properties (Knopff 2011). The likelihood of depredation events can increase if domestic animals are left to roam free outside, particularly at night. Cougars have been known to kill high numbers of animals in a single event – far more than what they would ever consume. Cougar conflict has been on the rise in Alberta slowly moving east and northwards from the more traditional cougar habitat of the Rocky Mountains and Foothills areas (Figure 1. ESRD 2012)

Cougars do not typically see humans as prey. Underweight and young, inexperienced cougars appear more likely to attack people (Beier 1991, Mattson 2007). Historically it has been believed that younger people or children under 16 years were more likely to be attacked than adult people (Beier, 1991). More recently, however, adults have been killed more often than children, perhaps because adults are more often alone (Torres 2005). While cougars are quite capable of killing people, they rarely do. There have been three to four attacks per year on people in North America since the beginning of the 1990s (Mattson 2007). Increasing cougar populations in many areas coupled with an expansion of human activity both living and recreating into cougar habitat has increased encounter rates and the frequency of cougar attacks, with half of fatal attacks occurring

in the past 20 years (Sweanor and Logan 2009). There has been one human fatality due to a cougar attack in Alberta. In 2001, a woman was killed while cross-country skiing in Banff National Park. The Bow Valley is a significant wildlife movement corridor and provides good quality habitat with a good prey base for cougars with many of the attributes that encourage both people and cougars to share the same landscape. It is not surprising then, that human-cougar encounters occur here. With the expansion of residential communities in the valley and the reduction of wildlife habitat over the last 20 years, cougar activity within developed areas has been prevalent for years. Some of the best habitat for some prey species now exists in and adjacent to developed areas and cougars will seek out these prey sources that exist throughout the year. Interactions with people are inevitable.

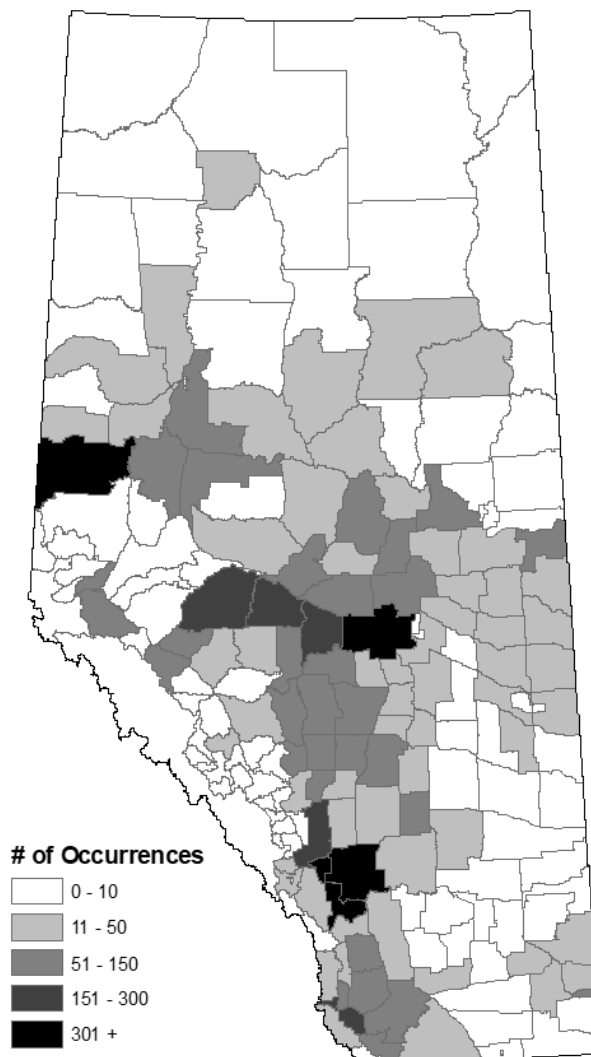


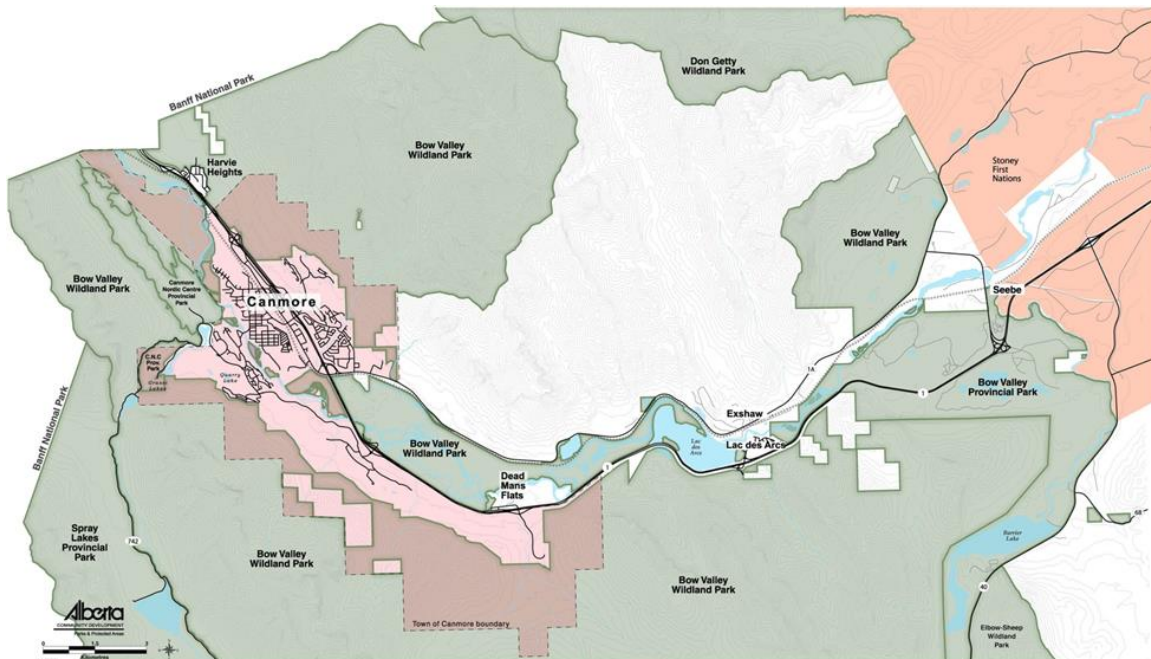
Figure 1. Alberta Cougar Occurrences



# Study Area

The Bow Valley is situated in the Front Ranges of the Rocky Mountains, 100 kilometres west of Calgary, Alberta. The study area includes lands from the eastern boundary of Banff National Park east to the Kananaskis River. The valley is bordered by a number of federal and provincial parks, and protected areas. These include Banff National Park, Bow Valley Wildland Provincial Park, Canmore Nordic Centre Provincial Park, Spray Lakes Provincial Park, and Bow Valley Provincial Park (Map 1). Other public lands include Alberta Forest Reserve. Municipalities include the town of Canmore and MD of Bighorn hamlets of Exshaw, Harvie Heights, Lac Des Arcs, Deadman's Flats and the Village of Little Kananaskis.

The natural vegetation of the valley is dominated by dense fire-origin coniferous forest cover. The valley, particularly lands along the valley bottom, are generally considered high quality habitat for wildlife. Topography ranges from flat land along the Bow River valley bottom to steep mountainside terrain on either side of the valley (Walkinshaw, 2002).



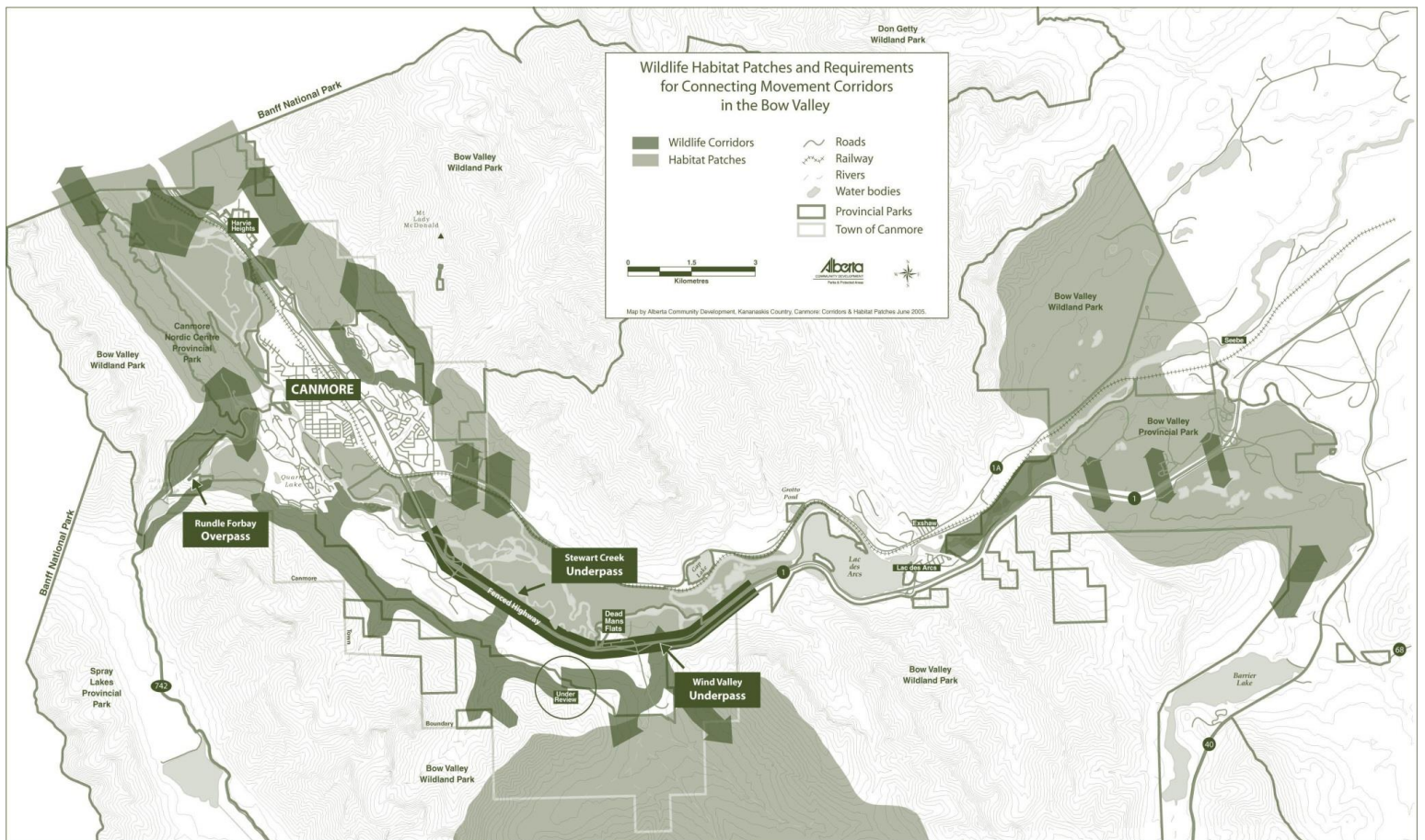
Map 1. Jurisdictional Boundaries within Bow Valley Study Area

The 2016 Canmore census placed Canmore's permanent population at 13,992 people. An additional 3,890 people are considered part-time ([www.canmore.ca/census](http://www.canmore.ca/census)). The M.D. Bighorn contributes approximately 800 residents to the valley (M.D. Bighorn, 2011). In addition, the City of Calgary has a population of more than one million people (GOA, 2013). The Bow Valley is considered an international tourist destination.

The Canadian Rockies Region, of which the Bow Valley is situated, experienced 3.2 million seasonal visitors in 2013 (Alberta Tourism Parks and Recreation, 2012).

The Bow Valley is part of a major transportation corridor which includes the four lane Trans-Canada Highway (21,500 vehicles daily), the two-lane 1A highway, and a two-track transcontinental railway (40 trains daily) all of which run the length of the valley adjacent to the Bow River. Other developments include a multitude of hotels, motels, bed and breakfasts, and mountain lodges. There are seven campgrounds, numerous picnic areas, four 18-hole golf courses, and an extensive network of hiking, biking, cross-country skiing and equestrian trails.

An extensive network of wildlife corridors and habitat patches has been identified within the Bow Valley (Map 2). This network is intended to provide connectivity for large carnivores and other wildlife between the larger protected areas of Kananaskis Country and Banff National Park.



Map 2. Identifying Network of Wildlife Corridors and Habitat Patches in the Bow Valley

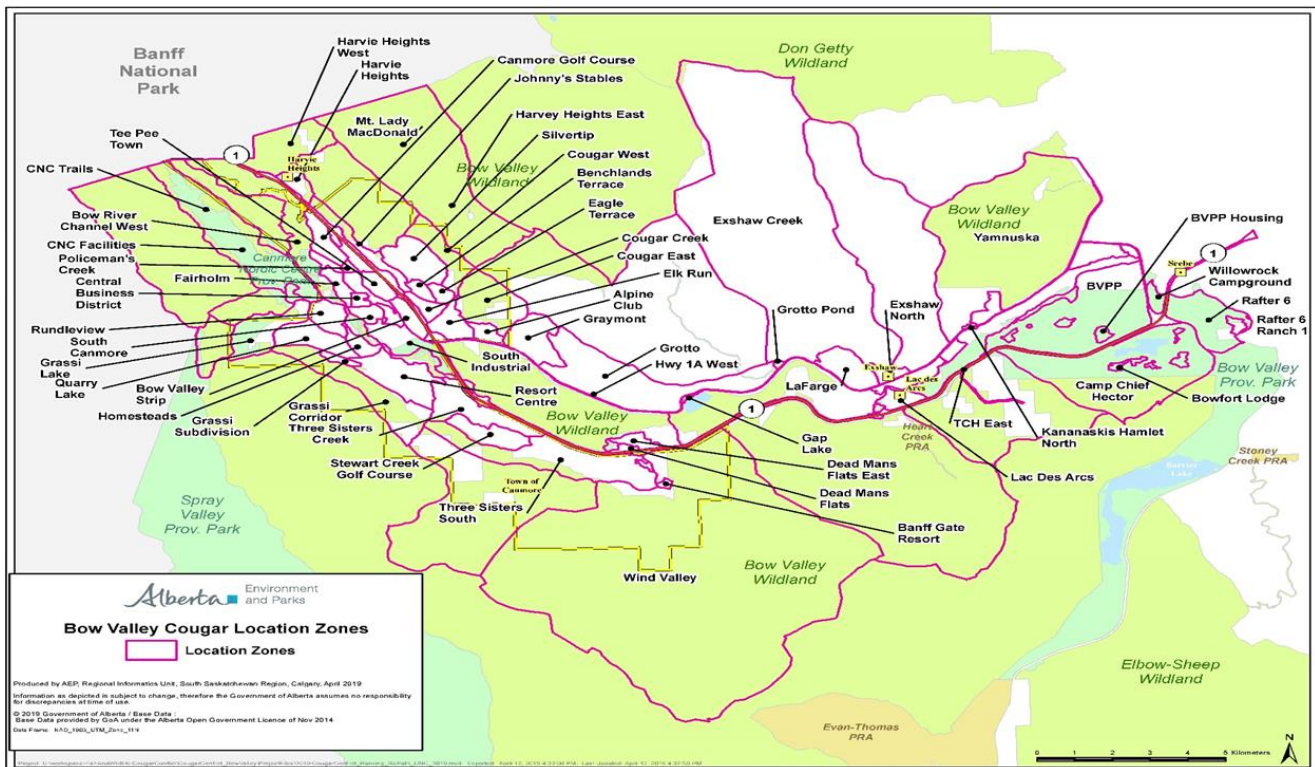
# Methodology

Information relating to cougar activity in the Bow Valley between 2000 and 2018 was obtained from Government of Alberta (GOA) ENFOR Occurrence Reports. These reports are completed in response to calls from the public reporting some kind of event involving cougars. The public are also encouraged to report occurrences to Kananaskis Emergency Services (KES). Cougar related occurrences from the KES database were also queried for this summary. Both databases were checked for duplicate records that may have been included in both KES and ENFOR databases. Where duplicate records were found, one of them was removed. Cougar mortality records were obtained from GOA Cougar Registrations which are completed by GOA District offices for every reported cougar death. These included rail and road kills, hunter and landowner harvest, and management removals.

Occurrences where there was no potential public safety risk were not included for the purpose of this summary. These were primarily sightings of cougars in backcountry areas or undeveloped lands where no property damage issues occurred and there were no behavioral responses from the cougar towards the observer that created any concern for public safety. Human-cougar occurrences in this summary, therefore, were incidents where an interaction took place between a cougar and a person or person's property that raised a concern over the safety of the observer or resulted in damage to personal property including livestock or domestic animals. The cougar's action, behaviour towards observer, and location of the occurrence, were also contributing factors. Generally, human-cougar occurrences for this report were those incidents involving the killing of livestock/domestic animals, cougars feeding on wildlife carcasses in areas frequented by people, attacks and threatening behaviour towards people regardless of location, or cougar presence in and around developed or residential areas where the presence of such animals creates a high risk to public safety.

In an effort to further evaluate the degree of severity and human risk associated with these human-cougar interactions, each occurrence was attributed a "severity level." These risk levels are based on Aversive Conditioning Indices developed by the Wind River Bear Institute (WRBI, 1999). They are intended to categorize the severity of each incident from a public safety/risk perspective and will help to inform management priorities for instituting mitigation efforts. Information was extracted from each record on location type, cougar behaviour, and food attractant in order to assign a severity level. Location type, cougar behaviour and attractant are described in Appendix I. Occurrences were assigned a severity level of Low, Moderate, High, Very High and Extreme. The intent of the severity level classification was to provide a clearer picture from a public safety perspective of the cougar activity occurring in the valley. For definitions of each severity level definition, refer to Appendix II.

An important aspect of this assessment was to spatially identify where and when in the valley the various types of cougar occurrences were taking place. To spatially analyze occurrence records, the study area was divided into a number of Location Zones to which individual occurrence records could be assigned (Map 3). Zones were identified within the study area, primarily based on municipal or geographical boundaries. The area (square kilometres) of each Location Zone was determined following removal of non-cougar habitat such as rock, ice, and water bodies. The result was a comparative density value number, calculated in records per square kilometre for each Location Zone. The use of density based values allowed for a comparison between Location Zones of unequal size. At that point, the number of human-cougar occurrences in a Zone was divided by the net area of each Zone. This was then multiplied by the number of years that human-cougar occurrences occurred to obtain a final value that was used to Rank individual Zones against each other. This provided an index for the abundance and frequency of occurrences in each Zone. The Ranks were as follows; Low (0.1 to 25), Moderate (25.1 to 50), High (50.1 to 100), and Very High (> 100). Zones with no human-cougar occurrences recorded were left as zero. Occurrences were further summarized by time (month and year), attractant type, and cougar behaviour and compared by Location Zone and jurisdiction. Jurisdictions included the Town of Canmore, M.D. of Bighorn, and Provincial Lands.



Map 3. Bow Valley Location Zones

# Results

Between 2000 and 2018, 381 occurrences were identified and analyzed for their spatial and temporal trends to examine factors such as attractants and their role in contributing to cougar occurrences. Mortality rates and causes of mortality were also summarized.

## Cougar Occurrences

Up until 2013, human-cougar occurrences had been increasing annually in the Bow Valley since 2000 (Fig 2). Since 2013, conflict related occurrences have declined to very low levels in 2017 and 2018. Some of the increase prior to 2013 is likely related to the improved reporting of occurrences that started in 2006. This was when GOA with the assistance of Bow Valley WildSmart began promoting the public reporting of wildlife activity via Kananaskis Emergency Services. As such, comparisons in occurrence numbers between pre- and post-2006 are likely not recommended.

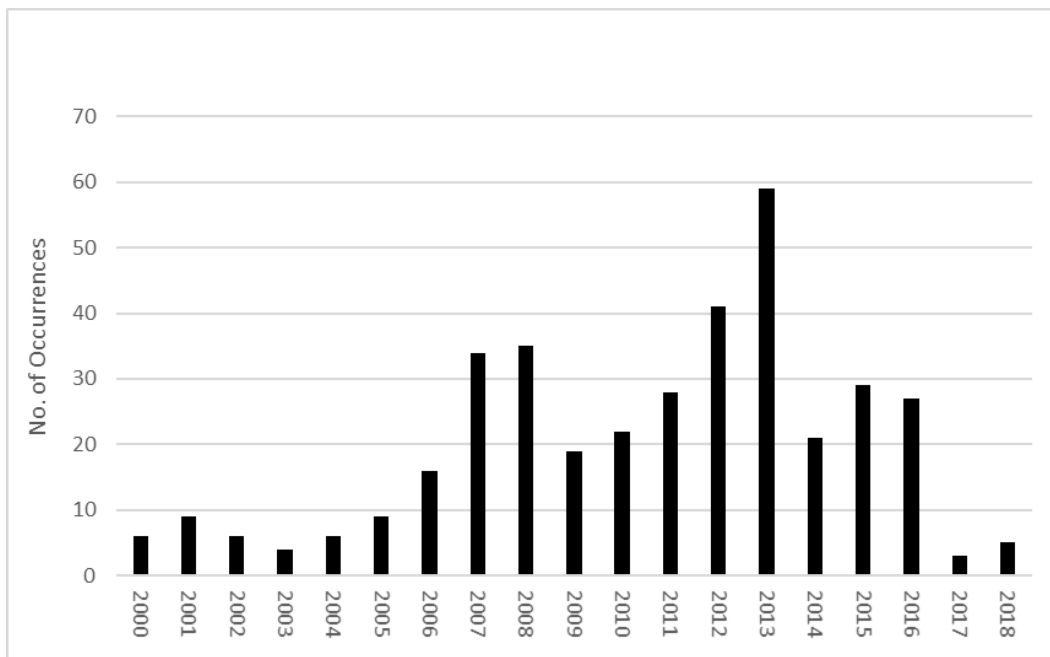


Figure 2. Annual Cougar Occurrences in the Bow Valley (N= 381)

It is difficult to attribute any one cause to the decline in occurrences post 2013. A reduction in actual cougar numbers, less use by cougars of human dominated developed areas, or perhaps changes in public reporting behaviour are possible explanations. Serious interactions such as attacks on people or pets as well as incidents of cougars in residential areas are likely to continue being reported so it is not likely the reduction in occurrences can be attributed to lower reporting.

## Cougar Mortalities

Known cougar mortality is relatively low in the Bow Valley (Fig 3). Between 2000 and 2017, 30 cougars were reported or found dead. Of the 22 mortalities where sex was known, 10 were females and 12 were males.

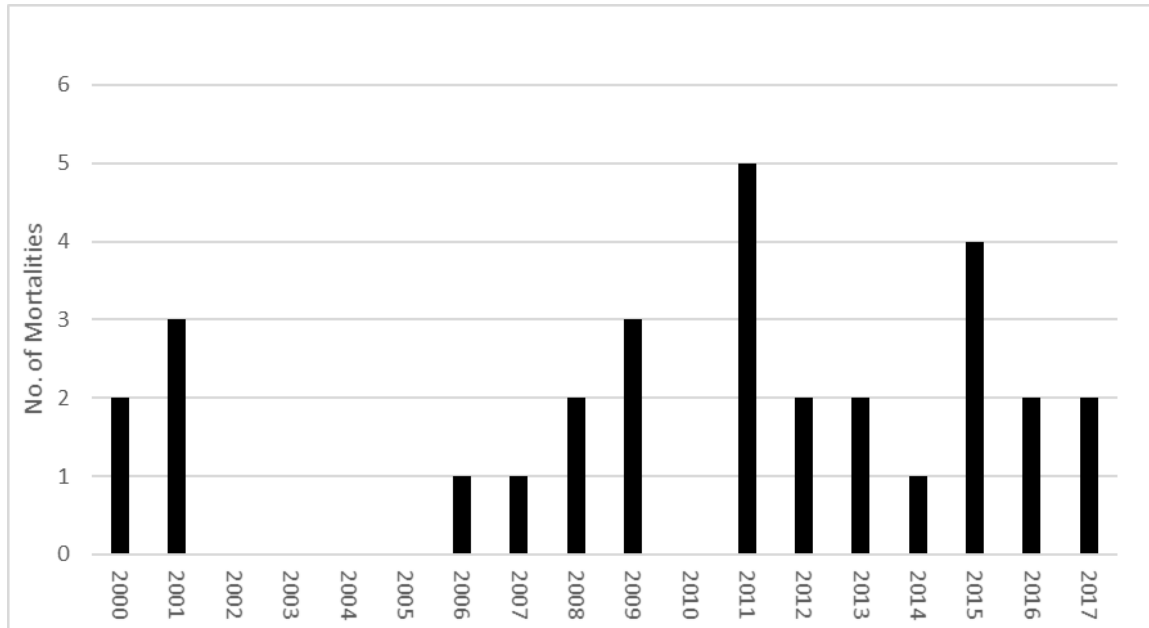


Figure 3. Annual Known Cougar Mortalities in the Bow Valley (N= 30)

Primary causes of mortality in cougar populations across the province vary depending on whether cougars are hunted or not. Where hunting seasons exist, most adult cougars are killed by hunters (Anderson and Lindzey 2005, Lambert et al. 2006, Stoner et al. 2006, Cooley et al. 2009, Robinson and DeSimone 2011). In Alberta, hunting is the primary source of adult cougar mortality on provincial lands. This is not the case in the Bow Valley. While cougar hunting is allowed in certain areas of the Bow Valley, much of the area is Wildland Park where dogs are not permitted to be off leash. This regulation limits the effectiveness (and desire) of hunters to harvest cougars.

Many cougar hunters, therefore, choose to hunt elsewhere where off-leash dogs can be used. In fact, there has only been two registered hunter kills reported over the last 18 years (Fig. 4) and the hunting quota that is set for the Bow Valley every year is rarely achieved. Hunter harvest of cougars in the Bow Valley is therefore very low (7% of total) relative to the rest of the province where hunting accounts for more than 60% of all mortalities (ESRD, 2012). By far the largest source of mortality has been from highway and railway collisions. This mortality source accounted for almost 62% (18 of 29) of all mortalities with 83% of those (15 of 18) being from highway collisions.

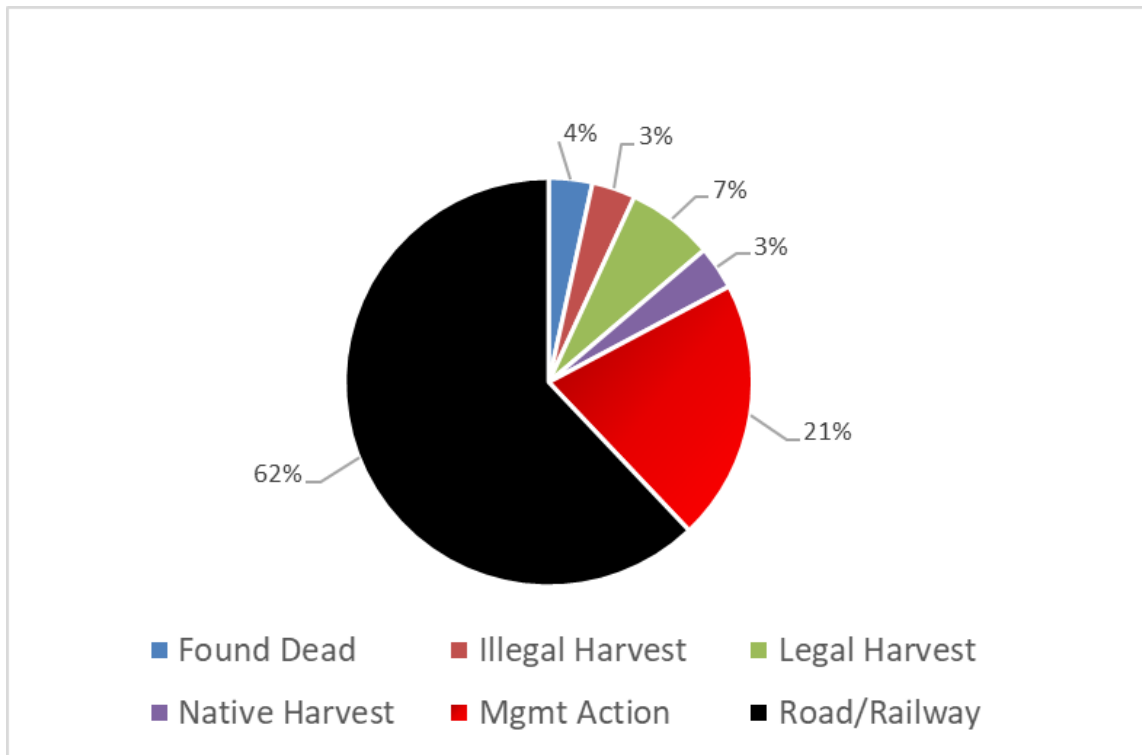


Figure 4. Known Causes of Cougar Mortalities in the Bow Valley (N= 29)

The second highest source of mortality was from management actions related to public safety concerns. Management actions were responsible for 21% (6 of 29) of recorded mortalities. These public safety related management removals involved cougars attacking pet dogs either on trails around Canmore (one in 2011) or in residential areas (one in 2000, one in 2007, and two in 2013). As mentioned earlier, attacks on people are rare but they can occur. In 2011, two young habituated cougars were radio-collared in Banff National Park after they had been seen regularly around the Banff townsite. One of these, a young male, was euthanized near Bow Valley Provincial Park after it attacked a young girl near Barrier Lake. His sibling was also destroyed that

summer thereafter after several close distance approaches with recreationists in the Canmore area.

## Human-Cougar Security Levels

In an effort to evaluate human-cougar occurrences into a metric relative to public safety concern and level of property damage, each occurrence record was assigned a severity ranking from Low to Extreme. The majority of the occurrences (64% or 244 of 380) were Low (Fig 5). Low level occurrences were primarily those of cougars frequenting residential areas, facility areas, and urban green spaces in the valley; 20 % (77 of 380) were High, followed by Moderate (9% or 32 of 380) and Very High (7% or 27 of 380). High level occurrences involved cougars preying on wildlife in residential areas or feeding on carcasses in developments such as residential areas, facilities/ playgrounds, urban green spaces and on trails.

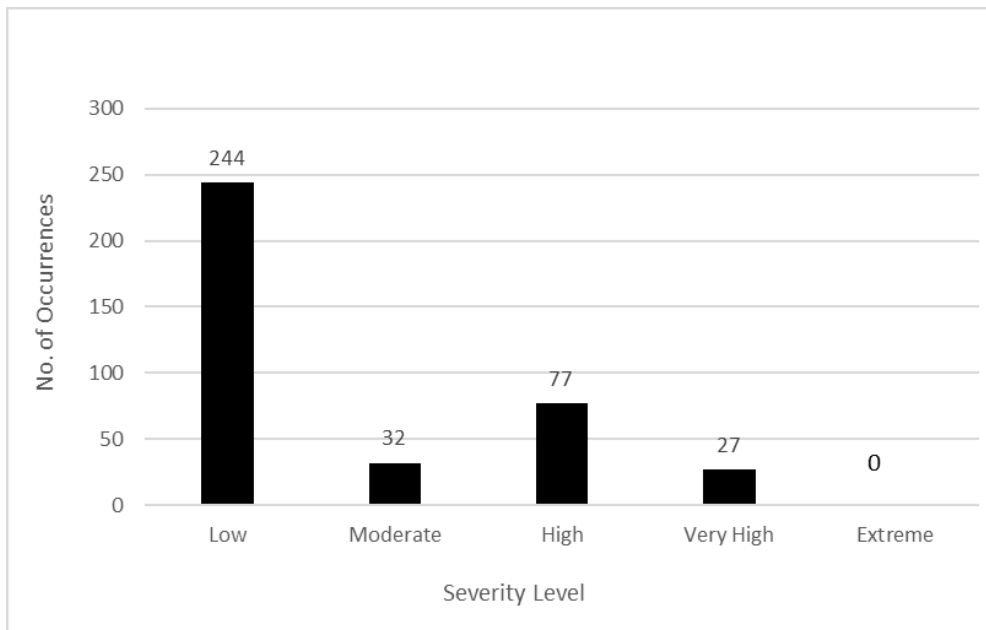


Figure 5. Cougar Occurrence Severity Levels in the Bow Valley (N= 380)

There were instances of cougars closing distance on people. In many of these cases, dogs were with the observer and may have been the reason for attracting the cougar's attention. Very High occurrences typically involved cougars preying on domestic animals, primarily dogs although there were a few instances of cougars attacking rabbits in town. Attacks on domestic animals occurred in residential areas, on designated trails, and in facility/playground areas. When dogs were involved, most were off-leash although at least two incidents involved dogs that were on a leash with their owners. There were 2 instances where cougars chased or stalked a person. One was a hunter while the other was a young boy in town. No contact was made in either instance.



There have been no Extreme level occurrences (cougars attacking and injuring or killing people) since 2000. Low to Very High Severity levels occurrences are present in most years between 2000 and 2018 (Fig 6).

Human-cougar occurrences occurred throughout the year with peak times occurring in July-August and the main winter months of December through March (Fig 7). High summer related occurrences likely coincides with high levels of human activity throughout the valley and possibly young cougars learning to hunt for themselves. During summer, longer daylight hours, warmer temperatures, and a lack of snowpack to impede ease of movement all lead to higher levels of human use throughout the valley and into cougar habitat for longer periods of time. The high winter occurrence activity is likely related to a concentration of prey species (ungulates) near and within developed areas during that time. Both High and Very High human-cougar occurrences exist during most months of the year.

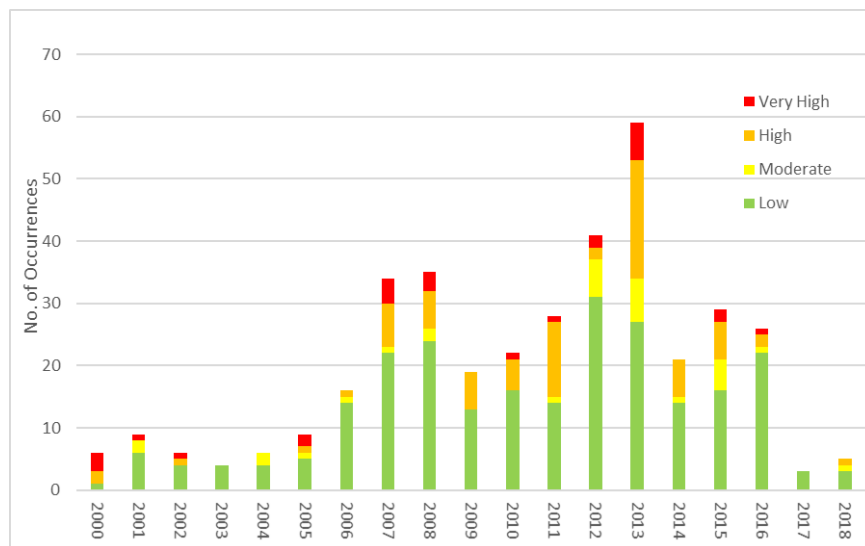


Figure 6. Annual Cougar Severity Levels in the Bow Valley (N= 380)

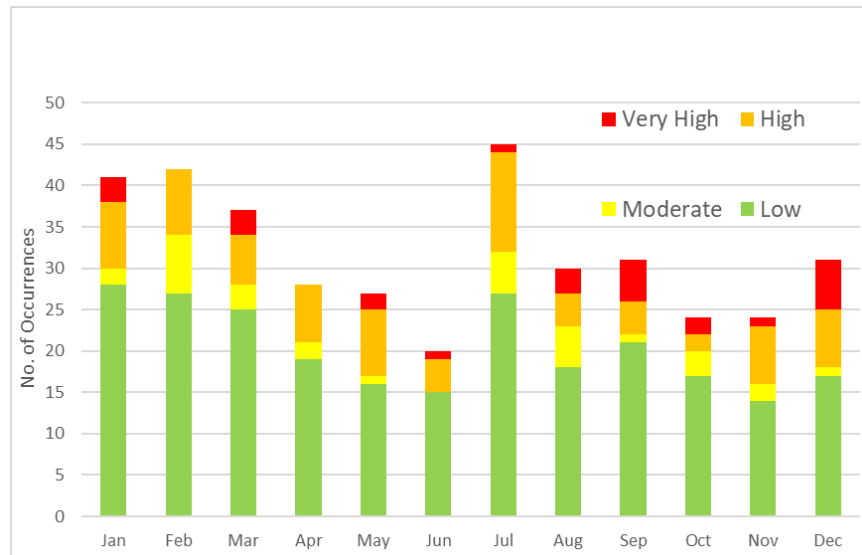


Figure 7. Monthly HCO by Severity in the Bow Valley (N= 380)

## Location Type

The majority of occurrences (74%, 284 of 381) occurred within the Town of Canmore. This was followed by 18% (67 of 381) of occurrences happening on provincial lands and 8% (30 of 381) on lands within the MD of Bighorn. Occurrences on provincial lands took place primarily along trails, day use areas, or near recreational facilities such as YMCA Camp Chief Hector or Rafter 6 Guest Ranch. MD of Bighorn related occurrences happened within the urban areas of Harvie Heights, Dead Man’s Flats, and Exshaw.

Residential Urban areas had by far the greatest proportion of occurrences (53%, 201 of 381). Facility areas, Trails, and Urban Green Spaces experienced the next highest number of occurrences in roughly equal proportions at 14%, 10% and 12% respectively (Fig 8). These three location types also had the highest number of High and Very High severity level occurrences. Interestingly, golf courses had 21 occurrences. One occurrence happened on the Canmore public golf course while the rest were equally distributed between Silvertip and Stewart Creek. These occurrences speak to the attractiveness of these golf courses as habitat for prey species such as elk and deer.

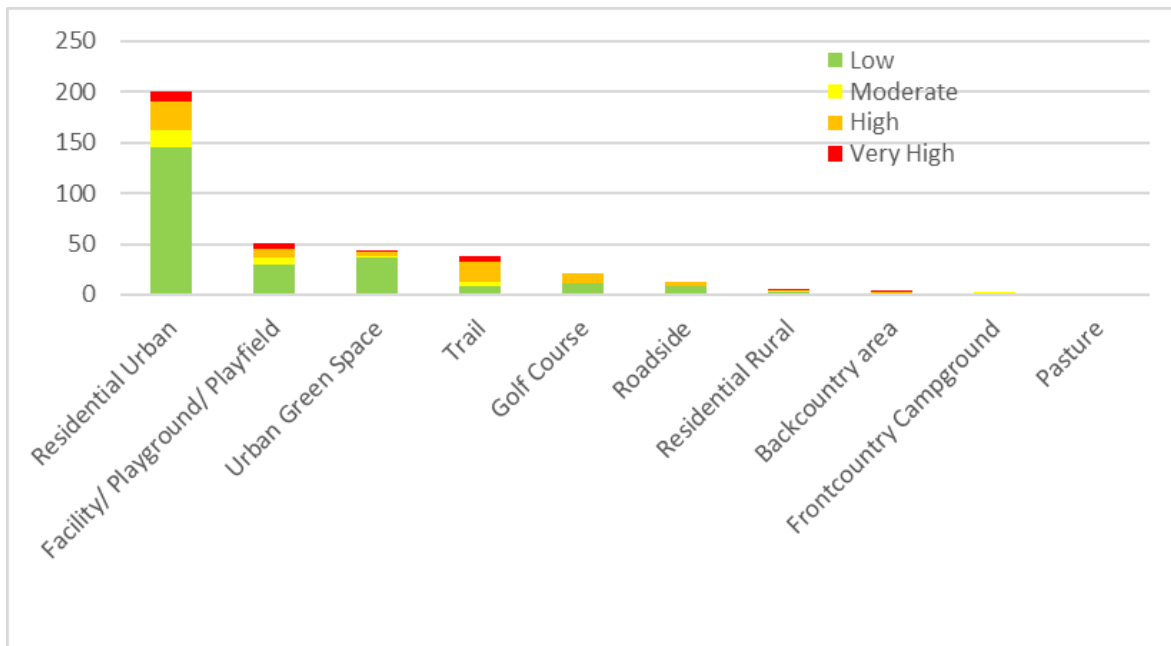
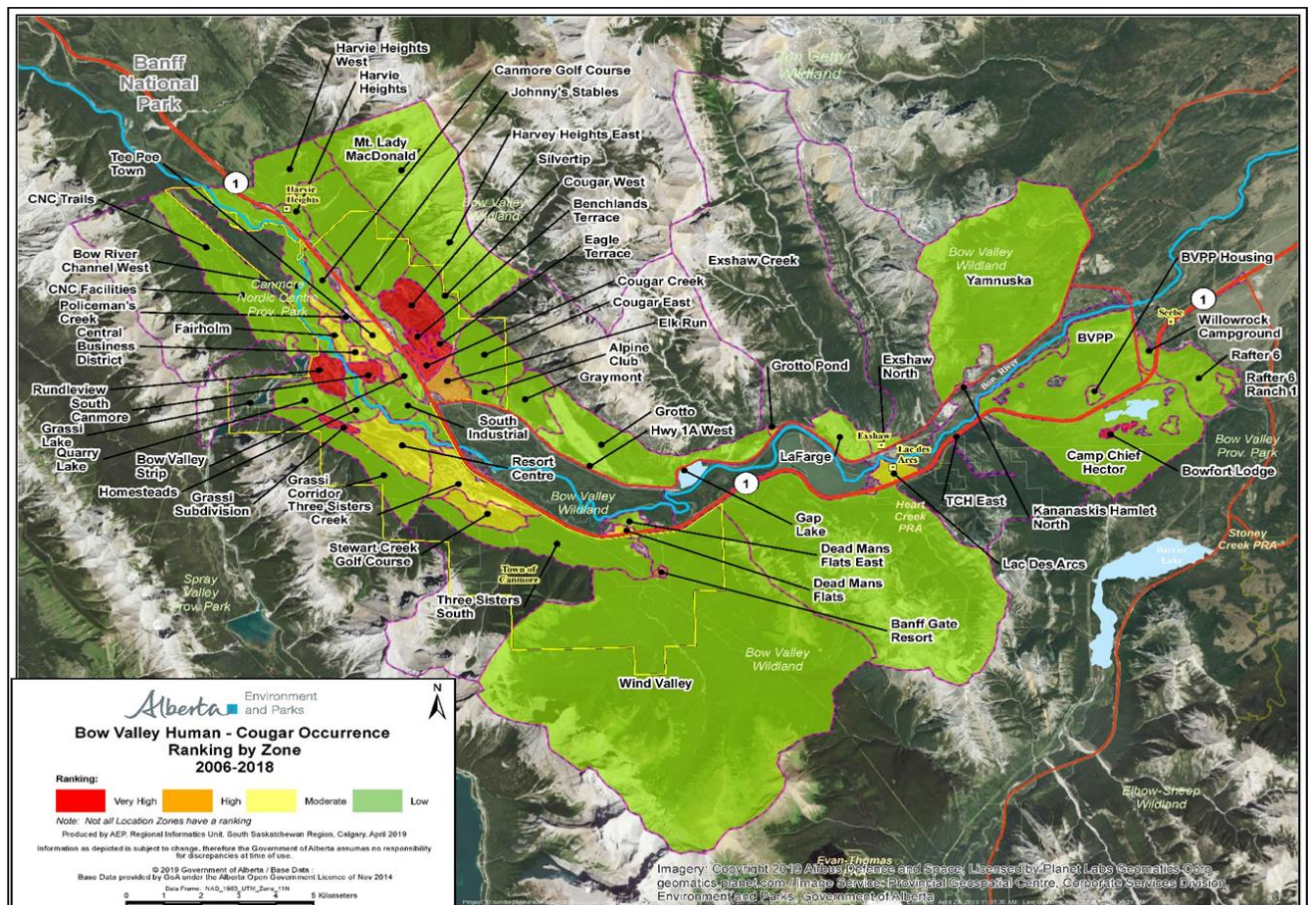


Figure 8. Number of Occurrences and Severity Levels by Location Type in the Bow valley (N= 381)

## Spatial Distribution of Occurrence

The valley was therefore divided into a number of Location Zones and each Zones was attributed a relative index of the magnitude and annual existence of human-cougar occurrences within the various Zones. The Zones were ranked Low, Moderate, High and Very High and are considered to be different ranking levels than those used for cougar severity levels. The areas with Very High rankings were primarily on the north side of the valley and included Eagle Terrace, Cougar Creek, Bow Valley Strip, Silvertip, Benchland's Terrace, and Elk Run (Fig 10). Very High ranked zones on the south side of the valley included Grassi Subdivision and Rundview. Eagle Terrace was the highest ranked zone in the valley. The remaining zone ranked Very High was Bow Valley strip. The common theme, with the exception of Bow Valley strip is that these Zones all border wildlife corridors. Bow Valley strip lies adjacent to largely undeveloped tracts of forested land within the Industrial Zone and Bow Flats along the Bow River.



Map 4. Ranking of Location Zones of Human-Cougar Occurrences in the Bow Valley

## Attractants

As mentioned earlier, cougars are attracted to areas with an abundance of prey species and attractants play a key role in increasing opportunities for interactions between cougars and people. Over the last 25 years there has been a rapid conversion of high quality wildlife habitat into human developments and a subsequent reduction in areas suitable to sustain local prey population. Some of this high quality habitat is often adjacent to or interspersed with high density urban development. This habitat is often used by prey species that are relatively habituated to human presence. Additionally, as the human population has increased, so too has recreational activities in designated wildlife habitat outside of developed areas. These situations result in predator/prey incidents occurring in close proximity to people and developments and can lead to public safety concerns.

There were 122 of the 381 occurrences (32%) identified as having an associated attractant. This is likely an underestimate as an attractant may have been present but not identified in many of the occurrence reports. The majority of attractants involved wildlife (52%) - either wildlife carcasses (34%) or wildlife actively being preyed upon (18%) (Fig 9). These included a variety of species including deer, elk, and bighorn sheep. Domestic animals constituted 37% (45 of 122) of the attractants involved in human-cougar occurrences with 80% of the species involved being dogs (36 of 45). The other domestic species involved were cats (2), horses (4) and rabbits (3). Humans were considered to be the attractant involved in 7% (9 of 122) of the occurrences. These occurrences involved cougars approaching, following, or acting in a threatening manner toward a person but did not result in the cougar chasing or charging the individuals. Garbage and human food was involved as an attractant in a small number of instances (4 of 122). This is a testimony to the effectiveness of the bear proof bins that exist throughout the valley.

The winter months seemed to be the most active periods for cougar occurrences (Fig 7). This may be the time period that cougars venture into developed areas looking for ungulates which have moved into townsite areas for the winter. Deer and elk will often move into town to avoid predation from cougars and wolves during winter. There have also been cases of residents leaving out food for deer in the form of salt blocks and vegetables. Feeding birds and rabbits is also known to attract deer into residential areas. When this happens residents increase the likelihood of having a cougar visit their properties in search of food; natural prey or otherwise.

In these instances, cougars may opportunistically prey on domestic pets. Although attacks on domestic pets occurred during every month, the highest number of occurrences involving cougars killing dogs was in December (7 of 46) and March (6 of 46). The other peak month for the killing of dogs was in July.

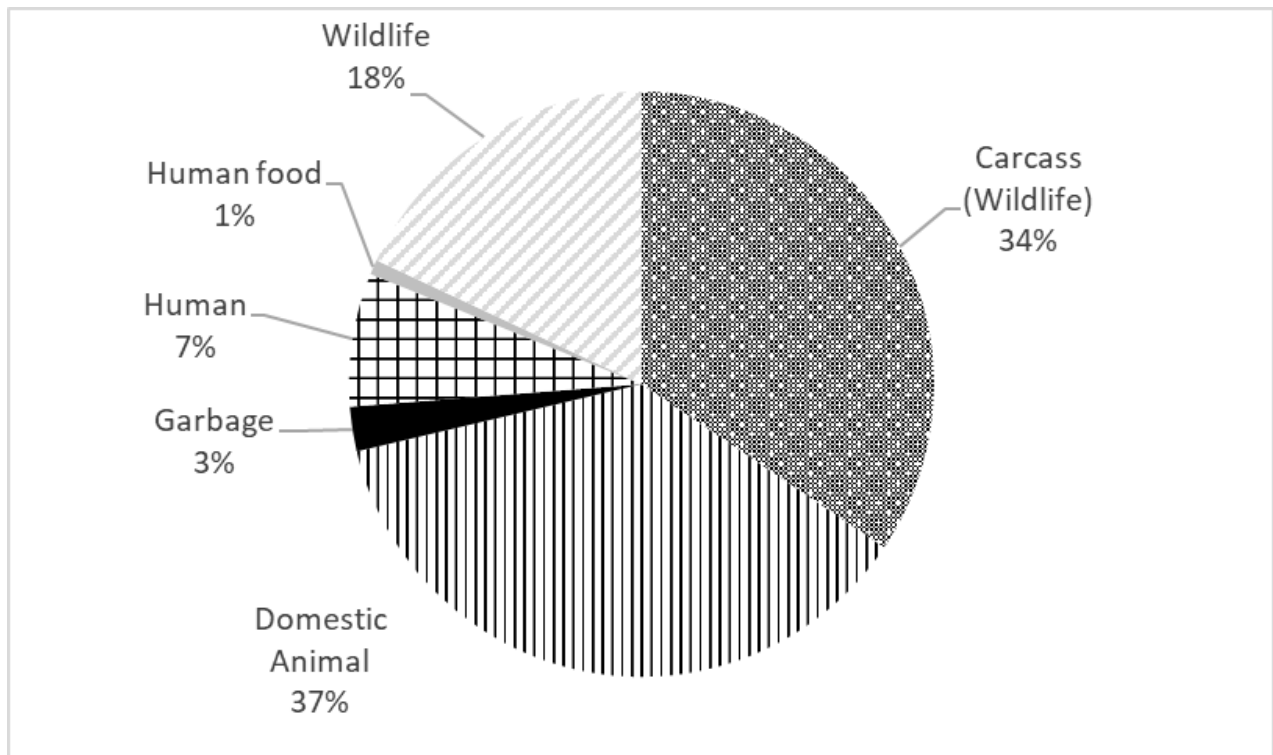


Figure 9. Cougar Occurrences by Attractant Type in the Bow Valley (N= 122)

## Cougar Behaviour

Behavioural activity of cougars was recorded whenever possible during human-cougar interactions. Of 379 occurrence reports, 311 reported some form of cougar behaviour during the interaction (Fig 10). The behaviour type most frequently observed was Retreat (24% or 73 of 311). Retreat behaviour usually involved cougars either running or walking away. The next most frequent behaviour type was Unaware (22% or 67 of 311). These were instances when an occurrence took place but the cougar was unaware of being observed. Often these were instances of cougar activity being observed from inside a dwelling or when tracks were left passing thru residential properties.

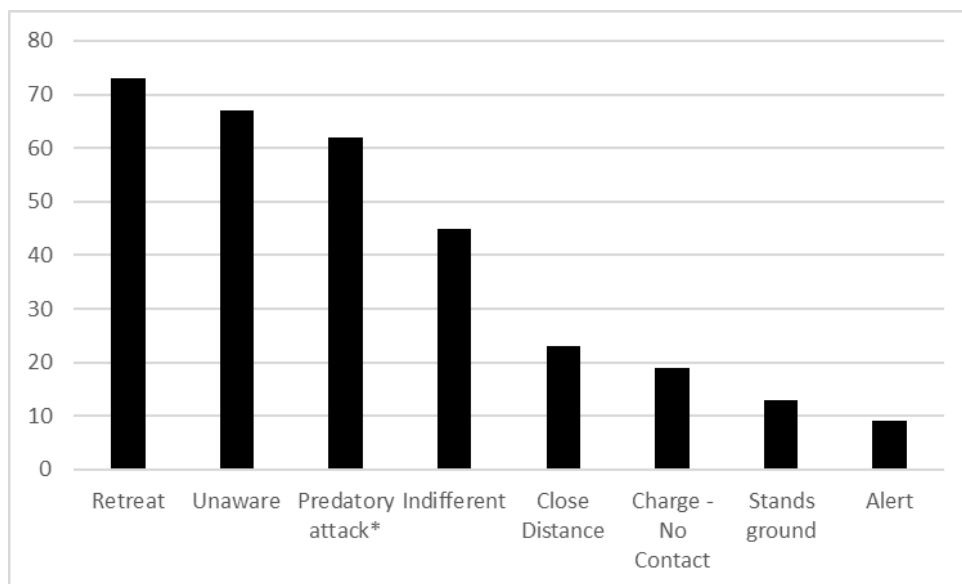


Figure 10. Cougar Occurrences by Behaviours in the Bow Valley (N= 311)

Predatory attacks applied to occurrences involving carcasses and the killing of wildlife or domestic animals. This was the third most frequent behaviour (20%, 62 of 311) (Fig 13). Indifferent behaviours were instances where the cougar was aware of the presence of people but continued with whatever activity they were previously engaged in (14%, 45 of 311 instances). Cougars “closed distance” on people and/or pets in 23 of 311 (7%) instances but did not make any contact. Cougars charged at but did not make contact during 6% of recorded occurrences (19 of 311). Of these 19 occurrences, 11 involved chasing of wildlife primarily in residential areas, 6 involved domestic pets, and 2 were charges at people. The remaining behaviour types, Stand Ground and Alert, were observed 13 of 311 and 9 of 311 instances respectively. When cougars stood their ground there was more aggressive type behaviour such as crouching, hissing or baring teeth exhibited whereas with Alert behaviour animals usually just watched, stared, or sat up). For both these behaviour types cougars neither retreated nor approached.

## Education

The primary program related to managing cougar related occurrences currently is public education. Alberta Environment and Parks (AEP) has a provincial Cougar Aware pamphlet that focuses on how to prevent human cougar interactions and what to do if you encounter a cougar <https://www.alberta.ca/cougars-and-outdoor-recreation.aspx>. Informative signs at recreational facilities, pamphlets, and community and school presentations about safely living and recreating in cougar habitat can help to reduce human cougar occurrences (Sweanor and Logan 2009). Educational signage has been installed in multiple locations in the Bow Valley in an attempt to further educate the public on cougar prevention (Fig 11). The Bow Valley WildSmart program also promotes similar messaging to Bow Valley residents and recreationists. The WildSmart speaker series has scheduled cougar biologists to come and speak to residents during the winter months.



Figure 11. Cougar Signage at the Canmore Nordic Centre

As discussed, natural and unnatural food sources bring elk and deer into developed areas habituating them to human presence. Cougars will also frequent developed areas, particularly if there is a food source present. This, in turn, leads to them become comfortable around developments and people. The high number of occurrences in and adjacent to residential urban and facility areas is testimony to this. This can increase their exposure to domestic pets. Town of Canmore has a bylaw against feeding of animals that could attract other wildlife and thus has enforcement capability to charge people for feeding deer. While education is important, enforcement of the Town bylaw is an important option as well to emphasize the importance of not feeding prey species, natural or otherwise, in order to reduce potential conflicts with cougars.



# Conclusion

Many programs have been initiated in the Bow Valley in an attempt to encourage human - wildlife coexistence. The creation of wildlife corridors and habitat patches has set aside land to enable wildlife to move through the valley. Crossing structures and highway fencing has reduced transportation related mortality in the areas where those structures are in place. The primary focus over the years has been on managing bears but more recently, other wildlife such as elk, cougars and coyotes have begun to generate increasing concern with wildlife managers. As with most wildlife, cougars may utilize habitats in highly developed landscapes because of the available food sources they provide. High quality habitat for prey species (deer and elk) is found within many developed areas of the Bow Valley. In pursuit of this prey, cougars will opportunistically take advantage of other prey, including domestic pets and rabbits that reside within those developed areas. Outside of developed areas, increased recreation brings with it more potential encounters with people and their pets.

The management of food sources is key to reducing occurrences between people and cougars. Not attracting potential prey species into developed areas while increasing high quality habitat for cougars and other wildlife where we want them to be is key to reducing the number of cougar occurrences in the valley. From an educational perspective, the Bow Valley WildSmart program has done a remarkable job getting the message out to locals, recreationists and tourists alike regarding how to coexist with wildlife.

The prevalence of prey species in residential areas, and people still recreating without bear spray are all indications that there is still work to be done. This will most certainly require residents and recreational users in the Bow Valley to further adjust their lifestyles to some degree to allow wildlife the space they need to thrive in the valley and to do so outside of developments.

Much of that educational messaging needs to be directed within the Town of Canmore, where 74% of all human-cougar occurrences occurred. Where educational messaging is deemed ineffective, enforcement options, including existing municipal wildlife attractant bylaws, should be helpful.

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# Appendix I

## Definitions

### **Location Type:**

Front country Trail: Municipal trail or other within developed area

Trail Backcountry: Trail in wilderness setting

Front country Campground: Formal, designated highway (non-ATV) accessed campground.

Backcountry Campground: Formal designated non-highway vehicle (i.e. foot, horse, boat, ATV) accessed campground.

Campground Random: Informal, non-designated vehicle or no vehicle accessed campground.

Facility/Playground/Playfield: Non-residential type facility (clubhouse, commercial development, recreation centre, school etc.) or playground or sports field.

Golf Course: Formal golf course.

Day Use Area: Designated picnic area or trailhead.

Railway: Railroad

Roadside: Any road used by highway approved vehicle.

Residential Urban: A residence (yard, driveway etc.) located in a high density urban setting (Town, city, village).

Residential Rural: A residence including outbuildings, located in a low density residential areas (e.g. rural acreage, farm, cabin).

Pasture-(private land): Private lands used for grazing livestock.

Urban Green Space: Forested patches of green space within municipal areas (e.g. environmental reserve, wildlife corridor, municipal reserve, and park).

Backcountry area: An area away from any human developed footprint e.g. trails, roads, residences, and facilities.

## **Animal Behaviours:**

*Alert:* Animal acknowledges person's presence by staring, standing up, sniffing air etc. and stops activity it was engaged in prior to person's arrival but does not close distance or retreat.

*Close distance:* Animal closes distance on person or animal (would include head-on approach or following) but does not make contact.

*Predatory Attack:* Cougar chases and kills/injures an animal or human.

*Charge-no contact:* Cougar closes distance aggressively (chases) an animal or person but does not make actual contact with the person or animal.

*Stands ground:* Animal does not retreat or close distance on person but exhibits agitated behaviour (vocalizing, growling, swatting ground).

*Indifferent:* Animal aware of person's presence but continues activity.

*Retreat walk:* Animal increases distance from person by walking but does not go into cover.

*Retreat run:* Animal increases distance from person by running but does not go into cover.

*Retreat to cover walk:* Animal increases distance from person by walking and does go into cover.

*Retreat to cover runs:* Animal increases distance from person by running and does go into cover.

*Retreat:* Animal increases distance but no indication provided as to whether it walked, ran, or whether it entered cover or not.

*Unaware:* Animal is unaware of you.

# Appendix II

## Cougar Occurrence Security Levels and Definitions

### Based on WRBI Indices (WRBI 2003)

No Occurrence (these occurrences types were not included in this summary)

Cougar feeding on natural prey (including carcasses) or travelling in non-developed areas (e.g. backcountry areas); or travelling irregularly thru campgrounds (front country, backcountry or random), golf courses and general sightings in the backcountry.

#### Low

Cougar feeding on wildlife (including carcasses) adjacent to or in unoccupied developed areas (e.g. closed trailheads, campgrounds, picnic areas, day use sites, golf courses); travelling through residential areas (e.g. yards, streets, driveways), repeated sightings on trails, campgrounds, day use sites, golf courses.

#### Moderate

Cougar feeding on non-natural foods (e.g. garbage) adjacent to or in developed areas; body commitment into/onto manmade structures (decks, dumpsters, pickup beds, corrals), standing ground behaviour.

#### High

Cougar predating/feeding on wildlife (including carcasses) near or in developed areas (includes designated trails, urban green spaces); predating on domestic animals (livestock, dogs, cats) in non-developed areas (e.g. trails, urban green spaces, backcountry areas, pastures), partial or whole body commitment into 2 or 3 sided structures; closing distance/following behaviours.

#### Very High

Cougar depredate on domestic animals (livestock, pets) in developed areas; entering 4 sided occupied or unoccupied structures for food or shelter; major property damage; charges people or domestic pets.

#### Extreme

Cougar injures or kills people.