



National Aeronautics and
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Earth Science Enterprise
<http://earth.nasa.gov>

Wildfires in Southern California





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Uncontrolled wildfire is one of the most destructive natural forces known to mankind. An average of 20,234 square kilometers (5 million acres) burns every year in the United States, causing millions of dollars in damage. But not all wildfire is destructive; prescribed and controlled fires can be beneficial by naturally thinning overcrowded forests and reducing fuel supplies, preparing sites for seeding or planting, managing competing vegetation, and creating varied vegetation patterns that provide diverse habitat for plants and animals.

While sometimes caused by lightning, nine out of ten uncontrolled wildfires are human-caused. Wildfire can spread at a rate of up to 22.5 kilometers (14 miles) per hour, consuming everything in its path. As a fire spreads over brush and trees, it may take on a life of its own—finding ways to keep itself alive, even spawning smaller fires by throwing embers kilometers away.

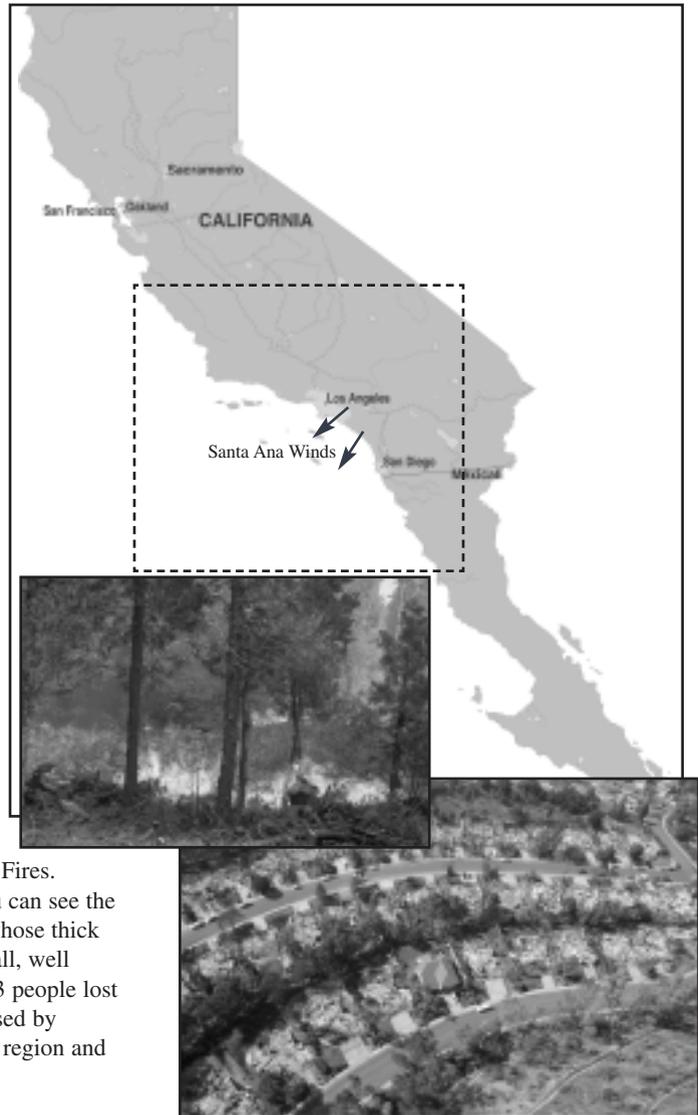
Several uncontrolled wildfires raged across southern California in October 2003. Whipped by the hot, dry Santa Ana winds that blow toward the coast from California's interior deserts, at least one fire grew 40.5 square kilometers (10,000 acres) in just six hours. The Moderate Resolution Imaging Spectroradiometer (MODIS) sensor on NASA's Aqua satellite provided this image of ten large wildfires in the areas surrounding Los Angeles and San Diego, California.

MODIS can also detect active fire areas. The red patches indicate precisely where the fires are burning, or have recently burned, while the black areas show the scorched Earth. Starting in the north, the first cluster is a combination of the Piru, Verdale, and Simi Incident Fires, which burned a combined 460 square kilometers (113,680 acres) of land. The next line of dots consists of the Old, Grand Prix, and Mountain Fires. The small cluster closer to the coast is the Roblar 2 Fire. Going south you can see the Paradise Fire (top), the Cedar Fire (center), and the Otay Fire (bottom), whose thick smoke is completely overshadowing the coastal city of San Diego. Overall, well over 809 square kilometers (200,000 acres) burned in the fires. At least 13 people lost their lives because of these fires, many of which appear to have been caused by carelessness and arson. Thousands of residents were evacuated across the region and hundreds of homes were destroyed.

The MODIS instruments aboard the Terra and Aqua satellites constitute a vital part of the National Interagency Fire Center's management toolkit for monitoring and controlling wildfires. With scores of wildfires burning across the United States each year, MODIS is providing fire management teams with a "big picture" perspective of active fires for resource allocation and strategic decision-making. The MODIS Rapid Response System at NASA's Goddard Space Flight Center processes the data and displays images and fire detections on the web in near-real time—usually within 2 to 4 hours of when MODIS collects the observations.

Additional images can be found at the MODIS Rapid Response System Website at: <http://rapidfire.sci.gsfc.nasa.gov>

Image courtesy of Jacques Descloitres, MODIS Rapid Response Team at NASA Goddard Space Flight Center.



For the Classroom

Fire! Remote Sensing Activities

[http://www.mcps.k12.md.us/departments/
events/science/EBS.EOS.FI.html](http://www.mcps.k12.md.us/departments/events/science/EBS.EOS.FI.html)

Using a series of satellite images, students evaluate the effects of the 1988 forest fires in Yellowstone National Park. Data from before the fires, the year after the fires, and a decade after the fires show several stages of forest progression. *(Courtesy of the Event-Based Science Project through a grant from NASA and scientists from the Goddard Space Flight Center.)*