

## Beetlekill

My dad and I are snowshoeing at Snow Mountain Ranch, a YMCA recreation area nestled in the central Rocky Mountains eighty miles from Denver. We're walking southwest, across a meadow, then through the riparian corridor around Pole Creek between the bare yellow willows. Then we turn and begin walking up a small forested mountain, exposed to the north. As we walk, I notice the trees—the doug firs and bare aspens, widely spaced and dotted with the occasional tall lodgepole. In between the trees bendy pine seedlings are weathering the winter half-buried in snow. It's in the high 40s, almost 50 degrees, slightly too warm for December, but the snow is thick on the ground and it is glittering, bright, and beautiful anyway.

On the way back to the parking lot, in the flat area between the summer camp cabins, we talk about how the forest used to look.

“It was so pretty here,” he said, “so much less spare, so green, such a beautiful forest.”

We don't talk about the beetles, or the clear-cutting that happened here, but they bubble under the surface. The forest, now dominated by spruce, fir, and aspen used to be tall, thick, old growth pine forest. Now, almost ten years after the end of the Mountain Pine Beetle outbreak, most of the pines left over are under ten years old or they are the comparatively rare survivors of a tectonic shift in forest composition. I stomp my snowshoes a little harder into the ground and feel my longing for the old forest unfold, familiar and almost involuntary.

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I don't remember, exactly, the first time I learned about mountain pine beetles—someone must have explained why all the trees were dying, but in my memory they were always orangeing, ambient and constant. My brother's memory is more specific—he remembers learning what they were in third grade after seeing a dead tree on our family friends' rural property. Both

of us remember the forest shaved away year after year. Across the west, pines, as well as some firs and spruce are vulnerable to death at the hands of the Mountain Pine Beetle, a key native parasite in the region, with a range that spreads across the westernmost third of the continent from southern Canada to northern Mexico.<sup>1</sup> Pine Beetles usually exist at an endemic level, mostly attacking older trees weakened by age, fungus, infection, or other parasites. Under the correct conditions, though, the endemic population can swell into an enormous outbreak. The outbreak I remember began in 1996, before I was born, and only died down in Colorado around 2014 when I entered middle school.<sup>2</sup>

As with many environmental issues, the problem with pine trees is multiple, layered, and rife with debate. Writers introduce the destructive potential of MPB, resort to the grief, but are forced at some point to remind the reader that the beetles are *actually* native. The result, particularly in cases where the reminder comes too late or not at all, is a bramble patch of emotional context and content.

I remember wondering if the beetle was invasive—they were presented to me mostly in PSA's, campground bathroom fliers, and murmurs among the adults I trusted to explain science facts to me. Their reign over NPS and Forest Service bulletin boards was absolute, comparable only to notices about invasive thistles and zebra mussels that were choking out the native plant and aquatic life. These bulletin boards were well-used, fliers sometimes bleeding ink from rainstorms even behind the yellowing plastic covers meant to protect them. Often they were surrounded by wood peeling paint, choked at the base by invasive field bindweed or the very thistles that they warned about. Universally, the PSA's and fliers about Mountain Pine Beetles were studded with grainy, high contrast pictures of the insects covered in wood dust and resin,

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<sup>1</sup>“Forest Health: Mountain Pine Beetle.” 2018.

<sup>2</sup> “Forest Health”

neon-highlighted outbreak maps, bold text, photos of dead trees, warnings to campers. I became convinced that the beetles were a highly destructive invasive species.

One night, in a campground bathroom, I faced down one of those fliers, taped in the corner of the mirror. I remember asking my mom if they were invasive.

“No, but there are fewer hard freezes because of global warming, so the pine beetles survive and kill more trees,” was her response.

I struggled to make this make sense in the context of everything I knew about the beetle. My thinking fractured, bouncing off of the trees and the cinder block walls and the night sky like beetles in flight—*native species*, and *grainy photograph*, and *human disruption*, and *beetle (I love beetles)*, and *oil drilling*, and *fire*, and *will any trees survive this*, and *human disruption*, *human disruption*, *human disruption*.

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This fracturing is common, and each writer contributing to the spectrum of pine beetle discourse contributes their own feelings, preoccupations, curiosity or lack of curiosity. A characteristic Denver Post article on the issue from 2005 begins with the sentence, “Grand Lake – In a mountain subdivision once so wooded most homeowners couldn’t see their neighbors, Ed Peterson steps away from a 50-foot lodgepole pine he has just toppled and turns off his chain saw.”<sup>3</sup> In a chapter of a popular encyclopedia of destructive bugs, the author begins by discussing the beetle’s path of destruction, “The mountain pine beetle was one of several that “left a trail of ruin” through America’s forests by burrowing under the bark, chewing tunnels through the wood, and “leaving millions of dollars’ worth of timber in a decaying and useless condition.”<sup>4</sup>

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<sup>3</sup> Cox, Jack. “Tiny Beetles Killing Millions of Pines.”

<sup>4</sup> Stewart, Amy., and Briony. Morrow-Cribbs. “Wicked Bugs the Louse That Conquered Napoleon’s

Sometimes, when researching pine beetles I feel like I'm reading about two bugs at once. Later in the Denver Post article, though, the author writes "The scourge, more wide-ranging than similar epidemics in Colorado in the 1970s and '80s, has killed millions of 100-year-old trees in the northern part of the state, turning whole mountainsides into jaw-dropping expanses of orange or maroon."<sup>5</sup> It is a scourge, but a precedented one. In the destructive bug encyclopedia, the passage about the trail of ruin is positioned on the page to the right and above of an information placard listing the distribution of *Dendroctonus ponderosae* as "Found throughout North America, from New Mexico, Colorado, Wyoming, and Montana, to the West Coast. In Canada, found throughout British Columbia and parts of Alberta."<sup>6</sup> Words like "ruin" and "scourge" are nestled into passages attempting to describe the beetle's natural life cycle and behavior patterns.

It is rare to find a story about Mountain Pine Beetles that isn't fractured like this. Scientists debate relentlessly: How do you track the beetles from year-to-year on their distributing flight patterns? Is it worth using insecticides on "high-value trees?" Should any beetles be stopped at all? What are the ultimate risks of all this death and destruction? There are so many stories about the beetle that it is hard, if not impossible, to determine which I am responsible for telling. The common fracture between "scourge" and "natural" feels oversimplified, looking back now, but there are many different types of fracturing and fragmentation. I have come to distrust singular narratives of the pine beetle. They feel opaque and illusory because the issue is so complex.

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Army & Other Diabolical Insects." 167

<sup>5</sup> Cox

<sup>6</sup> Stewart, 167

For years after that fluorescent-lit cinderblock bathroom with the little flier taped to the mirror, I circled the same dilemma every time I walked across a clear-cut meadow that used to be old-growth forest, saw a hillside turning bright orange—who is who? What part of this problem is beetle, what part of this problem is human, what part of it is tree? Who is natural and who is unnatural? Embedded somewhere in the beetle story is a pressing series of forestry questions—what constitutes destruction? What do forest managers, scientists, and writers really mean when they say “nature” or “natural?” That rhetorical dodge between “scourge” and “natural” evades a larger question—in a warming, changing, human-inhabited world, what does “natural” mean anymore?

The writer Emma Marris has argued that humans are involved in every ecosystem on the planet, which means that if you define nature as an unmanaged space, nature no longer exists and has not existed for a long time.<sup>7</sup> Because Snow Mountain Ranch clear-cut so much pine, almost every lodgepole on the property is under fifteen years old. Even so, the signs of recovery are evident. Where the managers re-seeded pines, they are growing. Some, planted only a few years after I was born, are taller than I am now, but the forest will always be different now than it was before.

Thus, climate change and human activity *were*, in part, responsible for the extreme nature of the outbreak that occupied and formed so many of my early outdoor experiences, and the future is far from certain. As the climate changes, the types of forest that different elevations can sustain will also change. Pine populations are facing new threats just as they begin to recover—more beetles, more fire, more heat. The range of the beetles is also already expanding into higher elevations, eating through populations never affected by Mountain Pine Beetle before.

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<sup>7</sup> Green, Jared. “Interview with Emma Marris.”

The warming climate disrupted the balance of long, multi-week freezes over a period of decades that helped to regulate the relationship between beetles and trees,<sup>8</sup> but what I didn't realize at the time was that decades of poor forest management by a vast number of agents, from the National Park Service and the Bureau of Land Management to private individuals and zoning boards, had contributed to creating the exact even-aged, thick forest conditions that I grew up worrying over and longing to see. That prismatic, dense, jewel-green forest I wanted so badly I could practically taste it was itself constructed by historical forces and violence—even before the beetle outbreak began in earnest.

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For decades, American forest managers pitted themselves against fire, beetles, and, in some ways, against humans. Besides hard winter freezes, and the tree's evolved ability to trap beetles and larvae in pitch tubes,<sup>9</sup> wildfire helps to control the MBP population. The benefits of fire also extend beyond beetle control for the entire forest. In Colorado, two of the populations most devastated by beetle-kill, Ponderosa and Lodgepole pines, both rely in different ways on fire to maintain healthy populations. Ponderosa pines, a common species in lower-elevation timber forests, benefit from frequent, low intensity fires on the forest floor. These fires clear the forest floor, preventing larger crown fires, which ladder up smaller trees and kill the Ponderosas.<sup>10</sup>

According to a Nature Conservancy report, Lodgepoles, one of the most famous and charismatic pine species are shade-intolerant and adapted to reproduce following large fires.

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<sup>8</sup> Best, Allen. "Survey: Beetle Kill Increased 50 Percent Statewide Last Year."

<sup>9</sup> Leatherman, D.A., et al. "Mountain Pine Beetle - 5.528."

<sup>10</sup> "Wildland Fire in Ponderosa Pine: Western United States (U.S. National Park Service)." *National Parks Service*.

Thus, lodgepoles that grow in unshaded environments tend to survive better than lodgepoles that sprout in the understory of a more mature forest. “Fire adaptation in trees occurs in two primary forms: the capacity to survive fire, or the ability to reproduce after fire even if killed,” the report states. “While species like ponderosa pine are adapted to survive fire, lodgepole pine is adapted to reproduce readily after fire.”<sup>11</sup>

In addition to killing off the most important animal parasite in pine forests, fire helps to maintain healthy forest conditions. Different species use varied approaches to reproduction and fire survival. As a result, forests that experience different types of fire tend to be more diverse in age than fire-deprived forests. Fires also burn old, injured, and diseased trees, which maintains healthy forest spacing. Mixed-severity fires, also help to produce species diversity and prevent one species from coming to dominate the forest over time. Genuine forest health and biodiversity both rely on the presence of fire.<sup>12</sup>

Nonetheless, forest managers face a complex and often competing set of demands, and as more people moved into Colorado, the number of wildland-urban interface and intermix communities in the mountains grew, and governments and corporations began to push outdoor recreation towards its current status as a major state industry. In turn, forest management as a fire suppression project became more and more viable. In some cases, this was an intentional, institutional effort, as in the case of the Smokey the Bear campaign run by the National Forest Service.<sup>13</sup> In others, it seems that this strategy was less organized—more of a reflexive push to secure homes and neighborhoods against the persistent threat of wildfire in mountain communities. Jack Cox’s article in the Denver Post spends much of its nearly 2000 words talking

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<sup>11</sup> Kaufmann, Merrill R, et al. “The Status of Our Scientific Understanding of Lodgepole Pine and ...”, 3

<sup>12</sup> Kaufmann, 4

<sup>13</sup> “About the Campaign.” *Smokey Bear*.

about real estate and opens on a homeowner attempting to manage the forest living on his land. The desire to suppress fire is an understandable reaction to a real risk, but in taking an extreme position on fire suppression, forest managers from the National Park Service to ranchers in Grand County produced a paradoxical reaction.

Total fire suppression resulted in the opposite of what it had intended—the ‘96-’14 outbreak was probably one of the largest in the long history between trees and beetles.<sup>14</sup> Fire, which tends to kill the older trees attacked by endemic beetle populations, helps to keep both beetle and tree populations under control. Disruptions to forest conditions, moisture conditions, winter temperatures, and fires all contribute to the possibility of a beetle outbreak.<sup>15</sup> Now, the state is experiencing an escalatory spiral of wildfires. The beetlekill trees remain in many forests, providing abundant, atypical fuel loads. Combined with droughts enhanced by climate change and remaining dense forest conditions, beetlekill helps to fuel fires, which in turn demand valuable resources to manage and mitigate. They also destroy the lives of many people that fire suppression was meant to protect.

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As a kid, I imagined the beetles burrowing under my skin, resin pouring out of pitch tubes, slowly turning dry and flame-orange, but in all that history of bulletins, and fliers and nightmares, and nostalgia, I never bothered to learn what the beetles I feared were actually like. The Mountain Pine Beetle (*Dendroctonus ponderosae*) is tiny—most accounts compare them to a grain of rice—and black, with miniscule, white hairs. Like many beetles, they are sturdy-looking, oval, and heavy-shelled, studded with ridges and bumps.

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<sup>14</sup> Kaufmann, 1-2

<sup>15</sup> Kaufmann, 11



In the late summer, the adult female Mountain Pine Beetle buries into a tree, usually a pine, gorges herself on the living tissue, and lays her eggs in the gallery she carves out of the tree by eating. Each beetle who finds a viable tree sends out pheromones to other flying beetles, alerting them to the presence of a good tree.<sup>16</sup> As the beetle begins to bury, the tree begins to release resin, in an attempt to ward off the beetles, producing the characteristic seeping pitch tubes on beetle-kill trees. Sometimes, the tree manages to kill the beetle, but it often fails, especially during a major beetle epidemic.<sup>17</sup> A 2011 study found that, “host defenses were major constraints when mountain pine beetle (*Dendroctonus ponderosae* Hopkins) populations were low, but inconsequential after stand-level densities surpassed a critical threshold.”<sup>18</sup> As the beetle burrows into the tree with her mouthparts, she also often spreads bluestain, a fungal infection that has a relationship with beetles. While the beetle lays her eggs, the spores of the fungus germinate and produce mycelia, which colonize the outer living layer of wood and the phloem, blocking the tree’s ability to conduct water and hastening its death.<sup>19</sup>

The white, maggot-like larvae overwinter under the bark, and to survive the freezing winters, they convert the carbohydrates in their bodies into glycerol, an antifreeze which they then convert *back* into carbohydrates when spring comes and they begin to pupate under the bark. In July, the larvae emerge as adults to fly, mate, and return to other trees to lay their eggs.<sup>20</sup>

Much still remains a mystery to the humans attempting to survey and study the beetles. Because of the delays, distribution flights, and epidemic patterns, Mountain Pine Beetles evade population estimation. In a paper called “The Signature of Endemic Populations in the Spread of

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<sup>16</sup> Stewart, 168

<sup>17</sup> Leatherman

<sup>18</sup> Boone, Celia K., et al. “Efficacy of Tree Defense Physiology Varies with Bark Beetle Population Density: A Basis for Positive Feedback in Eruptive Species.” 1174

<sup>19</sup> *Blue Stain Fungi - Field Guide to Insects and Diseases of AZ and NM Forests.*

<sup>20</sup> Stewart, 168

Mountain Pine Beetle Outbreaks” that I attempted to read while writing this essay, the researchers try to model the range of a pine beetle epidemic from year to year. The researchers note that the direct relationship between the beetle’s reproductive success and host death is mathematically convenient to modelers. Nonetheless, spatially accurate models for beetle populations “...must account for dispersal flights, which allow localized outbreaks to spread into nearby areas.” Models must also “reflect the eruptive and nonlinear nature of MPB population growth.” The methodological pitfalls of attempting to model and map the range and behavior of the bugs are substantial.<sup>21</sup>

Looking back on the epidemic, it seems that part of what I had missed the whole time was that the beetles, too, were alive, converting carbohydrate to glycerol and back, ingenious and natural, without my ever knowing. I despaired about humans for a long time after learning that climate change was contributing to the beetle epidemic. My longing for the forest of the past bordered on hatred at points. Human presence seemed disruptive and unnatural—invasive, even. I am now hesitant to jump to the conclusion that human inhabitation of the planet is so unnatural. My changing thoughts on humans parallel my changing thoughts on beetles, in this sense. The conclusion that human society separates “the human” from “the natural” seems dangerous to me now—a path more likely to lead to unbridled capitalism or ecofascism than anything productive. This, too, seems like an opaque and oversimplified way of telling the story. *Some* human activity is producing undesirable disruptions—carbon emissions produced by burning fossil fuels, for instance. Other human behavior might be more desirable.

In her book *Braiding Sweetgrass*, the botanist Robin Wall Kimmerer writes about asking her third year ecology students about the nature of negative interactions between humans and the

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<sup>21</sup> Koch, Dean, et al. “The Signature of Endemic Populations in the Spread of Mountain Pine Beetle Outbreaks.”

environment on a survey, recalling that the median response identified no positive interactions between people and the land.<sup>22</sup> Much of Kimmerer's work, both popular and technical, is dedicated to gently debunking this conclusion in the public arena, through a combination of technical botanical science and indigenous culture, history, and teachings—Kimmerer is an enrolled member of the Citizen Potawatomi Nation. Underlying her writing in multiple arenas is a conclusion that is, at least for American forestry and land management, profound and radical—entrance into any interaction with the land is also an entrance into a relationship.<sup>23</sup> Humans manage the land, and the land manages humans back—all the landscapes that people interact with are managed landscapes. Even the choice *not* to manage is, on some level, an ideological orientation toward management.

Whether you choose to see this as a natural or unnatural phenomenon, comes largely down to whether you view humans as a natural or unnatural force acting on the landscape. For Kimmerer and others, humans are a natural, active, equal force in the ecological community of any given piece of land they inhabit. <sup>24</sup> argue that, particularly in the American West, this way of thinking about the land is rooted in indigenous land management practices. Although not all areas in the west were equally inhabited and managed by indigenous people, and it is a mistake to overgeneralize the beliefs of distinct groups of people, it is clear from both research and tradition that the landscape is fundamentally shaped by the people who inhabit it. The vast, particular biodiversity of the American west was shaped by the way indigenous people

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<sup>22</sup> Kimmerer. *Braiding Sweetgrass*. 19

<sup>23</sup> Kimmerer. "Braiding Sweetgrass." 22

<sup>24</sup> Kimmerer, et. al. "The Role of Indigenous Burning in Land Management." 38

historically used fire to encourage the kind of diversity in plant and animal populations that made it possible to sustain societies, even in otherwise forbidding landscapes.<sup>25</sup>

Over the last century and a half, policy stripped native people of their rights and ancestral land at the same time that foresters attempted to produce a state of total fire suppression, eliminating not just human burning, but also lighting-triggered fires in forests where humans historically did little or no burning. These two things did not happen simultaneously by coincidence. Kimmerer writes that “The loss of fire in the American landscape is inextricably linked with the history of federal Indian policy that removed tribal people and, therefore, indigenous land management.”<sup>26</sup> In the meantime, due to cultural suppression, policies that outlawed or severely curtailed the practice of cultural burning due to colonial ideology,<sup>27</sup> devaluation of traditional methods of recording land management practices by mainstream science, much important knowledge has been lost.<sup>28</sup>

The kind of ecology that values the kind of total fire suppression, beetle suppression, disruption suppression that is necessary to create and maintain a dense, evenly-aged pine forest assumes that disruption is only or mostly a bad thing. Humans “...may believe that the structure and composition of forests do not (and even should not change), and, when they do, it means something alarming has happened”. In reality, though, forests aren’t static systems—they are communities where each individual can live for multiple centuries, experiencing “a number of very natural, and ecologically predictable forest-changing events or processes” over the course of time. <sup>29</sup>

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<sup>25</sup> Pierotti, Raymond, and Daniel Wildcat. “Traditional Ecological Knowledge: The Third Alternative (Commentary).” 1334-1335

<sup>26</sup> Kimmerer 37

<sup>27</sup> Sommer, Lauren. “To Manage Wildfire, California Looks to What Tribes Have Known All Along.”

<sup>28</sup> Kimmerer 38

<sup>29</sup> Kaufmann 5

The unchanging, wholly “alive” forest I grew up longing for was no more “natural” than the dying forest, or the recovering forest, or even the forest on fire, and indeed, that thick, green forest bore the marks of political and social processes. The progression of the landscape through various phases of commodification and domination affected the forest in lasting ways. Even in forests where indigenous people rarely or never burned, fire suppression represents a colonial suppression of the landscape’s evolved processes of disruption and reorganization, based on an orientation toward fire that is more aligned with the European landscape than the landscape of the American west.<sup>30</sup>

Given all of the factors involved, restoration of fire in the American West is a complex issue. Restitution of cultural burning and land management rights to tribes is an important step in remediating the relationship of humans with the land, but as climate change reshapes the landscape of the American West, the politics of fire continue to change and become more complex. Because of years of intense fire suppression and increased human settlement in wildland areas, there are many more areas that need to be burned than there were in the past. On the other hand, more and more agencies are coming to acknowledge that fire is a necessary part of the process of managing the land, science is beginning to devote more attention to the dynamics of the prescribed burn,<sup>31</sup> and more cultural burns are being restored.<sup>32</sup> The story of land management at the moment is fractured—as in beetle stories, there are reasons for both hope and dread.

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<sup>30</sup> Pierotti and Wildcat 1337

<sup>31</sup> Zhong, Raymond, and Andri Tambunan. “How to Save a Forest by Burning It.”

<sup>32</sup> Buono, Page. “Quiet Fire.”

The month I turned nine, the High Park Fire burned 87,415 acres, much of it wildland-urban interface in the foothills near my hometown of Fort Collins. It destroyed hundreds of homes and killed one person.<sup>33</sup> Because I was so young at the time, my memories of the fire are fragmentary—a night sky and moon turned red by smoke, the smell of the fire, hot and close. After the fire, my family drove up in the foothills to see what had burned. The hillsides were covered in twisted black trees, and dusty brown-and-mica soil, but there were flowers starting to bloom—fireweed and paintbrush among the dead, blackened trees. What I feel about the Colorado landscape is hard to shake, but I also know that the aliveness of that forest was concealing deaths past and deaths yet to come. Of course, my memory of that day in the burned area is probably exaggerated in certain ways, shaped by my perceptions of what fire does and what it is good for, but that day stuck around in my memory—the colors of the flowers and the clear sky.

In its time, the High Park Fire and the other fires of its season were considered landmark fires—they burned hundreds of homes and forced thousands of people to evacuate. It was also huge, high-intensity, and fast-spreading—nearly half of the burn was considered high or moderate intensity. Now, the High Park Fire seems comparatively small. The year 2020 was the worst fire year on record in Colorado. At the end of July, the Pine Gulch Fire, which was sparked by lightning north of Grand Junction, burned 139,007 acres. At the time, this seemed unimaginable, but less than fifteen days later, on August 13th, human activity sparked the Cameron Peak fire. Over the course of roughly six months, it burned 208,913 acres.<sup>34</sup> Colorado is also attempting, slowly, to recover from the Marshall Fire—a grass fire that burned almost a thousand homes in

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<sup>33</sup> Rhoades, Charles, et al. “Learn from the Burn: The High Park Fire 5 Years Later: Rocky Mountain Research Station.”

<sup>34</sup> “Cameron Peak Fire.”

Boulder County in the last days of 2021.<sup>35</sup> At the time when land managers most need to transform their relationship to fire, the fires themselves are straining the limits of land management.

The ecosystem created by a combination of evolved forest processes and land management by the indigenous people that occupied what is now Colorado before colonization no longer exists. Because of current land use patterns, it is unlikely that anything short of reversing time will allow exactly those conditions to exist again, especially as climate change reshapes fire, forest conditions, seasonality, and elevation in Colorado and across the world. In a changing climate, the windows where it's possible to safely conduct cultural and prescribed burns are narrowing,<sup>36</sup> and due to the hundred-year history of fire suppression, human burns remain both woefully under-researched and under-funded by government land management agencies.

A 2019 paper on barriers to prescribed burning based on interviews with land management officials throughout the west found that two of the biggest barriers managers face when attempting to apply fire to landscapes that badly need it are funding and capacity. The researchers also noted that the politics of fire suppression are still complex. One land manager interviewed for the project explained, "While we intellectually recognise the need and value of prescribed fire, our culture is that of 'firefighter'. And we are also a pretty risk-averse organization that really gets scared by the possibilities of a major escape. We have plenty of opportunities to draw on negative experiences of others."<sup>37</sup> On a wildlife-urban intermix property like Snow Mountain Ranch, where I grew up hiking and skiing, the issue is even more complex–

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<sup>35</sup> Paul, Jesse, and Jennifer Brown. "The Minute-by-Minute Story of the Marshall Fire's Wind-Fueled Tear through Boulder County."

<sup>36</sup> Zhong, Raymond. "Why Climate Change Makes It Harder to Fight Fire with Fire."

<sup>37</sup> Schultz, 878.

the pine populations currently recovering across the property demand fires that may be impossible to light in an area so close to buildings and in an area tourists expect to be forested.

When it comes to cultural burning, tribes continue to face significant barriers fueled by racism and risk-averse bureaucracy to regaining their rights to burn at traditional sites. “Native Americans still face persecution and penalty when they try to use fire in line with their traditions—even on public lands where they often hold treaty rights to hunt, fish and gather,” Page Buono writes. On reservations, Native land managers may also face federal restrictions on burning.<sup>38</sup>

Part of the reason total fire suppression appeals to government and private managers is because its risks are largely concealed or left to future generations. This allows people to evade both the need to admit the extent to which humans are involved in relationships with their environment because fire suppression purports to stop the disruptive influence of fire on the “untouched” landscape. When agencies decide against burning, they avoid the very real political and physical risks of working with fire. Prescribed burns are a political briar patch in a region of the world already ravaged by fire—the 2019 paper on barriers to prescribed burns quotes an agency leader who recalls, “We had the projects lined up. The burn window looked great, actually, for our region. But the politics of it... [an agency leader] asked me to cancel the event, for one because of the resource draw-down, but also just the optics of doing any kind of prescribed burning while people are losing their homes and people are losing lives and stuff.”<sup>39</sup> On top of this, there are real risks to setting fire-prone landscapes ablaze. In the early summer of 2022, two prescribed fires in northern New Mexico grew out of control because of high winds

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<sup>38</sup> Buono

<sup>39</sup> Schultz, Courtney A. Policy barriers and opportunities for prescribed fire application in the western United States. 877



and eventually merged, eventually producing the largest and most destructive fire in state history, which burned 341,735 acres and destroyed almost as many structures as the Marshall Fire did in Boulder County.<sup>40</sup> Fire is an imperfect tool, but as agencies and science communicators continue to conceal the risks of *not burning* to both human and forest communities, that risk continues to accrue. In some areas, failure to burn *now* means increased future risk—of both future fires and more disastrous beetle and disease outbreaks.

Culturally, mainstream land management is moving toward a less fire-averse model, but the possibilities for future landscapes in Colorado and the American West are heavily constrained by the patterns of the past. In Colorado specifically, land managers and the public alike are faced with a multiplying range of past forests—the precolonial forest, the forest of the 1700s, the forest of the Louisiana Territory, the fire-suppressed forest of the 20th century. Faced with these endless possibilities for nostalgia and increasingly difficult problem of fire in a changing climate, it is difficult to respond to and care for the landscape as it is *now*—not as it was a hundred or two hundred years ago, especially because so much public knowledge about Western forests comes from an environmentally different period. In Colorado, after twenty years of beetlekill and ten years of escalating fire, land managers, local governments, and private citizens alike are facing down constraints that existed under the surface all along. The past forests have, for the most part, concealed historical patterns and risk-management decisions. In the face of climate change and more than a hundred years of mismanagement, those tensions are rising rapidly to the surface.

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<sup>40</sup> “Single Incident Information: Hermits Peak Fire.”

Two seasons ago, barely two weeks after firefighters had finally contained the Cameron Peak Fire, my mom and I were snowshoeing up a mountain on the southwestern side of Snow Mountain Ranch. About halfway up, the grade of the trail increased. I was exhausted, numb with anxiety. Slogging through the cold air, I felt haunted by six months of record-breaking fires and the fact that in that week alone, thousands of people had died because of a record breaking COVID wave. As we hiked though, we came into a less-affected patch of forest. The trees were tall and the species were diverse—aspens, spruce, firs, tall lodgepoles that *must* have survived their own mass death event. I almost cried.

I am still stuck imagining nonexistent forests, but I am also more afraid now of sacrificing the forest alive now for a forest that never existed or a forest that may never exist again. Whatever else is true, the forest that exists right now, is alive and green under three-quarters-of-a-season of snow, asking something of me, just as it has been this whole time. In some trees, larvae are burrowed into living galleries, waiting for spring. In the summer, something will burn. Spending so much of my time imagining a different forest as a kid was, among other things, a way to avoid the real, living forest's insistence that I respond to its questions: *What will you say about this? What will you do about this?*

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