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Mapping Behavioral Landscapes: Predicting How Bobcats Respond to Urban Barriers

Population and habitat connectivity are important areas of focus for land managers working in suburban areas, where wildlife must navigate and react to barriers such as roadways and housing to reach foraging and resting habitats. This is particular true for larger, more mobile species, where habitat connectivity and home range could span many square miles.

Understanding how wildlife react to urban barriers is therefore an important aspect of assessing whether habitat connectivity measures are sufficient. In a study published in *Ecological Applications*, researchers at USGS, University of Wisconsin and Colorado State University employed a finite mixture modeling approach to describe the behavioral responses of bobcats (*Lynx rufus*) to urban development.

Researchers analyzed GPS collar data from two male and one female bobcats tracked in Orange County, California, and assessed their responses as they moved into more urbanized areas. The model then uses this data to predict how that bobcat will respond to all urban areas on the landscape — whether it moves along the urban edge or walks away entirely, and in which direction.

All three bobcats avoided areas of high urban density, by moving towards areas with lower urban density, or moving parallel to the urban edge, or both. However, the studied bobcats appeared to fall into two separate behavior responses categories: a resident animal keeping within a home range, and a more transient animal with a wider range.

With further refinement and data, the model will allow researchers to map bobcat behavioral responses to any landscape. The eventual behavioral mapping tool could help managers predict wildlife response to existing or planned urban features, and test land use and habitat conservation scenarios.

Management Implications

- Researchers have created a computer model that maps how bobcats respond to urban areas on a landscape.
- Bobcats avoided areas of high urban density by moving towards areas with lower urban density.
- Bobcats appeared to fall into two separate behavioral response categories: a resident animal keeping within a home range, and a more transient animal with a wider range.
- With further refinement, the behavioral mapping tool could help managers predict wildlife response to existing or planned urban features, and test land use and habitat conservation scenarios.

THIS BRIEF REFERS TO:

Tracey, JA, J Zhu, E Boydston, L Lyren, RN Fisher, KR Crooks. 2013. Mapping behavioral landscapes for animal movement: A finite mixture modeling approach. *Ecological Applications* 23(3): 654-669. doi: 10.1890/12-0687.1

<http://www.werc.usgs.gov/ProductDetails.aspx?ID=4891>

<http://www.werc.usgs.gov/fisher>

<http://www.werc.usgs.gov/boydston>



Data from USGS remote cameras and GPS collars helped create the behavioral landscape model for bobcats, like this mother and kitten in Riverside County, CA.