

Fighting fire with fire benefits forests, watersheds

By [Kevin Schultz](#)

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Tucked behind Half Dome, Mount Starr King and other natural walls of granite rock, the Illilouette Creek Basin in Yosemite National Park serves as one of just three areas in California where wildfires have been left to burn, for the most part, for decades.

There, Scott Stephens, a fire scientist from UC Berkeley, and fellow researchers have studied what happens when fires are allowed to burn, rather than repeatedly being put out.

Since such fires were reintroduced into the basin in 1974, Stephens said, more than 40 of them have transformed the area from a large, uniformly dense forest area, into a diverse array of sectioned vegetation — from grassland-like sections to thinned but intact woodlands.

Photos of the area from years before the fires showed a thick, continuous forest canopy “because of 100 years of suppression,” he said. “Today there are gaps — 3- to 4-acre openings throughout.”

In short, Stephens learned that allowing fires to burn tends to lead to more resilient forests, with smaller future fires and lessened impacts on the environment.

Now, in the midst of California's record-breaking drought, and the devastating wildfire season that came with it this year, Stephens, with a group of six other



Photo: Lea Suzuki, The Chronicle
The burned tree trunk in the Illilouette Basin is contrasted with new growth around it on Monday, September 21, 2015 in Yosemite, Calif.

fire researchers, is using what they've learned to urge officials to re-evaluate the way they manage wildfires.

Instead of traditional fire suppression techniques, Stephens and the other researchers want officials across the U.S. to fight fire with fire.

Prescribed burns

The scientists devised a plan in which fires would be left to burn themselves out while managing their spread to keep vegetation from building up and allowing a more massive, widespread future wildfire to ultimately ignite. Under their plan, some fires would even be ignited and managed by forest officials — a

method known as prescribed burning — to help clear out the build-up of brush from years of suppression.

The scientists outlined their approach to fire management in a paper published this fall in *Science*.

Both scientists and forest officials have long suspected that prescribed or managed burns reduce the fuel that feeds future fires and make a burned area more resilient afterward, but Stephens said the methods have not been applied widely or uniformly enough to have the effects they could.

Stephens' ongoing study of the Illilouette Creek Basin provided that opportunity, and turned up an unanticipated discovery.

Ponds of water and plant life suited more for a wetland than an arid forest sprung up, Stephens said. He and his research team were not quite sure why, but suspect that allowing an area to burn resulted over time in less vegetation to suck up any rainwater and fewer trees to block the snowpack from reaching into the ground.

Non-suppression techniques put “the habitat in the position of being sustainable over the long term, much more in line with what it was like before human intervention,” Stephens said.

Suppression builds fuel

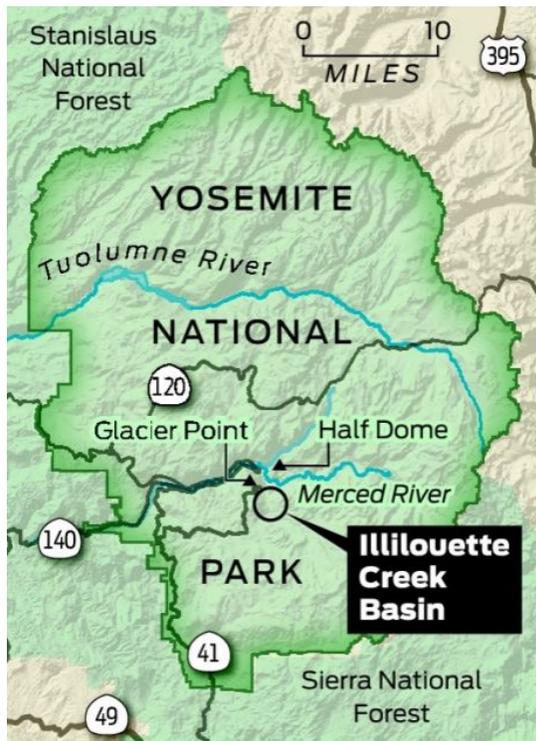
Since about 1875, he said, the standard means of fire management in the U.S. — suppression — has resulted in a build-up of vegetative fuel, a substantial reason that wildfires nationwide account for a large amount of destruction.



Photo: Lea Suzuki, The Chronicle
Anthony Ambrose, research assistant, works with a pistol that will shoot a dart carrying fishing line over a tree branch as they start the process of installing cameras to measure the snowpack, to see how the changing snow and water systems play into the system of natural burn on Monday, September 21, 2015 in Yosemite, Calif.

The scientists' recommendation comes at a time when new approaches in fire management are being considered nationwide. The U.S. Forest Service, for example, is revising its guidelines for handling fires in more than 150 national forests and has asked its forest managers to come up with a plan suited for the forest they oversee within the next decade.

As a part of its revision, the Forest Service has directed its managers to consider prescribed and managed fires for 11 million of its 58 million acres. In 2014, the service used fuel treatments — including prescribed burning, mechanical thinning and other techniques — on only 2.31 million acres.



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While the goal is to expand the program, Jennifer Jones, a spokeswoman for the Forest Service, said obstacles stand in the way for full implementation. In particular are the drought and other weather conditions that raise the risks if a fire were left to burn; the presence of 44 million homes and 70,000 communities on the forest land; and the large amount of smoke that fires would generate. Additionally, a large portion of Forest Service funding is directed solely toward fire suppression.

So far, eight national forest managers have revised their fire management plans, and three of them overseeing the southern third section of the Sierra Nevada have proposed adopting the new strategies.

Carolyn Ballard, district fire management officer for California's Sierra National Forest, was one of the early adopters. "There has been a lot of resistance," she said.

Some believe it is easier to "just try to put the fires out" and "forget about them," Ballard said.

Ultimately it will come down to changing the long-standing mind-set of fire management — and the funding behind it, she said. "It can be very frustrating when you see \$118 million spent fighting fires and I can get maybe \$100,000 a year to put prescribed fire in the landscape," she said.

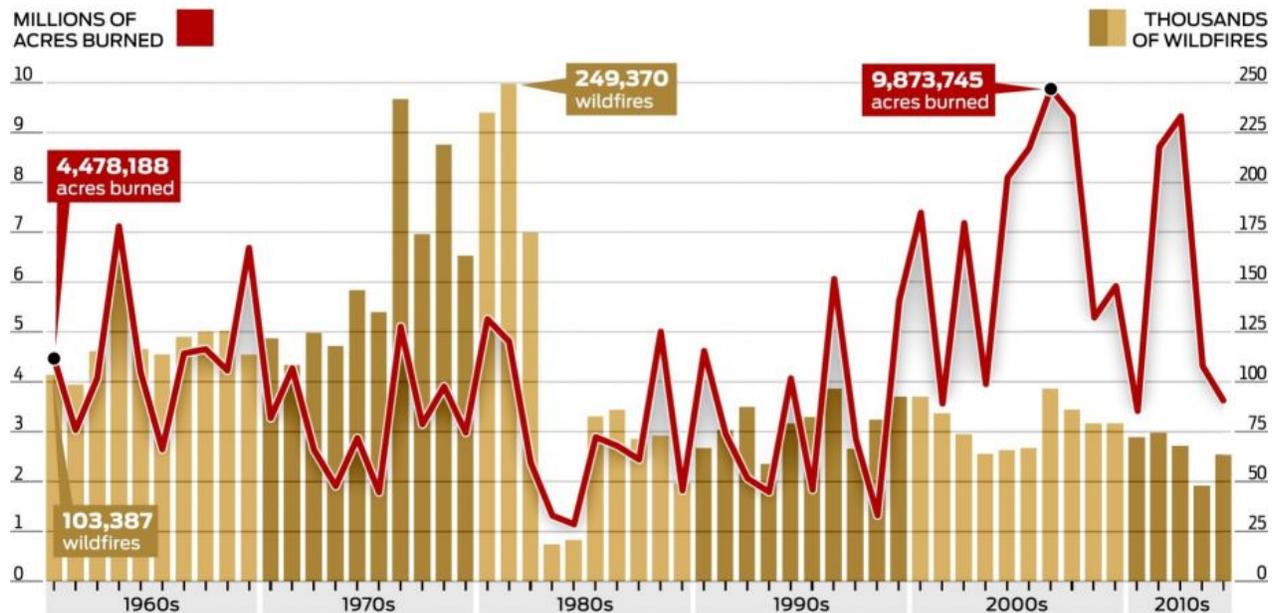
Cost of putting blazes out

Suppression costs for increasingly larger and more widespread fires are eating up more and more of the Forest Service's budget, Ballard said. Subsequently, the service is forced to divert funds away from prescribed and natural burns to emergency fire suppression.

In 2014, the cost of suppressing wildfires in the U.S. rose more than six times from what it was in 1985, from \$240 million to \$1.52 billion, according to data from the National Interagency Fire Center.

Total wildland fires and acres burned (1960-2014)

Fire suppression became the main tactic for fighting wildfires in 1875. Over time, the elimination of fire from the natural environment has led to a buildup of vegetation, which has subsequently fueled and transformed fewer fires into more widespread and destructive events.



NOTE: Figures prior to 1983 may be updated as National Interagency Coordination Center verifies historical data.

Source: National Interagency Fire Center

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Stephens said there would be long-term savings in making the new approaches a firm priority: Prescribed and managed fires cost much less than traditional fire suppression and cut down the costs for suppression in the future, he said.

Early in Stephens' study of the Illilouette Creek Basin, he and fellow researchers found that if an area had been allowed to burn within the past decade, the chances of a new fire extinguishing itself without spreading beyond that area rose to 90 percent or higher.

Additionally, Stephens found that a fire that had burned in the area a decade earlier led to the regrowth of a section with wetland-like vegetation. This sparked his interest into how regular periods of burning affected the water distribution of an area.

“The water piece may be important,” he said. “We are in a drought. If we could tie forest management goals in with water, that would be a big win.”

Sally Thompson, a hydrologist from UC Berkeley who started researching the area in 2013, said the phenomenon is a result of fewer thirsty trees to suck up all the water or block snow from reaching the snowpack.



Photo: Lea Suzuki, The Chronicle

Gabrielle Boisrame, research lead, checks one of the weather stations in the Illilouette Basin during a visit in which cameras to measure the snowpack, to see how the changing snow and water systems play into the system of natural burn were being installed on trees on Monday, September 21, 2015 in Yosemite, Calif.

Effect on water yield

Jim Branham, executive officer for the Sierra Nevada Conservancy, said he is familiar with the idea that reintroducing fire to the forest could increase the area’s water yield.

“If you have too many straws in the ground, it is going to use more water,” he said, but added he’d favor more scientific exploration of how use of fire could lead to more water.

“We all get water from the Sierra Nevada. This was an infrastructure developed decades ago based on historic patterns,” he said. “We have a pretty good idea that our future doesn’t look like our past ... so really understanding how we can do things is going to help with future water management.”

Regardless, Ballard said she has seen more and more momentum toward further use of fire to fight future fires.

“This is what we see the Forest Service moving toward here in California,” she said. “It’s not fast, but it’s picked up more in the past 18 months than in the past decade. ... We’ve finally reached the tipping point where fires can’t easily be put out because fire has been taken out of the natural landscape.”

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