Title

Effects of a Purpose-Built Underpass on Wildlife Activity and Traffic-Related Mortality in Southern California: The Harbor Boulevard Wildlife Underpass

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Abstract

Conservationists have advocated the construction of wildlife crossing structures for the purpose of reducing traffic mortality of wildlife and maintaining habitat connectivity in increasingly fragmented landscapes. In May 2006, construction was completed on a wildlife underpass beneath Harbor Boulevard, a four-lane road that bisects the Puente Hills, one of the few remaining large tracts of coastal sage scrub habitat in southern Los Angeles County. We monitored the frequency of road-killed wildlife and the activity of medium and large mammals at track-stations in the vicinity of the underpass before, during and after underpass construction. We also used digital remote cameras and track stations to determine wildlife use of the new underpass. Remote cameras were installed in the underpass on 26 May 2006, soon after construction was complete. Our aim was to determine whether such underpasses reduce traffic-related mortality of wildlife and improve functional connectivity of remnant coastal sage scrub and other natural habitats for wildlife populations. Cameras indicated that wildlife began using the underpass almost immediately after construction. Mule deer and coyotes were photographed using the tunnel 3 and 4 weeks, respectively, after cameras were installed. Coyotes have used the underpass fairly regularly, with a sharp increase observed in October 2006, 23 weeks after cameras were installed. Use of the underpass by deer has been less consistent, perhaps due to seasonal changes in habitat use. As of April 2007, coyotes were photographed at the underpass an average of 26.6 times per month, and deer, an average of 2.0 times per month. Additionally, one bobcat was photographed in February 2007.

Track-station surveys indicated that coyotes and striped skunks are very common across the study area, but that other rare or more secretive carnivores such as long-tailed weasels, gray foxes and bobcats are also present. Track-station activity, and the diversity of species represented, was especially high in the center of the Puente Hills study area, suggesting that wildlife activity increases as one moves east and away from more intensely urbanized areas of the county. Across the study area, rodents were the most common road-killed animals followed by, in order of abundance, striped skunks, opossums, coyotes, brush rabbits, raccoons, mule deer, and bobcats. One American badger, a species that is considered uncommon in developed parts of Los Angeles County, was also found. Incidence of road-kills increased with higher speed limits. On Harbor Boulevard, coyotes accounted for 39% of the 31 road-kills detected since surveys began in July 2004, followed by opossums (19%) and striped skunks (16%). Two bobcats (6%) were also killed by vehicles on Harbor Boulevard over this period. Incidence of road-kills was very high on Harbor Boulevard relative to the rest of the study area prior to construction; however, to date (10 months post-construction), there has been no reduction in the frequency of road-kills on Harbor Boulevard. There also has been no apparent change in the frequency of road-kills across the study area between comparable pre- and post-construction surveys. Although wildlife use of the underpass has been relatively high, the lack of any decrease in the number of road-killed animals, notably coyotes, suggests that some animals have not found or are not using the underpass, and that other measures such as fencing might be considered in the vicinity to funnel more crossings off of Harbor Boulevard and into the underpass.

The underpass was constructed at Harbor Boulevard because it represents an area of significant narrowing of the Puente Hills Wildlife Corridor by urban development, where traffic-related mortality of wildlife was suspected to be high. As such, the new underpass has the potential to facilitate movement between protected areas of the Puente Hills and other undeveloped private and public lands to the east. We hope that our project, which will monitor wildlife activity and traffic-related mortality in the vicinity of the underpass through May 2007, will add to the current body of knowledge on mitigating the negative effects of roads on wildlife. Additionally, our project may also provide information that will help to eventually create and maintain a functional wildlife corridor from the San Gabriel River to the Cleveland National Forest, of which the habitat in Puente Hills will be a critical link.

Biographical Sketches: David Elliott is currently a Master's student at California State University, Fullerton. His project aims to evaluate the effectiveness of a purpose-built wildlife underpass in Los Angeles County, California and measure wildlife activity in the area surrounding the underpass. Dr.

Paul Stapp is an assistant professor in the Department of Biological Science at Cal State Fullerton.