LANDSCAPE CONNECTIVITY

FOR MEDIUM AND LARGE MAMMALS IN THE CITY OF LOS ANGELES

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Photos:
(ABOVE) Motion-triggered cameras on Lakeridge Bridge above the CA-101 highway recorded multiple crossings by mule deer, such as this adult female and two fawns in the morning of August 9, 2012.

(ABOVE-RIGHT) A motion-triggered camera detected a coyote entering a pedestrian tunnel under a highway at night on July 13, 2013, crossing from Griffith Park towards the Los Angeles River.

(RIGHT) This image taken on February 12, 2012 by our hillside camera east of Lakeridge Bridge is the first known documentation of a mountain lion in the Griffith Park area.

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Connectivity for wide-ranging species is particularly limited in cities where habitat is scarce and roads and other development divide natural areas. Despite intensive development, the City of Los Angeles (LA) contains several large open space areas. However, little is known about connectivity in this highly fragmented landscape. Thus, we initiated the Griffith Park Connectivity Study, centered on LA's Griffith Park and potential connections to other areas of habitat. We focused on terrestrial wildlife species with large area requirements, mammalian carnivores and mule deer (*Odocoileus hemionus*). Wildlife must cross major highways to move between Griffith Park and other habitat areas or to access the Los Angeles River.

We set up motion-triggered cameras to monitor potential locations where wildlife could cross the surrounding highways. Highway CA-101 on the western side of Griffith Park divides Griffith Park from the rest of the Santa Monica Mountains. We identified two roaded bridges over CA-101, Lakeridge and Pilgrimage, as the most likely crossing locations of this highway, because of the close proximity of natural habitat. We placed cameras at bridge corners with views of bridge roadways and sidewalks. We also put cameras in natural habitat on adjacent hillsides for comparison. To avoid quickly filling up memory cards with images of heavy vehicle traffic, we set bridge cameras to record images only from 6 pm to 6 am. We conducted one year of continuous camera monitoring of these sites, starting in November 2011.

Cameras in hillside habitat near bridges detected mule deer, bobcat *(Lynx rufus)*, coyote *(Canis latrans)*, raccoon *(Procyon lotor)*, striped skunk *(Mephitis mephitis)*, and a male mountain lion *(Puma concolor)*. We first detected a mountain lion in February 2012 on cameras in natural habit just east of CA-101, the first verifiable records of a mountain lion east of I-405 or CA-101 in the Santa Monica Mountains. This mountain lion was later given the identification code of P22 as part of a National Park Service study. Lakeridge Bridge cameras recorded coyotes crossing CA-101 approximately twice a week but no other carnivore species were photographed on the bridge. Cameras also detected mule deer crossing Lakeridge but less frequently than coyotes. Cameras on Pilgrimage Bridge documented only one deer crossing event and only one carnivore image, a raccoon that could not be confirmed as crossing.

We next placed cameras at the openings of three tunnels under highways between Griffith Park and the LA River and in habitat in Griffith Park near these tunnels. From December 2013 to Oct 2014, cameras in habitat on Griffith Park's eastern side recorded gray fox *(Urocyon cinereoargenteus)* in addition to the species detected on the western side of Griffith Park near CA-101. Cameras documented coyotes at all three tunnels; bobcat, raccoon, and deer were each documented using one or more tunnels, but wildlife use was infrequent. These tunnels, which provide safe passage for pedestrians, equestrians, and cyclists, may allow wildlife to use the LA River as a corridor to and from Griffith Park, but we do not yet know about wildlife movements within the River itself.

The paths that we as humans use to navigate the landscape—highways and other roads— intersect and often form barriers to animal movements by splicing through wildlife habitat. Can the LA River and other waterways become animal highways in even heavily developed landscapes? Such connectivity will depend on the configuration of the larger landscape and the existence of wildlife-friendly "onramps" and "offramps," allowing animals to enter and exit corridors at locations of larger habitat areas.

Further study will help us determine if other species occasionally move in or out of Griffith Park, the frequency of these movements, and factors that limit connectivity, so that we better understand the sustainability of species in this fragmented landscape.