



The Carr Fire along State Route 299 in Shasta and Trinity counties grew into a monster before finally being brought under control in early September. In addition to causing seven deaths and burning almost 230,000 acres, the blaze closed 27 miles of SR 299. Caltrans will spend \$21 million on repairs.

Signs of Fiery Times Ahead

Caltrans Mobilized Quickly to Protect Travelers, Restore Damaged Highways

Until recently, the fire season put Caltrans on alert for an intense but relatively short duration. Today, defending the State Highway System against destructive wildfires, and their aftermath, is no longer a three- to four-month exercise.

The disastrous **Camp Fire**, which now ranks as California's deadliest fire ever, and the Los Angeles-area blazes that broke out in mid-November last year are startling proof that the state's fire season is lasting longer, and becoming more destructive than ever.

After a series of small outbreaks last June, following a drier-than-usual winter, fires began to erupt around the state in July.

During one of the most fiery Augusts in the state's history, Caltrans deployed hundreds of employees and contractors who worked 12- to 16-hour days with little rest — staffing road closures, repairing sections of guardrail and scorched pavement, removing burned trees and debris, fixing drainages, replacing burned signs and highway sensors, and controlling erosion and stabilizing roadside terrain against mudslides.

Only a few months later, fires in Butte County and Southern California grew to monstrous proportions and caused the worst loss of lives and property in state history.

Costs are still being finalized, but it appears all but certain that fiscal year 2018-19 will go down as Caltrans' most costly fire season.

From July through the end of November, Caltrans' costs from 28 blazes that damaged state highway property and infrastructure approached \$150 million. Caltrans had already planned to spend almost \$100 million in repair costs before the Camp and Los Angeles-area fires struck. Those blazes were expected to add at least \$48.5 million to the final toll.

This year's path of destruction follows on the heels of a disastrous 2017 season. Caltrans spent a total of \$93.4 million to repair damages caused by 27 fires last year.

The estimated cost of fixing fire damages to the state highway network in the last two years will be \$243 million — almost six times the amount spent in FY 2016-17 and 2015-16. The cumulative damage in those two earlier years was less than \$47 million — \$13 million in 2016-17

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Here's a breakdown of Caltrans' fire response efforts during, and after, major blazes in Northern, Southern and Central California.

Northern California

Driven by 50-mph winds, the Camp Fire erupted Nov. 8 in the Sierra Nevada foothills east of Chico and spread quickly. It roared through the town of Paradise, eventually charring more than 153,000 acres from Chico in the west to the Feather River Canyon in the east. More than 80 persons perished, and nearly 20,000 structures — including 13,500 residences — were destroyed.

State Routes 70 and 191 experienced the bulk of the damage and repairs. Caltrans took erosion control measures, such as hydroseeding and straw wattle placement, to prevent landslides.

By the time it was fully contained in late September, the Mendocino Complex Fire in Colusa, Lake, Glenn and Mendocino counties had become the largest wildfire in California's recorded history, topping last year's Thomas Fire in Ventura and Santa Barbara counties.

The Mendocino Complex Fire closed portions of State Routes 20, 29 and 175 in Caltrans' regional District 1 (North Coast) on its way to burning a total of 460,000 acres.

A \$10.5 million emergency contract was awarded to begin repairs on SR 175 and SR 20. Preliminary estimates list more than one mile of guardrail to be replaced, as well as damaged signs, fencing, drainage systems, slopes and other infrastructure.

The Carr Fire grew from a small blaze started by an errant vehicle along State Route 299 west of Redding to an inferno that blackened nearly 230,000 acres and claimed seven lives. The Carr Fire closed 27 miles of SR 299 in Caltrans District 2, which is based in Redding. SR 299 is a vital route for travel and commerce between interior Northern California and the North Coast.

Caltrans staff began assessing the damage and repairs needed to quickly return the highway to safe working condition. An emergency "director's" order, issued when

repairs are deemed critical, was obtained to replace guardrail, culverts, signs and re-do new erosion control, an estimated \$21 million cost.

The Klamathon Fire was the first of the major fires to strike the District 2 area, igniting next to Interstate 5 in Siskiyou County on July 5 and burning 38,000 acres in a two-week rampage. The fire destroyed 10 miles of fencing, guardrail, 120-plus road signs and sensitive highway electronics, and charred 500 trees. A \$1.5 million Director's Order was approved to fix those damages, and reseed the area before winter rains arrive.

The fire danger became very real for District 2 personnel working out of the Redding office. The fire roared to within a mile of the facility, cutting power to the neighborhood and forcing evacuations. Shortly before the lights went out, however, quick-thinking employees managed to move and set up critical communications and traffic management operations at a Caltrans facility one-half hour south in Red Bluff, out of fire danger.

Caltrans deployed three of its Satellite Communication Trailers, or SATCOMs, to aid communication, visual assessment and administer temporary power in District 1 and District 8 (San Bernardino/Riverside counties).

Hundreds of Caltrans employees who had to work long, stiflingly hot, and smoky hours in the field were aided this year by the arrival of safety vans — mobile storehouses stocked with personal protective equipment,



A contracting crew, under orders from Caltrans District 2, acted quickly to replace damaged signs along SR 299, near Whiskeytown.

such as respiratory and heat illness protection, safety glasses and vests, water, and food. During the fires, these vans traveled to the front lines to bring supplies to field employees at highway closures, maintenance stations and wildfire base camps.

Southern California

Losses from the **Woolsey** and **Hill** fires in the Los Angeles and Ventura County canyon lands are still being tallied. The flames shut down U.S. Highway 101 and Pacific Coast Highway, destroying hundreds of homes, buildings, power lines, vehicles and equipment. More than 100,000 acres were devoured.

The **Cranston Fire**, near the communities of Idyllwild and Mountain Center on State Routes 74 and 243, burned more than 13,000 acres and forced 7,000 residents to leave their homes.

In addition to the Cranston, Caltrans responders had to deal with multiple wildfires that included the **Valley Fire** in the San Bernardino Mountains and the **Holy Fire** in the Lake Elsinore area. More than 20,000 people had to flee the Holy Fire.

The Cranston Fire closed portions of SRs 74 and 243, and left a path of baked earth denuded of vegetation that's highly susceptible to flash flooding. More mudslides are feared over the next five years as the mountain landscape recovers.

Long-term repairs are being made to culverts, debris flow basins and vulnerable slopes.



The Carr Fire on SR 299 burned right up to the road's edge, and in some spots jumped it, destroying guardrail, signs and pavement.

Central California

The **Ferguson Fire** that began in mid-July closed portions of SR 140 and briefly forced the shutdown of Yosemite National Park. The fire claimed 97,000 acres before being contained in mid-August.

The **Donnell Fire** along SR 108 in the Carson-Iceberg Wilderness, within District 10, burned more than 36,000 acres and was brought under control in early September.

Caltrans also works with federal and state agencies to assess potential impacts to highway resources that lie in the path of fire-damaged watersheds. Caltrans participates in the federal Burned Area Emergency Response (BAER) program to identify and manage potential risks to resources within the National Forest System, and is a member of the state-level Watershed Emergency Response Team that also assesses post-fire changes to burned landscapes.

In the case of the Ferguson Fire that burned forested federal lands along State Route 140 to Yosemite National Park, a BAER assessment team that included Caltrans representatives concluded that up to 10 locations along SR 140, primarily culverts and bridges, were likely to be inundated this winter by post-fire debris flows through burn areas.

After an assessment of the area, a \$5 million director's order was issued to address drainage and culvert damages, erosion/debris flow issues, burned tree removal and other fire impacts. District 10 staff also have coordinated with the National Weather Service this winter on a new weather monitoring system for the section of SR 140 near the Ferguson Fire burn scar. A color-coded risk assessment is issued ahead of storms with potential to send post-fire debris flows onto the roadway, allowing Caltrans to close SR 140 and protect travelers.

Statewide

A total of six director's orders were executed statewide, with a total construction amount of about \$45 million. In addition, emergency declarations totalling \$48.5 million were ordered to repair damages from the Camp, Woolsey and Hill fires.

Not only is Caltrans replacing what's been destroyed, but is investing in materials that can better withstand disasters, such as new guardrail built with metal posts instead of wood.

At its Sacramento headquarters, Caltrans activated its Department Operations Center to coordinate resources



Caltrans District 2 crews inspect a section of Interstate 5 that had been closed because of the Delta Fire burning in the Shasta National Forest. The fire had consumed more than 62,000 acres north of Shasta Lake. Districts 2 and 1 had to contend with the largest and most deadly blazes in the state.

and strategy with its district offices and emergency response partners, such as the California Office of Emergency Services, National Guard and California Highway Patrol.

From its emergency center, Caltrans used a high-tech array of tools to monitor the fires and protect state highway resources. Caltrans utilizes a web-based map application, the Emergency Management Common Operational Picture, that allows emergency managers to monitor state highway assets during events such as fires, and get a real-time look at roads that may be threatened and need to be closed to protect the public.

Caltrans employees also joined other agency representatives in staffing the State Operations Center in Mather, outside Sacramento, which served as the central communications hub distributing information and fire updates.

Caltrans' other emergency response systems were put to the test. District 2 employees were notified of the pending emergency situation through the Everbridge communications system that relays text, email and phone calls. Everbridge has been recently installed at all 12 regional districts, and complements the existing Highway Information Network (CHIN) notification system.

Similarly, Caltrans used another email-based alert system, FireCast, to give field staff daily fire danger ratings. Eventually, it's expected that FireCast will project the path of blazes along the State Highway System to better warn

field staff and the public. It's intended to help guide where equipment should be staged and what roads should be closed. The Department already employs a ShakeCast alert system to notify Caltrans staff when an earthquake of a certain magnitude occurs.

In the future

Most climate models indicate that the past two years represent the new normal for California, with more frequent and intense wildfires fueled by higher temperatures and drier conditions. To better assess risks and proactively protect state highway infrastructure, Caltrans has commissioned climate change studies for each of its 12 regional districts.

Changing weather patterns now extend the danger of massive fires well into the winter months. For example, the Thomas Fire burned about 282,000 acres and destroyed more than 1,000 structures in Ventura and Santa Barbara counties in December 2017, well past the traditional fire season. In the near future, Caltrans crews can be expected to go from protecting travelers from wildfires — then a few days later, hop in the cabs of their snow removal machines to clear icy roads. **MM**

Source: Herby Lissade, Assistant Division Chief; Rene Garcia, Emergency Management Office Chief; Caltrans Division of Maintenance; Erin Von Tersch, public information officer, Public Affairs