ABSTRACT

The interface between former wildland and urban sprawl is of major concern in the Western United States throughout wildfire-prone areas. Kern County, California, northwest of Los Angeles, is one such heavily impacted area. Recent major wildfires there have portrayed extreme fire behavior and caused significant property damage underscoring the need for fire prevention efforts before emergency response. This thesis demonstrates the utility of pre-incident planning (PIP) maps for wildfire mitigation built using geographic information system (GIS)-based cartography. PIP maps highlight imperative spatial information for emergency responders during the first, crucial "golden hour" of a wildfire, particularly accurate locations for structures and water sources, along with ratings of roadways for fire engine access. The PIP approach would not be possible without GIS, in fact, owing to the need for an accurate, up-to-date spatial data and voluminous map production. In both concept and execution, PIP maps, have proven valuable far beyond their original intention aiding in at least a dozen major wildfires since 2008, helping to protect over 4000 structures. In addition, PIP maps have shown qualitative benefits, improving firefighter safety, incident organization, and emergency communication. Constructing PIP maps for Kern County cost $115,000; the return on investment is estimated in the millions of dollars.