

Battling longer, more intense fire seasons

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Graduate student Clare Super is studying the effects of climate change on disaster-relief workers, specifically career firefighters in Montana, where she grew up. Credit: University of Pennsylvania

Fires in Australia have been burning for months. At least 28 people and hundreds of thousands of animals have died, and more than 15 million acres have been destroyed as firefighters work to squelch the blaze. Penn doctoral student Clare Super has been closely watching news of the fires. Super is a third-year doctoral student in the Department of Anthropology in the School of Arts and Sciences at the University of Pennsylvania.

"I'm from Montana. Over the course of my childhood, I experienced a worsening [fire](#) season," says Super, a third-year graduate student in the Department of Anthropology. "Many of my friends and family participate in seasonal wildland firefighting."

But for Super, interest in the fires goes beyond a connection to where she grew up. It also forms the starting point for her doctoral research, which focuses on how fighting fires affects disaster-relief workers physically, works she hopes will eventually broaden the understanding of how climate change and more frequent, intense disasters affect the bodies of more and more people. Her study population is Montana's career firefighters, a group that University of Montana exercise physiologist Brent Ruby has been examining since 2018.

Ruby, a mentor of Super's, had previously found that the body-fat levels of many of these firefighters increased over the course of a season, despite how active they were. And [current models](#) offered no clear explanation. "My guess was that these really intense, energetic, nutritional demands on bodies are creating a shift in the microbiome," Super says.

That's part of what she will try to determine as she spends the next several years collecting and analyzing blood and fecal samples from about 100 firefighters. She also hopes to follow two crews as they actively put out fires. Now, she continues to monitor what's happening in Australia, with an eye toward the 2,700 people on the front lines, the influence of climate change, and parallels to fire management in the United States.

Before we get into the fires in Australia and fire management here, can you explain the anthropology side of your research?

I'm studying biocultural anthropology, which can be many things. For me, it's about the societal, biological, and environmental factors that affect health, specifically in wildland firefighters.

I've also been interested in the microbiome for a while. So, when Dr. Ruby found that over the course of a fire season, despite the fact that the firefighters are so active, their blood and body-fat numbers were increasing, I thought the microbiome might be one answer. From an anthropology perspective, it's not really possible to tease apart caloric intake, microbiome profile, and the psychological stress of a hard job. Background, not just biological background—the microbiome you have going in—but also level of social support and socioeconomic status are also probably influential factors.

The number of wildfires in the U.S. has increased during the past six decades, according to NASA, and they're also destroying more land. What's causing this?

The major two factors are Forest Service practices over the last 100 years and climate change. These are pretty related in my mind, yet many people tend to favor one or the other.

Let's talk about fire management first. How has this played out?

Fires in many western landscapes are a natural part of the ecosystem. Early settlers knew this and used prescribed burns as a tool to manage the accumulation of smaller trees. But since the early 1900s, Forest Service policy had been to completely suppress wildfire in national land and to encourage it on private land. At the time, this idea, that all fire was bad, seemed like a good one. The policy was that we needed to put out every fire by 10 a.m. on the day it started—no matter how small. After World War II, we had the technology and the personnel to actually do this.

In the '60s, however, we began to realize we were having much more intense fires, so the Forest Service changed its policies, thinking that if it implemented prescribed burns, it could better control the fire season. The agency didn't truly implement enough prescribed burns though because a lot of the politics around them is impossible.

Beyond that, you can see that more and more of the Forest Service budget is just for fire control. It used to be for forest maintenance and research, but now so much of the budget is just for putting out fires.

How does climate change factor in?

The fire season is becoming more intense and longer. I wouldn't even say there's a fire season in Southern California anymore; it's an ongoing risk. An example of how this is changing is with policy: A lot of career

firefighters are no longer seasonal workers, but they've officially become full-time workers in some places.

Part of this is because conditions are changing. Spring begins earlier in Montana, which seems great when you're there, but it also means that by July things are a lot drier than they used to be. You can see patterns like this everywhere, though they look different in different places and from year to year. Atmospheric conditions are creating more extreme lows and highs.

All of these changes lead to social shifts and migration and disruption in agriculture. It's not just the bodies of firefighters that will experience the demands to stay alive to control these disaster events. That's going to be more common in firefighters but will also affect any disaster victims. These metabolic and microbiome effects, along with other specific health effects—for fire, that means things like consequences of smoke inhalation—are going to happen more.

How does this compare to the policies in Australia?

From what I've seen, especially with the policies of the current government, Australia is also a wildfire-adapted ecological landscape, and more people are starting to live at the wildland-urban interface, basically natural spots where people previously didn't live. In the U.S., you can see it a lot with urban sprawl around places like San Diego or even Big Bear, which used to be just a ski resort and is now a full-on metropolis. People are expanding out. Australia also has a policy of not letting smaller fires burn, although they're a lot less effective at doing this than the U.S. because they have fewer personnel.

That being said, you can see shifts in social systems starting to occur in Australia right now. People who have been denying climate change for a really long time, when they experience the disasters themselves, become

eager to employ some climate change-related action afterwards. Once these shifts in attitude start occurring—and especially if they start occurring to affluent people—then changes follow.

What can Americans do to mitigate worsening fires and longer fire seasons?

That is the big question, right? There are so many suggestions as to what you can do, especially if you read the report from the Intergovernmental Panel on Climate Change and listen to experts like that. I don't see anything that could actually prevent major climate change effects aside from a complete societal and economic upheaval.

Right now, our economy doesn't allow for investment in climate-change prevention. The shifts need to be big and long-term. Any action we take to prevent [climate change](#) now, we're not going to observe the effect of it in any one presidential cycle. Some sort of political and economic system that isn't the one we have—and I don't know what that looks like—needs to occur in order to prevent this going forward.

Provided by University of Pennsylvania

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