ABSTRACT

The Lake Tahoe Basin, California/Nevada is the setting for evaluating a species richness modeling technique that is both accessible and provides an apparently unique approach to studying forest diversity patterns. Species richness, the total number of species of a focal group present in an ecological community without regard to individual taxa, is an important indicator of biodiversity. Despite its importance to researchers and natural resource managers, predicting species richness patterns in forested landscapes is difficult and therefore, not common. The computationally powerful yet highly accessible Maxent package, specifically designed for modeling species distributions, is used to predict homogenous patches of species richness by treating species richness values as individual "species." Areas where ranges of homogenous species richness overlap are then isolated and displayed as "border regions" similar to ecotones. Nowhere in the ecological literature is Maxent used in this manner, nor are transitional zones between regions of species richness viewed as spatial entities. Therefore, this thesis investigates if Maxent can make valid predictions about species richness and if areas where species richness predictions overlap constitute transition zones. To validate the model, traditional species distribution models for each included tree species were created using Maxent, stacked and then summed to produce a comparable species richness surface. Similar patterns between the two models indicate that Maxent accurately predicts species richness from environmental factors. Border regions were validated as legitimate spatial entities using split moving window dissimilarity analysis—a technique used to identify ecotones. Results indicate that using Maxent for this application is very likely valid and species richness border regions represent a promising spatial entity for studying diversity patterns. This spatially explicit approach provides an accessible method for studying species richness patterns at multiple scales. Further, a temporal series of these models provides a method for examining how diversity changes over time.