

Assessing Changes in Clusters of Wildlife Road Mortalities after the Construction Wildlife Mitigation Structures

Thomas Yamashita¹, Trinity Livingston¹, Kevin Ryer¹, John Young², and Richard Kline¹

¹The University of Texas Rio Grande Valley

²Texas Department of Transportation

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Abstract

Collisions with vehicles are a major threat to wildlife populations and often occur in identifiable patterns. To reduce wildlife road mortalities, mitigation structures including exclusionary fencing and wildlife crossings are constructed. Openings in fencing at road intersections may lead to concentration of road mortality hot spots at openings leading to a belief that these gaps concentrate road mortalities. However, it is also possible that hot spots existed at these locations before construction indicating that road mortality patterns have not changed with mitigation structure construction. Therefore, to assess mitigation structure effectiveness, it is important to examine both road mortality numbers and road mortality spatial distribution. Wildlife road mortality data was collected on a 15-km section of rural highway in Texas, USA before, during, and after the construction of wildlife mitigation structures. We expected that the number of road mortalities would decrease after construction compared to before construction and that road mortalities would become more concentrated around openings in the fence. We used ANOVA to compare numbers of road mortalities and emerging hot spot analysis and generalized linear modelling to assess changes in road mortality spatial distribution. Road mortalities were not significantly different in the before and after construction periods ($p = 0.092$). While there were no significant changes in road mortality patterns with construction, cluster intensity was greater when nearer to fence openings in all three time periods. Emerging hot spot analysis provides an effective and easy way to visualize road mortality patterns through time, however, due to low numbers of mortalities in many road mortality studies, including this one, the power of this analysis to detect significant changes in road mortality may be limited. This technique can provide both ecologists and transportation planners an effective tool for identifying patterns that may warrant further investigation using traditional statistical techniques.

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