

# Challenge to prevent Sierra forest fire catastrophe

By Linda Fine Conaboy

INCLINE VILLAGE – “It’s not a matter of getting better at firefighting, it’s now a matter of too much stuff for fires to burn,” Malcolm North, forest ecologist with the U.S. Forest Service Pacific Southwest Research Station said, explaining that in 2017, the costs to fight fires was upward of \$3 billion. “We’re losing the forest fire battle. It’s not whether fire will occur, it’s when.

“We have two choices. We can continue to deny that we can control fire or we can get in front of it and learn how to be smarter when it comes to forest fires.”

Forest fire and drought are top-of-mind for those who live in, or close to, the Sierra Nevada, as attested to by the packed house last week at a UC Davis TERC presentation at Sierra Nevada College on managing fire and drought in the Sierra Nevada.

The room was jammed as North did his best to explain the symbiotic nature of fire, fuels and forest inhabitants.



**“The goal for a resilient forest and happy owls is big trees and moisture.”**

*– Malcolm North*

Beginning with why our forests are unhealthy, with a nod to spotted owls and the role they play, followed by data collection and finally, circling back to managing forests so that all creatures can live out their lives despite climate change, drought and wildfire, North wove his four intertwined topics into a fascinating saga.

“It doesn’t take a forest ecologist to see that our forests are in bad shape. Clearly, something is out of whack,” North said.

He blames early clear-cutting in the Sierra during the Gold Rush time period for the beginning of an irrevocable alteration of the forests. “Large, fire resistant trees were cut and ‘defect’ trees were eliminated,” he said. “But in actuality, these gnarled, crooked trees (defect trees) are the nexus for wildlife—like owls. This was not a good idea.”

Additionally, fire suppression changed the forests in the Sierra Nevada forever, causing incredible density on the forest floor, thus providing fire with the fuel it needs to easily burn.

“Fire is actually essential in a forest. Eliminating fire, like for the last 100 years, causes crown fires,” he added. “In the past, fires occurred every 10-15 years, adding life to the forest.”

Long ago, a typical, healthy forest supported about 64 trees per acre with a diameter of about 26 inches; now, there are about 320 trees on an acre with measly girths of 14 inches or so.

Canopy cover totaled 32 percent of the green foliage aloft; now, the dense forest canopy averages 65 percent.

Forests, North said, used to be able to recover and reseed themselves, but now money is going directly to fire suppression, not to the necessary replanting of a fire-ravaged forest, causing lots of shrub fields to grow, further exacerbating the problem.

Additionally, the elimination of repeated fires (every 10-15 years) means that there is now competition for water.

“Lack of water causes stressed trees, which are becoming overwhelmed by beetles who can sense when a tree is unhealthy. There’s never been a precedent for beetle infestation in the Sierra,” North said. “Beetle mortality is particularly accelerating the loss of large, tall, old-growth trees.”

He added that sugar pines are in a reduced state not only because of drought and forest mismanagement, but also because of rust. “Beetles are just a pile on,” he said.

Add to all of this the spotted owl, whose now-protected habitat is a roadblock to forest restoration and resilience. According to North, owls need lots of tree canopy to thrive as do northern flying squirrels, Pacific fisher and northern goshawk. “Actually, 70 percent canopy is good for owls; bad for fire.”

To determine the amount of actual available canopy cover, some means of measurement needed to be utilized, North said. "If canopy structure is so important, how accurately is it measured? Not so well," he said. "Measurements are crude and inaccurate. The Forest Service doesn't even accurately measure canopy cover."

Enter LiDAR (light detection and ranging) a remote sensing method used to examine the surface of the Earth. In actuality, LiDAR analysis found that owls really don't need masses of dense ground cover, but they do need canopy cover to survive.

"So maybe ladder fuels (live or dead vegetation that allows a fire to climb up from the landscape into the tree canopy) can be reduced without endangering owl habitat," North mused.

As he prepared to wind up his talk, he arrived at his final topic—how to meld owls' needs with wildfire resistance? He suggested that tree planting patterns are key to a healthy forest. For example, trees need to conform to a group/gap situation where groups of trees are surrounded by gaps of space. "There's a tight coupling among ecosystem processes—forest heterogeneity supports fire diversity.

"Old-growth forests with restored fire patterns in Yosemite and Sequoia national parks all exhibited the same needs—tall trees, snags and moisture. The goal for a resilient forest and happy owls is big trees and moisture."