Ecology, 97(11), 2016, pp. 3244

Unprecedented remote sensing data over King and Rim megafires in the Sierra Nevada Mountains of California

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Abstract. Megafires have lasting social, ecological, and economic impacts and are increasing in the western contiguous United States. Because of their infrequent nature, there is a limited sample of megafires to investigate their unique behavior, drivers, and relationship to forest management practices. One approach is to characterize critical information pre-, during, and post-fire using remote sensing. In August 2013, the Rim Fire burned 104,131 ha and in September 2014, the King Fire burned 39,545 ha. Both fires occurred in California's Sierra Nevada. The areas burned by these fires were fortuitously surveyed by airborne campaigns, which provided the most recent remote sensing technologies not currently available from satellite. Technologies include an imaging spectrometer spanning the visible to shortwave infrared (0.38–2.5 μm), a multispectral, high-spatial resolution thermal infrared (3.5–13 μm) spectroradiometer, and Light Detection and Ranging that provide spatial resolutions of pixels from 1 × 1 m to 35 × 35 m. Because of the unique information inherently derived from these technologies before the fires, the areas were subsequently surveyed after the fires. We processed and provide free dissemination of these airborne datasets as products of surface reflectance, spectral metrics and forest structural metrics (http://dx.doi.org/10.3334/ORNLDAAC/1288). These data products provide a unique opportunity to study relationships among and between remote sensing observations and fuel and fire characteristics (e.g., fuel type, condition, structure, and fire severity). The novelty of these data is not only in the unprecedented types of information available from them before, during, and after two megafires, but also in the synergistic use of multiple state of the art technologies for characterizing the environment. The synergy of these data can provide novel information that can improve maps of fuel type, structure, abundance, and condition that may improve predictions of megafire behavior and effects, thus aiding management before, during, and after such events. Key questions that these data could address include: What drives, extinguishes, and results from megafires? How does megafire behavior relate to fire and fuel management? How does the size and severity of a megafire affect the ecological recovery of the system?

Key words: AVIRIS; California; imaging spectroscopy; King Fire; Light Detection and Ranging; MASTER; megafire; remote sensing; Rim Fire; thermal infrared.

The complete data set is available online from Oak Ridge National Laboratory DAAC, Oak Ridge, Tennessee, USA at: http://dx.doi.org/10.3334/ORNLDAAC/1288

Manuscript received 10 May 2016; revised 15 August 2016; accepted 30 August 2016. Corresponding Editor: W. K. Michener.
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