



## Why the 2017 fire season is shaping up to be one of California's worst

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Wildfires ravaging Northern California have led to at least 33 deaths and the destruction of about 5,700 structures, including homes and businesses. The governor has declared a state of emergency in Napa, Sonoma and Yuba counties. Meanwhile, the Canyon 2 fire in Southern California has scorched thousands of acres and burned several homes.

It's just the beginning of California's fall fire season — which could prove to be one of the most destructive yet.

**Read more wildfire coverage »**

(<http://www.latimes.com/local/california/la-northern-california-fires-live-coverage-hundreds-evacuated-blazes-ravage-napa-sonoma-20171009-htmlstory.html>)



Satellite imagery shows fires erupting overnight in Northern California on Oct. 8 and 9. (Source: NOAA's GOES satellite)

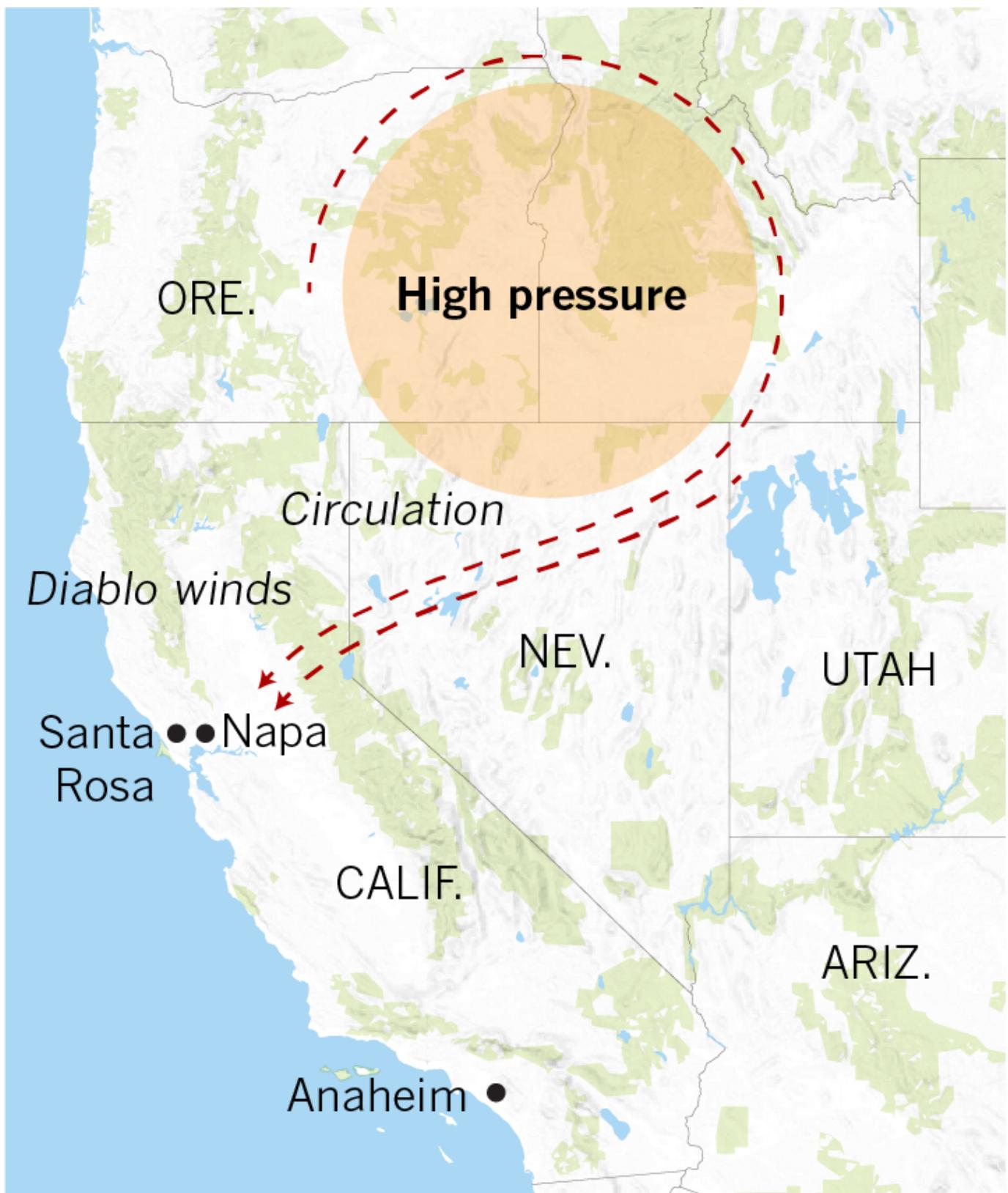
*Are you one of the thousands affected by the wildfires in Northern California? We want to hear your story.*

(<http://www.latimes.com/local/lanow/la-me-ln-wildfires-northern-california-story-20171011-htmlstory.html>)

### Powerful winds, greater devastation

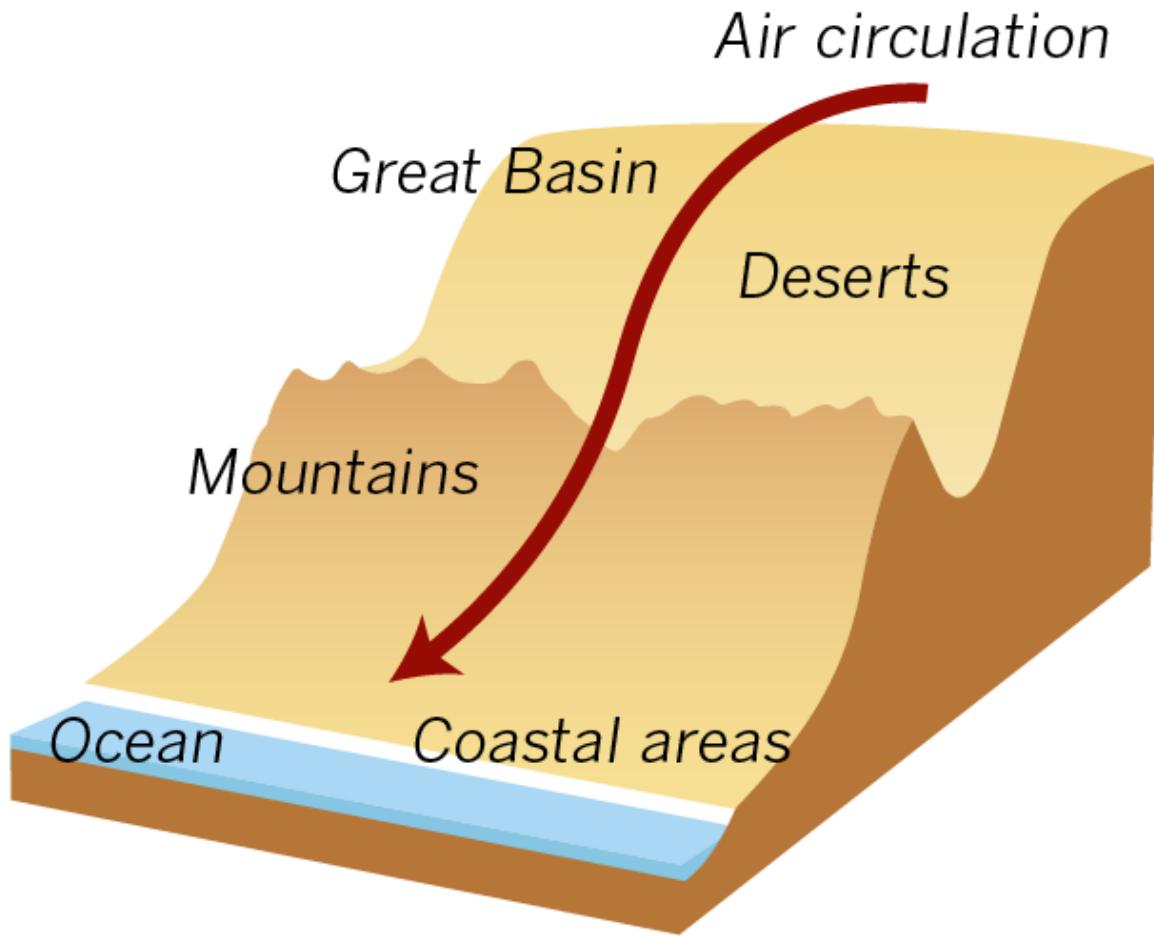
California is susceptible to fires year-round, but fires that occur in fall can be especially dangerous. The effects of hot, dry temperatures during the summer worsen in later months due to winds from the Great Basin. Known as Santa Ana winds in Southern California and Diablo winds in the north, these powerful warm winds cause fires to spread faster and quicker.

## **How these winds work**



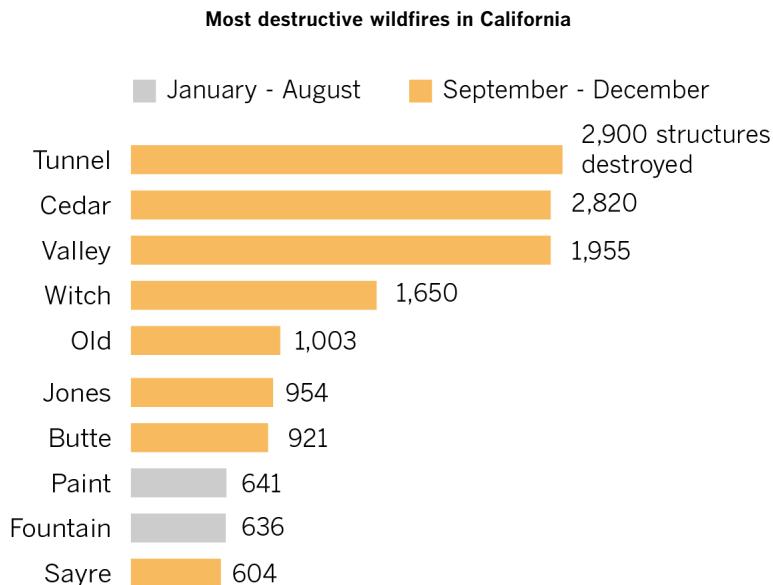
Winds originate inland in areas of high pressure. The winds travel down to lower-pressure, coastal areas, picking up speed and becoming hotter. Winds may speed up more as they squeeze

through canyons and narrow mountain spaces.



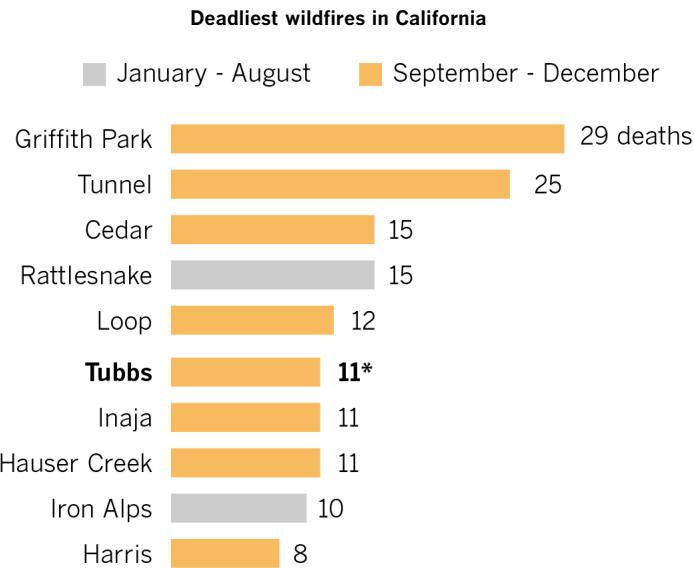
Source: Times reporting, Mapzen, OpenStreetmap.

According to a 2015 study (<http://iopscience.iop.org/article/10.1088/1748-9326/10/9/094005#erl518461s3>) that examined fires in Southern California, wildfires occurring during the Santa Ana season — late September through the end of the year — cause far greater structural damage than fires in the summer.



Source: Cal Fire ([http://calfire.ca.gov/communications/downloads/fact\\_sheets/Top20\\_Destruction.pdf](http://calfire.ca.gov/communications/downloads/fact_sheets/Top20_Destruction.pdf)). Damage totals are current as of February 2017 and do not reflect the fires currently burning in Northern California.

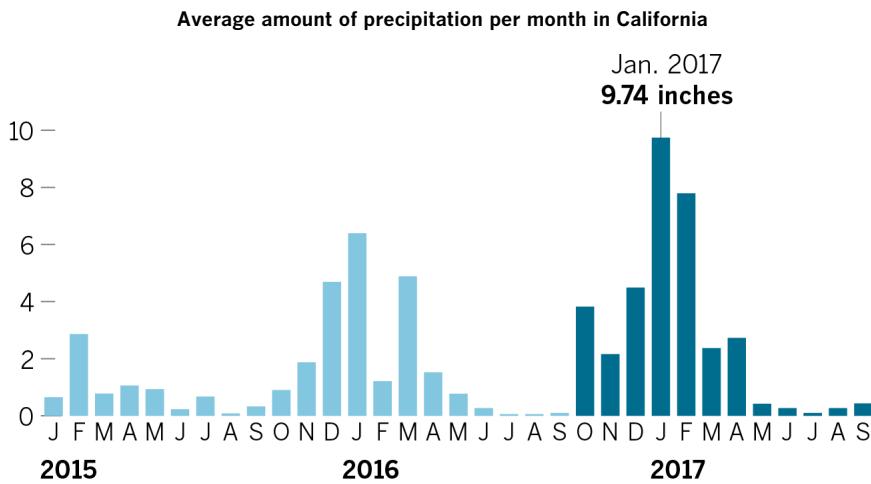
The fires can be deadlier, too. Eight of the 10 deadliest fires burned during the fall season.



Source: Cal Fire ([http://calfire.ca.gov/communications/downloads/fact\\_sheets/Top20\\_Deadliest.pdf](http://calfire.ca.gov/communications/downloads/fact_sheets/Top20_Deadliest.pdf)).  
\*Tubbs fire deaths are recorded as of Oct. 12, 2017, and do not include all deaths in this week's Northern California fires.

## A wet winter leading into a long, dry summer

Historic amounts of rain and snow in the winter kept large fires from burning in California until April. The 2016-2017 water year set records in the northern Sierra Nevada, which recorded a total of 94.7 inches of rain throughout the year.

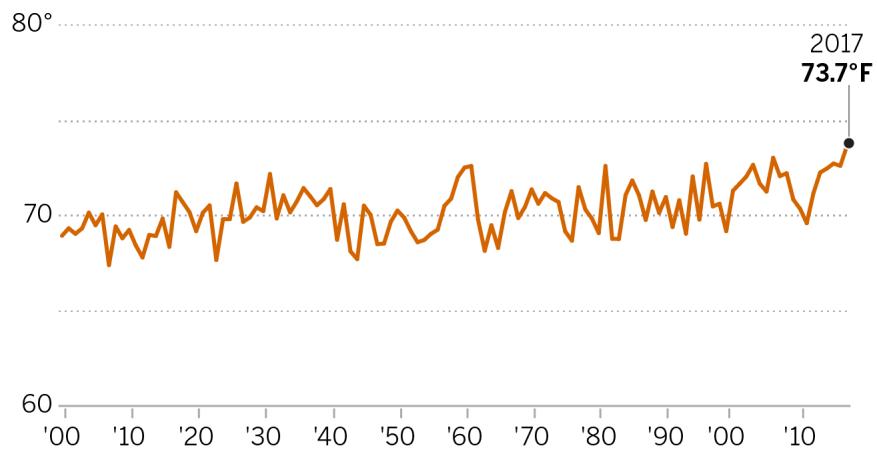


Source: NOAA. (<https://www.ncdc.noaa.gov/cag/time-series/us/4/0/pcp/all/1/2013-2017>)

While wildland vegetation grows every year during the wetter months, the heavy rains led to a larger amount of growth in areas like Santa Rosa and Napa, which hadn't seen large fires in several years. New brush growth is very flammable and can create embers that can travel a considerable distance.

This summer was the hottest ever recorded in California, allowing for new vegetation to dry up.

**Average summer temperature (June - August) per year in California**



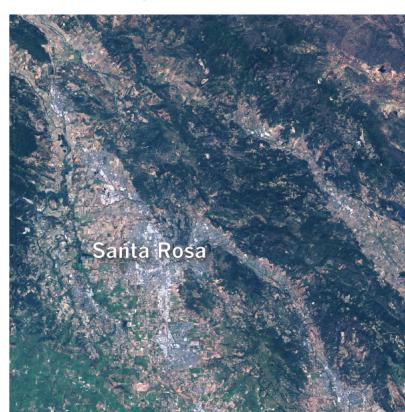
Source: Western Regional Climate Center

Composite images from the Landsat 8 satellite show just how dry the area around Santa Rosa had become after a recordbreaking rainy winter. In the first months of the year, record-setting rainfall led to increased vegetation in the area, but by summer, much of it had dried up.

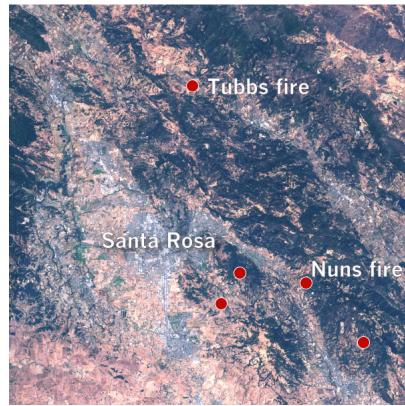
January - March 2017



April - June 2017



July - September 2017



Sources: USGS, NASA, Google, Cal Fire. Red dots indicate active fires.

“You kind of have this perfect storm of weather conditions,” said Yufang Jin, an assistant professor of remote sensing and ecosystem change at UC Davis, who co-authored the study on Southern California wildfires. Given these hot, dry conditions, Jin said, it’s not unusual to see more than 10 wildfires burning in a close area, much like the clusters of fires in Northern California this week.

### As urbanization grows, so does the risk of wildfire

Over time, the edges of cities have encroached on wild spaces. The close proximity between private property and wildlands allows fires to spread more rapidly and damage or destroy more property in the process.

That allows fires during this part of the year to spread more rapidly into urbanized areas, Jin said.

Many of these at-risk areas are in wildland-urban interface areas, or WUIs — where housing and vegetation intermix or come within close proximity of each other.



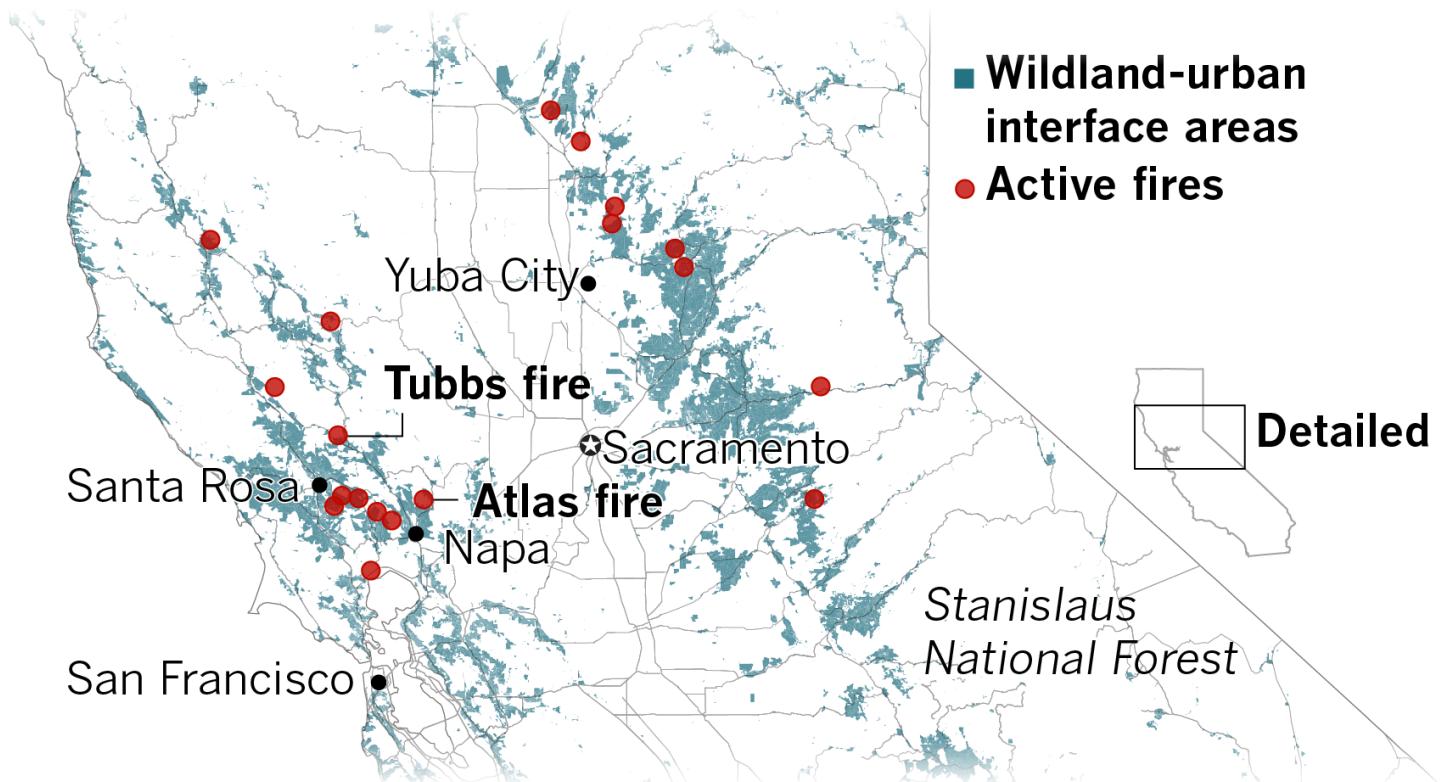
Homes destroyed by wildfire in Santa Rosa, Calif., on Oct. 11, 2017. (Marcus Yam / Los Angeles Times)

Volker Radloff, a professor at the University of Wisconsin-Madison who works at Silvis Labs, describes some WUI areas as “like a medieval city, with an urban city next to a big dark forest.”



Source: Silvis Labs (<http://silvis.forest.wisc.edu/maps/wui>).

Some of the most heavily-damaged areas in Santa Rosa and Napa were in the middle of these areas.



Sources: Silvis Labs, OpenStreetMap, Cal Fire. Locations of active fires as of 11 a.m. on Oct. 12, 2017.

Development in such areas poses a significant problem for firefighters and communities. According to a 2002 report by FEMA (<https://nfa.usfa.fema.gov/downloads/pdf/statistics/v2i16-508.pdf>), 38% of new home construction in the western United States was adjacent to or intermixed with WUI areas.

"We could do better on land-use planning and how we build communities and where we place them," said Scott Stephens, a professor of fire science at UC Berkeley. "In Northern California, there's an underappreciation of communities' vulnerability to fire."

## So what's next?

High-pressure-driven Santa Ana and Diablo winds can continue through the early spring, leaving an already dry state vulnerable to fast-spreading wildfires. Prescribed burns may not be effective in mitigating damage in areas with lots of low-lying grass and brush, where fire and smoke can spread quickly.



Firefighters work to control the spread the Canyon 2 fire in Anaheim Hills on Monday, Oct. 9, 2017 in Anaheim, Calif. (Patrick T. Fallon / Los Angeles Times)

FEMA has listed several recommendations on how homeowners in WUI areas can protect themselves:

- Construct homes with fire-resistant materials.
- Situate homes on lots to protect them from fire spread.
- Clear a perimeter of defensible space around homes.
- Install smoke alarms.
- Develop and practice evacuation plans in the event of a wildfire.

Many of these recommendations must be acted on before a home is built, making it crucial for communities to work together to prepare for large wildfires, said Stephens. He recommends that homeowners in WUI or high-risk areas meet within their communities and with their local fire officials to make contingency plans before a wildfire.

Homeowners in high-risk areas can also remove flammable shrubbery ([www.readyforwildfire.org/Fire-Safe-Landscaping/](http://www.readyforwildfire.org/Fire-Safe-Landscaping/)) from their yards and consider replacements such as aloe or ice plant — and look into purchasing fire insurance.