

Montana US Highway 93 South Wildlife Crossings Research MDT # HWY – 308445-RP



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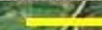
Outline

- ◉ Introduce Study Area and Purpose
- ◉ Methods
- ◉ Pre-Construction and Control Results
- ◉ Post-Construction Preliminary Findings
- ◉ Kernel Density Analysis
- ◉ Model Building
- ◉ Future Work

Study Area



To Missoula



Lee Metcalf
National
Wildlife Refuge

Bass North Bridge

Bass South Bridge

Bass Fishing Access Culvert

Dawns Crossing Bridge

93

Stevensville
Airport

McCalla Creek North Bridge

Kootenai Creek Bridge

McCalla Creek South Bridge

Kootenai Springs Culvert

Indian Prairie Culvert

Big Creek Bridge

Axeman Culvert

Sweathouse Creek Bridge

Victor

Bear Creek North Bridge

Bear Creek South Bridge

Mountain Gallery Culvert

Lupine Culvert

Fun Park Culvert

Mill Creek Bridge

Wildlife
Crossing
Structures

93

Pinesdale

Corvallis

93

93

Blodgett Creek Bridge

Hamilton

Hamilton

Ravalli

Purpose

Determine the effectiveness of the 19 wildlife crossing structures by investigating:

White-tailed deer usage rates by type and across types (including height, width, length, and material),

Relationships between usage rates and landscape variables (cover, water, topography),

Changes in deer-vehicle collisions between pre-construction and post-construction of wildlife crossing structures

Relationships between animal-vehicle collisions and wildlife crossing structures over time and space.

Methods

Monitor wildlife crossings pre and post-construction with remote trail cameras placed near crossing entrances

Calculate success, repel, and parallel rates, and deer abundance

Analyze data pre and post construction,
across structure types, landscape variables

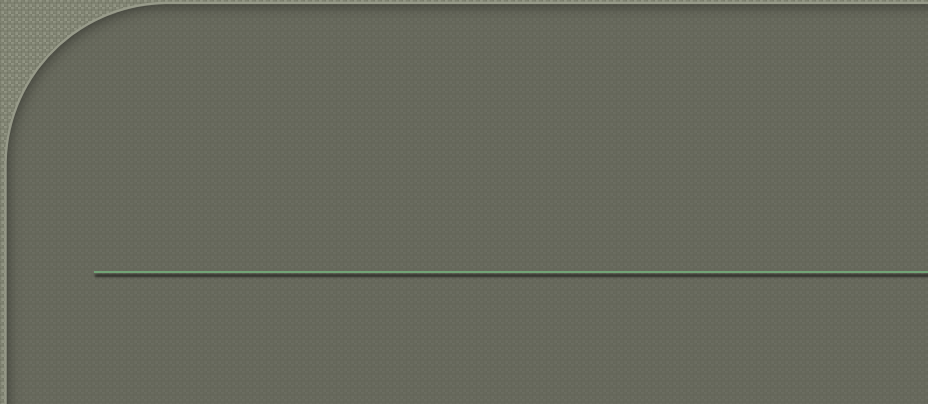
Create models with traffic volume, deer
abundance, and deer-vehicle collision
carcass data to predict how well crossings
are working at preventing collisions

Kernel Density Analysis



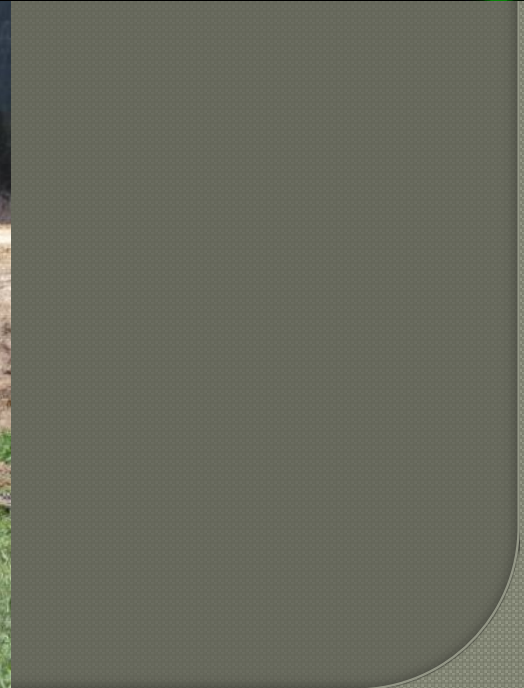
Photo credit: P. Cramer





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Pre-Construction and Control

Provides deer abundance estimates, success, repel, and parallel rates near roads with no crossing structures. They also show other animals nearby that may or may NOT use the crossings.



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Pre-Construction Results

Structure Camera Location	MP	Cam Days	Deer Per Day	Succes Cross	Succ Rate (%)	Repel Rate (%)	Paral Rate (%)
Bear Creek South	57	629	2.6	1662	98	1	1
McCalla Creek South	65	109	2.3	21	9	7	84
Sweathouse Creek	60	452	1.1	65	13	1	86
Big Creek	61	277	0.8	33	14	14	72
Mill Creek	55	599	0.07	1	3	0	97
Bear Creek North	58	536	0.03	2	14	14	72

Control Cameras

Preliminary Results

- Bell Crossing west camera, 3.2 deer/day, 2,833 successful crossings, 65% suc., 6% rep., 29% par.
- Bell East, 2.6 deer/day
- Big Creek, 1.2 deer/day
- McCalla Creek South, 1.1 deer/day

Post-Construction Preliminary Results

During this study, cameras recorded deer moving through structures on 15,455 occasions.

Bridges work best. Of the 8 most successful structures, 7 are bridges. High, wide, and cover.

Carnivores were observed on 2,540 occasions. These included black bear, puma, wolf, coyote, bobcat, red fox, raccoon, and skunk.

Post-construction Preliminary Results

Camera Location	MP	Succ Per Day	Success Cross	Succ Rate (%)	Repel Rate (%)	Paral Rate (%)
Bear Creek South (Bd)	57	4.4	1097	96	1	3
Big Creek (Bd)	61	2.2	1035	84	8	8
Dawn's Crossing (Bd)	70	1.9	3047	96	2	2
Sweathouse Creek (Bd)	60	1.9	869	92	3	5
Bass Creek Fishing Access (StCu)	70	1.5	2247	96	3	1
Kootenai Creek (Bd)	66	1.5	2050	91	4	5
McCalla Creek North (Bd)	66	1.2	1508	83	6	11

Blodgett Creek (Bd)	50	0.7	695	95	2	3
Indian Prairie Loop (CnCu)	63	0.6	367	24	8	68
Lupine (CnCu)	56	0.5	70	37	13	50
Mill Creek (Bd)	55	0.3	116	44	12	44
McCalla Creek South (Bd)	65	0.2	214	40	17	43
Bass Creek North (Bd)	71	0.15	229	52	7	41
Kootenai Springs Ranch (CnCu)	65	0.07	64	4	12	84

Preliminary Results

	S/D	Suc	Rep	
Par				
Bridges (12)	1.2	70%	8%	
22%				
Steel Round	0.8	50%	7%	
43%				
Culverts (2)				
Concrete (5)	0.2	18%	10%	
72%				
Box Culverts				
Control/Pre (11)	-	60%	8%	32%
20%				

Preliminary Findings

Fencing is important. Bridges without fencing had lower white-tailed deer success rates

Preliminary Findings

Height, Width, Cover, and Location are Important.



Preliminary Findings

Pre-construction monitoring showed that an existing bridge, Bear Creek South, was working well for white-tailed and mule deer, even though it was not designed as a wildlife crossing structure. Again, height, width, cover, and location are important.

The Bear Creek South bridge camera recorded over 1600 successes by white-tailed deer and 700 successes by turkeys in just 600 days. Black bear also moved under the bridge.

2.6 success per day

Success	98%
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Repel	1%
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Parallel	1%
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Preliminary Findings

A large, round, corrugated-steel culvert (18 feet high and wide) worked well for white-tailed deer.

The Bass Fishing Access culvert recorded 2247 successes by white-tailed deer, 150 by fox, 15 by coyote, 2 by puma, and 9 by black bear in 1498 days.

1.2 success per day

Success	96%
Repel	3%
Parallel	1%

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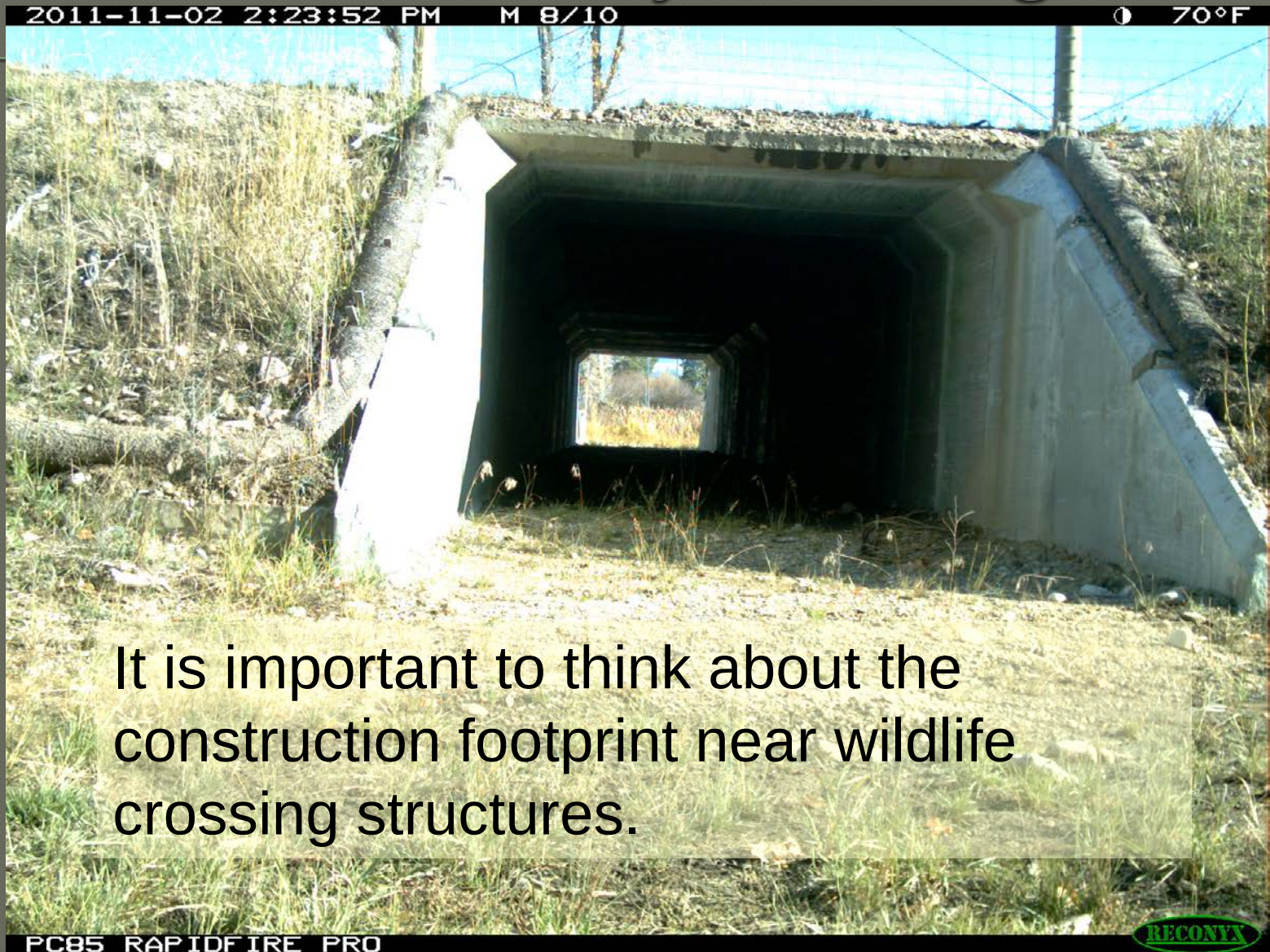
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Preliminary Findings



It is important to think about the construction footprint near wildlife crossing structures.

Preliminary Findings

Not all the animals out there are using crossing structures.

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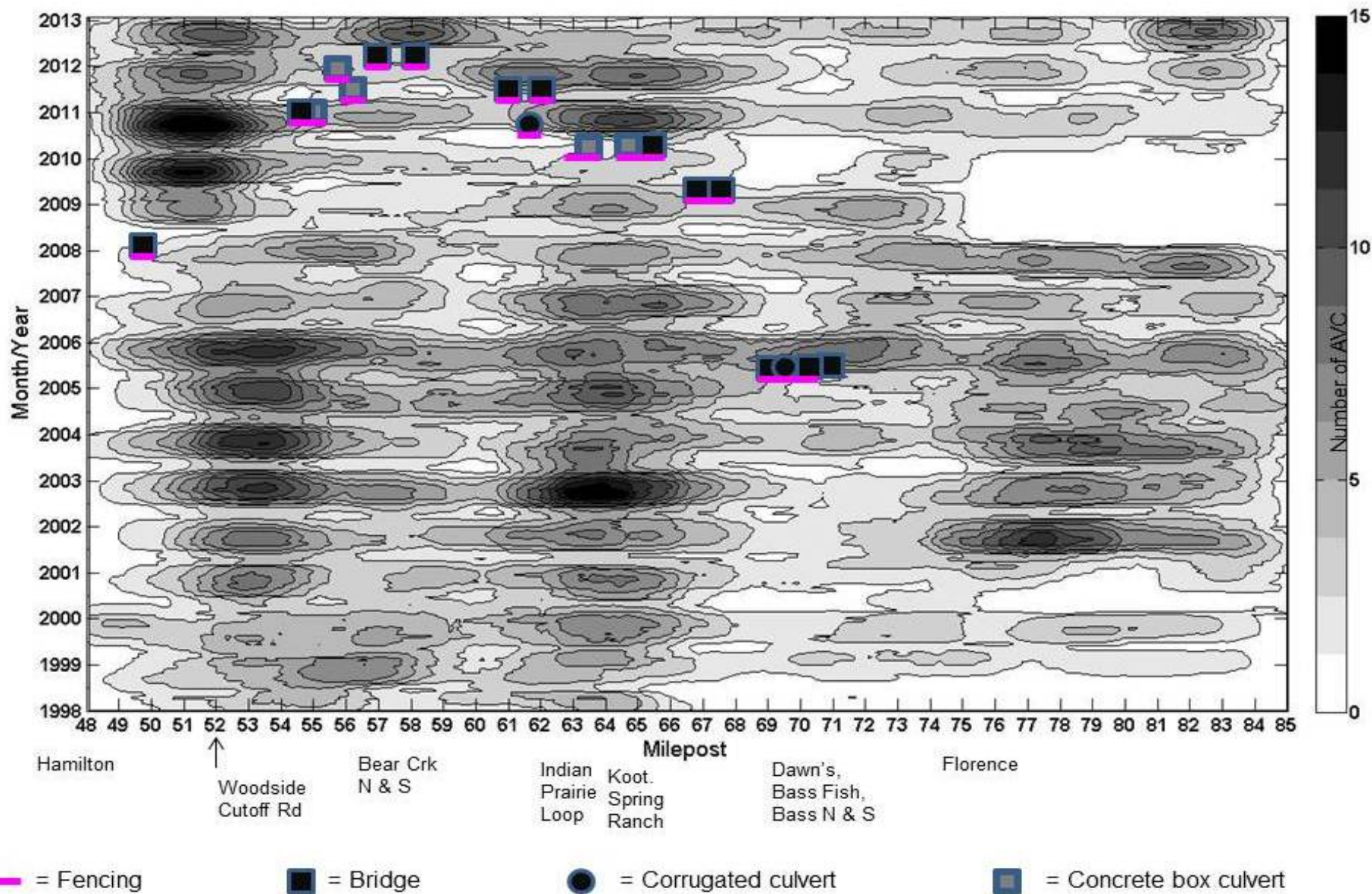
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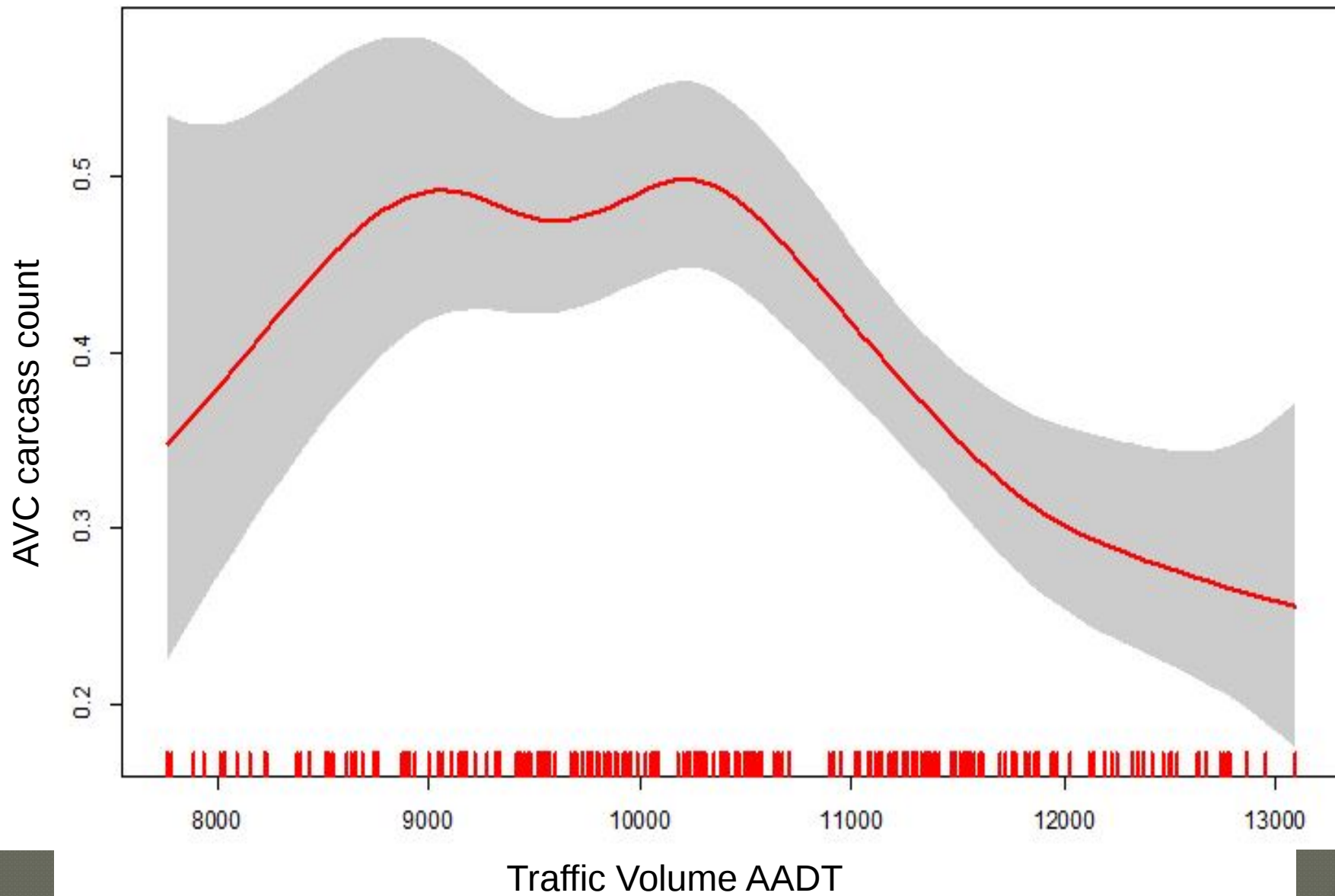


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Create models with traffic volume,
deer density, and deer-vehicle
collisions to predict how well
crossings are working at
preventing collisions



Future Work

Continue to monitor wildlife crossing structures into 2015.

Use multivariate statistics to determine relationships between white-tailed deer success and crossing structure features and landscape variables.

Build statistical models to analyze deer-vehicle collisions, and determine efficiency of wildlife crossing structures.

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