How Well Can We Predict Wildlife Corridors? Tests Of Alternative Modeling Approaches In Migratory Elk And Dispersing Wolverines

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Landscape connectivity has become a key focus of conservation biology as natural habitat is increasingly fragmented by human land use. Several landscape modeling approaches are now relied upon to identify likely dispersal and migration corridors and guide conservation planning. However, the predictive accuracy of these methods has seen limited testing against empirical movement data, which limits confidence in their utility and confuses selection of appropriate methods for a given application. To address these issues, we used GPS collar data from migrating elk and dispersing wolverines to evaluate the ability of common modeling approaches (cost-distance/least-cost path models and circuit theory models) to predict observed movement routes. While both methods made generally similar predictions, cost-distance models consistently outperformed circuit theory models, and predictive success was much higher for elk than for wolverine movements. Furthermore, the form and complexity of underlying landscape resistance maps influenced model performance and revealed unforeseen differences between models. These findings illustrate that corridor model performance depends greatly on focal species and landscape characteristics as well as selection of appropriate methods for the application at hand.