

## TRACES OF THE ANIMAL PAST: METHODOLOGICAL CHALLENGES IN ANIMAL HISTORY

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# Making Tracks: A Grizzly and Entangled History<sup>1</sup>

*Colleen Campbell and Tina Loo*

What are historians really doing when they study animals? In 2002, Erica Fudge argued they were analyzing “the history of human attitudes toward animals,” and suggested, provocatively, that there was no such thing as animal history; that is, there were no histories of animals themselves, ones that captured how they experienced the world over time.<sup>2</sup> In large part, as she and others in this collection have noted, this was because the traces of the non-human animal past we have are ones created by *Homo sapiens*. As Ann Laura Stoler contends, the archives scholars use are not just places to find facts; they are institutions that produce them. As a result, the knowledge that comes from the archives can work to uphold the perspectives, beliefs, and interests of the powerful.<sup>3</sup>

In that sense, animal history is “impossible” in both ways that anthropologist Michel-Rolph Trouillot used the word.<sup>4</sup> Trouillot was writing about the history of the Haitian Revolution, but there are parallels to be drawn with animal history. Like the Haitian Revolution, animal history is impossible because of the nature of the archive, a place where non-human animals are silent, present largely as property, commodities, and specimens. More fundamentally, animal history, like the history of the Haitian Revolution, was, and perhaps still is, impossible to *imagine*: for a long time, it was literally “unthinkable” because of our biases, which precluded

considering certain groups as historical actors, whether enslaved people launching a successful revolution, as it was for Trouillot, or non-human animals who made their worlds and ours.

In the twenty or so years since Erica Fudge wrote her piece, animal history has changed: it is much more than a history of ideas and representations—as important as the insights from that work are and continue to be. There is a growing number of works that decentre humans, highlight their interdependence with other animals, and take the prospect of other-than-human intelligence and emotions seriously. They rely on a careful and creative use of conventional historical sources, as Jason Colby does with oral history (Chapter 9), but they also draw on new evidence, particularly scientific research on animal behaviour and cognition. Susan Nance’s history of circus elephants uses this literature to understand animal agency and resistance, and Brett Walker draws on it to underscore how wolves in Japan adapted to their changing circumstances.<sup>5</sup> Sandra Swart (Chapter 1) uses this literature as well, but moves well beyond it. Focusing on the takhi, Mongolia’s “wild horse,” she makes a compelling case for examining what animal bodies—the hair, blood, bone, and feces—might tell us about their past and their experiences.

Our animal history also relies on a different kind of source and a different tool to analyze it. Specifically, we look at locational data tracking the movements of a population of grizzly bears (*Ursus arctos*) living on the eastern slopes of the Canadian Rockies from 1994 to 2004 and use GIS (Geographic Information Systems) software to analyze the data. In both these ways, our chapter complements the work of Sean Kheraj, who shows how GIS can be used to tell urban animal history (Chapter 12) and Emily Wakild (Chapter 14), who also uses the movement of animals as an entry point to telling stories about them. Grizzlies are brown bears or a kind of brown bear, the most widely distributed of the eight bear species. They are effective hunters, with large teeth, formidable foreclaws, and an acute sense of smell and hearing. Once occupying much of North America, these animals, like the wolf, were revered, then feared and hunted to near extinction by settlers in many parts of the continent. The remaining populations are found from Alaska to the Yukon, Northwest Territories, and south into western Canada and the northwestern United States. In all the places they currently exist, grizzly bears have been classified as threatened,

endangered, or vulnerable species, sparking scientific research to inform better conservation and management policies.<sup>6</sup>

The locational data we use comes from one such research effort, which we describe in greater detail below. We use it to do two things: in the first and longest part of our chapter, we explore the possibilities of this data for telling a more animal-centred history, one that helps us understand how these grizzlies experienced the world. We then use the process of collecting and analyzing this data as a springboard to explore the idea of “entanglement,” a concept central to animal studies that calls attention to how human lives are enmeshed with those of non-human animals.<sup>7</sup> Because people are so often oblivious to their entanglements with non-domesticated creatures—something that speaks to our power—animal studies scholars focus on moments of encounter, when what is invisible is revealed and can produce new insights about what it means to be human in an entangled world.

While we write in one voice in the first part of our chapter, we depart from this stylistically in the second part: there, we each discuss our encounters with the grizzlies of the eastern slopes, encounters that differ from the conventional stories about what happens when humans meet apex predators. Colleen Campbell speaks to her experience as a field researcher on the Eastern Slopes Grizzly Bear Project, collecting the locational data (among other things), and as a visual artist whose practice has been shaped by her fieldwork. Tina Loo discusses her experience using the data. Hers is a different kind of encounter, at once intimate and at a distance from the bears, but nonetheless productive of meaning.

We begin, however, with a brief overview of the history of animal tracking to put the locational data we use in context and to discuss the kinds of stories it makes possible.

### *Making Tracks, Finding Histories*

Tracking animals has a deep history. A combination of inquisitiveness and necessity led early humans and their descendants to familiarize themselves with footprints, feathers, hair, and scat. An ability to read these traces of the animal past, or, more specifically, traces of animals who had passed by, was crucial to people in contexts where they were both predators and prey, where they needed to feed themselves and avoid becoming food.

If the necessity for such knowledge faded for some people in some places over time, the curiosity that fuelled its acquisition did not. The desire to know where animals go led to experiments in bird banding and fish tagging in the late nineteenth and early twentieth centuries. The shortcomings of these methods may, as Robert M. Wilson points out, explain the enthusiasm with which scientists in the second half of the twentieth century embraced radio-telemetry, a method to determine location from radio signals emitted by a transmitter worn by an animal.<sup>8</sup> Many hoped this technology, developed in the shadow of Sputnik and the context of the Cold War, would finally make wildlife legible.

As Etienne Benson shows, radio-tracking technologies, with their promise of transcending the limits of human observation, were embraced by many American scientists and the government agencies that funded them in the postwar period. Not only did they change the practice of wildlife science but they also transformed our relationship with wilderness and wildlife itself. As a result, it was not long before some biologists raised questions about the utility and impacts of these new tracking technologies. Olaus and Adolph Murie took issue with the grizzly bear research carried out by Frank and John Craighead in Yellowstone National Park in the 1960s and 1970s. For Olaus Murie, such technologies compromised what he called “wilderness wildlife”: they were invasive, required handling the animals, and had no place in national parks. With echoes of Aldo Leopold’s critique of “the gadgeteer,” he argued that parks were places for “basic scientific research, with the least possible equipment. It should be for the kind of scientific study based on thinking, based purely on close observation, trying to understand the relations among various animal forms and the changing environment.”<sup>9</sup>

Nevertheless, radio-telemetry technology persisted even when newer but more expensive technologies became available.<sup>10</sup> Such was the case for the Eastern Slopes Grizzly Bear Project (ESGBP). The locational data it generated charted the movements of a total of seventy-one collared grizzlies over an eleven-year period.<sup>11</sup> Carried out from 1994 to 2004 (inclusively), the Project brought together researchers from the University of Calgary, in partnership with a number of provincial and federal government bodies, environmental organizations, and the private sector. The researchers were particularly interested in bear demography, habitat quality and selection,

population fragmentation, mortality, the needs of female grizzlies, and the specific as well as the cumulative effects of human development in the central Rockies ecosystem, a 40,000-square-kilometre area encompassing parts of Alberta and British Columbia, and within it, the Bow River watershed. More than 11,000 square kilometres in size, it includes half of Banff National Park and the Alberta provincial lands adjoining it, incorporating all of what's known as Kananaskis Country.<sup>12</sup>

While the project's scientists used the bears' movements to inform their recommendations about how the central Rockies ecosystem should be managed, we use them to show how locational data can be a source for animal histories. Thanks to field researchers like Colleen Campbell, we have more than 38,000 locations, showing where each tagged or collared animal went and, in some cases, brief comments from the trackers about what individual bears were doing or who they were with.

But data is not a story. How do you create one from all those latitudes and longitudes? In thinking about how to craft more "biocentric" narratives, the literary critic David Herman suggests that storytelling about non-human animals needs to "shift from the register of events to the register of actions."<sup>13</sup> History is organized around events and while an "event" can simply be an outcome, the way we define them is usually fundamentally anthropocentric. Events are often noteworthy—to us!—in some way; they may even be planned. An "action" carries no such valence: it is something that is done. Each of the data points we have records an action—a bear moving—taken by a particular animal and recorded by an individual tracker using radio-telemetry equipment.

In thinking about the meaning of all this movement—these actions—we were inspired by the work of Aaron Koblin, a digital media artist interested in visualizing data to say something about our relationship to technology. "Flight Patterns," his visualization of air traffic over the United States in a twenty-four-hour period, is especially useful.<sup>14</sup> One of the arguments it makes so powerfully is that movement makes space: as each day begins you see an increase in air traffic from east to west. That traffic is shaped by innumerable social, economic, and political relationships of different scales, from the individual to the global. What materializes from those relationships—captured in the movement of planes—is the continental United States.

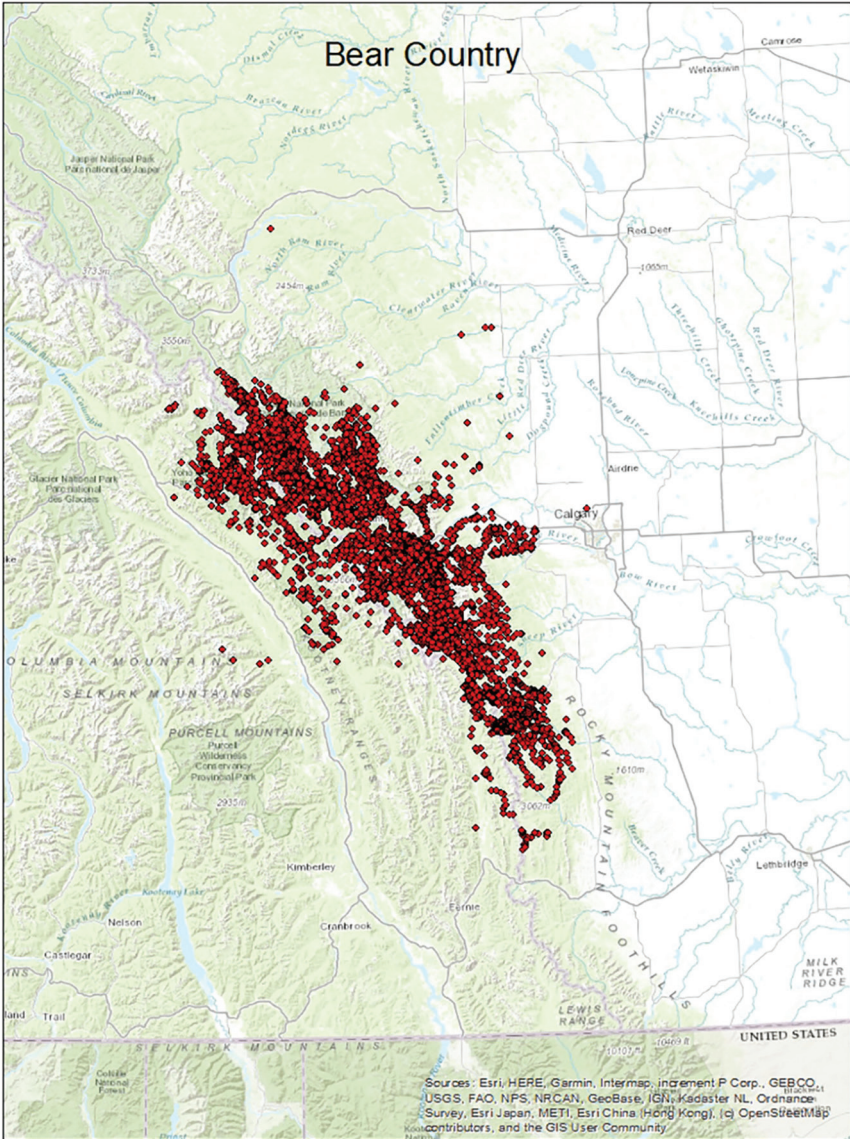


Fig 11.1 Map of Grizzly Country generated by plotting the locations of all the bears tracked by the Eastern Slopes Grizzly Bear Project from 1994 to 2004. Credit: Map generated by Tina Loo using Esri ARCGis. Map sources: Esri, HERE, Garmin Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap contributors, and the GIS User Community.

If movement makes space, then what materializes from the locational data gathered by the ESGBP researchers is bear country, the dominion of the eastern slopes grizzlies (Figure 11.1). Unlike Aaron Koblin’s “Flight Patterns,” the movement of bears does not manifest itself in an instantly familiar shape—and that, for us, is the point. Visualizing locational data with GIS “creates novel geographies and locales.”<sup>15</sup> As Andrew Robichaud argues (Chapter 13), it shows us what we cannot otherwise see. The surprise the map elicits is its power; through the emotion it evokes, it has the potential to influence what we do. The unfamiliar shape of “grizzly country” underscores our status as outsiders. Despite the fact humans occupy parts of it, grizzly country is a foreign country; indeed, it is one we are oblivious to and our ignorance has worked to the detriment of its citizens. Now that we can see it, might we behave differently?

If air traffic in the US represents relationships and decisions made at multiple scales, ones shaped, for instance, by geography, infrastructure, and social, political, and economic relationships, then what explains the movements that make grizzly country? What can be said about the relationships and decisions that gave rise to the dominion of the bears?

Perhaps unsurprisingly, researchers with the ESGBP concluded that bear behaviour and movement are shaped by the quality of habitat and the seasonality of available food sources, something that brings them into the river valleys of the eastern slopes—and the lives of humans. As it happens, the valleys are also the very places that humans built their settlements, highways, railways, and recreational facilities, like ski hills and golf courses. Indeed, rather than deter grizzlies, these developments attract them: radio-telemetry shows that the bears were often found along rivers, roads, railways, and on ski runs and golf greens. These are all edge habitats favourable to the growth of a variety of berries.

Canopy forest cover restricts the growth of many foods that bears seek. Any conditions that bring light to the forest floor benefit the growth of berry bushes and many other foods that grizzlies favour. Fire breaks and burned areas, trails, roads, and railroads, campgrounds, logged areas, glades, meadows, ski runs, and towns all allow in light that promotes the growth of berry bushes. From Colorado to Alaska, buffaloberries (*Shepherdia canadensis*) are usually abundant in bear habitat. Other species that thrive in similar habitats include grouseberry, crowberry, wild



strawberry, raspberry, wild blueberry, nodding onion, hedsarum, elderberry, cranberry, many kinds of sedges, and grasses. Bears seek them all; their movements track the availability of this forage. In the spring and early summer, grizzlies are often found at lower elevations, eating roots, graminoids (grasses and sedges), and forbs (herbaceous flowering plants). As this food becomes available at higher elevations, bears move uphill, and return to the valley bottoms in summer and early fall to take advantage of berry season.<sup>16</sup> In all, grizzlies forage on more than fifty plant species in the central Rockies, most of which grow in forest margins and open slopes.<sup>17</sup>

The central Rockies is part of a large range where bears rely on prodigious quantities of *Shepherdia canadensis* for the 20,000 to 30,000 calories of daily intake they need to prepare for hibernation. Research reveals that grizzlies will ingest 100,000 to 200,000 *Shepherdia* berries daily, as the crop ripens in the mid- to late summer.<sup>18</sup> When the availability of *Shepherdia* is compromised, bears get their calories from other plant species. In open spaces, like the verges of the roads and alpine meadows, they also dig for hibernating ground squirrels and marmots, and flip rocks looking for small rodents, invertebrates, and insects.<sup>19</sup>

While some human developments, like ski hills and golf courses, create environments favourable to the growth of food bears prefer, other developments constrain the animals' movements and fragment their habitat. The telemetry data showed that the grizzlies of the eastern slopes had larger ranges than their counterparts in British Columbia, likely because the habitat in the eastern slopes is poorer: they travelled more to get enough to eat.<sup>20</sup> But ranging widely increased the chances of encountering humans and human developments, especially roads.

For grizzlies, like for people, roads make movement easier, and because they do, bears, and especially female bears, tended to be attracted to them.<sup>21</sup> But the traffic on those roads also posed an obstacle—and a mortal danger.<sup>22</sup> Female bears of all ages and, to a lesser extent, subadult males, were found near roads and crossed them more often than adult males, regardless of the time of day.<sup>23</sup> The kind of road mattered: grizzlies selected low-traffic roads and avoided high-traffic ones when they could. Opened in 1962 and twinned within national park boundaries between 1981 and 2014, the Trans-Canada Highway in particular proved to be an especially

challenging barrier to carnivore movement and a source of wildlife mortality. Over the course of the Eastern Slopes study, average daily traffic flows increased twenty per cent.<sup>24</sup> But it was not the only such high-volume thoroughway in the Central Rockies Ecosystem: as the Eastern Slopes Grizzly Project scientists observed, “[w]e know of no other area within occupied grizzly bear habitat in North America that has such an extensive network of high speed, high volume highways.”<sup>25</sup>

In contrast to highways, railways seemed to be less of a constraint and more of an attraction to bears. The relative absence of humans and car and truck traffic offered grizzlies food and easy passage, particularly in mountainous terrain. Not only could they take advantage of the berries and other herbaceous plants that grew in the disturbed environment along the railroad right-of-way, but they also could avail themselves of the grain spilled on the tracks by leaky hopper cars and the animals killed by passing trains. Indeed, on the eastern slopes, where the best habitat happens to be used by humans, food found on and along the rail lines may be especially important to the health of individual bears, if not the population as a whole.<sup>26</sup>

The relationships that shaped the movement of bears through the Bow River watershed were thus ones they had with the immediate material environment, something that in turn was shaped by their sex, their place in bear society, climate, and the needs, desires, and economy of a growing human population. The area is an hour or two drive away from Calgary, which by the end of the study had a population of nearly one million. It also encompasses a major commercial transportation corridor, providing rail and road connections between the prairies, the Port of Vancouver, and Asian markets. In addition, the area is an international tourist and recreational destination, which includes multiple national and provincial parks, ski hills, hotels, and golf courses, as well as the towns of Canmore and Banff and the village of Lake Louise. The parts of the watershed that are not designated parkland are open to ranching and subject to resource extraction; specifically, logging, mining, and oil and gas development.

Given all this, if Karl Marx did animal history he might have argued that these bears experienced and made history under conditions that were not of their own making.<sup>27</sup> As the members of the ESGBP put it, the grizzlies inhabiting the Bow River watershed “live in one of the most

developed and rapidly developing landscapes in which they still survive.”<sup>28</sup> In their final report, the project’s scientists noted survival rates of ninety-five per cent for female grizzlies and eighty-one to eighty-five per cent for males. In their view, these remarkable numbers were attributable to better management of human food and garbage beginning in the 1980s.<sup>29</sup> Given the continued development and human population pressures in the area, however, researchers considered the animals to be under stress. Maintaining their numbers would require further regulation and monitoring.

While these survival rates were certainly the result of effective human intervention, they were also a tribute to the ability of the grizzlies to deal with change, often within their own lifetimes and over generations. The animals moved around to exploit the caloric possibilities opened by ski hills, golf courses, campground developments, and rail traffic, and they negotiated the dangers presented by cars, trucks, and trains. Doing so was something bears learned from their mothers, with whom they usually stayed for two and a half years, and through their own observations and experience. For instance, researchers speculated that the large male grizzly known as “The Boss” (M122) grew to the size he did because he had learned to avoid trains, having once been grazed by one. That ability allowed him to feast regularly on the elk and deer carcasses he knew he would find by the tracks.<sup>30</sup> These animals knew, learned, and remembered things; they were and are knowledgeable.

We can thus think of locational data of the kind collected by the ESGBP as an expression of the “situated knowledge” possessed by the bears. It is knowledge that is located—“situated”—in the social, historical, and material contexts in which it was produced as well as the animals’ sex, age, and personalities.<sup>31</sup> As the scholars of science and technology put it, “all forms of knowledge reflect the particular conditions in which they are produced, and at some level reflect the social identities and the social locations of knowledge producers.”<sup>32</sup> In short, the movements of the eastern slopes grizzlies are a manifestation of their past experience and learning, of who they are. It is an artifact of their history, one that is entwined with that of the humans who live, work, and visit the central Rockies ecosystem as well as those who benefit indirectly from its development.

Not only can the locational data from the Eastern Slopes Project be a source for a population-level history of a particular group of grizzlies, allowing us to see how their collective experience is shaped by and entwined with that of humans, but it also has the potential to tell us about specific individuals. In other words, it is a source for biography. Animal biography has a long and contentious genealogy, dating back to the early twentieth century and the “nature fakers” controversy that pitted naturalist John Burroughs against authors like Ernest Thompson Seton and Charles G. D. Roberts, who had written enormously popular, sympathetic portraits of individual animals. The problem, according to Burroughs, was that they were “sham natural history,” overly sentimental and decidedly anthropocentric. Since then, writers have struggled with how to tell animal stories from their point of view.<sup>33</sup> For filmmakers Leanne Allison and Jeremy Mendes, locational data offers a way to do so. They tapped into its biographical potential in their interactive documentary *Bear 71* (2012), which tells the story of one eastern slopes grizzly (F71) from her perspective.<sup>34</sup> From the time she was tagged until her death on the railway tracks, F71’s movements were monitored—by wildlife personnel when she was near human-use areas, and with GPS and trail cameras. Images from the latter, combined with compelling data visualization of her GPS locations, reveal the stresses she confronted in the Bow Valley. At the same time, and with echoes of Olaus Murie’s critique of the Craigheads’ radio-tracking of the Yellowstone grizzlies, *Bear 71* serves as a critique of the surveillance that allowed her story to be told—and which envelops us all.

Even without the compelling trail camera trap images and the dynamic data visualization that animates *Bear 71*, we believe the locational information we have can reveal something of the social and, we argue, emotional worlds of individual animals. It is possible to see the relationships they had in which humans did not figure centrally if—again—we follow the advice of David Herman and others. In addition to calling for a “shift from the register of events to the register of actions,” Herman argues that stories about animal life need more granularity and slower pacing. He, as well as Gordon Burghardt and Marc Bekoff, also urge us to practice a kind of critical empathy in writing animal stories, imagining “what it might be like” for them, given the particularities of their bodies and biology.<sup>35</sup> Doing the latter helps avoid anthropocentrism. Herman asks us

to consider “If I were a member of species X, I would engage with the world along the following lines.”<sup>36</sup> Only then might we capture animals’ experience.

With all this in mind, meet bears F30 and F46, female grizzlies who lived with their families east of the resort village of Lake Louise in a region that included the ski area and the drainages of the Pipestone River and Baker Creek. It is one of four “hotspots,” areas that sustain more females than might be predicted given the habitat.

Born in 1985, F30 was first collared in the fall of 1994. At the time, she was accompanied by three “young of the year,” as biologists call cubs less than twelve months old: they were likely her first. She had a reputation among humans as a cranky bear, known to bluff charge people or vehicles that surprised her or got too close. Charging is an aggressive, but defensive action; it was a way for F30 to create enough space and time to get her cubs away, as was the case in mid-June of 1995, when she ran at a truck in the east parking lot of Whiskey Jack Lodge at the Lake Louise ski hill. After doing so, she veered off and chased her cubs into the trees and safety.<sup>37</sup>

While F30 was wary of humans, she and her cubs had good relations with other grizzlies, especially F46 and her young, with whom they were often seen. CM, another tracker with the Eastern Slopes Project, delighted in the relationship, noting that she spotted F30 in early July 1997 “with 3 cubs and with #46. #46 is with her cubs so there is a meeting of at least 7 bears going on!”<sup>38</sup> F46 was a year older than F30, and was collared a year later, in 1995. At the time, she had two yearling cubs, a male and a female. The male was fitted with an ear transmitter and became M45.

Colleen Campbell monitored F30 and F46 for eleven years during which they had two litters each; they were located by telemetry and observed in close proximity with their offspring numerous times during the summers. Their first litters of three and two cubs, respectively, were the same age and were observed playing together on several occasions.

In the summer of 1997, F30 was recaptured to replace her collar. Her cubs, all females, were still with her. They, too, were captured and given ear tag transmitters that identified them as F56, F59, and F60. The next summer, F46’s other cub, a female, was captured and given an ear transmitter identifying it as F65.

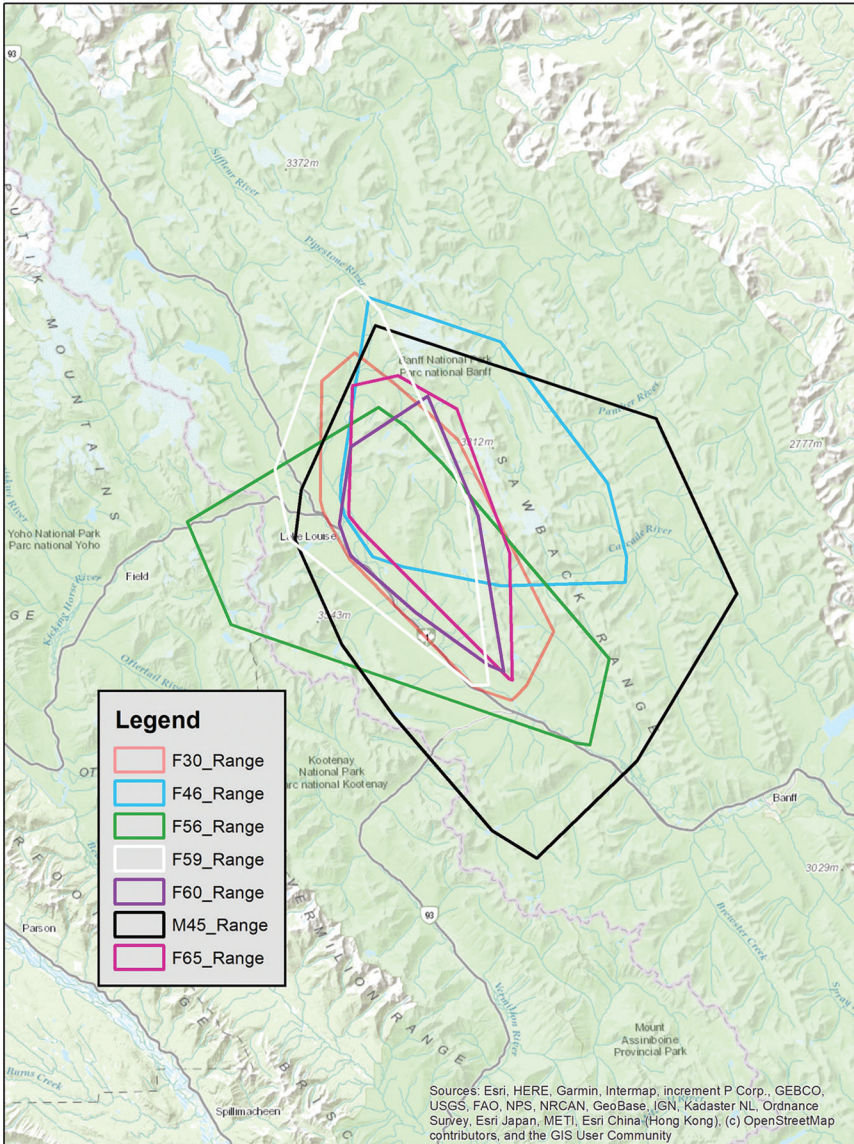


Fig. 11.2 The ranges of grizzly bears F30, F46, F56, F59, F60, M45, and F65 generated from the tracking data collected by the Eastern Slopes Grizzly Bear Project. Credit: Map generated by Tina Loo using Esri ARCGis. Map sources: Esri, HERE, Garmin Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap contributors, and the GIS User Community.

For the next number of years, these seven bears—F30 and F46 and their cubs F56, F59, F60, M45, and F65—shared overlapping home ranges that included the ski hill, Pipestone Valley, Baker Creek, and the mountain passes and lakes east of Boulder pass (Figure 11.2).<sup>39</sup> While it was not unusual for family groupings to be seen together, the data also suggest that grizzlies could form long-term relationships with unrelated animals of the same species. We know that male and female bears come together for the purposes of mating. But these associations are short in duration, counted in hours or days: the average length of M-F encounters was seventy-two hours, longer in “pre-berry season;” in other words, during breeding season.<sup>40</sup> Researchers also reported that same-sex encounters were usually between adult and subadult grizzlies, and were “significantly shorter” in duration, averaging twenty-two hours for F-F associations and fourteen for M-M associations.<sup>41</sup> What’s interesting about F30 and F46 is that they were two adult bears who carried on their association—their friendship?—sometimes for days, and certainly over years.<sup>42</sup>

F30’s and F46’s second litters of three and one, respectively, were a year apart. F46 was cautious about her single cub being near the other cubs until hers was two years old and robust enough to hold its own playing with F30’s three three-year olds. When they had no offspring, F30 and F46 were seldom in such close proximity. At the conclusion of the ESGBP study, monitoring ended; we never learned if these cubs might have grown to be “friends” as adult bears, as their mothers appeared to be.

Such friendly associations are not ones that non-scientists have paid much attention to when it comes to keystone predators like bears. Insofar as we see their relationships, it is usually the ones they have with their young. We often paint their interactions with other animals as competitive or adversarial, overlooking the possibility that the proximity of these animals to each other could be for companionship and play and not just utilitarian reasons like predation, procreation, and protection.

F30 and F46 were not particularly unusual. During early grizzly bear investigations in Yellowstone National Park, researchers observed a variety of relationships female bears had with their young cubs, some keeping them very close, others exhibiting less tight bonding. Females were also observed in the company of one or more other females with cubs, sometimes persistently over a season, and once, one female relocated her den

before winter hibernation to within a short distance of the female with whom she had spent significant time during the summer. Additionally, four subadult males, three of them related plus one adopted into the same family, were observed travelling together for several seasons. Their relationship apparently bestowed on them greater status within their habitat than would be granted a single bear of the same subadult age.<sup>43</sup>

In addition to giving us insight into the relationships these animals may have had with each other, the movement data also lets us discern distinct behaviours and individual personalities. In general, male bears tended to have bigger home ranges than did females and this was certainly the case with the Lake Louise grizzlies. For instance, F46's cub M45 had a range of 1,435 square kilometres: this was more than five times larger than his sister's, F65, who ranged over a 284-square-kilometre area.

But there could also be a good deal of variation among members of the same sex. Grizzlies, like people, are individuals. Take F30 and her offspring, all females. Though F30 was not known to have taken her cubs across the Bow River, the Trans-Canada Highway or Highway 93N, all three of her offspring crossed on their own. F56 was especially adventurous: for three successive summers (1999 to 2001), she explored up into the Plain of Six Glaciers area and crossed Abbot Pass (2,925 metres) on at least two occasions. Why? If we were grizzlies, we would not be headed up that high if we were just hungry: there is very little food at higher altitudes. Could it be that she was possessed of a different personality, that she was more curious?<sup>44</sup> Or fun-loving? According to the notes accompanying the telemetry data, climbers reported seeing her in October 1999 at Abbot Pass "bum sliding down the Death Trap," one of the glaciers. Later that day, she was spotted again, this time at the teahouse at Lake Agnes, just above Lake Louise, a favourite destination of human day hikers (Figures 11.3 and 11.4).<sup>45</sup>

The locational data for F59 shows that for most of August 2002 she started moving big distances: on average, she moved twice as far every day that month than she did in July, nearly fourteen kilometres daily compared to just six. Moreover, her movements were not in one direction, but back and forth, all over the place. Why? After all, it was late summer and berry season, and if we were grizzlies, we would not be moving big distances every day. Instead, we would be focused on feeding, packing in the



Fig. 11.3 F56 was wearing a GPS collar, which captured her approximate route. This map shows twelve days of travel from 8 September 1999 to 19 September 1999. Map by Colleen Campbell, 2020.



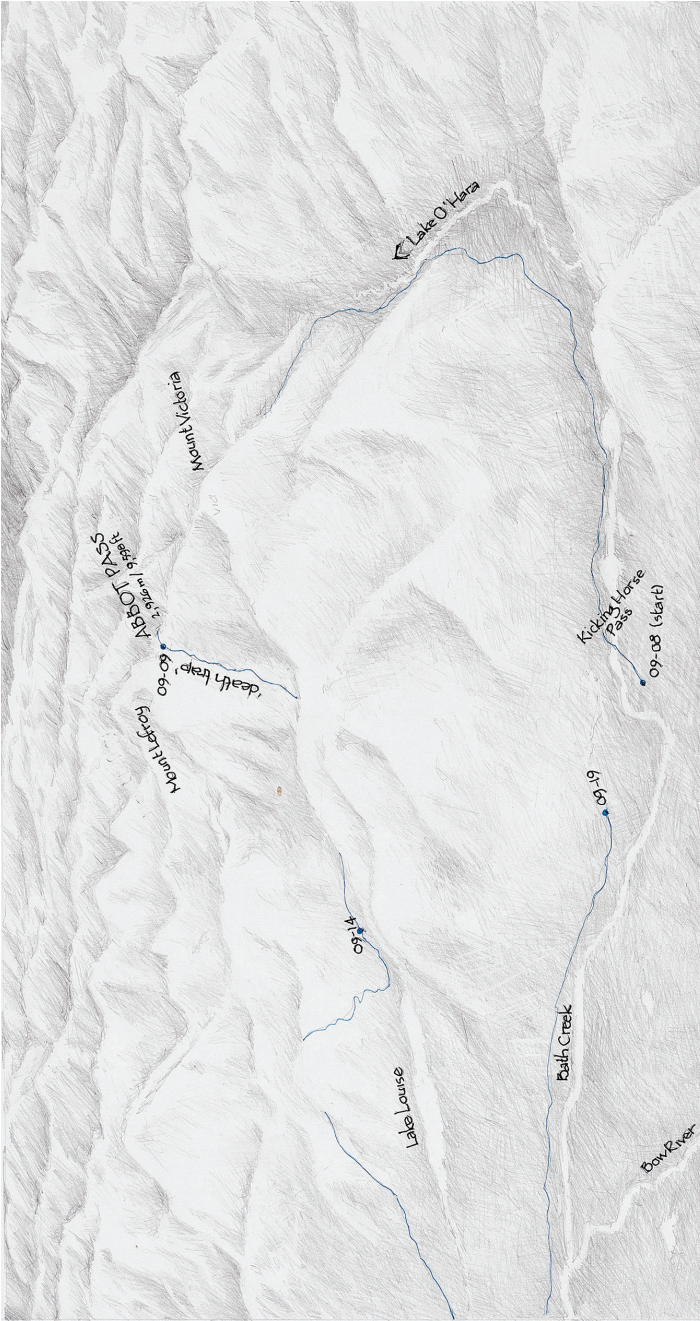


Fig. 11.4 Detail of F56's route over Abbot Pass and down the "Death Trap," during September 1999. Map by Colleen Campbell, 2020.

calories concentrated on the Lake Louise ski hill, in preparation for winter and hibernation.

But that is not what F59 was doing. As Colleen Campbell recalls, her movements in early August coincided with the disappearance of her cub, who was never located as far as we know. Could she have been looking for it? If so, it is another glimpse into the emotional lives of these animals. F59's movements let us add concern, anxiety, and love to curiosity and adventurousness as sentiments these grizzlies held and possible motivations for their associations and movements. In revealing these emotions and behaviours, the locational data allows us to move beyond a reductionist view of animals that sees them as life forms motivated only by the need to survive.

Of course, the bears did not just interact with each other; they also interacted with other animals. Observers saw grizzlies in the company of other animals, like wolves, elk, deer, geese, and—for the Lake Louise bears—Colleen Campbell.<sup>46</sup> Field researchers like Colleen were also a part of the lives of the eastern slopes grizzlies as much as they were a part of hers. She followed F30 and her family (as well as other bears) for more than a decade.

Colleen's experience, which she relates in the next section, reminds us that fieldwork can generate insights about the natural world and our relationship with it. As Richard White observed, people have historically come to know nature through labour, not just recreation, and what they come to know through work differs from the knowledge generated by play.<sup>47</sup> Colleen's wildlife work on the eastern slopes shaped her understanding of animals, the natural world, and her own place in it. The story she tells of encountering F30 departs somewhat from the usual stories of humans meeting other apex predators, like Val Plumwood's classic one, which emphasizes violence and the experience of being prey.<sup>48</sup> That said, like those stories, hers is still one that emphasizes how the knowledge that is produced by such encounters comes as much through the sensing body as the thinking mind. An awareness of that, as well as human vulnerability, can lead to an appreciation of connection and the more-than-human condition of our existence.

## *Ways of Knowing and Being through Encounter*

My career as a field researcher started in 1991, with coyotes. Coyotes have small home ranges and hunt at any time, all year long. Each coyote—male, female, juvenile, breeding adult—is like a beautiful wild dog, and part of a family group. I loved searching for them. I was happy in the woods. During the summer of 1993, I monitored two grizzly bears. Each was often near a road, and I monitored them only when they were at risk of encountering humans, to try to maintain distance between people and the somewhat indifferent bears.

The Eastern Slopes Grizzly Bear Project started in spring of 1994. Bears range more widely than coyotes. The work shifted in complexity. Telemetry was the primary method of locating individuals, usually from the ground, occasionally from the air. We sometimes worked in the backcountry, collecting scat and hair samples (non-invasive ways to collect DNA) and identifying rub trees. Periodically, I was enlisted to track a mortality, possibly collect a carcass, and help with a necropsy. I assembled capture kits, entered or checked data, wrote reports, presented talks and, from time to time, proposed a research idea. The biologist for whom I worked generously encouraged each of us to expand our responsibilities. Eventually, most of us worked alone, most of the time.

Bears are seasonal and so was the work of tracking. Every spring, I was thrilled to hear the first “pings” of a functioning collar. For many years, the heartbeat VHF rhythm that primed my spirit for summer belonged to F30, while she was lingering near her den. Once she left her den high on a ridge, her signal would be lost in the convolutions of the landscape. I would have to look for her when I began my regular “commute” on foot from Temple Lodge to the lakes and ridges east of Boulder Pass (Figure 11.5). The work was predictable but there was no typical day. I started before dawn. Using telemetry, I would locate any bears I could find as I drove from Canmore to Lake Louise. Later, I would hike to Boulder Pass and beyond, the work directed by the activity of the bears and the weather.

The first spring hike to Boulder, relentlessly uphill for 5.2 kilometers, was brutal. I was an interloper and I always felt a little spooked working alone. My loud calls (“EH-OH”) were effective. Even when there were two of us working together, we would broadcast our presence loudly, letting

Fig. 11.5 Colleen doing telemetry, ca. 1992. Photo credit. Mike Gibeau.



the bears know we were there. Most animals, including grizzlies, prefer to avoid humans if at all possible. I know of only one time a field researcher deployed bear spray during the years of the ESGBP work.

I explored—climbing ridges to listen for signals, following game trails, noting a scrape, a rub tree, plants, or watching a bear in an avalanche slope, perhaps five hundred metres away, doing work that bears do: digging, resting, foraging.

Each day yielded some tidbit, some experience to be treasured: cubs playing, a bear—once, two wolverines—sliding in the snow, hare tracks that disappeared at a junction with a bounding leap of a marten, astonishingly, a lynx and a wolf, each about one hundred metres away from me

in opposite directions along the trail. I became absorbed in everything I observed, trying to decipher the ever-changing puzzles I encountered. I came to know the bears and coyotes that I tracked as discrete personalities, as unique as each of my human friends.

The early season unease dissipated a little with each hike to Boulder Pass. I was becoming used to being outdoors, comfortable knowing I shared the mountains with creatures I could not see. Every hour on the ground fed my imagination and what was initially “liking my work” became reverence for where I worked. I began to understand that everything “fit”—somewhere.

Beyond the fieldwork and research, I learned about these animals’ entangled histories with us, about coyotes’ 10,000 years as a disreputable god and grizzly bears’ 35,000-year tenure as a solemn spiritual guide. Until a few hundred years ago, we humans generally understood and respected the wildlife around us. The characteristics of different species shaped the stories people told about them, ones that were devised to give each a “place” in our world and ours in theirs.

Currently, we have a conflicted relationship with both coyote and bear and nearly all others: raccoons, cougars, bobcats, ravens and magpies, sharks and seals. We do not want them in our gardens, yet we long to see them. Most of them terrify us, yet we leap from our cars to get a photograph when we see one along the roadside.

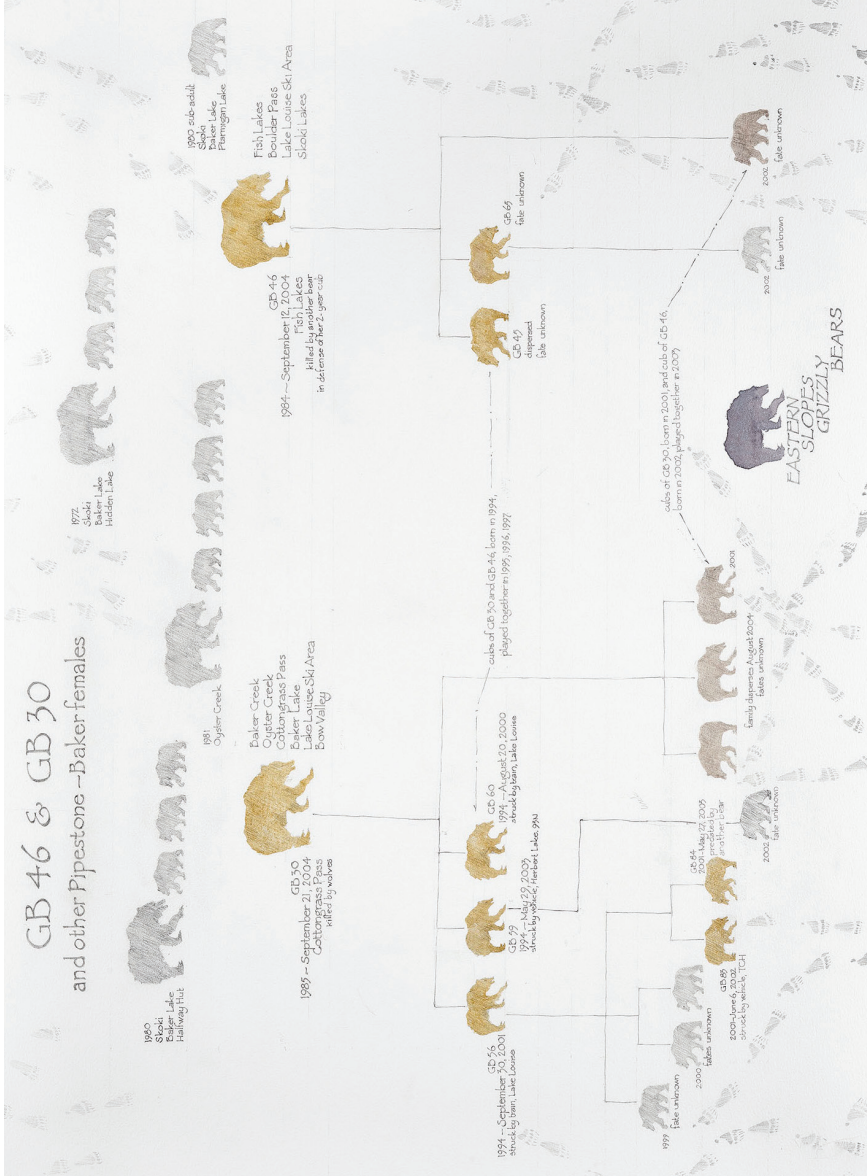
It was this understanding that prompted me to write about the eastern slopes bears. Through that effort, I realized that much of what I wanted to share could be more effectively conveyed in a series of drawings. After about thirty pages in my sketchbook, I planned and drew twelve large sheets chronicling the life histories of all the eastern slopes research bears. I included information about grizzly bears that predated the formal research and those that have been monitored since—to 2017—more than 150 different animals. In the drawings, the individuality of each bear can be easily apprehended, and the species—by analogy, all species—understood as comprised of unique beings, each with a personal life story. Perhaps this is a route to appreciating the intrinsic value of other species and of the spaces that they need to live and thrive (Figures 11.6 and 11.7).

I would like people who see my drawings to understand what I learned through fieldwork; namely, that humans have historically related to



Fig. 11.6 Entanglement I, Graphite and watercolour on paper, 15.5" x 15.5", Colleen Campbell, 2019. Fear of living bears becomes lament, even outrage, when we kill one on the highways or the railways.

Fig. 11.7  
 Sheet #5 of  
 12, "Eastern  
 Slopes  
 Grizzly  
 Bears:  
 Each One  
 is Sacred,"  
 Colleen  
 Campbell,  
 2017.





wild animals through shared use of the same habitat with conditions—taboos—about how humans should behave. I made a lot of noise, never knowingly approached an animal, changed my path if I felt twitchy about something. Historically, there was a mutuality to the agreement, which humans apparently believed that the wild animals understood, as in the ancient story of a girl who married a bear, and a recent story of the protagonist tiger in Sasha Snow’s and John Vaillant’s accounts of a notable human-tiger conflict in Primoria, far eastern Russia, during the 1990s.<sup>49</sup> I want people to sense that, until recently, we did not see the world and everything in it “for our taking.”

In the Bow Valley, where I live, we have been engaged in many efforts to coexist with the wild creatures around us.<sup>50</sup> We have changed our garbage management, worked to rid our neighbourhoods of bear attractants, such as fruit-bearing trees, fenced the highway, and built overpasses and underpasses for wildlife. We also have many NGOs offering adaptive educational programming so locals and visitors alike can learn to become “wildsmart.” And, still, our relationship with other species and their habitat is very lopsided, dominated by human desire. Too often, our entanglements with other species are fatal for them (Figure 11.8). Our attitudes and desires are serious contributing conditions to the climate and environmental emergencies we face.

My twenty years of wildlife fieldwork and experiences, such as my encounter with F30 and her cubs, influence my research, persistently enter my studio work, and permeate the stories I tell when presenting to an audience. I share my belief that nature makes no mistakes and that we cannot enjoy our own species’ health without a healthy world. We must value bears (and, analogously, all else) not only for the extrinsic benefits they may bring us through tourism and medical science—but also for their intrinsic qualities, as wild animals with a right to “place”—“bear country” and by analogy, all other “countries.”

\* \* \*

Late one August afternoon in 2004, I was tracking F30. She had moved nearly twenty kilometres east since early morning, staying out of sight as she travelled between the Bow River and the well-travelled secondary

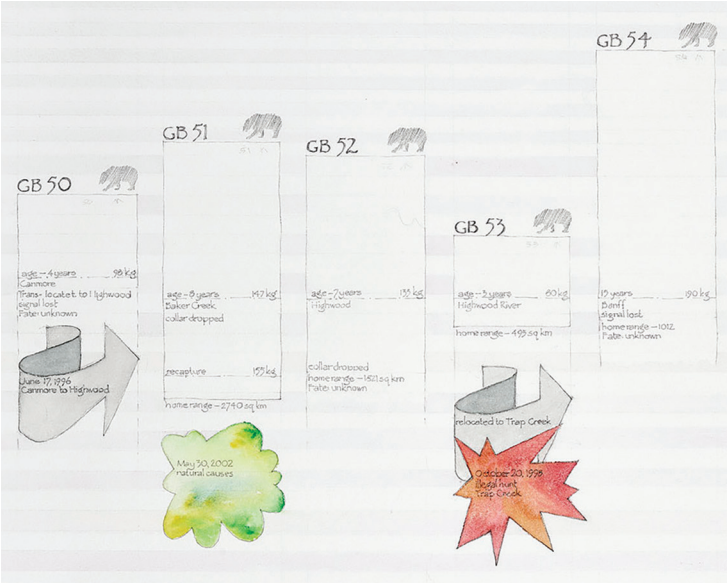
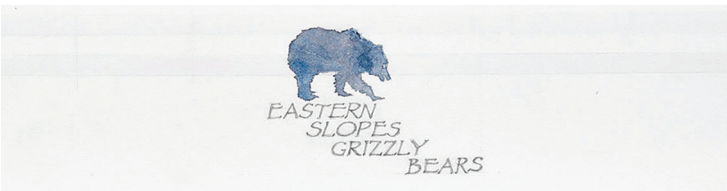
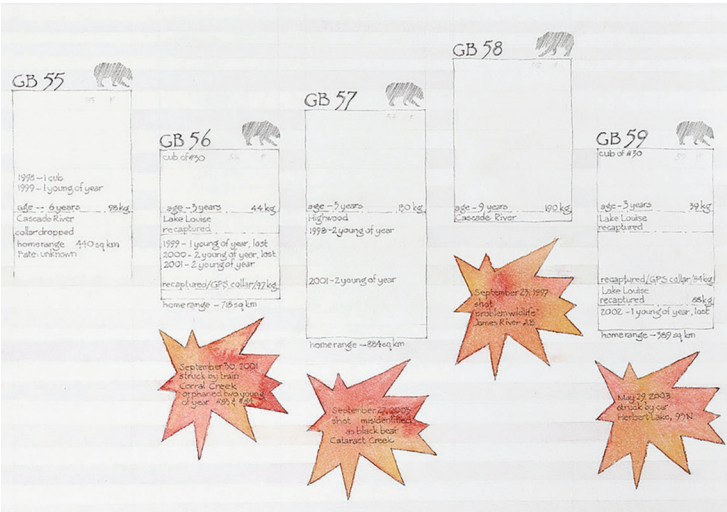


Fig. 11.8  
 Details of  
 some of the  
 lives  
 described  
 in “Eastern  
 Slopes  
 Grizzly  
 Bears:  
 Each One  
 is Sacred,”  
 Colleen  
 Campbell,  
 2017.



road. She was still keeping her cubs, now three years old, safe until the family eventually dispersed.

*Shepherdia canadensis* was abundant and F30 was following open forest edges along the rail and road, providing for herself and her three nearly grown cubs. Her signal placed her in the pinch where the train tracks lay between the river and a twenty-five metre escarpment that rises to the eastbound lane of a long split of the road.

At the top of the bluff, I pulled over to the grassy shoulder. The strength of the signal suggested I might see F30 and her family near the river below me. Nonetheless, I opened the hatch of my car to retrieve a portable antenna and compass so I could get a “fix” on her in case I did not make visual contact. The steady rhythm of pings originating from F30’s collar was loud and I noticed that the attenuating lever was already toggled into position. “Attenuation” is a way of significantly reducing the volume to enable a tracker to isolate the direction from which the signal originates. My antenna was not connected, the signal was attenuated, the volume tuned as low as possible, and still the sound was too loud. The signal needle bounced repeatedly to the top of the scale.

I immediately realized that F30 must be very close. I did not anticipate that she was only a few metres behind me on the shoulder of the road, standing tall on her back legs and watching me.<sup>51</sup> Though she surely heard my car and the all the different clattery sounds of my work, F30 had topped the escarpment anyway—wild, beautiful, and perfectly “bear”—and was no more than six to eight metres away from me.

Having monitored F30 closely for nearly ten years. I had admired her countless times, most often through binoculars. In this moment, I could nearly touch her; she was balanced upright and facing me. I could see her nose twitch, testing the air for my scent; I could see the claws on her front feet, hanging relaxed at her sides, her ears directed towards me, and her hair quivering with the flex of her muscles as she subtly maintained her balance.<sup>52</sup> Magnificent.

Such moments distort one’s sense of time. The whole experience lasted only a few seconds. I stood still and thought very calmly, “Interesting. I can do absolutely nothing to change this situation. She is right there.” Those thoughts were followed quickly by “Hmm . . . bear spray is in the front seat of my car . . . and so is my camera.” I felt no particular anxiety,

no panic. F30 appeared to be studying me, just as I had studied her for the past decade.

Then she shrugged me off, dismissed me. F30 dropped to the ground and crossed the road, towards cover in the forest. Her three cubs topped the bank, in half-minute intervals, and behaved identically to their mother, standing tall on back legs to observe me and following her invisible footsteps across the pavement to disappear into the forest.

When I started working as a wildlife field technician, the work was straightforward; accurately locate an animal, record the data, find the next subject, day after day after day. Over time, I came to believe that when I closed the door of my vehicle to start walking into the wilderness, I was in someone else's home, often the "bear country" we identified earlier in this chapter. Acting persistently with respect and caution still guides me when I am on a trail. Not typically fearful, I have learned to turn around on occasion—at times in response to just a "shiver" or a sense in my spine, sometimes in response to an odd sound or a pile of fresh scat. I have learned to value my other senses, to trust my instincts—in many ways, to be the animal I am.

My experience is very different from that of Val Plumwood, who, while searching for a route through an unfamiliar waterway in her canoe, had a terrifying encounter with a predatory crocodile. I navigated ridges and trails with a detailed map in my mind and "knew" the bears I accidentally met at the crest of the escarpment. Though I was surprised by F30's proximity that afternoon, I had come to appreciate and respect her over the previous decade. I believe I was slowly habituated by time and my own caution to encounter F30 and each of her cubs—any one of which could kill me with a single swipe of a front paw—without panic.

\* \* \*

Unlike Colleen, I have never encountered the eastern slopes bears in the flesh—but I have interacted with them in the process of analyzing the locational data collected by project members. My experience is a disembodied one, and my story is about the power of virtual encounters. In both of these ways, it runs counter to the emphasis in the literature: some of the most evocative and insightful work calls for taking the sensing body seriously in writing animal histories, both those of humans and non-humans, and

it pays particular attention to what Ryan Tucker Jones calls “the living terrain of encounter.”<sup>53</sup> Colleen’s story of what she learned from her fieldwork and coming face-to-face with F30 is an example, though it differs from more conventional stories involving predators in that it does not involve an attack and near-death experience. Still, I would argue that despite these differences, my encounter was generative in ways similar to Colleen’s.

I first encountered the grizzlies of the eastern slopes indoors, at the Whyte Museum of the Canadian Rockies, where Colleen’s exhibit, “Eastern Slopes Grizzlies—Each One is Sacred” was on. I got to know them better when Colleen and I decided to collaborate on this chapter, and she shared the Excel spreadsheet containing all the locational data from the Project. To use it, I learned the basics of GIS and in the process became a tracker.

The process of “line tracking”—as the function on the GIS program I used is called—drew me into the lives of these animals. Though less embodied, it was a strangely intimate and even seductive experience. There were as many questions as there were answers; this despite arguments about modern animal tracking as an especially apt expression of human power over life in the Anthropocene. Seeing is not understanding: I knew where the grizzlies were at particular moments but I did not know more than that. And I had no idea of what was happening in the spaces in between data points.

Those questions speak to the power of data visualizations and, in my case, to the process of making them, to provoke an emotional response and potentially transform us. The maps and animations of movement make us marvel; they engage us. The questions that they cannot answer bring us up against our own intellectual limits, something that feeds and sustains wonder.<sup>54</sup>

Both Colleen and I have visualized the eastern slopes data differently, but in making tracks I have come to understand how doing so has the potential to cultivate what one scholar calls an “affective micropolitics of curiosity” in that space between seeing and knowing.<sup>55</sup> It is a desire to understand and learn rooted in humility. It is the kind of emotional engagement that can, bit by bit, shift how we see the world and, potentially, act in it.

## Conclusion

As this story of the eastern slopes grizzlies has shown, locational data is a potential source for animal history. It can help us understand the lives of a population of animals as well as specific individuals. But it cannot be used alone. We have drawn on scientific studies as well as the observations of the human trackers who worked on the Eastern Slopes Project to help make sense of it. But more than other sources of information, animal stories require different narrative strategies and different ways of imagining, some of which we highlighted here; namely, the need to shift from events to actions and to practice a critical empathy, one informed by a knowledge of a particular animal's differences, by an understanding of its body, behaviour, and environment.

The kind of empathy required for more animal-centred stories can also come from encountering them—directly, as Colleen did, and indirectly, as in Tina's case. Both our encounters were generative: they made us more knowledgeable about the eastern slopes bears and, more broadly, they cultivated a particular disposition, one that helped us make sense of the movement data and write this grizzly history. They also speak to the curiosity that can come from entanglement, one that has the power to change how we are in the world.

## NOTES

- 1 Thanks to Dr. Mike Gibeau whose work with grizzly bears is the source of data we used for this paper and for whom Colleen Campbell conducted many years of fieldwork; to Sally Hermansen, who helped Tina Loo learn ArcGIS; to Scott Jevons, GIS specialist, for his 3D maps which are the basis of the drawings showing the travels of GB F56; to Emily Wakild for her close reading of our piece and helpful suggestions; to Jennifer Bonnell, Sean Kheraj, Marcel Martel, and Jay Young who organized the "Traces of the Animal Past" conference at York University and to all the participants for their stimulating and generous engagement. We also benefited from the comments of two anonymous reviewers.
- 2 Erica Fudge, "A Left-Handed Blow: Writing the History of Animals," in *Representing Animals*, ed. Nigel Rothfels (Bloomington: Indiana University Press, 2002), 6.
- 3 Ann Laura Stoler, *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense* (Princeton: Princeton University Press, 2009). Although much humanistic scholarship has explored "the archive" as a place where knowledge is produced rather than found, it has often ignored the work of archivists in real archives—who have dealt

- with such issues both theoretically and practically. See Michelle Caswell, “The Archive’ is not an Archives: Acknowledging the Intellectual Contributions of Archival Studies,” *Reconstruction* 16, no. 1 (2016), <https://escholarship.org/uc/item/7bn4v1fk>.
- 4 Michel-Rolph Trouillot, *Silencing the Past: Power and the Production of History* (Boston: Beacon Press, 1995).
  - 5 A few key works that have influenced us are Virginia DeJohn Anderson, *Creatures of Empire: How Domestic Animals Transformed Early America* (New York: Oxford University Press, 2004); Thomas Andrews, “Dying with their Boots On,” in *Killing for Coal: America’s Deadliest Labor War* (Cambridge, MA: Harvard University Press, 2008); Susan Nance, *Entertaining Elephants: Animal Agency and the Business of the American Circus* (Baltimore: Johns Hopkins University Press, 2013); and Brett Walker, *The Lost Wolves of Japan* (Seattle: University of Washington Press, 2005).
  - 6 There’s a taxonomic debate about grizzlies: some scientists see them as brown bears while others argue they are a subspecies of the brown bear called *Ursus arctos horribilus*. The information in this paragraph on the grizzly bear is from Robert E. Bieder, *Bear* (London: Reaktion Books, 2005); Charles C. Schwartz, Sterling D. Miller, and Mark Haroldson, “Grizzly Bear,” in *Wild Mammals of North America: Biology, Management, and Conservation*, 2nd ed., ed. George A. Feldhamer, Bruce C. Thompson, and Joseph A. Chapman (Baltimore: Johns Hopkins University Press, 2003), 556–58; and Sarah Elmeligi, *What Bears Teach Us* (Victoria: Rocky Mountain Books, 2020), 20.
  - 7 Henry Buller, “Animal geographies II: Methods,” *Progress in Human Geography* 39, no. 3 (2015): 376.
  - 8 “Comments by Robert M. Wilson,” H-Environment Roundtable Review of Etienne Benson, *Wired Wilderness: Technologies of Tracking and the Making of Modern Wildlife* (Baltimore: John Hopkins Press, 2010), 13–14, <http://www.h-net.org/~environ/roundtables/env-roundtable-3-1.pdf>
  - 9 On “the gadgeteer,” see Aldo Leopold, *A Sand County Almanac and Sketches Here and There*. Special Commemorative Edition, with an introduction by Robert Finch (New York: Oxford University Press, 1989), 180. Olaus Murie quote from Etienne Benson, *Wired Wilderness: Technologies of Tracking and the Making of Modern Wildlife* (Baltimore: John Hopkins University Press, 2010), 61.
  - 10 The key work on the history of animal tracking is Benson, *Wired Wilderness*. For a recent overview of tracking technologies see Roland Kays et al., “Terrestrial animal tracking as an eye on life and planet,” *Science* 348, 6240 (2015), <https://doi.org/10.1126/science.aaa2478>.
  - 11 Some eastern slopes grizzlies were fitted with GPS collars for a portion of the study period. There were an estimated one hundred grizzlies in the study area and at any given time, a third of them were collared and tracked by the Eastern Slopes Grizzly Bear Project.
  - 12 The information about the ESGBP is from *Biology, Demography, Ecology and Management of Grizzly Bears in and around Banff National Park and Kananaskis Country: Final Report of the Eastern Slopes Grizzly Bear Project*, ed. Stephen Herrero (Calgary: Environmental Sciences Program, Faculty of Environmental Design, University of Calgary, 2005).

- 13 David Herman, "Animal Minds in Non-Fiction Comics," in *Animal Comics: Multispecies Storyworlds in Graphic Narratives*, ed. David Herman (London: Bloomsbury Press, 2018), 218.
- 14 Aaron Koblin, "Flight Patterns," <https://youtu.be/ystkKXzt9Wk>.
- 15 Nils Hanwahr, "Marine Animal Satellite Tags," in *Future Remains: A Cabinet of Curiosities for the Anthropocene*, ed. Gregg Mitman, Marco Armiero, and Robert S. Emmett (Chicago: University of Chicago Press, 2017), 93.
- 16 Schwartz, Miller, and Haroldson, "Grizzly Bear," 565.
- 17 David Hamer and Stephen Herrero, "Grizzly Bear Food and Habitat in the Front Ranges of Banff National Park, Alberta," *Bears: Their Biology and Management* 7 (1987): 199–213.
- 18 Arthur M. Pearson, *The northern interior grizzly bear Ursus arctos L.* (Ottawa: Canadian Wildlife Service Report Series Number 34, 1975).
- 19 David Hamer and Stephen Herrero, "Wildfire's Influence on Grizzly Bear Feeding Ecology in Banff National Park, Alberta," *Bears, Their Biology and Management*, 7A (1987): 179–86.
- 20 On the relationship between population density and home range size, see John A. S. Nagy and Mark A. Haroldson, "Comparisons of Some Home Range and Population Parameters among Four Grizzly Bear Populations in Canada," *Bears: Their Biology and Management* 8 (1990): 227–35.
- 21 Carrie L. Roever, Mark S. Boyce, and Gordon B. Stenhouse did a study that indicated that "bears were selecting roads and roaded habitat for travel." See their "Grizzly bear movements relative to roads: application of step selection functions," *Ecography* 33, no. 6 (2010): 1113–22.
- 22 Byron Benn and Stephen Herrero, "Grizzly Bear Mortality and Human Access in Banff and Yoho National Parks, 1971–1999," in *Biology, Demography, Ecology, and Management of Grizzly Bears in and around Banff National Park and Kananaskis Country*, ed. Herrero, 67. There are a number of other studies in this final report that speak to the relationship between roads and grizzly bear mortality.
- 23 Karen Graham et al., "Spatial and temporal use of roads by grizzly bears in west central Alberta," *Ursus* 21, no. 1 (2010): 43–56.
- 24 *Alberta Highways 1 to 986: Traffic Volume History, 1962 to 2017* (Edmonton: Alberta Transportation and Cornerstone Solutions Inc., 2017), <https://open.alberta.ca/publications/traffic-volume-history#summary>. Waller and Servheen estimated that the threshold for grizzlies crossing highways was one hundred vehicles per hour. Even at the start of the ESGBP, in 1994, volumes vastly surpassed that. John S. Waller and Christopher Servheen, "Effects of Transportation Infrastructure on Grizzly Bears in Northwestern Montana," *Journal of Wildlife Management* 69, no. 3 (2005): 997.
- 25 Stephen Herrero, "The Eastern Slopes Grizzly Bear Project and Science-Based Grizzly Bear Conservation," in *Biology, Demography, Ecology, and Management of Grizzly Bears in and around Banff National Park and Kananaskis Country*, ed. Stephen Herrero (Calgary: Faculty of Environmental Design, University of Calgary), 15.
- 26 Sonya Z. Pollock et al., "Spatiotemporal railway use by grizzly bears in Canada's Rocky Mountains," *Journal of Wildlife Management* 83 (2019): 1787–99, <https://doi>.



- org/10.1002/jwmg.21750; and A. Gangadharan et al., “Grain spilled from moving trains create a substantial wildlife attractant in protected areas,” *Animal Conservation* 20 (2017): 391–400, <https://doi.org/10.1111/acv.12336>.
- 27 The Marx quote in full is “Men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past.” See Karl Marx, *The Eighteenth Brumaire of Louis Bonaparte* (1852), <https://worldhistorycommons.org/karl-marx-eighteenth-brumaire-louis-bonaparte>.
- 28 Herrero, ed., *Final Report of the Eastern Slopes Grizzly Bear Project*, vii.
- 29 See David Garshelis, Michael Gibeau, and Stephen Herrero, “Grizzly Bear Demographics in and around Banff National Park and Kananaskis Country, Alberta,” in *Final Report of the Eastern Slopes Grizzly Bear Project*, 26–49, and Stephen Herrero, “The Eastern Slopes Grizzly Bear Project and Science-Based Grizzly Bear Conservation,” in *Final Report of the Eastern Slopes Grizzly Bear Project*, 6.
- 30 Carnivores in general are noted to be fast learners, and it seems that grizzlies learn to select their habitat from their mothers. See Colleen Cassidy St. Clair et al., “Animal learning may contribute to both problems and solutions for wildlife–train collisions,” *Philosophical Transactions of the Royal Society B: Biological Sciences* 374 (2019), <http://dx.doi.org/10.1098/rstb.2018.0050>; and Scott E. Nielsen et al., “Does Learning or Instinct Shape Habitat Selection?,” *PLOS One* 8, no. 1 (2013), <https://doi.org/10.1371/journal.pone.0053721>. The information on “The Boss” comes from St. Clair et al., “Animal learning,” 4. On how long grizzly bear cubs stay with their mothers, see Charles C. Schwartz, Sterling D. Miller, and Mark A. Haroldson, “Grizzly Bear,” in *Wild Mammals of North America: Biology, Management, and Conservation*, ed. George A. Feldhamer, Bruce C. Thompson, and Joseph Chapman (Baltimore: Johns Hopkins University, 2003), 564.
- 31 Kristoffer Whitney, “Domesticating Nature? Surveillance and Conservation of Migratory Shorebirds in the ‘Atlantic Flyway,’” *Studies in History and Philosophy of Biological and Biomedical Sciences* 45 (2014): 84.
- 32 “Situating Knowledge,” in *A Dictionary of Human Geography*, ed. Alisdair Rogers, Noel Castree, and Rob Kitchin (Oxford: Oxford University Press, 2013). Online edition.
- 33 On the “nature fakers” controversy, see Ralph H. Lutts, *The Nature Fakers: Wildlife, Science, and Sentiment* (Charlottesville: University Press of Virginia, 2011) and Lisa Mighetto, “Science, Sentiment, and Anxiety: American Nature Writing at the Turn-of-the-Century,” *Pacific Historical Review* 54, 1 (1985): 33–50. John Burroughs’ 1903 essay, “Real and Sham Natural History,” is reprinted in *The Wild Animal Story*, ed. Ralph H. Lutts (Philadelphia: Temple University Press, 1998), 129–43.
- 34 *Bear 71*, directed by Leanne Allison and Jeremy Mendes (2021; Ottawa: National Film Board of Canada), film, <https://bear71vr.nfb.ca/>.
- 35 Quote is from David Herman, *Narratology Beyond the Human: Storytelling and Animal Life* (New York: Oxford University Press, 2018), 139. Gordon M. Burghardt argues for what he calls a “critical anthropomorphism” in his “Critical Anthropomorphism, Uncritical Anthropocentrism, and Naïve Nominalism,” *Comparative Cognition and Behavior Reviews* 2 (2007): 136–38. Marc Bekoff argues that anthropomorphizing makes animal emotions accessible to humans, and doing so doesn’t mean

- discounting their different points-of-view. He believes it's possible to "biocentrically anthropomorphic." See his "Animal Emotions: Exploring Passionate Natures," *Bioscience* 50, no. 10 (2000): 867.
- 36 David Herman, *Narratology Beyond the Human: Storytelling and Animal Life* (New York: Oxford University Press, 2018), 139.
- 37 See spreadsheet entry for F30, 19 June 1995. F30 is also recorded charging vehicles on 10 June 1995 and 1 July 2002.
- 38 See spreadsheet entry for F30 on 6 July 1997. Also see entries for F30 on 7 July 1995, 14 July 1995, 30 June 2001, 2 July 2001, 3 July 2001, 7 July 2001, and 17 July 2003. In addition, these entries for F46 also record the proximity of F30: 26 June 1997 and 6 July 2001.
- 39 F30's cubs stayed with her for four years; F46's for five years. We are assuming the proximity of these animals to each other signalled a relationship. It's a valid one, at least according to Stenhouse et. al., who note that bears were seldom close unless they are associating in some way. See Gordon Stenhouse et al., "Grizzly Bear Associations along the Eastern Slopes of Alberta," *Ursus* 16, no. 1 (2001): 37.
- 40 Stenhouse et al., "Grizzly Bear Associations," 36–37.
- 41 Stenhouse et al., 36.
- 42 See footnote 38. In 2001, 30 and 46 and their cubs were together for over a week, from the end of June to early July, far more than the twenty-two hours encounters between female bears were supposed to last.
- 43 John J. Craighead, Jay S. Sumner, and John A. Mitchell, *The Grizzly Bears of Yellowstone: Their Ecology in the Yellowstone Ecosystem, 1959–1992* (Washington, DC: Island Press, 1995), 205–17.
- 44 On curiosity in black bears, see Ellis S. Bacon, "Curiosity in the American Black Bear," *Bears: Their Biology and Management*, 4 (1980): 153–57.
- 45 See spreadsheet entry for F56 for 9 October 1999.
- 46 For instance, the spreadsheet records that F46 and her cubs were seen in the vicinity of two bull elk and three mule deer on 8 July 1995 and that F30 and her cubs encountered a lone wolf while they were feeding on 8 August 1995. "All stood up and charged as the wolf skirted the group."
- 47 Richard White, "'Are you an environmentalist or do you work for a living?': Work and Nature," in *Uncommon Ground: Rethinking the Human Place in Nature*, ed. William Cronon (New York: W. W. Norton, 1995), 171–85.
- 48 The classic example is Val Plumwood, "Human Vulnerability and the Experience of Being Prey," *Quadrant*, March 1995, 29–34. Plumwood tells the story of being attacked by a crocodile while canoeing in Kakadu National Park in Australia.
- 49 Gary Snyder, "The Girl Who Married the Bear," in *The Practice of the Wild: Essays* (San Francisco: North Point Press, 1990); Catharine McClellan, *The Girl Who Married the Bear: A Masterpiece of Indian Oral Tradition* (Ottawa: National Museums of Canada, 1970); *Conflict Tiger*, directed by Sasha Snow (1997; Bristol: Sasha Snow Film Production); and John Vaillant, *The Tiger: A True Story of Vengeance and Survival* (Toronto: Vintage Canada, 2011).

- 50 See for instance, *Living with Wildlife*, directed by Leanne Allison (2018; Canmore: Front Range Films).
- 51 Often interpreted as threatening, standing is an expression of curiosity; it is a way for a grizzly to get a better sense of what is happening. See Stephen Herrero, *Bear Attacks: Their Causes and Avoidance* (New York: Nick Lyons Books, Winchester Press, 1985), 23.
- 52 F30's ears, as well as her upright stance, suggest she was curious. Like many animals, grizzlies' ears are good indicators of their state of mind. If the ears are back, the bear is indicating aggression. See Herrero, *Bear Attacks*, 219–20.
- 53 Ryan Tucker Jones, "A Whale of a Difference: Southern Right Whale Culture and the Tasman World's Living Terrain of Encounter," *Environment and History* 25, no. 2 (2019): 185–18.
- 54 Reflecting on the history of bear research and the power of telemetry to understand the species, biologist Cliff J. Martinka noted, "it seems to me that elusive knowledge provides another value—one of knowing that some mysteries continue to accompany a species of the wilderness." See his "Reflections on the Recent History of Bears," *Bears: Their Biology and Management*, 9, Part 1 (1994): 5.
- 55 Jamie Lorimer, "Moving Image Methodologies for More-than-Human Geographies," *Cultural Geographies* 17, no. 2 (2010): 252.