

# Quantifying and predicting wildlife movement - A state of the knowledge review

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## Short Abstract

A pressing wildlife management question is to understand how human activities influence wildlife movement. As the physical environment become more dynamic due to human activities, quantifying and predicting the movement response of wildlife is essential. Recently, pattern measures for new high-resolution movement datasets are being developed and applied to wildlife research in attempts to better understand the mechanisms of movement that is central to assessing wildlife fitness and habitat requirements. However, there is a gap in methods available to quantify how wildlife movements are impacted by interactions with the physical environment. The review presented here will outline the current state of the knowledge in methods available to analyze wildlife movement and integrate these data with high-resolution landscape data. Methods detailed will be classified based on their ability to quantify and/or predict wildlife movement. Generally, widely used methods have focused on visualization (e.g., path description) and broad scale quantification of spatial-temporal patterns of movement (e.g., the utilization distribution). More recent methods, including brownian bridge and state-space models, quantify wildlife movement (e.g., estimation of home range, movement, and resource selection) at increasingly fine scales. New methods are also being developed to quantify interaction between two or more individuals (e.g., dynamic interaction). However, few methods are available to predict the future potential for wildlife movement based on baseline models. Methods and tools that can predict wildlife movement in response to disturbance, either natural or human, would help tailor management and conservation plans. The review will conclude with a brief outline of a new proposed method for prediction of wildlife movement.