



Coffee Break Training - Community Risk Reduction

Understanding Geospatial Information: Reading Imagery – Part 1: Introduction

No. CR-2015-1 April 22, 2015

Learning Objective: The student will gain a basic understanding of how aerial and satellite imagery provides information for incident managers.

In 1991, the Oakland Hills Firestorm killed 25 people, including a firefighter and a police officer, and injured 150 others. It destroyed 1,520 acres, including 3,354 homes and 437 multifamily units. Economic losses exceeded \$1.5 billion. If looked at in terms of alarm assignments, it was a 107-alarm fire. The fire demonstrates how high-altitude imagery and Geographic Information Systems support incident planning, response, mitigation and recovery.

This NASA image from 11,000 feet (3,353 m) at 1026 hours on Oct. 21 helped Incident Commanders “see” through the smoke. Fires over 1,100 F (593 C) show as yellow in this infrared composite. Burned-over areas are a pale red. The blue is clouds holding condensed water vapor within the smoke plume, blocking reflection of the infrared wave. The smoke itself is transparent. Many hundreds of individual structures are either actively burning or smoldering in this view.

An emergency is not fully understood without knowledge of local geography and weather. This fire started on the evening of Oct. 19; it was fought and thought to be extinguished. It reignited the next morning and spread on a hot, dry, northeasterly wind blowing at 65 mph (105 kph). The wind helped spread the fire.

As the fire massed, it began generating its own winds, a defining characteristic of a firestorm. The self-generated winds interacted with ambient winds to create erratic, dangerous gusts, which in turn helped produce numerous cyclonic swirls.

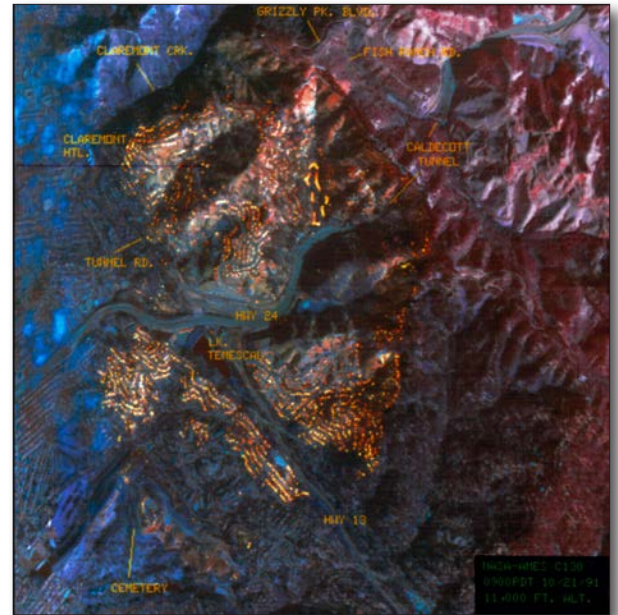
In 1923, the same conditions converged on nearby Berkeley, initiating an urban conflagration. A lesser conflagration in the same area occurred in September 1970, and a smaller fire started in Wildcat Canyon in December 1980. Given the terrain, vegetation, weather conditions and proximity of development, the East Hills have a history of severe fire.

The next four lessons will cover the basic elements of reading satellite imagery: scale; patterns, shapes and textures; colors and shadows; finding direction; and applying what you know.

References

Pennsylvania State University Creative Commons License: <https://www.e-education.psu.edu/natureofgeoinfo/>.

NASA Earth Observatory Image License: <http://earthobservatory.nasa.gov/ImageUse/>.



Infrared imagery of the 1991 Oakland Hills Firestorm captured by a NASA Ames C-130 aircraft. Ground resolution is 15 feet (4.6 meters (m)). (Image area is 2.9 x 2 miles (4.7 x 3.2 kilometers).)

For archived downloads, go to:

http://www.usfa.fema.gov/training/coffee_break/