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Abstract

Automating fireshed assessments and analyzing wildfire risk with ArcObjects and ArcGIS

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This paper describes the integration of three ongoing efforts in the USDA Forest Service concerned with the design and modeling of landscape fuels treatments to reduce the incidence and severity of large wildfires: (1) *The Fireshed Assessment Process*—Developed in Region 5 (California) of the Forest Service to provide a collaborative, interactive setting to design and test landscape fuel treatments in real time, while building public trust and cooperation among landowners, publics, and regulatory agencies. The Fireshed process uses an array of fire behavior models and GIS operations to analyze wildfire behavior and design fuel treatments patterns to address large-scale wildfire spread; (2) *ArcFuels*—A project to automate Fireshed assessments with Visual Basic macros and ArcObjects. The macros link Forest Service databases and wildfire behavior models like FlamMap with ArcMap and desktop office software. The system provides interactive wildfire modeling and mapping within ArcMap, and facilitates the design of landscape fuel treatment projects for Fireshed assessments; (3) *Actuarial framework for wildfire risk*—A project to develop a new wildfire risk assessment process for use in Fireshed assessments. Risk is defined as the *expected net value change* calculated as the product of (1) probability of a fire at a specific intensity and location, and (2) the resulting change in financial value or ecological condition. This framework can include present, future, positive, and negative impacts from wildfire, and integrates the effects of both wildfire spread and intensity.

In this paper, we describe the integration of these three efforts and demonstrate their application to analyze wildfire risk on a wildland urban in eastern Oregon, USA.

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