

Abstract

The Waldo Canyon fire was the most destructive wildfire in Colorado history (until the Black Forest Fire in 2013). The fire torched more than 340 houses and claimed at least two lives. It started on June 23, 2012 while the biggest spread of the fire occurred on June 26, 2012 when the meteorological conditions for fire risk peaked. The fire was 100% contained on July 10, 2012.

Research Questions: How did this fire happen? What were the Meteorological and Climatological conditions before the fire started and also during the fire? How did it spread? What was the vegetation factor in the cause of this fire?

Techniques: Using GIS and Remote Sensing data collected from GLOVIS and NOAA websites with information of the wildfires to analyze the physical geography and the vegetation to calculate the risk and analyze the spread of the fire. In addition, data from satellite imagery will help investigate these wildfires along with other supporting images from LANSAT, Aerial Photographs, and thermal imagery. A big component of any fire is how dry and windy the area was. Data from the National Weather Service and other weather websites will be necessary to gather the resources to study the Meteorological and Climatological conditions leading up to this event.



Colorado Springs, Colorado
June 23, 2012 –
July 10, 2012

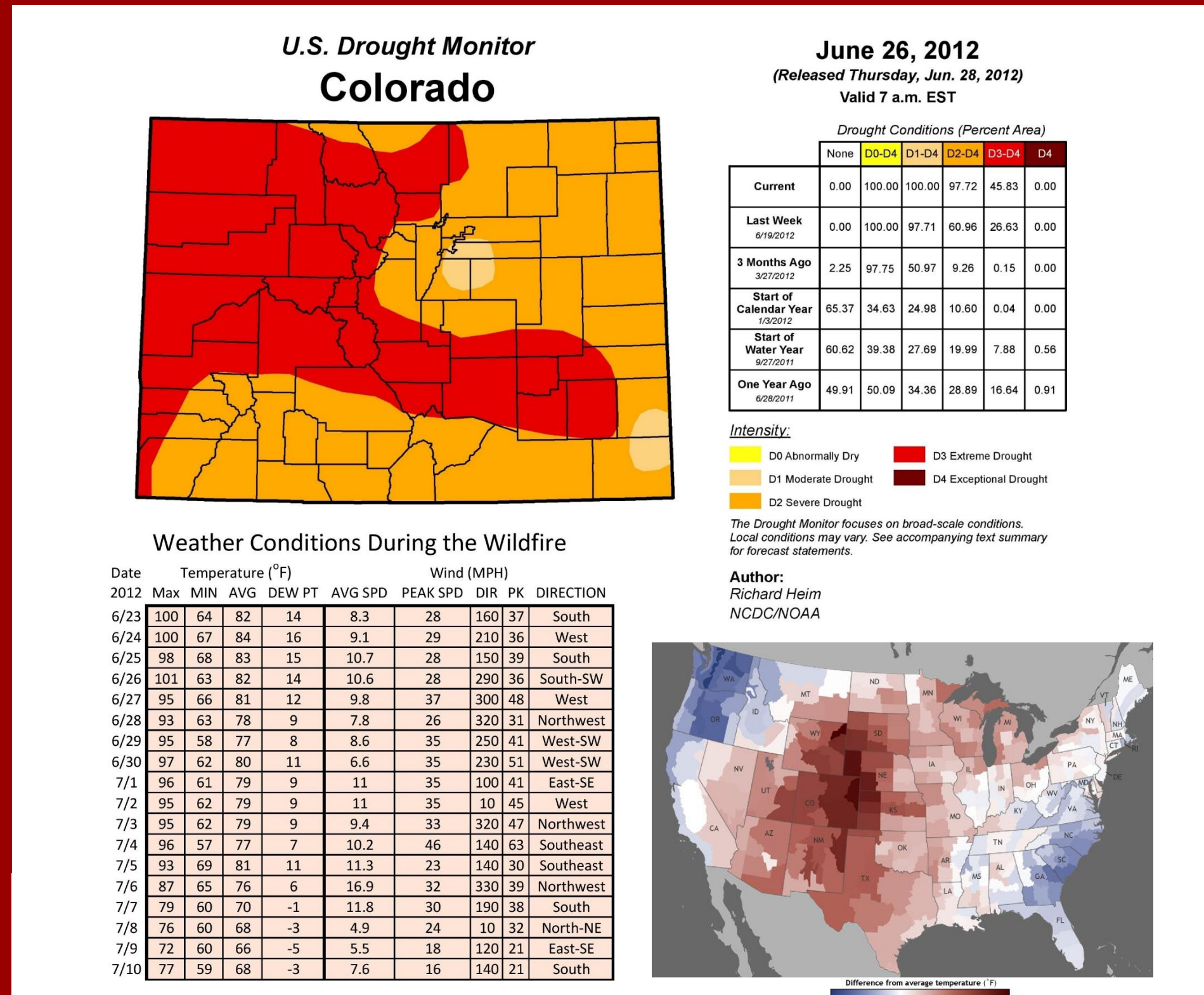
WALDO CANYON FIRE

Investigating the cause to the fire that burned 18,247 acres (74 km²), took the lives of two people, injured 6, and burned 346 homes.

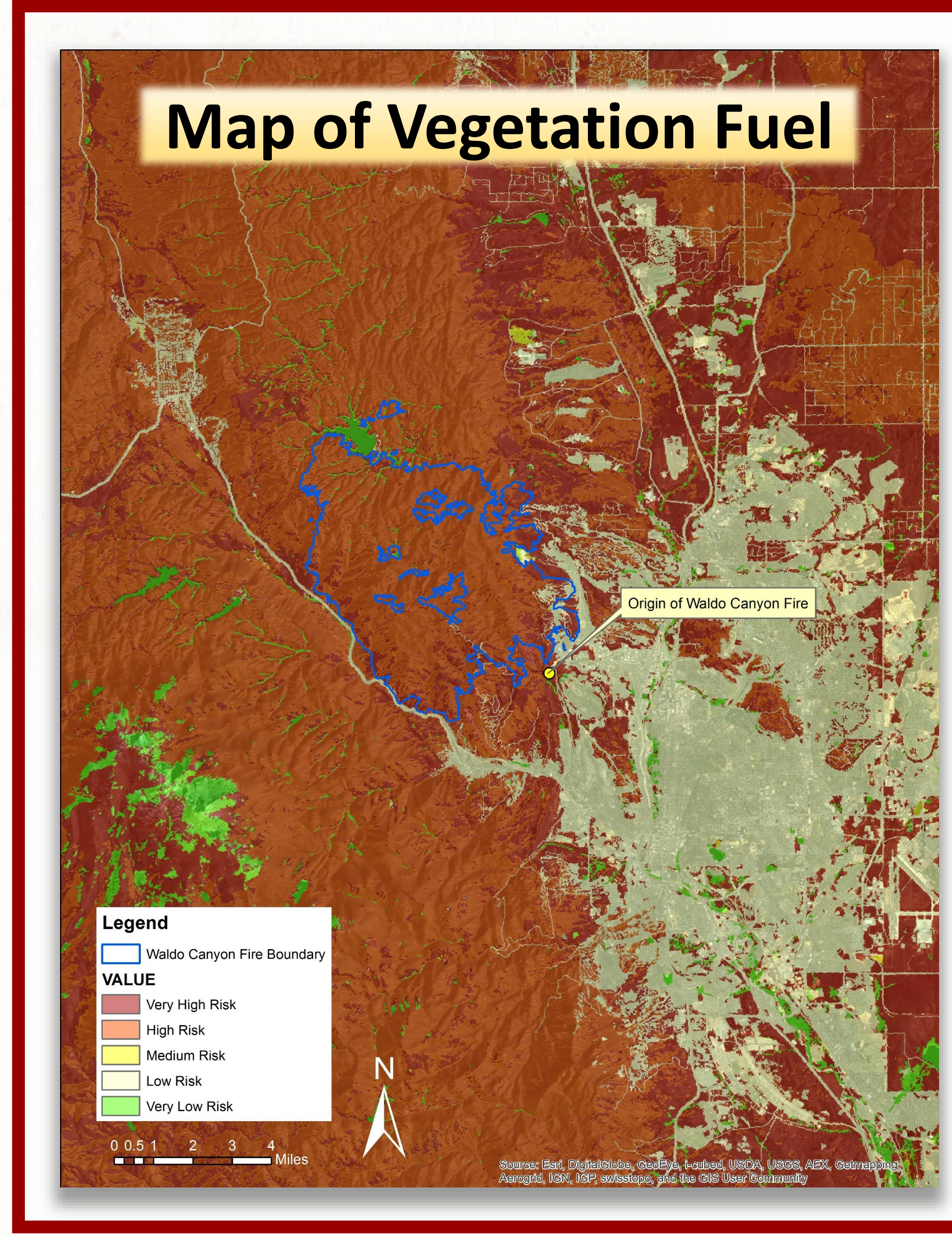
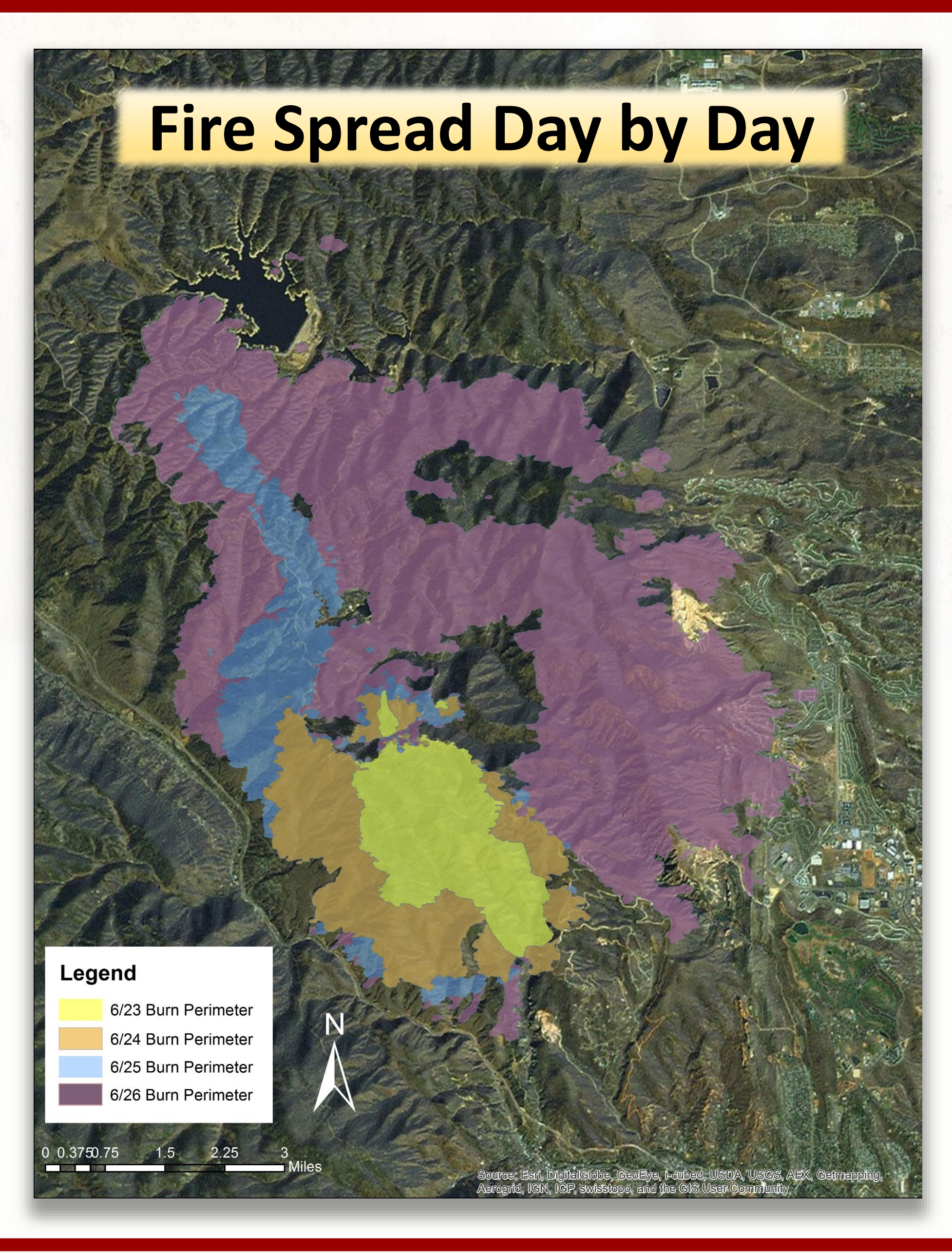
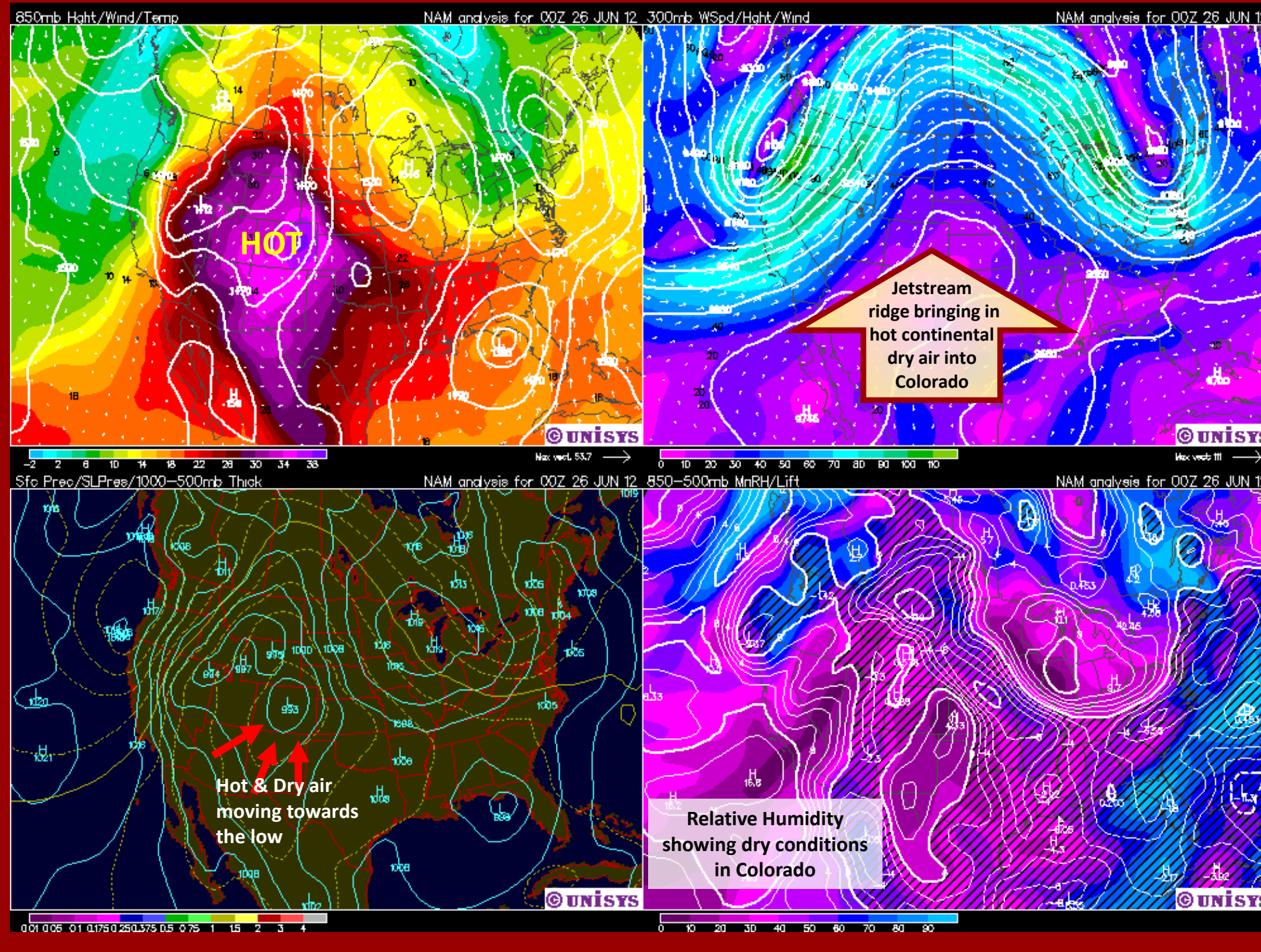


Meteorological/Climatological Conditions:

- 2012 set records as being the warmest in the month of June and for the entire year with July temperatures ranked as the third highest.
- 2012 was the fourth lowest recorded year of precipitation amounts.

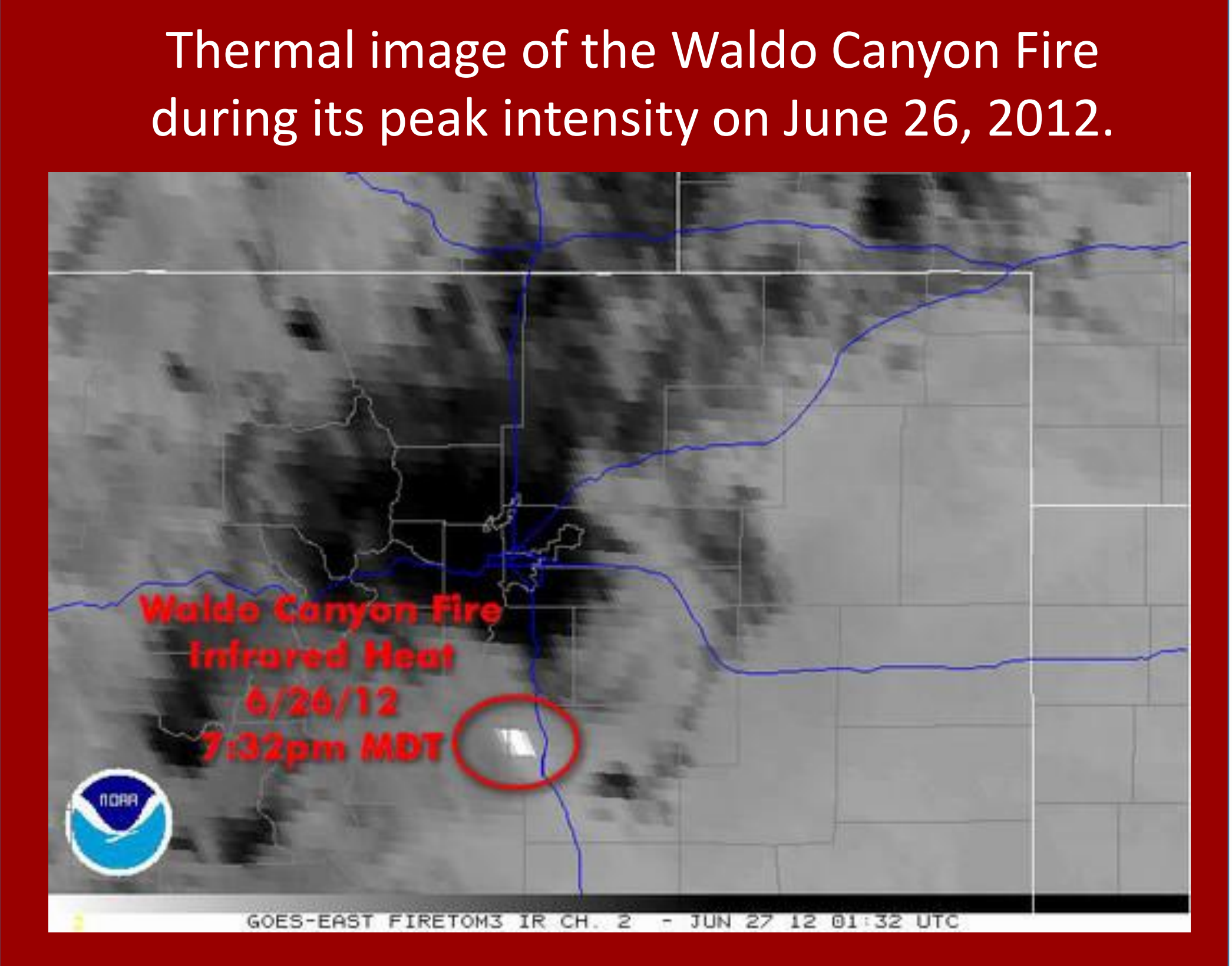


Colorado Springs, Colorado																					
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Top-left: Heavy ash and smoke from the wildfires turns the sky dark. Top-right: On June 26, 2012, the fire is spreading east towards the western side of Colorado Springs. The heavy ash falls resembling snow. Bottom-left: The smoke from the fire decreased visibility and unhealthy to breath. Bottom-right: After the fire, the hard work and determination of the firefighters did not go unnoticed as many residents whose houses were saved by firefighters held demonstrations showing their gratitude.

An ominous cloud of smoke from the Waldo Canyon Fire rises from the south behind the Air Force Academy's Cadet Chapel as cadets head for a briefing on evacuation procedures June 27, 2012. The Academy evacuated more than 600 families and 110 dormitory residents from the base the evening of June 27.



Conclusion

A ridge in the Jetstream (upper air winds) brought hot and dry continental air from the south to the Colorado area, and then the pattern stalled throughout most of the lifespan of the fire. Dewpoint temperatures, the temperature in which the air temperature must drop to in order to reach saturation, was in the single digits to teens while the air temperature was breaking past 100 °F. The winds were the main contributor to the direction and the strength of the fire spread.

2012 was a very hot and dry summer, followed by a very dry winter. The dry winter did not help the area preventing a massive drought in the west-central United States. Summer 2012 set records in both heat and drought that lead up to over 10 wildfires throughout Colorado. Other parts of the United States experienced very dry and hot summers too. For example, a derecho, a very intense line of storms that originated in Iowa on June 29, 2012, moved very quickly to the eastern seaboard which was caused by extremely high temperatures.

In the initial days of the fire, mainly the 23rd and 24th, the fire had a broad mix of shrub-land and Evergreen forests to help the spread of the fire. It should also be noted that due to the extreme drought conditions, and winds, these lands were very susceptible to rapid fire spreading. As the fire spread Northwest, the predominant fuel source were the Evergreen and Deciduous forests, which are to be considered a strong fuel source to fuel a forest fire.

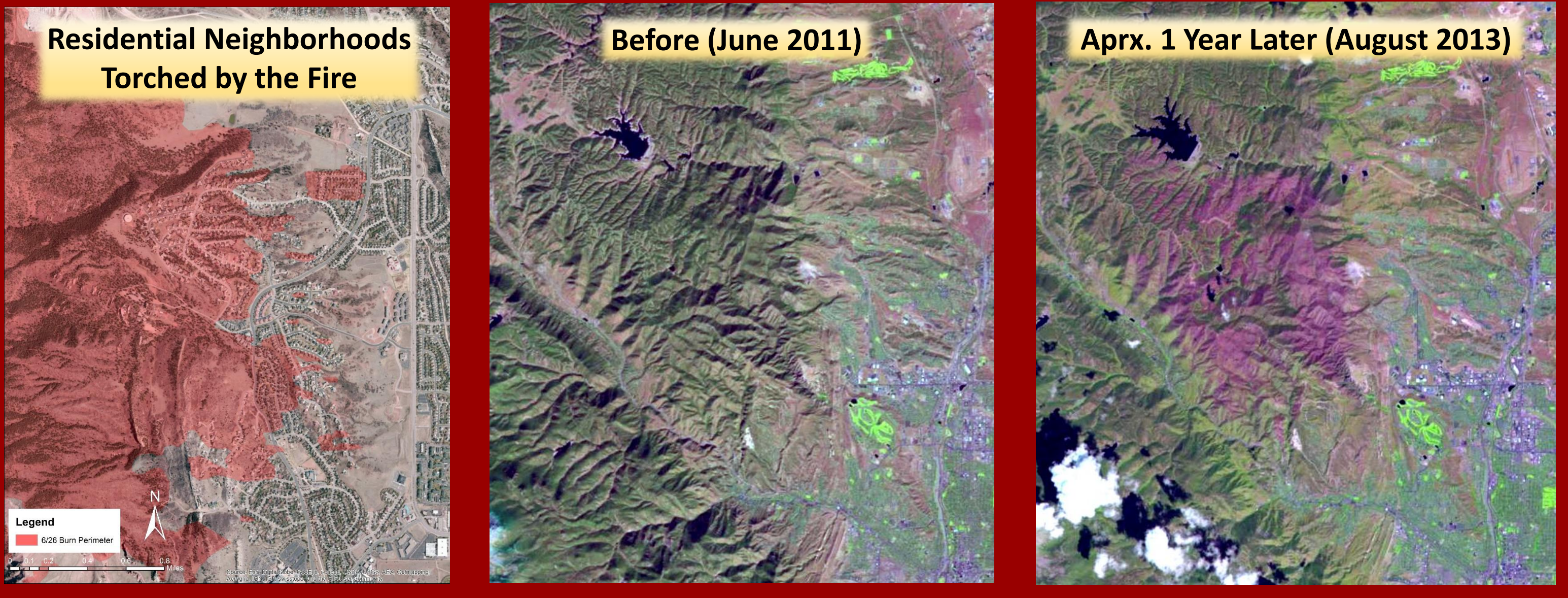
It is currently unknown what actually caused the Waldo Canyon Fire, whether it be dry thunderstorms or arson, is still under investigation. The area is slowly recovering and will take many years to return back to before the fire. The areas that were low burned areas are starting to see grass and yucca growths, while the more scarred areas are slower to recover.

Future research: More case studies like the Black Forest Fire in 2013 and finding correlations with weather conditions, vegetation, and to try to model the data that might help forecast fire seasons and prepare emergency responders.

Devastation

There are three levels of soil burn severity within the burn scar. 41% of the area is low/unburned, 40% moderate severity, and 19% high severity.

Post-fire, many residents near the burn scar on the west side of Colorado Springs, CO were encouraged to purchase flood insurance as they had to deal with flooding and mudslides shortly after the fire.



Landsat Images of the Burn Scar

Sources

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