



Cougars on the Edge

TRACKING MOUNTAIN LION BEHAVIOR AT THE URBAN-WILDLAND INTERFACE

By Mathew W. Alldredge



Credit: Colorado DOW

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A rainy Thursday morning this past May began like any other for most residents of Fort Collins, Colorado. People settled into work, enjoying their coffee, while kids daydreamed about recess as their teachers began to outline the plans for the day.

At 8:30 a.m., the peaceful morning erupted into chaos when Fort Collins police notified the community that a cougar was sighted in the 1400 block of Maple Street, not far from where one had been spotted just two days earlier. Two city elementary schools went on lockdown as wildlife officers combed the area for the cougar without success. Residents were advised to “proceed with extreme caution.” The cougar was not found.

Similar scenes have played out with increasing frequency across the western United States, where sprawling human populations mean that cougars (*Puma concolor*)—also known as mountain lions,

catamounts, panthers, or pumas—are finding themselves stuck on the edge between natural habitats and human-dominated landscapes, and caught in the nexus between cougar conservation and public safety. Exurban areas and even some urban areas, inhabited by wildlife-loving residents and their carefully tended lawns and gardens, attract ungulates and other cougar prey. Predator populations inevitably follow.

The resulting human-cougar interactions can range from a mere sighting to the killing of a pet to—far more rarely—an attack on a human, and such situations cause conflict, raise fears, and challenge managers. That’s why my colleagues and I at the Colorado Division of Wildlife (CDOW) are engaged in multi-year studies of cougar populations, tracking individual animals as they make use of developed and undeveloped landscapes, and monitoring their responses to management techniques like translocation and aversive conditioning. We’re hoping that better information about cougar habits and responses to management will enable us to both conserve cougar populations and maintain human safety.

Setting the Stage for Conflict

Cougars once occupied a range in the Western Hemisphere larger than that of any terrestrial mammal (other than humans) since the Pleistocene (Rabinowitz 2010). Highly adaptable, cougars inhabited deserts, grasslands, tropical rainforests, temperate mountains, and boreal forests. After Europeans settled North America, however, they virtually eliminated eastern cougar populations and dramatically reduced western populations in an effort to protect livestock and valued game species, and also to protect themselves. Later, government-funded control and bounty programs, along with widespread unregulated killing of predators in the late 1800s and early 1900s, contributed to further cougar population declines.

Beginning in the 1960s, cougar killing was regulated in most of North America and cougar populations throughout much of the West began to increase.



Credit: Colorado DOW

Treed by hounds in Boulder County, a young female cougar takes a rest. Cougars have proven adept at finding their way into urban and suburban areas, stirring up controversy over how to manage them. Opinions may range from “leave them alone” to “kill every one.”



Today, most western states and provinces report stable or increasing populations, even in habitats that adjoin major urban and metropolitan areas ([Cougar Network](#)).

As cougar populations have rebounded over the last 40 to 50 years, human populations have grown apace. Throughout the western states, urban populations have expanded into foothills, canyons, and mountains—the same areas where cougars are re-establishing populations. Humans are often drawn to rural and exurban communities because of a desire to be closer to nature and to see and interact with wildlife, but that sentiment can change once they encounter a cougar on their own streets.

These exurban dwellers alter the environment in other ways that can lead to negative human-cougar interactions. Their pets, from a cougar's perspective, may be construed as alternative prey, or even competition if a dog happens upon a cougar's prey cache. Additionally, due to private property rights and constraints on access, sport-hunting opportunities in residentially developed areas are typically limited, allowing prey populations to flourish. Likewise, there is little hunting-caused mortality on urban cougar populations, allowing these populations to expand.

In response to the onslaught of human development, many state, county, and city governments in the West have purchased land to manage for wildlife. These parcels, combined with the huge tracts of public land managed by the U.S. Forest Service (USFS), Bureau of Land Management (BLM), U.S. Fish and Wildlife Service, the National Park Service, and privately-owned ranching properties, provide extensive, connected habitat for wildlife. As wide-ranging species like cougars—which can have territories of greater than 100 square miles—explore the borders of these protected habitats, they are increasingly living in human-dominated landscapes.

Management in the Middle

With more people in wildlife habitat, expanding cougar populations, limited hunting, ample wild and domestic prey, and potential competition over resources, the stage is set for conflict. It's therefore no surprise that, over the last few decades, wildlife agencies in the West have been dealing with an ever-increasing number of cougar incidents in urban and exurban areas. When responding to a



Credit: Colorado DOW

sighting or complaint, wildlife officers have been known to find a house cat or dog mistaken for a cougar, a cougar statue, a cached prey item, a cougar track, or even a cougar warming itself on the cover of a resident's back-porch hot tub.

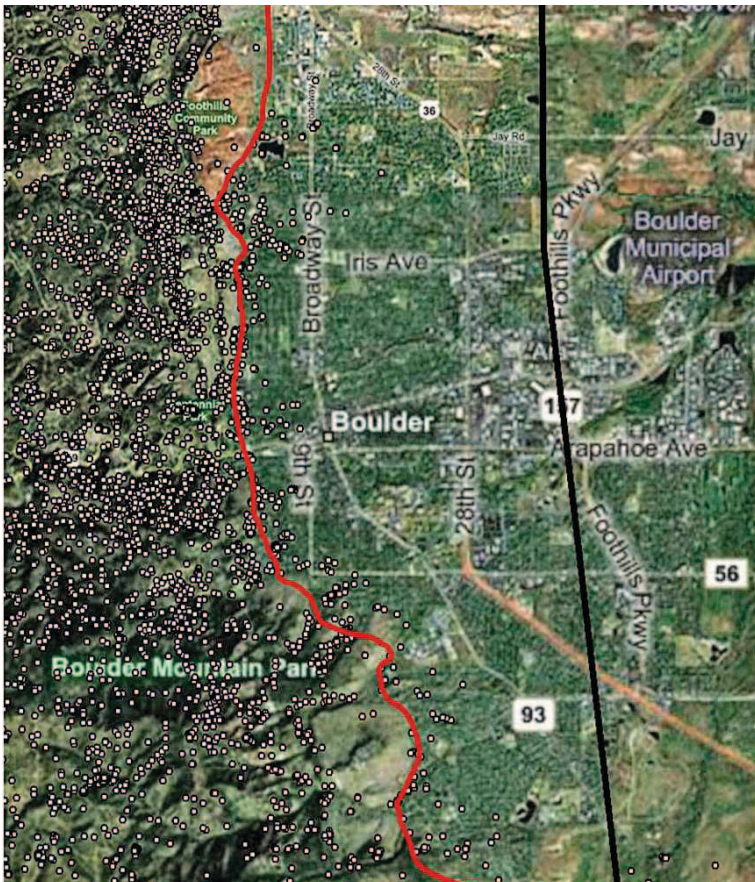
Much rarer are reports of cougars attacking people. From 1890 to 2008, there were 21 confirmed fatal cougar attacks and 154 confirmed non-fatal attacks ([Cougar Info 2009](#)). But the risk of an attack is growing for individuals who live or recreate in cougar habitat: The number of attacks on humans in the U.S. and Canada increased nearly five-fold from the 1970s to the 1990s, with 14 fatal attacks and 64 non-fatal attacks occurring in that time period ([Mattson *et al.* 2011](#)).

When a complaint about a cougar is found to be legitimate, a responding wildlife officer must determine the best course of action, factoring in the type of interaction (nuisance, depredating, or dangerous), cougar behavior, cougar status (age, sex, and health), cougar history (first time offense versus repeat behavior), location (densely populated versus rural), and public safety. Based on this assessment, and taking into consideration conservation of cougar populations, the officer may choose one or more of the following responses:

- No action toward the cougar, but provide educational materials or in-person visits to the reporting party and community as appropriate.

Researchers with the Colorado Division of Wildlife outfit a sedated male cougar caught in Boulder County with a GPS collar. Information gleaned from tracking this and other cats has indicated that, while some individual animals make use of urban areas, most go out of their way to avoid human activity.

Go to www.wildlife.org to get information about *Managing Cougars in North America*, a new book written by leading cougar researchers and published by the Western Association of Fish and Wildlife Agencies and the Berryman Institute.



Credit: Colorado DOW

- Deterrent methods (such as fencing), combined with education efforts.
- Aversive conditioning of cougar (non-lethal projectiles, pepper spray, or hounds) combined with education efforts.
- Capture (through immobilization or trapping) and relocation of the cougar.
- Killing the cougar.

Picking the “best” path isn’t easy, especially since dealing with the human side of the equation is half the battle. Public sentiment runs the gamut from “the cougars were here first, so leave them alone” to “get rid of all of them because it is only a matter of time before they kill someone.” Defining acceptable levels of human safety is extremely difficult. In a 2005 public opinion survey in Colorado, 56 percent of respondents felt it was highly to moderately acceptable to destroy a cougar that attacks and injures or kills a person who is recreating in cougar habitat, 36 percent felt that eliminating the cougar was only slightly acceptable or unacceptable, and 8 percent were unsure (CDOW 2006, unpublished data). Of course,



Credit: Colorado DOW

The GPS locations of collared cougars near the city of Boulder, Colorado (left), indicate that they prefer to stay outside city limits. But when city residents spot a cougar or evidence of one, such as a deer carcass cached in a homeowner’s carport (above), the predators can sometimes feel too close for comfort.

opinions change when the person is actually involved in an incident with a cougar.

In addition, there is limited information available regarding how cougars use urban and exurban habitats and how they respond to management prescriptions (CMGWG 2005). For instance, there are conflicting opinions and evidence as to whether cougars in developed areas become habituated to humans, human activities, and urban landscapes or are just utilizing these areas opportunistically and generally avoiding humans. Understanding this simple dichotomy can significantly affect management decisions. While a habituated cougar would be a candidate for relocation or removal, the opportunistic cougar may not justify such a response because it likely will not be seen in the area again. To attempt to get a better understanding of how cougars interact with humans, use urban and exurban areas, and respond to management practices, CDOW—as well as many other western state agencies—have embarked upon research projects in and around the urban-wildland interface.

Tracking Cougars

In one such project, we have spent the last five years conducting an ongoing fine-scale study of 62 GPS-collared cougars living along the northern Front Range of Colorado, an area with a significant and



growing human population. Specifically, we've focused on Boulder, a city with a population of roughly 100,000, up from 77,000 just 30 years ago. The town's western edge traverses prime cougar habitat with a large population of ungulates such as elk and mule deer—prime cougar prey. The surrounding area contains small mountain communities, scattered housing developments, small ranches, and lands owned by local governments, the USFS, and the BLM. Each year CDOW responds to a large and increasing number of cougar incidents from Boulder and the surrounding area, ranging from sightings and prey caches to more aggressive encounters.

As part of our study, we record the collared cougars' positions seven or eight times a day. Some of our best data has come from six adult females that include the city of Boulder in their home ranges. All six have interacted with humans in some way within city limits and have been reported by the public: Either they've been seen by a resident or they've cached a deer or raccoon carcass in a populated area.

Wildlife officers respond differently to these interactions, depending on their nature and frequency. Two of the six cougars entered Boulder only once and were captured and translocated up to 100 miles outside of the city. Two others entered the city occasionally, and even killed deer within the city limits, but were not translocated, primarily because interactions with these two cougars generally involved periods when they had older cubs that were utilizing small prey items, such as raccoons or house cats. The remaining two cougars entered the city more often: Up to 6.5 percent of their GPS locations were within city limits. These two were euthanized because of repeated sightings in town. Based on our GPS data, however, cougar use of lands within city limits was minimal, despite the large numbers of deer and other prey available in Boulder. In fact, our analysis indicates that they use privately owned land less than we would expect based on its availability (see map on page 74). For the four infrequently visiting cougars, the more tolerant, non-lethal management actions appear to be justified.

Clearly, cougars use human-dominated landscapes. But our study indicates that, at a fine scale, the cats seem to avoid centers of human activity in both space and time. Even as cougars travel and hunt in the urban-exurban landscape, they seek areas farthest from human structures or activities. Researchers in California and Washington have demonstrated

similar patterns (Burdett *et al.* 2010, Kertson 2010). In Colorado, we've frequently found cougars moving cached prey items from human structures to locations farther away from human habitation.

While cougars are normally most active at dawn, dusk, and nighttime, we have found that they adjust their activity patterns within urban areas to be more active at night, after human activity declines. Of the times we recorded a cougar located within city limits, 76 percent occurred between 11 p.m. and 5 a.m. We observed that cougars generally entered the city at night, traveled longer than normal distances to reach daybeds, and returned to urban prey caches the following night significantly later than they would return to a cache in a more remote setting.



Credit: Ian Morris

None of the 62 collared cougars have shown any signs of habituation to or selection for domestic animals, suggesting that depredation on domestic animals by cougars is primarily opportunistic. After investigating more than 1,100 potential predation sites and more than 400 confirmed feeding events from our data, cougars have killed or scavenged just 23 domestic animals, including an alpaca, a domestic bird, five dogs, and 16 domestic cats. Cougars have also attacked dogs when the pets investigated a prey cache or roamed into undeveloped areas in cougar habitat.

In addition to our Boulder-area study, we've been tracking cougar population dynamics for the past six years in a slightly more wild setting, on the Uncom-

Photographed from a home in the foothills outside Boulder, a female cougar drags a freshly killed deer across a driveway before caching it in a nearby tree. As human populations expand into the wildlands of the American West, even cougars behaving normally—stalking, eating, and caching prey—may wind up in developed areas.




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pahgre Plateau in western Colorado. We've tracked 11 GPS-collared cougars venturing into Log Hill Mesa, an exurban development on the plateau that happens to be in high-quality cougar habitat. Fortunately, our findings there give little cause for concern: None of the collared cougars have been reported killing livestock or pets, nor have they required any management actions by CDOW related to human interaction.

The Future of Exurban Cougars

Most people in places like Boulder or Log Hill Mesa are aware that they live in cougar habitat and generally acknowledge their responsibility for co-existing with cougars in these areas. Yet when a pet is killed or hikers have an inopportune sighting, the tendency of most is to blame the cougar, assuming it had become habituated to people, was young and inexperienced, was sick or unhealthy, or otherwise was doing something that a cougar should not do. The truth is that sometimes humans encounter a cougar simply doing what cougars do—hunting in the place where they live.

As humans continue to move into the urban-wildland interface, it is virtually assured that human-cougar interactions will also continue, or even become more common. But there are steps we can take to reduce or improve these interactions. If residents allow deer to roam in yards and neighborhoods, pets to run free, and livestock to graze unprotected, negative interactions will increase. Conversely, if communities alter local habitats to make them less desirable to both deer and cougars, practice proper animal husbandry, and educate themselves and their children about how to live in cougar habitat, they will likely have fewer and more-positive interactions with cougars.

The road toward acceptance will not always be smooth, as human attitudes toward cougars are very polarized. Managers will be forced to make hard decisions about the level of tolerance of cougars in developed areas, balancing cougar conservation, human safety, and opposing viewpoints. With our research and that of other groups indicating that many cougars are using urban areas opportunistically on a limited basis, it may mean that maintaining those individuals on the landscape could help achieve a more-peaceful coexistence. Additional research on cougars in exurban environments will provide the tools necessary to minimize conflict while maintaining healthy cougar populations. ■