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STATES:

Devastating wildfires pose growing threat to Hawaii's lush forest and water resources

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Mention Hawaii to mainlanders and they'll usually picture surfers, hula dancers and palm trees -- not wildfires.

But Hawaii's scientists and land managers report that wildfires

present a persistent and growing threat to the Aloha State's forests, water resources and even its coral reefs. Research is ongoing, but many suspect that hotter, drier conditions borne by climate change are making the issue worse.

In late January, flames consumed approximately 460 acres of lush native forest on the island of Oahu, including part of the Oahu Forest National Wildlife Refuge. Three helicopters were needed to help douse the blaze.

While no homes were threatened, Lisa Hadway, administrator of the state Department of Land and Natural Resources' Division of Forestry and Wildlife, explained it was still essential for crews to extinguish the fire as quickly as possible.

A forest fire creeps down to the sea from the West Maui Mountains. Photo courtesy of Peter Liu.

As an isolated island chain, Hawaii is home to an unusually high percentage of endemic species, meaning that many of its native trees, animals and insects are found nowhere else in the world.

And unlike many forest types in the western United States, "Hawaii's unique forests aren't adapted to fire, so when a fire sweeps through an area, for the most part ... it's replaced by invasive species," Hadway said.

Invasive species are a huge problem for Hawaii. The U.S. Forest Service **estimates** that over 1,000 nonnative plant species have taken hold there, and the agency cites invasive species as Hawaii's leading cause of biodiversity loss and extinctions.

Wildfires, invasive species and development mean Hawaii's native ecosystems have become increasingly rare. For example, scientists estimate that less than 10 percent of Hawaii's native dryland forests remain intact -- and, Hadway said, "guess where most of the fires are?"

So when 460 acres of native Hawaiian forest goes up in smoke, like what took place on Oahu in January, it's a big concern.

"These fires have just been devastating," Hadway said.

'I had no idea how prevalent it was'

Part of the reason Hawaii isn't usually thought of as one of America's more wildfire-prone states is that blazes there are fairly small. The biggest, most infamous wildfires in the contiguous United States consume hundreds of thousands of acres at once. In Hawaii, less than 10,000 acres burn each year.

But for a small state, many little fires can add up.

A soon-to-be-published analysis by researchers with the nonprofit Hawaii Wildfire Management Organization; the Forest Service; Colorado State University; and the University of Hawaii, Manoa, determined that each year, a greater proportion of Hawaii's total land area burns than the proportion of land area burned each year in the most fire-prone Western states.

"I had no idea how prevalent it was until we actually started summarizing this data," said Clay Trauernicht of UH Manoa.

Invasive plants and wildfires work in tandem to create a destructive cycle for Hawaii's native forests, Trauernicht explained.

Fire-adapted nonnatives such as fountain grass invade the

edges of native forests. When a fire burns through the area, the tenacious fountain grass recovers quickly, while native trees struggle to grow back. The invasive grass's territory steadily expands, making the area even more wildfire-prone, and the cycle continues.

More research is needed to learn how a changing climate might enhance the cycle, Trauernicht said, but he isn't encouraged by current scientific predictions.

"The projections for Hawaii are kind of grim from a fire perspective," he said. "Dry areas are supposed to get drier with more frequent drought conditions. That's really a worry."

Smothering coral reefs to death

In addition to chipping away at the last of Hawaii's native forests, wildfires also threaten the state's limited freshwater resources. According to Elizabeth Pickett of the Hawaii Wildfire Management Organization, fires can make the soil hydrophobic, meaning less water infiltrates the soil and contributes to the state's precious groundwater resources.

Wildfires are also destructive to the state's treasured coral reefs.

The most recent National Climate Assessment reports that Hawaii's coral reefs are already struggling to survive due to bleaching events and ocean acidification.

However, experts with the National Oceanic and Atmospheric Administration report that when rain falls on an area previously hit with a wildfire, the runoff that flows into the ocean is filled with sediments and chemicals that can smother corals to death, among other negative impacts.

"Once these sediments reach a coral reef they can often stay there for up to 10 years," Gerry Davis, an assistant regional administrator for the NOAA Pacific Islands Regional Office's habitat conservation division, explained in an email. "This now makes sedimentation not just a rain event, but also a wave event, as sediment can be repeatedly suspended."

To help reduce wildfire's impact on the state's resources, the

Hawaii Wildfire Management Organization is working aggressively to educate local communities on how to prevent and prepare for wildfires. This could make a big difference because the group's research shows most fires in Hawaii are caused not by lava flows or lightning strikes, but by humans.

"When we finally mapped out all of the fires, a huge majority of them are along roadsides and access areas like trails," Pickett said. "At least some of these could be preventable."

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