NEW TOOLS FOR ASSESSING LANDSCAPE SCALE OF VEGETATION AND WILDFIRE HAZARDS: A CASE STUDY FROM THE ROCKY MOUNTAIN REGIONS

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ABSTRACT

Integration of spatial information (i.e., remote sensing, geographic information system [GIS], and Global Positioning System [GPS]) with geospatial statistics can be used to investigate the spatial relationships among plant diversity, fuels, wildfire severity, and post-fire invasion by exotic plant species through linkage of multiphase sampling design and multiscale nested sampling field plots (pre- and post-fire). This technique provides useful information and new tools for describing and forecasting landscape-scale fire regimes, invasive plants, and ecological and environmental characteristics for the Cerro Grande Fire site, Los Alamos, New Mexico; Hayman Fire and High Meadow sites, Colorado; and other areas within the Rocky Mountain regions. Results of trend-surface models that describe the coarse-scale spatial variability to predict the distribution, presence, and patterns of native and exotic species, and fuel loading (tons per hectare) using stepwise multiple regressions based on the ordinary least squares (OLS) and spatial autoregressive (SAR) methods will be presented. Models with small variance were selected. In addition, the residuals from the trend-surface model based on the OLS or SAR procedure were modeled using binary regression trees and ordinary kriging for modeling small-scale variability based on semi-variogram models. All models were selected based on lowest values of standard errors, corrected Akaike Information Criterion statistics, and high R^2.

Citation: Kalkhan, M.A. 2007. New tools for assessing landscape scale of vegetation and wildfire hazards: a case study from the Rocky Mountain regions [abstract]. Page 224 *in* R.E. Masters and K.E.M. Galley (eds.). Proceedings of the 23rd Tall Timbers Fire Ecology Conference: Fire in Grassland and Shrubland Ecosystems. Tall Timbers Research Station, Tallahassee, Florida, USA.