Name(s)	Project Number
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Project Title

Development of a Novel Method to Predict Wildfire Ignition Sites in San Diego County

Abstract

Objectives/Goals

Over 100,000 wildfires burn between 4 to 5 million acres across the United States every year. Wildfires cause over $800 million worth of damage in California every year. What is even more shocking is that 80-95% of all wildfires in San Diego County are ignited or intensified by humans or human activity. Most current wildfire models seek to model fire spread post wildfire outbreak, or to analyze weather patterns in order to determine wildfire danger zones. Often, the aspect of human behavior is ignored. The purpose of this project is to create a novel, proactive, and more effective high-risk fire ignition map of San Diego County that incorporates anthropological data on the urban-wildland interface.

Methods/Materials

In order to carry out this project, retrospective data was collected from the San Diego Association of Government (SANDAG) in order to generate weighted risk factors (weights) associated with fire causation within San Diego. The data collected by SANDAG represents actual cause data for 94 wildfires accounted for between the 2000 and 2005. The shapefiles used in this experiment came from two online geoportals: SANDAG and CalFire. The map generation and analysis completed in this project was done using the GIS program ArcGIS. Using Buffer, Union, and Dissolve tools, a Final Combined Union Risk Map was created using the shapefiles accessed online. The final map was divided into seven weight classes.

Results

In order to test the accuracy and integrity of the Final Combined Union Risk Map, the 972 wildfire ignition sites in San Diego County between 2006 and 2010 (Map 8) were overlain on the map. When tested against these ignition sites, the risk map captured between 47-70% of the fires that occurred, depending on the buffer zone used. The three different zones were wildfire ignition sites that fell within the fire risk map, sites that fell in or within 250 meters of the risk map, and sites that fell in or within 500 meters of the risk map.

Conclusions/Discussion

This test validated the hypothesis of generating a fire risk map that would capture 30% of fires. The predictive risk map developed, which took into consideration only human variables, was more accurate than previous ignition risk maps analyzing various geographic, climate, spatial, and vegetation aspects. This map could be a very useful tool in fire prevention and mitigation.

Summary Statement

A high risk area map for wildfire ignition sites in San Diego was generated using ArcGIS and a weights of evidence model; the final risk map was tested against actual wildfire ignition sites and achieved 71% accuracy.

Help Received

John Hofmockel, a GIS Analyst for SANDAG, helped in accessing data and shape files as well as taught how to use ArcGIS; Dr. Jane Willoughby helped edit the sections; Mother helped construct the board.