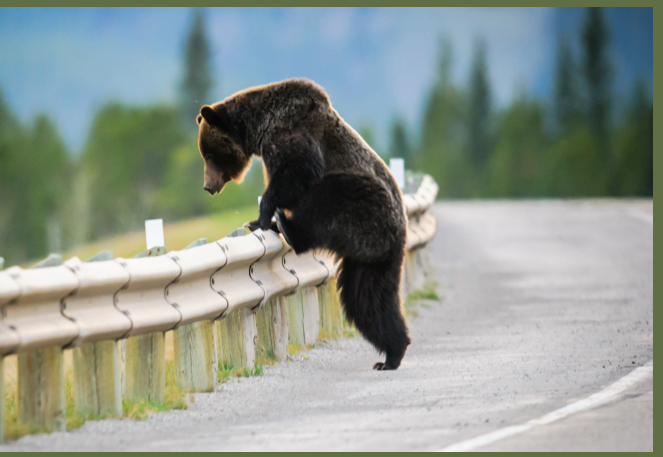


A Before-After-Control-Impact Study of Wildlife Fencing Along a Highway in the Canadian Rocky Mountains

Presenter

Tony Clevenger

Western Transportation Institute

Mitigation Technologies to Reduce Impacts

Mitigation Evaluations & Experimental Controls

RESEARCH ARTICLE

How Effective Is Road Mitigation at Reducing Road-Kill? A Meta-Analysis

Trina Rytwinski[1]*, Kylie Soanes[2¤], Jochen A. G. Jaeger[3], Lenore Fahrig[1], C. Scott Findlay[4], Jeff Houlahan[5], Rodney van der Ree[2], Edgar A van der Grift[6]

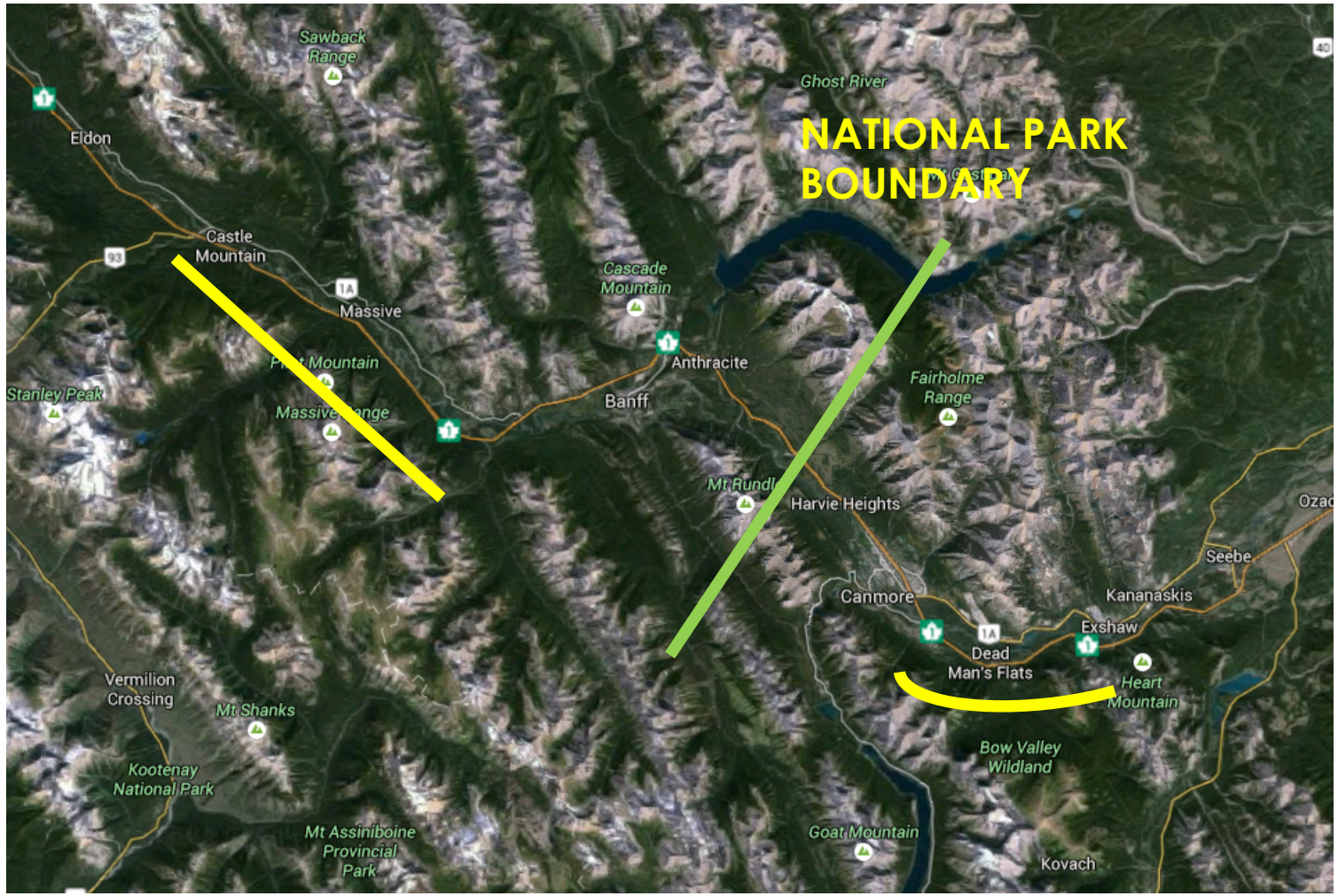
Bow Valley, Alberta, Canada

Purpose of Study

1. Compare WVC counts Before & After mitigation Treatment and Control sections – BACI design

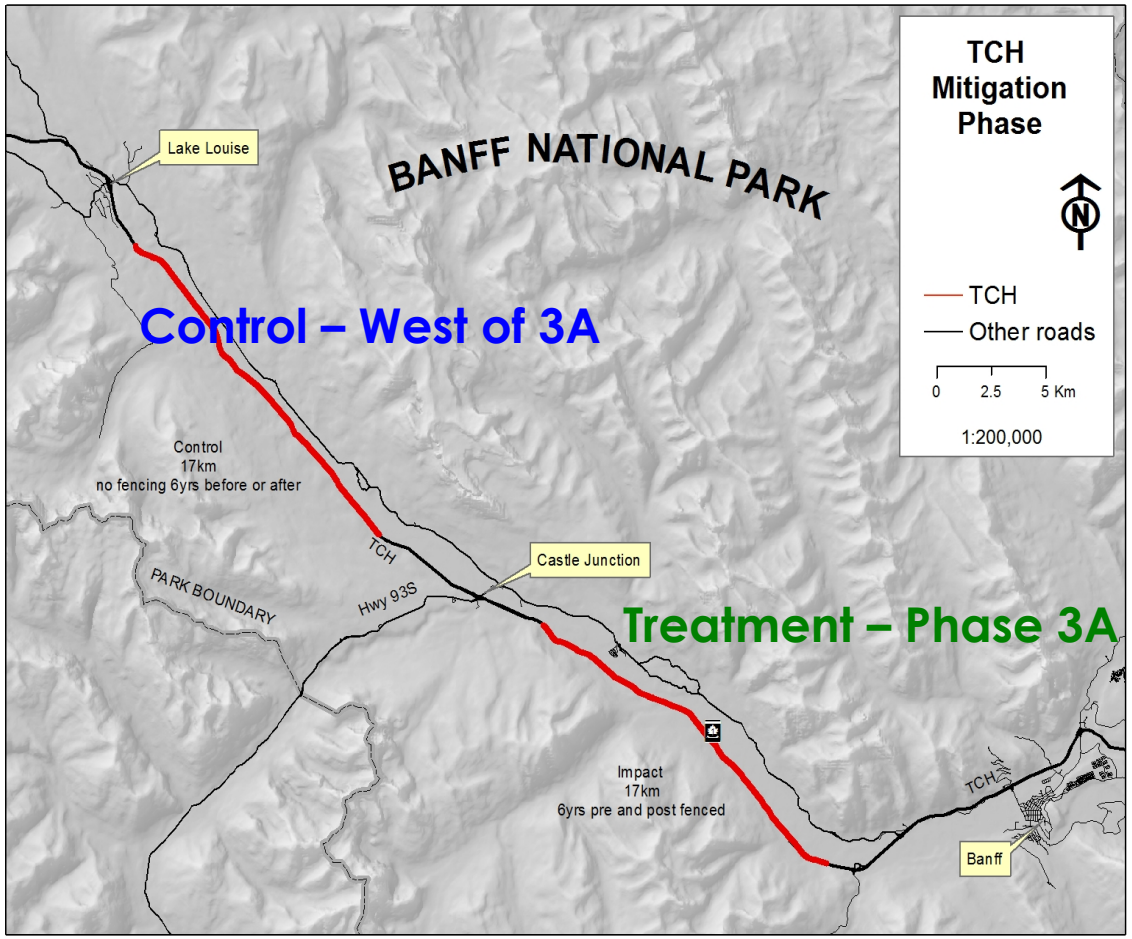
2. Determine cost savings from changes in WVCs using average monetary costs by species, (*Huijser et al. 2009*)

Two Study Areas



BACI Design

Before-After-Control-Impact



Banff NP

2 - 17 km sections

Treatment:

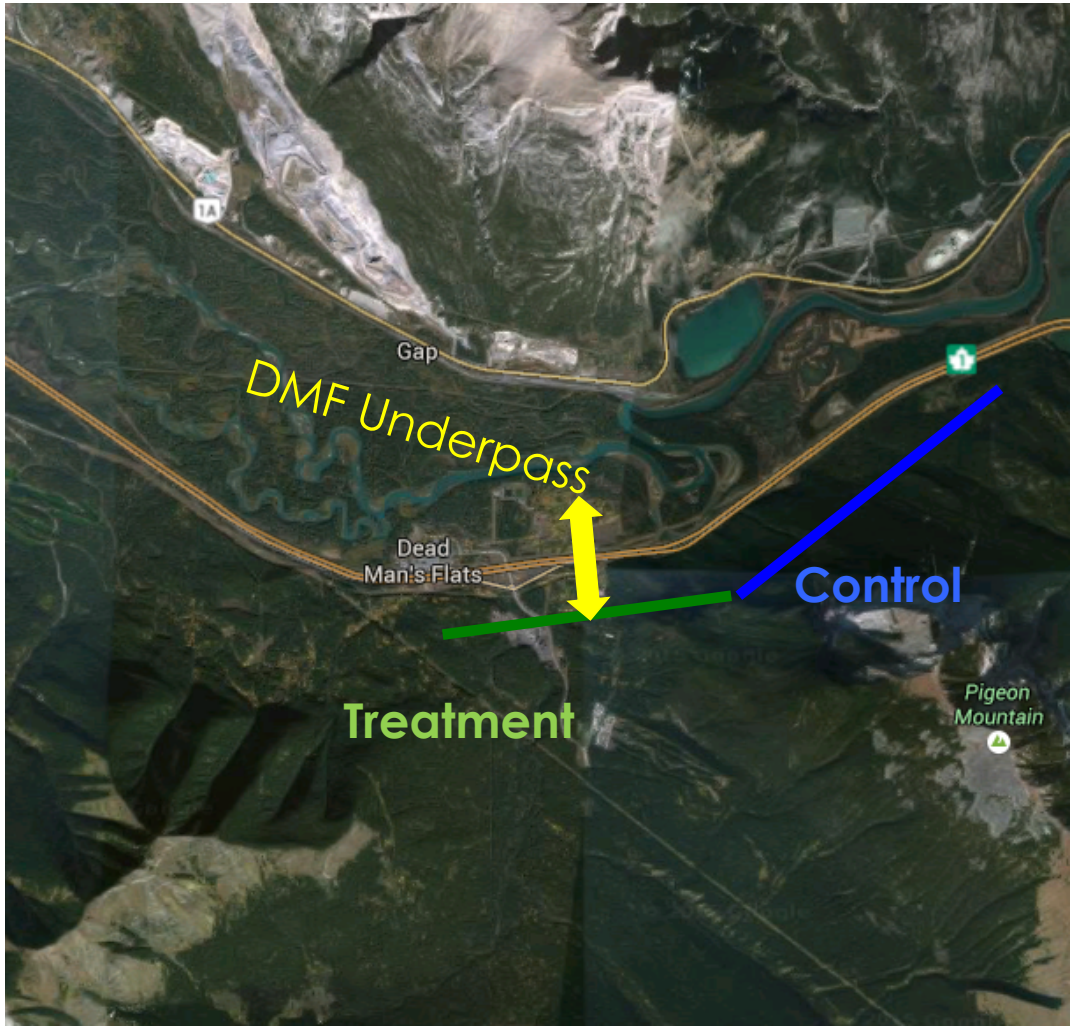
- Fencing 2.4 m
- 12 Underpasses

Control

- No fencing

BACI Design

Before-After-Control-Impact



Dead Man's Flats

2 - 3 km sections

Treatment:
- Fencing 2.4m
- 1 Underpass

Control
- No fencing

METHODS

Data collection:

WVC data collected year-round in both study areas

- Species, # individuals, UTM, Date

METHODS

Data analysis*:

6 years of WVC data Before & After mitigation
- Treatment & Control sections

Banff NP
PRE: 1988-1994
POST: 1997-2003

DMF
PRE: 1998-2003
POST: 2005-2010

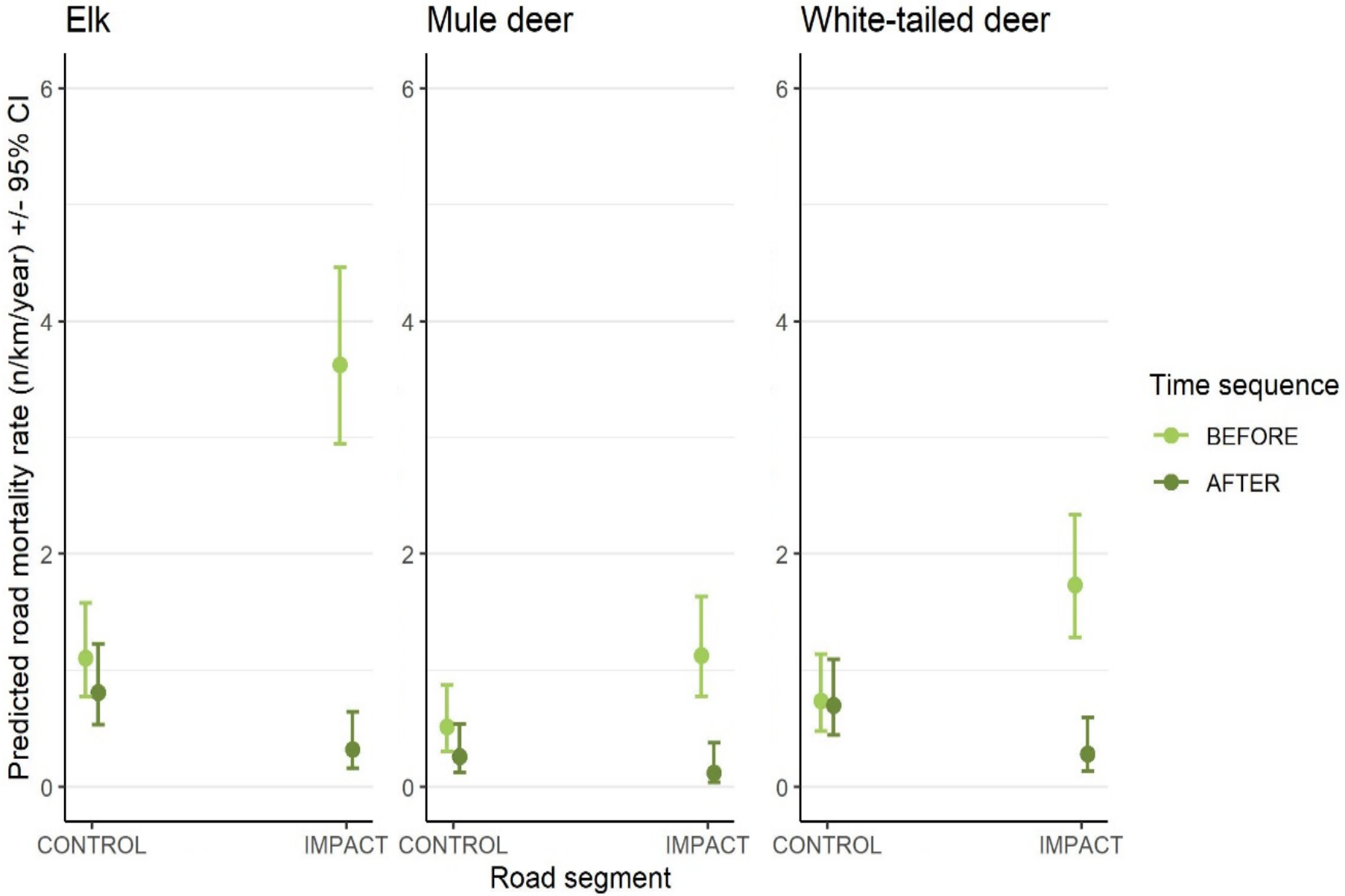
**Non-parametric*
Mann-Whitney U-tests

RESULTS

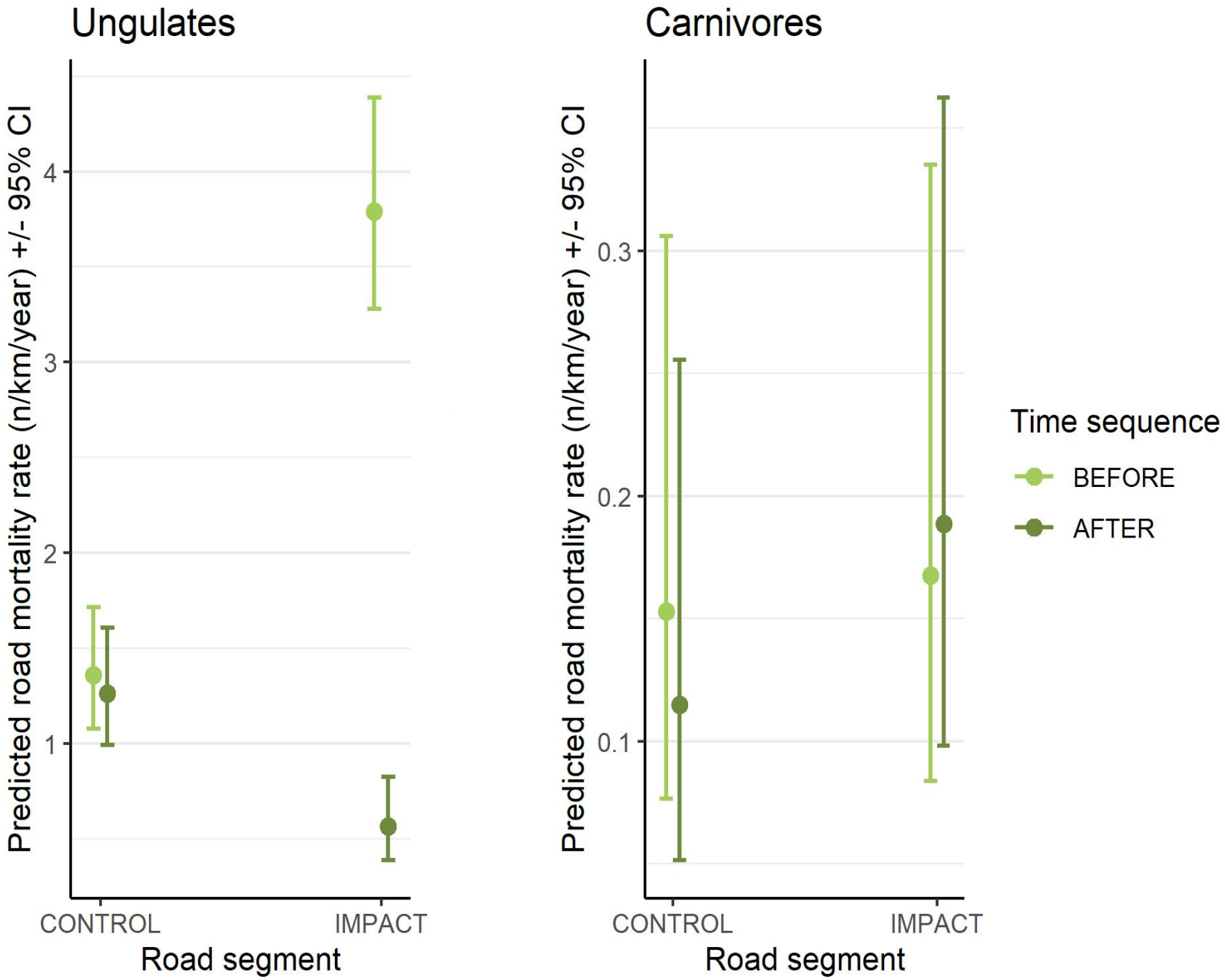
		Control		Impact	
Study area	Species	Before	After	Before	After
Banff	Black bear	0	2	2	2
	Cougar	0	0	0	0
	Unknown deer_spp	0	1	0	1
	Elk	18	14	57	2
	Lynx	0	0	0	0
	Moose	3	3	1	0
	Mule deer	10	6	23	1
	Sheep	0	0	0	0
	Unknown ungulate_sp	0	0	0	0
	Wolf	1	0	3	0
	White-tailed deer	9	8	16	0
Dead Man's Flats	Black bear	6	3	0	5
	Cougar	0	1	1	2
	Unknown deer_spp	4	11	5	7
	Elk	12	8	33	6
	Lynx	1	0	0	0
	Moose	0	0	7	1
	Mule deer	4	1	5	2
	Sheep	0	3	5	0
	Unknown ungulate_sp	0	0	2	0
	Wolf	0	0	2	0

Table 1: Summary of wildlife-vehicle collision data collected between 1988-2010. The duration and length of each road section and time sequence are described in the text.

RESULTS

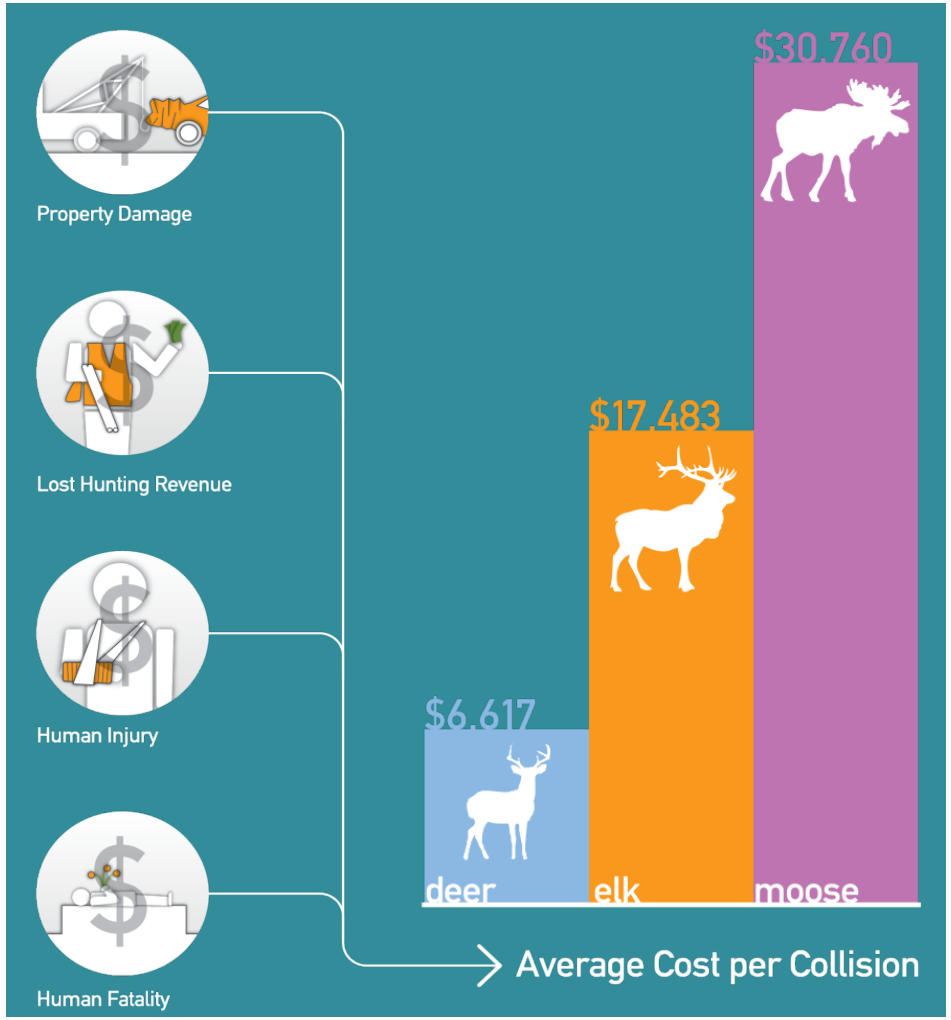

Elk
Mule deer
White-tailed deer
Predicted road mortality rate (n/km/year) +/- 95% CI
0
2
4
6
CONTROL
IMPACT
Road segment
Time sequence
BEFORE
AFTER

RESULTS


Ungulates
Carnivores
Predicted road mortality rate (n/km/year) +/- 95% CI
4
3
2
1
0.3
0.2
0.1
CONTROL
IMPACT
Road segment
Time sequence
BEFORE
AFTER

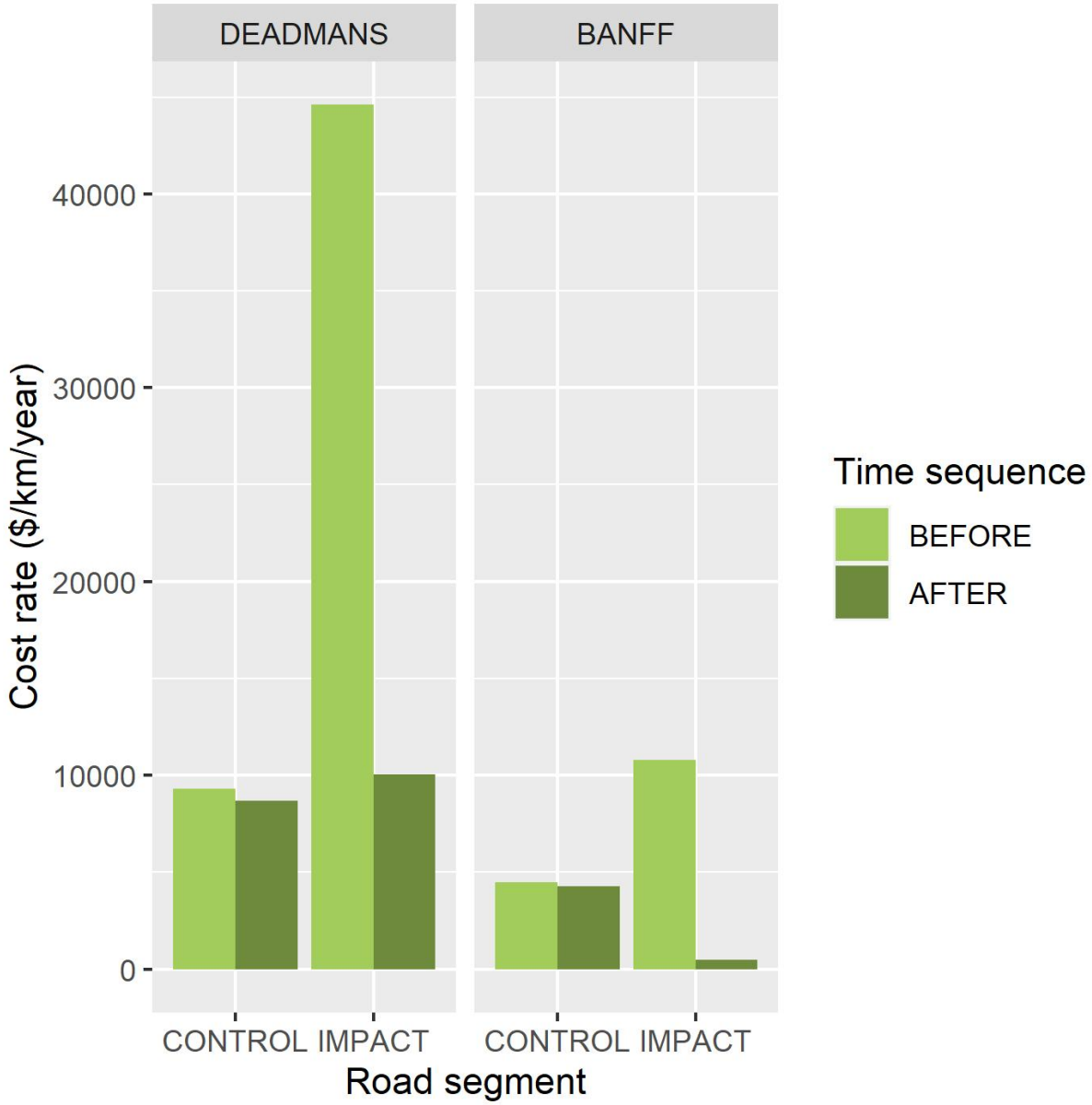
AVERAGE COST PER COLLISION

Description	Deer Dollars (2007)	Elk Dollars (2007)	Moose Dollars (2007)
Vehicle repair costs per collision	$2,622	$4,550	$5,600
Human injuries per collision	$2,702		$10,807
Human fatalities per collision	$1,002	$6,683	$13,366
Towing, accident attendance, and investigation	$125	$375	$500
Hunting value animal per collision	$116	$397	$387
Carcass removal and disposal per collision	$50	$75	$100
Total	$6,617	$17,483	$30,760



Huijser et al., Ecology and Society, 2009

Costs to Society



Summary and Conclusions

WVC REDUCTION:
Significant reductions in collisions for ungulates
No change in collisions with carnivores

COST-BENEFITS:
Societal-wide benefits of mitigation - < 2 years

CONCLUDE:
Fencing highly effective at reducing with ungulates

Summary and Conclusions

CARNIVORE ROADKILLS –
We found little effect of mitigation

Causes?

- Sample sizes
- Statistical power

Safety Perspective

- Carnivores low risk
- Loss of females will have per-capita effect

Summary and Conclusions

INVESTMENT RETURNS FROM HIGHWAY MITIGATION

Quick returns !! But with conditions….

1. Fence in high-risk areas

2. Spatial accuracy of WVC data is important

Summary and Conclusions

BACI STUDY DESIGN

Requirements:
Long-term monitoring of WVCs

Phased approach can be cost-effective
Target high-risk areas of WVCs

Summary and Conclusions

Fencing –

Multi-purpose tool for wildlife conservation

Effectively reduces ungulate-vehicle collisions

Research needed on carnivores and other taxa

Thanks to the PFS committee members for input and support

Efficacy and cost-savings of fencing and wildlife crossings to reduce wildlife-vehicle collisions in the Bow River Valley, Alberta Canada

Thank you for watching.

For more information, please go to

http://tpf-5-358-wvc-study.org