

Society for Range Management and Weed Science Society of America, "Working landscapes providing for the future", February 7-11 2010, Denver, Colorado.

Mel E. Bridges, B.D. Maxwell, and L.J. Rew

The role of current and historical land use in predicting invasive plant habitat suitability.

Habitat suitability models for invasive plant species can be useful tools for land managers to prioritize management and locate areas susceptible to invasion. Models depicting the spatial configuration of habitat suitability of an invader are usually a function of various environmental variables; however, historical and current land use may play a critical role in predicting the potential geographic distribution of a species of interest. Our objectives were to determine whether land use type was a significant predictor of habitat suitability and whether land use type improved the predictive ability of the habitat suitability models for three invasive weed species. Land use/cover were classified for areas within the Paradise Valley, MT at various years between 1948 and 2003. The presence and absence of three invasive plant species, Canada thistle (*Cirsium arvense*), downy brome (*Bromus tectorum*), and spotted knapweed (*Centaurea maculosa*), were mapped, and various habitat suitability models for these weed species were derived using logistic regression with different combinations of environmental and land use variables. Final models were selected based on minimized Akaike's information criterion (AIC) values resulting from stepwise procedures. The 2003 land use type was a significant predictor of habitat suitability for all three species. The predictive power of models including only environmental variables was compared to models including both land use type and environmental variables by calculating and comparing the areas (AUC) under receiver operating characteristic (ROC) curves for each model. The predictive ability of Canada thistle and spotted knapweed models were improved when 2003 land use type was included in the logistic model. Although all land use classes significantly contributed to the downy brome model, the predictive power of the model was not improved. Furthermore, historic land use variables exhibited significant relationships with the current distributions of all three weed species. Our results suggest that historic and current land uses can influence the habitat suitability of invasive plant species, and land managers may benefit from an understanding of which land uses are associated with increased vulnerability to invasion.