Abstract

Recovery from wildfires is related to a series of interacting factors. This study was conducted to reproduce and attempt to improve upon the work of Casady et al. (2010) by building a regression decision tree model for predicting post-fire recovery based on interacting environmental factors using two spatial resolutions. Mimicking the efforts of Casady et al. in evaluating post-fire vegetation regeneration rate, their term has been renamed throughout this study as ReGreen Rate, since this is a more accurate representation of how the imagery can be interpreted. This present study used a combination of ArcGIS and R to prepare data from 30 m and 240 m spatial resolutions and analyze model attributes' impact on recovery rates. This study answers two questions. First, does the use of higher spatial resolution data create a more accurate regression tree model predicting the post-fire ReGreen Rate? Second, do different indices of fire severity show a different result in model accuracy? The resulting models all demonstrated a strong correlation between fire severity and rate of vegetation recovery, where greater fire severity lead to faster recovery. As for the first question, 30 m spatial resolution data did provide a marginally more accurate predictive model. However, the model built from the 240 m spatial resolution data was nearly as accurate as the model developed from the 30 m spatial resolution data when applied to the 30 m data. Second, different indices of fire severity did not provide statistically different accuracy in the resulting model. Further research into modeling various forest recovery rates could be useful in constructing generalizable models based on 240 m data to produce a good prediction of recovery for application in forest management, enabling targeted areas for post-fire replanting and optimizing resources allocation.

Casady, Grant M., Willem J. D. van Leeuwen, and Stuart E. Marsh. 2010. "Evaluating Post-wildfire Vegetation Regeneration as a Response to Multiple Environmental Determinants." *Environmental Modeling & Assessment* 15: 295-307.