Animal-Vehicle Collision Research and Mitigation
I-64 Charlottesville-Waynesboro

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Virginia Transportation Research Council
1.25 million DVCs in the U.S.

VDOT spends ~ $4.1 million/year on carcass management

*State Farm Insurance projections for the entire insurance industry. Includes deer, elk, and moose
VDOT asked VTRC to look into potential mitigation for deer crashes.

VDOT safety analysis: Afton Mountain Area.
Collision Types
Staunton to Charlottesville, I-64 MM 87-118
(2012-2016)

- Fixed Object Off Road: 384
- Rear End: 302
- Deer (police records): 224

Approx 1 in 6 result in injury.
Collision Types
Staunton to Charlottesville, I-64 MM 87-118
(2012-2016)

- Fixed Object Off Road: 384
- Rear End: 302
- Deer (police records): 224
- Carcass Removals: 1,056*

* 2.75 times higher than top police-reported crash type

Deer crashes are 53% of all crashes
Deer Crash Data
I-64 in Albemarle County (MM 102 -131).
Deer Crash Data with Carcass Removals
I-64 in Albemarle County (MM 102-131).
Collision Types, I-64 in Albemarle County

- Rear End
- Colliding with Fixed Object off Road
- Side Swipe
- Deer

Year
- 2013
- 2014
- 2015
- 2016

Counts
- 0
- 20
- 40
- 60
- 80
- 100
- 120
Collision Types, I-64 in Albemarle County

*Working on means to collect carcass removal data statewide*
Deer and Bear Carcasses (1 mi segments)
2012-2016

I-64 Mile Markers

Deer
Bear

Afton Mtn
Virginia Deer Crash Data (2012 – 2016)
Effective Mitigation

Underpasses/overpasses with fencing: 86% DVC reduction
Study Background

• The U.S. road system includes more than 582,000 bridges longer than 20 feet, 480,000 of which are over waterways.*

• The road system also includes millions of smaller structures, many of which serve as passageways for wildlife.*

• Because these structures were not designed for wildlife passage, they have no fencing.

Research is needed to establish how retrofitting an individual existing underpass with fencing affects AVCs and the use of the structure.

First, data is needed to support fencing recommendations

*Forman et al., 2003
Purpose of Study

Evaluate *activity* and *behavior* of white-tailed deer and other wildlife along
(1) unfenced isolated underpasses and
(2) a forested riparian corridor with no viable underpasses
Charlottesville, VA
5 mi (8 km)

307 ft span
10 x 12 ft openings
189 ft long
Methods

- Collect carcass removal data (2012-present)
- Monitor study sites with cameras

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<th>Date</th>
<th>Mile Marker</th>
<th>Animal Desc.</th>
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Camera Monitoring (2 yrs)
52 cameras deployed March 2013
Camera Monitoring

Primary questions:

Underpasses

• Wildlife use of the underpasses (full crossings vs turning back)
• Activity and behavior along the adjacent roadside
• Roadside activity relative to distance from the underpass

Drainage Corridor with no underpass

• Activity and behavior of wildlife at drainage/interstate intersection compared to farther away from intersection
RESULTS

Deer and Bear Carcasses 2013-2014

9.2 DVCs per mile per year

Bear: 18 bear deaths (2 yrs)
RESULTS

Deer Carcasses per Month

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Deer Activity by Time of Day (Sep to Nov)
PHOTOS

336,000 total

• ~ 1/3 deer
• 35 black bears
• Few thousand photos of other species
Wildlife Activity
Site 1 vs Site 2 (2 yrs)

Underpass Use

Site 1 culvert
Site 2 bridge

Roadside Activity (per camera)

Site 1 roadside
Site 2 roadside

6/1/2017
Site 1 Deer Activity: 1,152 per yr
Deer activity along the roadside adjacent to the culvert was 3 times greater than activity through the underpass
Site 1 Deer
Activity: 1,115 per yr

Site 2 Deer
Activity: 1,253 per yr

Roadside deer activity was 3 times less than activity through the underpass.

Deer Activity/Day Through Underpass
Deer Activity/Day Along Road

(n) = Total Deer Activity over 2-yr period.
Site 1 Deer Activity: 1,115 per yr

Site 2 Deer Activity: 1,253 per yr
Roadside deer activity was 3 times less than activity through the underpass

DVCs at each site: 7.5/mi/yr
Roadside Behavior
Deer per Day

Deer Activity Along Road

\((n) = \text{Total Deer Activity over 2-yr Period}\)

Drainage Corridor
Afton Mountain

0.5 mi

Rock wall

(21) (107) (464) (837) (520) (630) (149)
Cost Savings

Fencing and escape structures for just one underpass is expected to result in a savings in costs associated with deer-vehicle collisions of $501,473 over its service life. 

Assuming $6,617 per DVC (Huijser, 2009)

Fencings is cost effective when it prevents 1 DVC per mile per year
Implementation

Fencing installation at 2 underpasses Feb-June 2017
Implementation
- deer warning messages on changeable message signs, Oct and Nov 5pm to 9am (Crozet to Afton Mountain)
Opportunities?

Potential Target for Virginia Road Ecology Working Group (FWS, DGIF, DCR, conserv groups)
Funding Opportunities for Wildlife Crossings

- Highway Safety Improvement Program
- Transportation Enhancements program (FAST ACT) – funds habitat connectivity projects
- Assoc of Fish and Wildlife Agencies
- VDOT’s Research Implementation funds
- Grants
- Foundations
- Private Donations
- Local Taxes
Thank you

Technical Review Panel
Vernon Hoke (Project Champion)
David Morris
Amy O’Leary
Nelson Lafon (VDGIF)

Camera Pole Installation
Danny Huffer
Gary Wheeler

Field/Research Assistance
Lewis Lloyd
Michael Crawley
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Site Visits
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Nelson Lafon
Jim Bowman
David Kocka
Al Bourgeois
Mike Pelton

Implementation of Recommendations
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David Pearce
Jimmy White

Report available
http://vtrc.virginiadot.org
Report 16-R4
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