Highway crossing structures for metropolitan Portland's wildlife

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Abstract

The protection and restoration of the Portland, Oregon metropolitan region's wildlife biodiversity is an overarching objective of Metro Parks and Greenspaces. Metro, Portland's elected regional government, currently manages 8,000 acres of open space containing 50 mammal species. Included are roughly 50 miles of stream and river frontage as well as wetlands, riparian areas, meadows, forests, and other valuable habitat. Metro, the U.S. Fish and Wildlife Agency, and Portland State University have embarked on a jointly funded project to promote biodiversity by encouraging the use of wildlife-crossing structures to reestablish wildlife-movement corridors within areas currently fragmented by roads. This team project has three sequential stages. Stages 1 and 2 have been completed. Stage 3 is currently underway: Stage 1. Examination of the extent of the deer-vehicle conflict problem in the Portland metropolitan region and identification of deer-vehicle accident (DVA) hotspots for potential crossing-structure construction. The black-tailed deer (Odocoileus hemionus Columbianus) is the resident subspecies.1 Stage 2. Production of a user-friendly manual that can be employed by transportation planners to incorporate wildlife-crossing structures into the region's transportation-planning process.2 Stage 3. Development of a model that predicts DVA hotspots to facilitate the intelligent siting and design of future roads in the region. While the literature contains accounts of model development for predicting DVA hotspots for the white-tailed deer (Odocoileus hemionus), there appear to be no studies (to date) for predicting DVA hotspots for the black-tailed deer.3 In stage 1, we collected a total of 2,200 DVA incidents in Clackamas, Multnomah, and Washington Counties for the period 1987-2002 from road-maintenance department carcass pickup reports, Oregon Department of Transportation (ODOT) wildlife-vehicle accident reports, and wildlife-rehabilitator intake records. Because ODOT does not maintain deer carcass pickup records for state and federal highways, the most complete data available were for countymaintained roads. Incidents were geocoded and mapped. A GIS analysis, using grid cells of 1.00mi2 and 0.25 mi2, regressed total DVAs/cell against a suite of landscape characteristics/cell: 1) total new building permits, 2) total miles of streams and rivers, 3) total miles of roads and highways, 4) total forest vegetation, 5) total other vegetation, and 6) total wetland area. DVA hotspots were identified visually. We determined that DVAs were nonrandomly located along roads and that they began to increase in June and peak in November. No significant correlation was established between DVA density and any of the landscape variables. Metro is currently pursuing development of crossing structures at several of the sites identified by the

data as hotspots. Students in Portland State University's Master of Urban and Regional Planning program used the results of stage 1 to produce the Metro publication "Wildlife Crossings: Rethinking Road Design to Improve Safety and Reconnect Habitat." This is a comprehensive manual for siting, designing, and funding wildlife-crossing structures in the urban/ suburban/rural mix of metropolitan Portland. It is designed for transportation planners and resource agencies and is available to the general public. In stage 3, a temporal and spatial DVA hotspot model for the black-tailed deer is under development for northwest Clackamas County using additional years of wildlife-vehicle accident reports and carcass-pickup data. As a result of this study, we recommend that all road-maintenance agencies maintain carcass-pickup records, including carcass-pickup locations identified by GPS, date of retrieval, species, gender, and age class. This information should be consolidated in a regional database to identify wildlife-movement corridors and substantiate the need for wildlife-crossing structures at selected locations.

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Highway Crossing Structures for Metropolitan Portland's Wildlife

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Abstract

The protection and restoration of the Portland, Oregon metropolitan region's wildlife biodiversity is an overarching objective of Metro Parks and Greenspaces. Metro, Portland's elected regional government, currently manages 8,000 acres of open space containing 50 mammal species. Included are roughly 50 miles of stream and river frontage as well as wetlands, riparian areas, meadows, forests, and other valuable habitat. Metro, the U.S. Fish and Wildlife Agency, and Portland State University have embarked on a jointly funded project to promote biodiversity by encouraging the use of wildlife-crossing structures to reestablish wildlife-movement corridors within areas currently fragmented by roads.

This team project has three sequential stages. Stages 1 and 2 have been completed. Stage 3 is currently underway:

Stage 1. Examination of the extent of the deer-vehicle conflict problem in the Portland metropolitan region and identification of deer-vehicle accident (DVA) hotspots for potential crossing-structure construction. The black-tailed deer (*Odocoileus hemionus Columbianus*) is the resident subspecies.[1]

Stage 2. Production of a user-friendly manual that can be employed by transportation planners to incorporate wildlife-crossing structures into the region's transportation-planning process.[2]

Stage 3. Development of a model that predicts DVA hotspots to facilitate the intelligent siting and design of future roads in the region. While the literature contains accounts of model development for predicting DVA hotspots for the white-tailed deer (*Odocoileus hemionus*), there appear to be no studies (to date) for predicting DVA hotspots for the black-tailed deer.[3]

In stage 1, we collected a total of 2,200 DVA incidents in Clackamas, Multnomah, and Washington Counties for the period 1987-2002 from road-maintenance department carcass pickup reports, Oregon Department of Transportation (ODOT) wildlife-vehicle accident reports, and wildlife-rehabilitator intake records. Because ODOT does not maintain deer carcass pickup records for state and federal highways, the most complete data available were for county-maintained roads. Incidents were geocoded and mapped. A GIS analysis, using grid cells of 1.00mi^2 and 0.25 mi^2, regressed total DVAs/cell against a suite of landscape characteristics/cell: 1) total new building permits, 2) total miles of streams and rivers, 3) total miles of roads and highways, 4) total forest vegetation, 5) total other vegetation, and 6) total wetland area. DVA hotspots were identified visually.

We determined that DVAs were nonrandomly located along roads and that they began to increase in June and peak in November. No significant correlation was established between DVA density and any of the landscape variables.

Metro is currently pursuing development of crossing structures at several of the sites identified by the data as hot-spots. Students in Portland State University's Master of Urban and Regional Planning program used the results of stage 1 to produce the Metro publication "Wildlife Crossings: Rethinking Road Design to Improve Safety and Reconnect Habitat." This is a comprehensive manual for siting, designing, and funding wildlife-crossing structures in the urban/suburban/rural mix of metropolitan Portland. It is designed for transportation planners and resource agencies and is available to the general public.

In stage 3, a temporal and spatial DVA hotspot model for the black-tailed deer is under development for northwest Clackamas County using additional years of wildlife-vehicle accident reports and carcass-pickup data.

As a result of this study, we recommend that all road-maintenance agencies maintain carcass-pickup records, including carcass-pickup locations identified by GPS, date of retrieval, species, gender, and age class. This information should be consolidated in a regional database to identify wildlife-movement corridors and substantiate the need for wildlife-crossing structures at selected locations.

[1]**Team**: Jennifer Budhabhatti, Metro Parks and Green Spaces; Jo Price, Metro Data Resource Center; Luis Ruedas and Linda Anderson, Portland State University. [2]**Team**: Masters in Urban and Regional Planning students Theresa Carr, Radcliffe Dacanay, Kevin Drake, Charl Everson, Arianne Sperry, and Kerri Sullivan, supervised by professors Connie Ozawa, Deborah Howe, and Steve Johnson of Portland State University; Jennifer Budhabhatti, Metro parks and Green Spaces; and Ted Leybold, Metro Transportation Department. [3]**Team**: Linda Anderson, M.S. candidate, and committee members Keith Hadley, Joseph Poracsky, Heejun Chang, Geography Department; Alan Yeakley, Environmental Sciences and Resources, Portland State University.

Biographical Sketch: Linda Anderson is a M.S. candidate in geography at Portland State University, Portland, Oregon. Her master's thesis, "An Examination of Black-tailed Deer (*Odocoileus hemionus columbianus*) Deer-Vehicle Accident Hotspots in Northwest Clackamas County, Oregon," will be completed in December 2005. Fields of interest include wildlife ecology, biogeography, landscape ecology, and conservation biology. She strongly believes that the conservation of wildlife-movement corridors and habitat should be standard practice in the design of transportation networks.