

As wildfires continue in western United States, biologists fear for vulnerable species

By [Elizabeth Pennisi](#) | Sep. 30, 2020 , 11:55 AM

Two weeks ago, conservation scientist [Dominick DellaSala](#) was at his home in Talent, Oregon, writing an opinion column warning that the hotter, drier weather that had sparked devastating wildfires in California could soon catalyze blazes across the western United States. Then, his power went out. Looking out his front door, he saw a wall of black smoke produced by a wildfire that was speeding toward Talent. “It was close,” recalls DellaSala, who works at the Earth Island Institute—so close that he had to evacuate, then wait and see whether his home would survive.

So far this year, fires in Oregon, Washington, and California have burned some 3 million hectares, marking the West Coast’s worst fire season in at least 70 years. The blazes have killed at least 35 people, destroyed hundreds of structures, and caused extreme air pollution that has threatened the health of millions of residents. Ecologists fear the wildfires also could inflict lasting damage on species and ecosystems. In particular, they worry the loss of habitat could imperil species with small populations or restricted ranges, and that incinerated ecosystems will fail to rebound in a warming climate, leading to permanent landscape changes. “We are in uncharted territory here, and we just don’t know how resilient species and ecosystems will be to wildfires of the magnitude, frequency, and intensity that we are currently experiencing in the U.S. West,” says S. Mažeika Patricio Sullivan, an ecologist at the Ohio State University, Columbus.

It’s too soon to say how many species the fires have put in jeopardy, researchers say. But [Australia’s experience with its record fires last year](#) has created anxiety; scientists there now say the habitat loss has [imperiled dozens of species](#), and perhaps [caused some to go extinct](#). And, already, there are worrying reports from the United States. In Washington, biologists estimate the fires have killed 50% of the state’s endangered pygmy rabbits, which inhabit sagebrush flats that burned this year. They believe only about 50 of North America’s smallest rabbit remain. Officials estimate the flames have also killed 30% to 70% of the state’s sage grouse and sharp-tailed grouse, birds that also depend on sagebrush.

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Elsewhere, fires have threatened the habitat of the white-headed woodpecker, found only in pine forests in the Pacific Northwest and California, and the Grace’s warbler, limited to pine and oak forests in the southwestern United States and northern Mexico, says wildlife biologist Vicki Saab of the U.S. Forest Service’s Rocky Mountain Research Station. In New Mexico, researchers are examining whether smoke from the fires might have played a role in the unusual deaths of thousands [of birds found scattered on the ground](#). The birds might have developed respiratory infections because of the smoke, researchers say, or abandoned feeding grounds before they had a chance to store up enough fuel for their migration.

Fires that hit California in 2014 might offer a preview of what some species face. After flames swept through habitat of the endangered spotted owl, [many of the birds abandoned nesting sites](#), biologists Gavin Jones of the Rocky Mountain Research Station and M. Zachariah Peery from the University of Wisconsin (UW), Madison, found. In 2015, some 22% of nesting sites used by the birds in 2014 were not reoccupied and are still empty, Jones says, and this year’s fires could add to the

losses. Because the owls carry tracking tags, Jones has also found the owls tend to avoid burned areas larger than 100 hectares, presumably because they need nearer tree cover as shade, perches, and protection from predators. “With more, larger, severe fires we risk losing that owl habitat,” Peery says.

Plants with small ranges that grow in areas that have burned—such as the Coulter pine in California—might also face trouble, says Camille Stevens-Rumann, a fire ecologist at Colorado State University, Fort Collins. “California especially has a lot of endemic plant species that could be very much impacted,” she says.

The impact of the fires might not be entirely bad, researchers note. Many species in the West evolved to cope with fire, and some need it to thrive. “Many of the old-growth forests we know and love in the Pacific Northwest were born of large and severe fires centuries ago,” says Brian Harvey, a wildfire ecologist at the University of Washington, Seattle. The mosaic of burned and unburned areas left after a fire can, for example, provide valuable “habitat for the entire suite of [bird] species that evolved in western North America,” says Saab, who studies the effects of fire on birds. The black-backed woodpecker, for instance, feasts on the eggs that beetles lay on charred trees, and the white-headed woodpecker likes to nest in newly opened areas. Fire also releases soil nutrients that can encourage the growth of shrubs that attract insects and other invertebrates that birds such as the dusky flycatcher and mountain bluebird find tasty.

One big question facing researchers is how burned forests will recover, “now that the postfire climate is likely to be warmer and drier than when the parent trees established long ago,” Harvey says. Climate change could make it ever harder for forests and other ecosystems to come back and bode more fire in the future. “Just a little more drought can lead to much bigger fires,” says Monica Turner, a fire ecologist at UW who calls climate change “a threat multiplier.”

Already, some ecosystems in North America that have had frequent or intense burns are not regenerating. In some places, such as the sagebrush ecosystem of the Great Basin west of the Sierra Nevada mountain range and forests in the Klamath Mountains along the California-Oregon border, invasive shrubs or grasses appear to have taken over. Because the invaders burn frequently, they appear to be preventing seedlings from maturing. “When trees fail to regenerate, then we get into a feedback cycle that makes it very difficult in the long term to get back to a forest,” says Víctor Resco de Dios, a forest scientist at Southwest University of Science and Technology in China.

It’s still not clear whether this year’s West Coast fires are worse than what the region might have experienced before humans began to suppress fire nearly 100 years ago. But some fire experts argue that recent fires have left ever larger patches of forest that have burned with “high severity,” imperiling recovery. These spots, often larger than 400 hectares, may be too big to be reseeded by adjacent intact trees and too extensive to attract wildlife.

DellaSala, however, is one researcher who disagrees with that analysis. He and Chad Hanson, also at the Earth Island Institute, use computerized maps to compare changes in vegetation and fire severity from 1984 until 2015. They found that the size of severely burned patches expanded between 1984 and 1991, but has **remained stable since then**, the duo reported on 6 September 2019 in *Diversity*. Faulty vegetation databases used in other studies had skewed earlier results, they argue.

Predicting the aftermath of the current fires is a “very complex” task that will depend on a wide range of factors, including vegetation type, terrain, and future climate, says Edward Smith, fire manager for the Nature Conservancy. And there are likely to be a variety of outcomes, he says. “Some habitats will bounce right back, others will struggle for years to recover what was lost, and still others will completely change to a new type of habitat.”

DellaSala will now get to see the process up close. After sleeping on friends' couches for a week, he was able to return to Talent. Near his house, he saw "total devastation," including homes on the opposite side of his street that had burned. His house, however, had been spared.

With reporting by John Pickrell in Sydney.

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