

HOW 'BOUT THEM APPLES:

Insights on reducing human-bear conflicts

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Panoramic photo of downtown Missoula and the Rattlesnake, taken from Mt. Jumbo saddle.

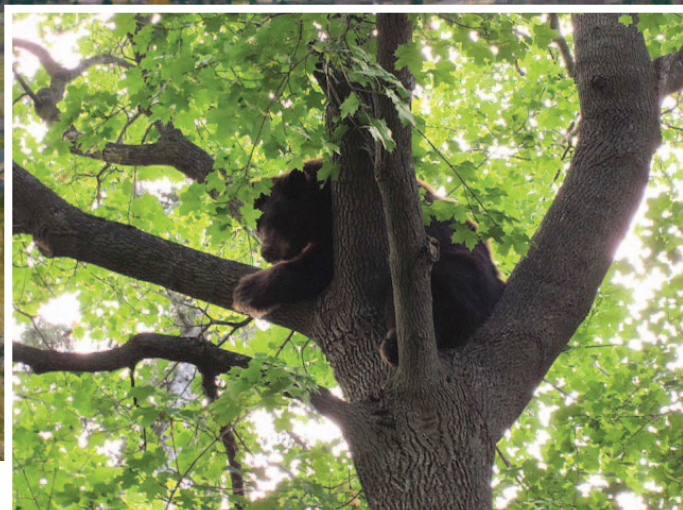
A landowner told me the best way to know when apples are ripe is when you start seeing little presents under the trees. We stood staring at a rather large black bear scat that had been deposited from high up in the tree above us. Wow, I thought to myself. This guy is not in the habit of checking how ripe his apples are getting in the fall. He just waits to see bear sign, and then tries to pick his apples before the bears eat them all.

I pondered the scat a little longer, then asked him what happens after he picks the apples. "Do you see bears anymore?" He told me the bears just disappear after his harvest, and he rarely sees them again.

As I normally did with landowners in my study area, I went on to ask about other things on his property that might attract bears. "Do you ever have problems with bears getting into your trash?"

"Of course not!" he replied. "I keep my garbage in my garage until the morning of garbage day. I have never had a problem."

Little did I know at the time, but this conversation would be central to my master's work on reducing human-bear conflicts within urban areas.



ABOVE: A large male black bear spends the day in a large backyard tree, waiting for the cover of nightfall to slip out of the city limits.

The Trouble with Bears

Conflicts are a reality in most societies that co-exist with wildlife. In scientific terms, human-wildlife conflicts are interactions between humans and wildlife species that lead to a negative impact on either the animal or the human. Society spends billions of dollars per year trying to reduce human-wildlife conflicts such as crop losses to insects and vehicle collisions with wildlife.

Human-bear issues result from the interactions between bear foraging behaviors and the habits of humans. Bears are omnivorous; they can eat everything that humans eat. They also rely heavily on memory and previous experience when searching for food and deciding where to go. Humans facilitate the interactions because they live, grow food, and recreate in bear habitat. The detrimental effects include damage to property and threats to human safety.

Bears have few manners when trying to obtain food. They will claw open coolers in campsites, break windows in cars, tear open doors of houses, pull down walls, and even rip into refrigerators.

All of these incidents cost society money. For example, Yosemite National Park sometimes spends over a half million dollars per year dealing with damage caused by black bears. Moreover, bears do not always perceive humans as innocent spectators. In certain human-bear interactions, the bear may view a human as threatening, in the way, annoying, or in very rare cases as prey. The risk of serious injury and death is uneven between the two species. Since 1900, about 60 people in North America have been killed by black bears. Compare that to the hundreds of bears that lose their lives each year as a result of human-bear conflicts.

Reducing these conflicts is a good idea for both humans and bears, but how do we do it and where do we start? In the past, wildlife management agencies relied on reactive management strategies such as trapping, relocation, hazing, and euthanasia. Aside from euthanasia, these methods may not have a lasting effect. The homing abilities of bears allow them to find their way back to their original home range, even after long-distance relocations. As a result, managers find themselves dealing with conflicts in the same areas time and time again.

That is why many wildlife management agencies, conservation groups, and landowners are adopting more proactive strategies for minimizing human-bear conflicts. The focus shifts away from the individual bear, and instead concentrates on human behaviors and conditions in the landscapes where people live. Thus today, significant portions of human-wildlife conflict budgets are being invested in education efforts with the aim of informing the public how to live responsibly

with bears. Many wildlife managers are growing reluctant to trap a problem bear unless all bear attractants have been permanently cleaned up and the bear continues to exhibit habituated behavior.

Missoula, a Magnet for Bears

The big question about the new strategies is, do they work? This question was of keen interest to the Rocky Mountain community of Missoula, Montana. This town of about 67,000 lies in a valley at the confluence of two renowned trout-fishing rivers, the Clark Fork and the Bitterroot. Six small valleys converge here, each dissected by mountain creeks and rich riparian vegetation. Aside from some adjacent grasslands, Missoula is completely surrounded by forest. All told, Missoula sits right in the middle of black bear habitat.

Missoula has a long history of human-black bear interactions, but conflicts have been rising for the last 40 years. This increase started in the 1970s as Missoula began its sprawl into formerly rural areas. This trend was exacerbated in the late 1990s by a couple of unusually dry summers that limited the growth of natural bear foods. One result was that Montana Fish, Wildlife & Parks fielded over 275 human-black bear interactions per year within city limits. This was a significant



ABOVE: A young black bear in a Missoula resident's backyard considers climbing a ponderosa pine tree. **RIGHT:** Typical culvert trap for capturing bears. **FAR RIGHT:** Jerod A. Merkle collaring a small female black bear.



jump over the 15 interactions per year reported prior to the mid-1990s.

Responding to calls and managing conflicts during these chaotic years put a strain on agency personnel. On the upside, in 2000 it sparked collaboration among Montana, Fish Wildlife & Parks, landowners, and Defenders of Wildlife. The outcome was a coalition called Missoula Bears, missoulabears.org, that has been very active in monitoring and working to reduce human-bear conflicts within Missoula. Its approach is to field sightings and conflict reports, provide information to the public and keep neighborhoods clean. Although the efforts seemed to work, biologists and

landowners did not see human-bear conflicts disappear. They wanted to know why.

Thus began my Master's study at the University of Montana, located in Missoula. The initial objective was to describe the movements and diet of black bears living in Missoula. I quickly figured out where bears were going (into town) and what they were eating (food sources provided by human residents). I had to think more deeply about how to develop a research project that could actually assess and inform proactive management strategies and reduce the probability of human-bear conflicts. The key to applied research is in asking the right questions. My key research question boiled down to this:



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What is the most important human food source that changes bear behavior by drawing them out of the mountains and into the town of Missoula?

Keeping Tabs on Town Bears

Studying the bears required the ability to keep track of them. I placed large culvert traps near Missoula houses and captured 16 bears. These animals were fitted with Global Positioning System (GPS) collars, which communicate with satellites to record the locations of collared animals. Locations of each bear were reported every three hours and their daily movements were followed for over two years.

With the bears on the air, I set about determining what they eat while in the urban area. My days commenced with checking to see where the bears had been the night before. For locations on private property, I would visit with the landowner and identify what the bear was doing there. It was easy to assess what the bears were eating. For example if they were eating garbage, it would be strewn all over the yard or the street. If the food source was a fruit tree, I could document broken branches, claw marks from climbing, half eaten apples, and applesauce scat.

I also determined the seasonal availability of natural and human foods of interest to bears. Within the urban area I monitored

the periods of time when apples were ripe and the days of the week when garbage containers were set out for pick-up and presumably available to bears. In the wildlands outside of town, I monitored five berry-producing plant species to learn when berries were ripe and available to bears. Finally, I monitored when spring green-up occurred in both the urban and wildland areas using images obtained from NASA satellites.

Then I worked on determining which foods were the strongest attractants. I began by analyzing all 14,000 individual GPS locations to identify which ones were near houses. This revealed that some bears had more than 60 percent of their GPS locations within 100 yards of a house, while other bears rarely came into town. The next step was to identify the date of each event when a bear walked near a house. The bears in this study generally left their dens between late March and late April, and were back in their dens between late November and late December. I observed almost no activity within the urban area during March and April, followed by a slight increase of time spent near houses in summer (May through July). Bear behavior changed drastically in August. Bears that normally spent their summers in wildlands switched to spending most of their time near houses during autumn. This type of behavior continued to increase in frequency until about mid-October and then slowly decreased as bears headed to their dens for the winter.

The date of each location allowed comparison of what types of food were available when bears were foraging near houses versus when they were foraging in wildlands. The findings were fairly straightforward. Bear foraging near houses was highly correlated with the period of time when apples were available. No other food item came close to explaining this pattern. I did observe a relationship between time of urban green-up and the early summer period when bears came into town. No correlation was found between garbage availability and periods when bears were near houses. Similarly, I found no correlation between the availability of natural foods outside of the urban area and bear foraging within the urban area. These observations were supported by the dietary analysis, which revealed an urban diet consisting mostly of apples, supplemented marginally by garbage, bird seed, and native vegetation.

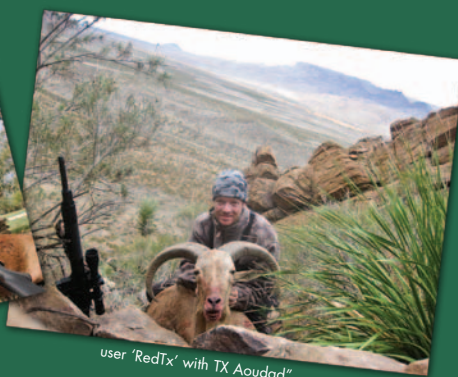
These results indicate that bears near Missoula are busy "being wild" foraging on natural foods in the wildlands during the spring and summer months. But long before natural foods are depleted, bears are attracted

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to the urban area for a specific reason. Apples. My data show that bears come to town to forage on apples even when wildland foods are still available. Furthermore, they do not seem drawn by garbage, although they do eat it when available. This is an interesting result because conventional wisdom says that bears are attracted to town primarily by garbage, and that this shift occurs when natural foods are scarce.

Solutions for Missoula and Beyond

How can Missoula best address its bear problem? The simple solution might be to ask all Missoula residents to cut down their apple trees. However, it's more complex than that. Instantaneously removing all apple trees—and the food source they provide—could cause more damage than good. A slower, phased removal is a better option as it would allow bears to adapt to a diminishing food source. Urban humans value apple trees as a food source and as ornamentals for landscaping. And, there are other species to consider; urban yards provide food and habitat for many kinds of wildlife.

The situation in Missoula is typical of many mountain towns in western North America. I suggest that the results of this study can be incorporated into proactive management efforts in two ways. First, promote and fund fruit-gleaning projects such as the one facilitated by the Great Bear Foundation, greatbear.org. Fruit gleaning removes significant amounts of available food in urban areas, thereby reducing the attraction for bears. In addition, this practice actively engages citizens in the solution, provides a food source some people can use, and removes unwanted apples for others. Second, work with land developers and realtors to promote bear-friendly landscaping. For example, discourage or in some cases outlaw the planting of new fruit trees within known bear conflict areas.

Application of these results and suggestions can be considered for other areas where human-bear conflicts are prevalent. Bears come into town not only for garbage, but for other attractants that may not seem immediately obvious. For example, avocado trees can be a significant issue in California, and domesticated berry bushes are a key attractant in the eastern U.S. and Canada. The reality is that so-called secondary attractants (other than garbage) are very important, and in some cases they are the primary factor in human-bear conflicts.

Do you live within a wildland-urban interface? If so, take a look at your landscaping next time you walk outside. Think about the food that it produces for wildlife, and ask yourself a couple of key questions. Am I indirectly contributing to human-wildlife conflicts? Is it possible that animals are finding food on my property and then moving on to other areas where conflicts may develop?

And of course if you own a fruit tree, watch your step when the apples are ripe. ■

HOW 'BOUT THEM APPLES:

Jerod Merkle is a Ph.D. candidate in the Biology Department at Laval University, Quebec, working on the ecology and management of plains bison. Specifically, he studies their movement and foraging behavior to better understand and predict how many bison there will be, and where they will be found in the future.



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