

WINE COUNTRY FIRES



Firefighters clear a downed tree from across Mount Veeder Road in the hills west of Napa on Wednesday after flames from the Nuns Fire raged through.

Peter DaSilva / Special to The Chronicle

A WORSENING TREND

Climate from page A1

flung cliffs and canyons have set the stage for chronic burning, fire experts say.

"I can't imagine how there isn't going to be more of this in the future," said Hugh Safford, an ecologist for the U.S. Forest Service's Pacific Southwest Region. "It's shocking what's happened, but it really isn't necessarily all that surprising."

In the past few years, the state's coastal mountains have witnessed several devastating burns, much in line with what the southern coast has long endured. In 2015, the Valley Fire that spread into Lake, Sonoma and Napa counties destroyed nearly 1,300 homes and killed four people, and the following year a blaze wiped out the heart of the Lake County town of Lower Lake.

The most destructive of this week's wildfires are within an hour's drive south of Lower Lake, but they swept into areas much more populated, such as the north edge of Santa Rosa, intensifying the impact.

"That part of the state over the past four years...has had an endless series of unrelenting fires," Safford said. "It's typical



A grove of trees near Trinity Road burns Wednesday near a vineyard after a mandatory evacuation was ordered in the area of Glen Ellen, east of Santa Rosa in Sonoma County.

of the coastal ranges, when you get to Santa Barbara and south, which are dry and hence more flammable. But this is really a new thing here. I think that Lake County may be the next frontier of Southern California as it moves north."

While fall has always been the most perilous season for Northern California wildfires, as offshore winds pick up and the trees and shrubs reach their driest points after the warm summer months, a number of the underlying forces have changed in the past decade or two.

The most obvious is temperature, which has risen globally as a result of human-induced greenhouse gas emissions. This summer marked California's hottest in recorded history. San Francisco reached an all-time high of 106 degrees in September, continuing a trajectory that's put the Bay Area more on par with balmy Southern California.

The milder weather means that vegetation is drier and more combustible and that the fire season runs longer, perhaps eventually becoming a year-round affair as it is in Southern California.

"As long as you have stuff to burn, warming temperatures increase the likelihood that stuff is going to burn," said Park Williams, a bioclimatologist and research professor at Columbia University's Lamont-Doherty Earth Observatory in New York. "Climate is certainly driving the trends that we're seeing in fire across the West."

A study published last year by Williams suggests that as much as half the burning of forest land in Western states since the 1980s is due to global warming.

Research also shows that extremes of weather both wet and dry — another product of climate change — are pushing more powerful blazes. Climate experts point with alarm to the way this year's extraordinarily

warm winter in California, which created a bumper crop of brush and grass, gave way swiftly to record heat that dried out the wildlands and provided copious fuel to burn.

"This is the recipe for bigger fires," Williams said. "Most models agree that the frequency of extremely wet years will increase, and that happens at the same time that all models show things getting warmer."

The same models explain the deadly string of hurricanes that battered parts of the U.S. and the Caribbean over the past few months. And they may explain recent landslides and drought in Africa, and threatening tsunamis in Central America.

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West Coast scientists are also investigating whether the warming planet is intensifying the hot offshore winds that have driven this week's Wine Country fires, commonly called Diablo winds.

At the same time, researchers are looking into whether climate change is tied to warmer evening temperatures, which have allowed fires like the ones in Napa and Sonoma counties to burn overnight rather than begin to cool. The worst damage in Sonoma County occurred between midnight and dawn on Monday.

While climate has created a playing field more conducive to furious and fierce fires, the root cause of the burns remains, almost exclusively, human failing. Northern California's coastal mountains don't see much lightning, and before the hills were settled, fire was relatively uncommon here. Today, there's no shortage of ignition sources, whether downed power lines, automobile tailpipes or cigarette butts.

"People want to live out in the woods, and this is always a real and present danger," said Safford of the Forest Service. "These fires should probably be a wake-up call to think more about human habitat and how we deal with that."

The growth of fires will likely

and federal firefighting budgets. Just three months into the current fiscal year, the California Department of Forestry and Fire Protection had spent \$28 million of its roughly \$430 million annual emergency fund — and that was before the Wine Country fires broke out.

"This week's fires alone are going to chew up quite a bit of what is left," said Cal Fire spokeswoman Lynne Tolmachoff. "And we're not done with fire season. We don't have any precipitation showing up in our forecasts. And then there's the fires in May and June next year."

"While it's still early in the budget year, Cal Fire's outlay is nearly on pace with the record \$547 million expended in 2015-16, an amount that required the state to tap of her funding streams as well as federal aid. The amount of emergency money spent annually by Cal Fire in the past five years is more than double what it was a decade ago.

Through Sunday, before wide swaths of Northern California turned into a disaster zone, wildfires had blackened about 850,000 acres across the state, nearly 70 percent above the five-year average for the date.

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Smoke fouls Bay Area's air, creates widespread health risk

Smoke from page A1

Dangers of smoke exposure

For people with pre-existing respiratory conditions, smoke inhalation can cause a flareup of symptoms that may not respond well to normal medication and other therapy.

Otherwise healthy people can suffer eye, nose and throat irritation, or develop a cough, headache or overall fatigue.

Children may be especially at risk because their lungs are still developing.

But otherwise healthy people also can suffer. Smoke pollutants can cause eye, nose and throat irritation. If people spend too much time outside, they may start coughing, or develop a headache or overall fatigue.

"This is definitely impacting everybody," said Dr. Thomas Dailey, medical director of pulmonary medicine at Kaiser Santa Clara. "Patients with emphysema and COPD (chronic obstructive pulmonary disease) and asthma are having

badly by the pollution had been treated in emergency rooms. Dozens of schools around the region have canceled classes for the remainder of the week.

Outdoor exercise is especially ill-advised. When people work out, they breathe faster and usually through their mouth instead of their nose, all of which increases the amount of pollutants they inhale. Many school athletic programs have canceled or postponed games.

This weekend, at least four major running events were canceled due to smoke, including a half marathon in San Francisco and a 31-mile ultramarathon in Muir Beach.

Bay Area stores that sell air purifiers and face masks that block pollutants have been overrun. Many places in the North Bay have been sold out of masks for days, though supplies have been donated to many evacuation centers. Cole Harder is in San Francisco to advise a map that compares air-quality levels around the world.

The air-quality index, a number that takes into account several types of pollutants, was hovering around 160 for the Bay Area most of Thursday. A healthy level is 50 or lower, which is typical for the area; the worst level is 500. The air is expected to remain unhealthy for at least the next two days, according to the Bay Area Air Quality Management District.

Public health and air-quality experts advised people to stay inside with doors and windows closed when possible. Those with pre-existing respiratory and heart conditions should wear masks that block small particles when outside.

Sherry Katz of Berkeley, who teaches history at San Francisco State University, has asthma that in the past has been exacerbated by smoky conditions. She's avoided complications this week, she said, largely because she's been taking pains to keep out of the smoke.

"I know smoke is a trigger for my asthma," Katz said. "It's a scary feeling when you can't breathe well."

Katz's husband, Dr. John Balmes, studies the health effects of air pollutants at the Human Exposure Laboratory at UCSF and has special expertise in wildland fire smoke. He's studied pollution in Beijing too, and the Bay Area's air this week has reminded him of China's dirty, dusty skies.

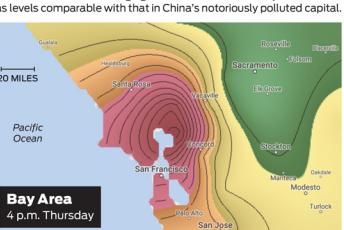
"Several days or even a week of smoke exposure probably isn't going to cause chronic health problems in otherwise healthy people," Balmes said. And even people who have

shortness of breath or other exacerbations. Even patients who don't have underlying lung conditions are reporting that their chests feel tight and they're coughing more."

Hospitals around the Bay Area have reported upticks in people with symptoms like breathing difficulty, severe coughing or tightness in their chest. Solano County alone reported that 23 people sick-

Bay Area air quality now as bad as Beijing's

Maps of particulate matter air pollution less than 2.5 microns in diameter — the most damaging form — show that the Bay Area now has levels comparable with that in China's notoriously polluted capital.



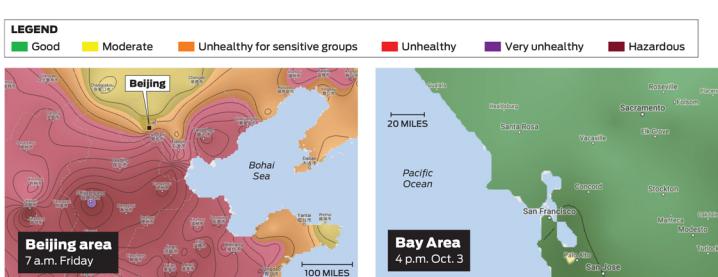
Source: Berkeley Earth

20 MILES

Bay Area
4 p.m. Friday

Beijing area
7 a.m. Friday

100 MILES



Todd Trumbull / The Chronicle

20 MILES

Bay Area
4 p.m. Oct. 3

100 MILES

To protect yourself

Stay inside with doors and windows closed. Do not use air conditioners or heaters that bring in air from the outside.

If you are not home, seek out public spaces like libraries, movie theaters or shopping malls that use recirculated air. Call ahead to make sure they have air filters.

In San Francisco, these libraries have air filters and are open on Friday during the following hours: San Francisco Main Library, 100 Larkin St., noon to 6 p.m.

Chinatown Branch Library, 1135 Powell St., 1 to 6 p.m.

Mission Bay Branch Library, 960 Fourth St., 1 to 6 p.m.

Glen Park Branch Library, 2825 Diamond St., 1 to 6 p.m.

If you are outside, limit exertion.

Wear a mask that keeps out small particles. N95 masks are the most common and can be purchased at hardware stores, pharmacies or stores like Walmart.

Seek medical attention if you have difficulty breathing, wheezing, chest pain, nausea or dizziness that is not resolved by going inside or getting away from smoke.

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Sources: Bay Area Air Quality Management District, San Francisco Department of Public Health, Chronicle research

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"The public health message is: You shouldn't be out there," Balmes said. "Why expose yourself to a toxin if you don't need to?"

heart or lung problems already are unlikely to suffer lasting damage from the pollution. Still, inhaling small particles is never good.

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