

US 93 Post-Construction Wildlife-Vehicle Collision and Wildlife Crossing Monitoring and Research

Project History and Work Plan

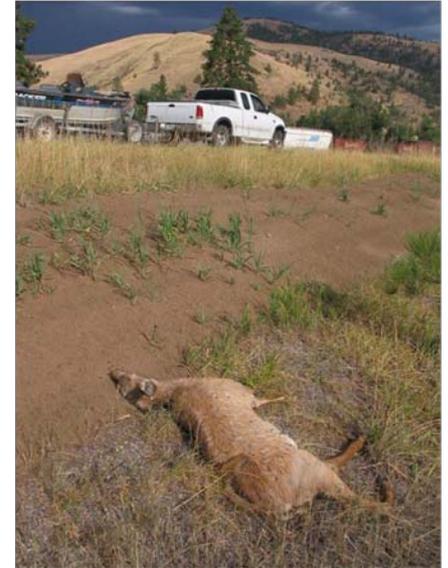
Marcel Huijser

Rob Ament

Whisper Camel*

Dale Becker*

*Confederated Salish and Kootenai Tribes



Funded by: Montana Department of Transportation and through UTC funds at WTI-MSU

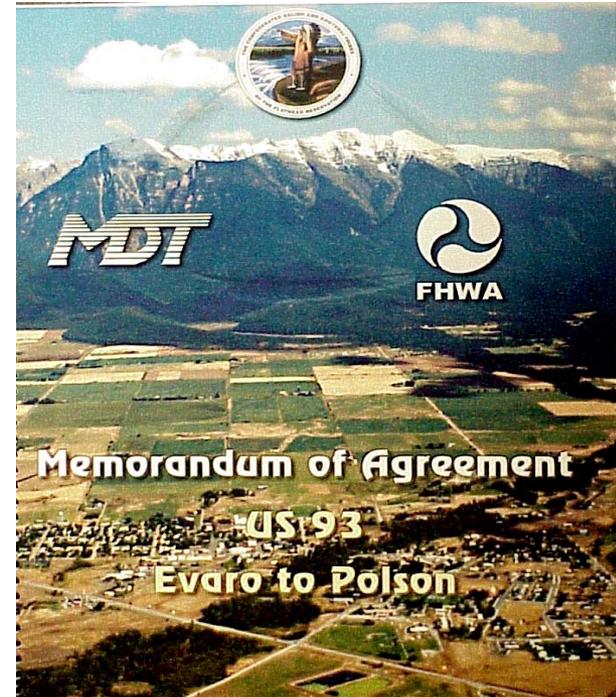
US93, Flathead Indian Reservation, Montana

Confederated Salish and Kootenai Tribes:

- “Road is a visitor”
- Respectful to land and “spirit of the place”
- Cultural values
- Natural resources

Transportation agency:

- Human safety



163 Killed • 4,992 Injured on Hwy 93
MDHS STATISTICS SINCE 1987

PLEASE BUCKLE UP!

TURN ON YOUR HEADLIGHTS • PASS WITH CAUTION

Your Health Is Our Concern...

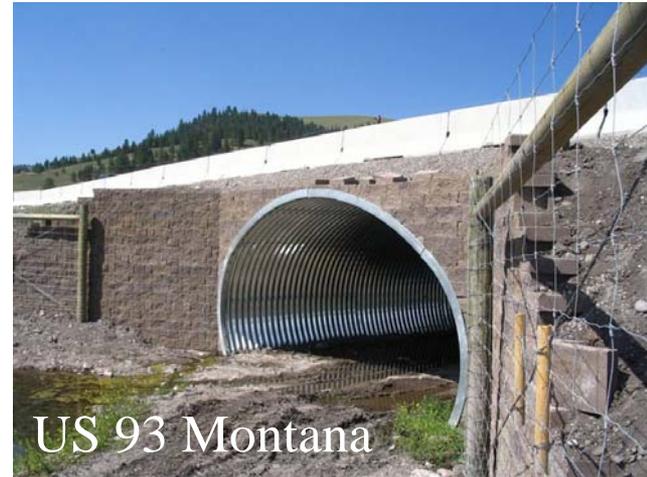


ST. LUKE COMMUNITY
HEALTHCARE NETWORK
Ronan, MT
The HEART of Healthcare in the Ronan Valley



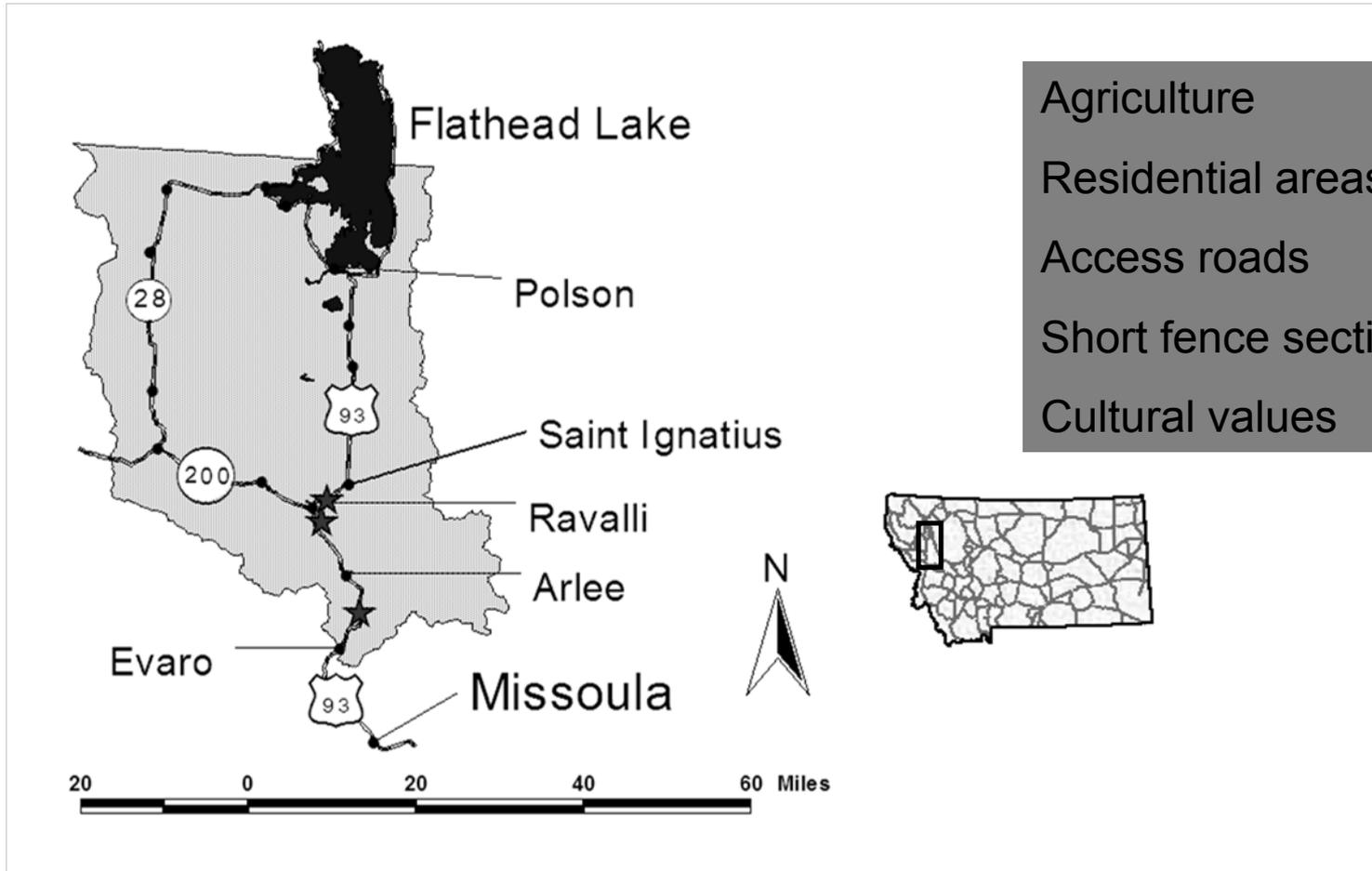
ABEL OUTDOOR

Fences in combination with crossing structures



Study area: US Hwy 93

56 mi



Previous Activities

Preconstruction research WTI-MSU (Hardy et al. 2007):

- Animal-vehicle collision (AVC) data
- Animal crossing (Xing) data
- Study design and sample size
- Measures of effectiveness



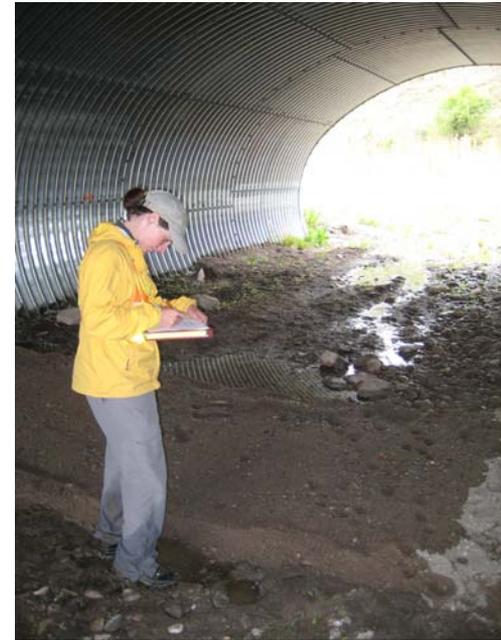
Additional activities:

- Black bear (Karin McCoy, University of Montana, MSc)
- Deer (Whisper Camel, Montana State University, MSc)
- Western painted turtle (Kathy Griffin, University of Montana, PhD)
- Traffic data
- Photo-monitoring railroad underpass



Since 2008

- Tiffany Allen (MSc student WTI-MSU)
 - Underpasses RC/RH
 - Wildlife jump-outs
 - Wildlife guards
- CSKT
 - Underpasses (RC/RH)
 - Isolated underpasses



Work Scope 2010-2015

- **Human safety:** reduction in wildlife-vehicle collisions
- **Maintaining habitat connectivity** for wildlife (deer (w-t and m) and black bear through the use of the wildlife crossing structures)
- **Cost-benefit analyses** for the mitigation measures.

Measures of Effectiveness

(page 18 in Work Scope)

Objectives

- Reduction in wildlife-vehicle collisions
- Maintain habitat connectivity for wildlife

When to call it a success?

- Agree on Measures Of Effectiveness (MOE)
- Set thresholds

Same conclusions/language used by all project partners

Management MOEs (safety or biologically based)

Expected reduction deer-vehicle collisions

- Literature: 87% reduction (79-99%)
- US93: 30% (16.6 mi out of 56 mi) fenced
- Expected overall reduction: 26%

Complications:

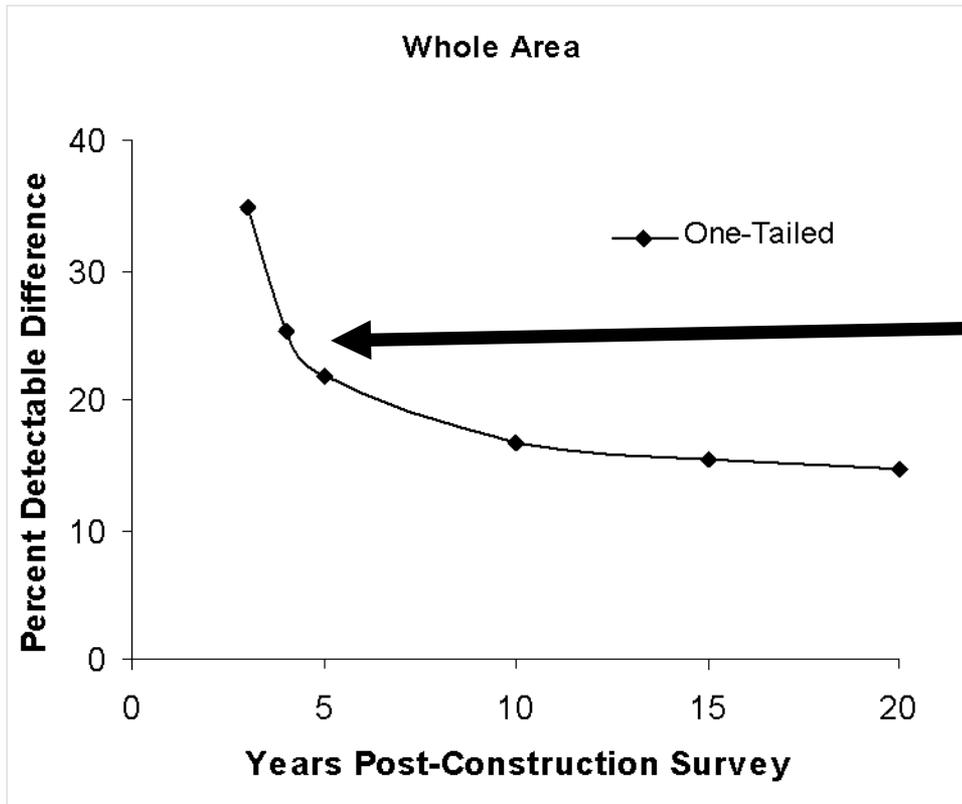
- Not homogenous distribution? ↑
- Many gaps ↓



Human Safety

If DVCs are reduced by at least 25% across the entire 56 mi long road section (fenced and unfenced road sections combined) using 4 years of post-construction monitoring data, the mitigation measures are considered to have sufficiently improved road safety along the entire corridor with regard to DVCs.

Power analyses (deer)



**4-5 years
monitoring
needed at a
minimum**

Human Safety

Ongoing data collection:

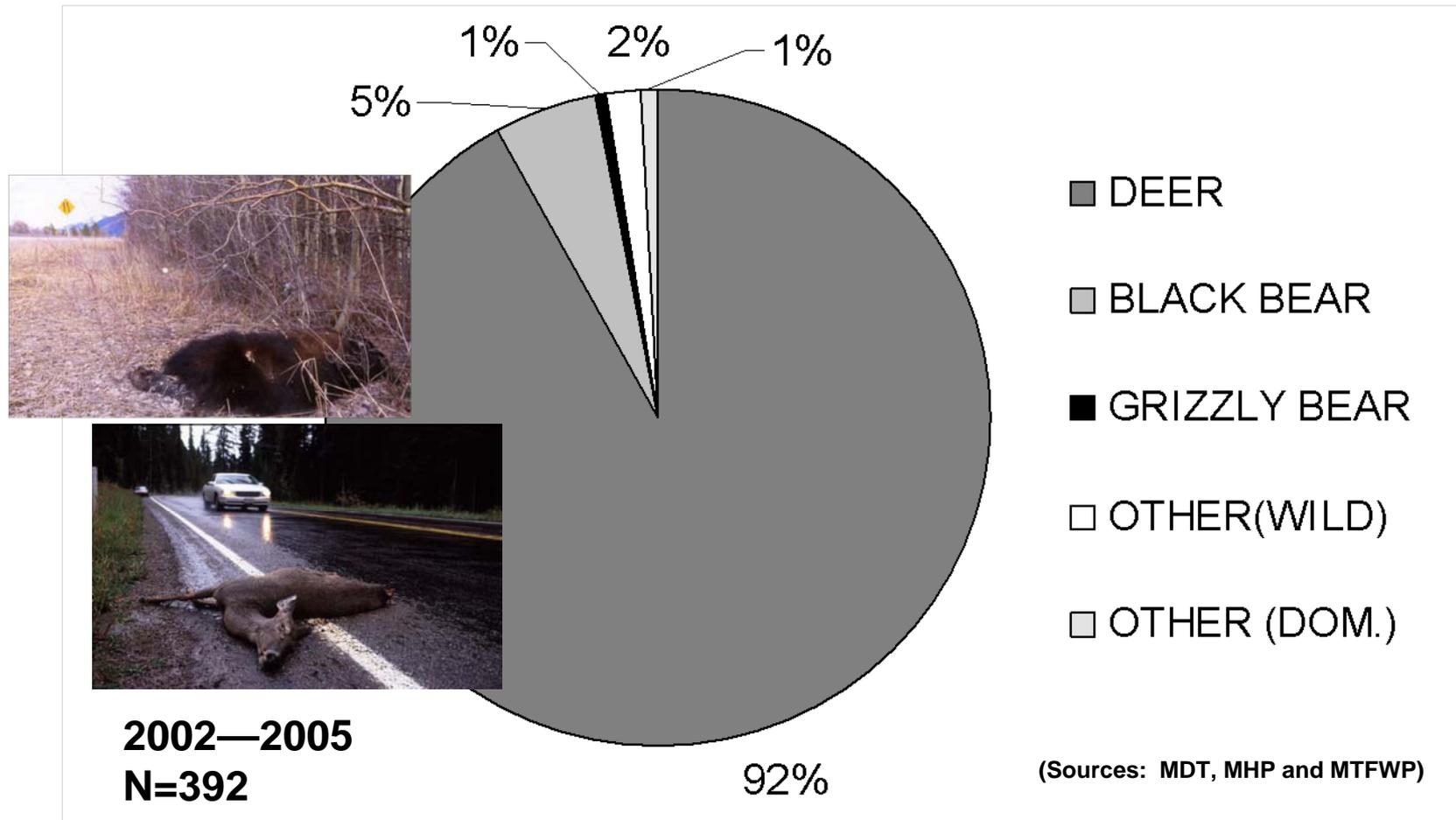
- MDT: carcass data
- MT Hwy Patrol: crash data
- FW&P: additional carcass data black bear



Comparison Before and After mitigation

- Adjust for fluctuations in population size
 - Deer pellet group counts
 - Collisions/traffic volume on other (unmitigated)roads

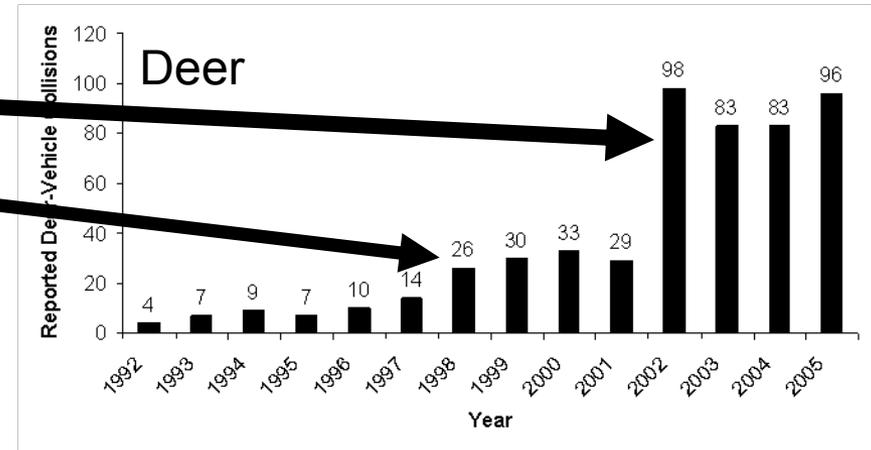
Road kill (animal-vehicle collision and carcass data)



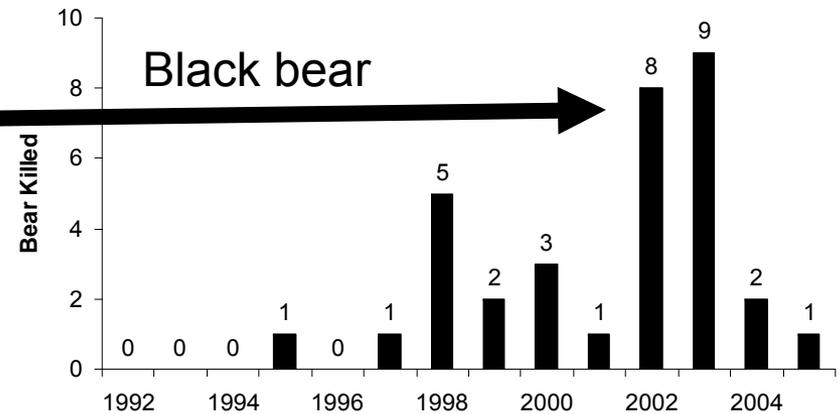
Deer and Black Bear road kill

2002/2003:
WTI and
MDT stress
importance
of reporting
AVC/AC

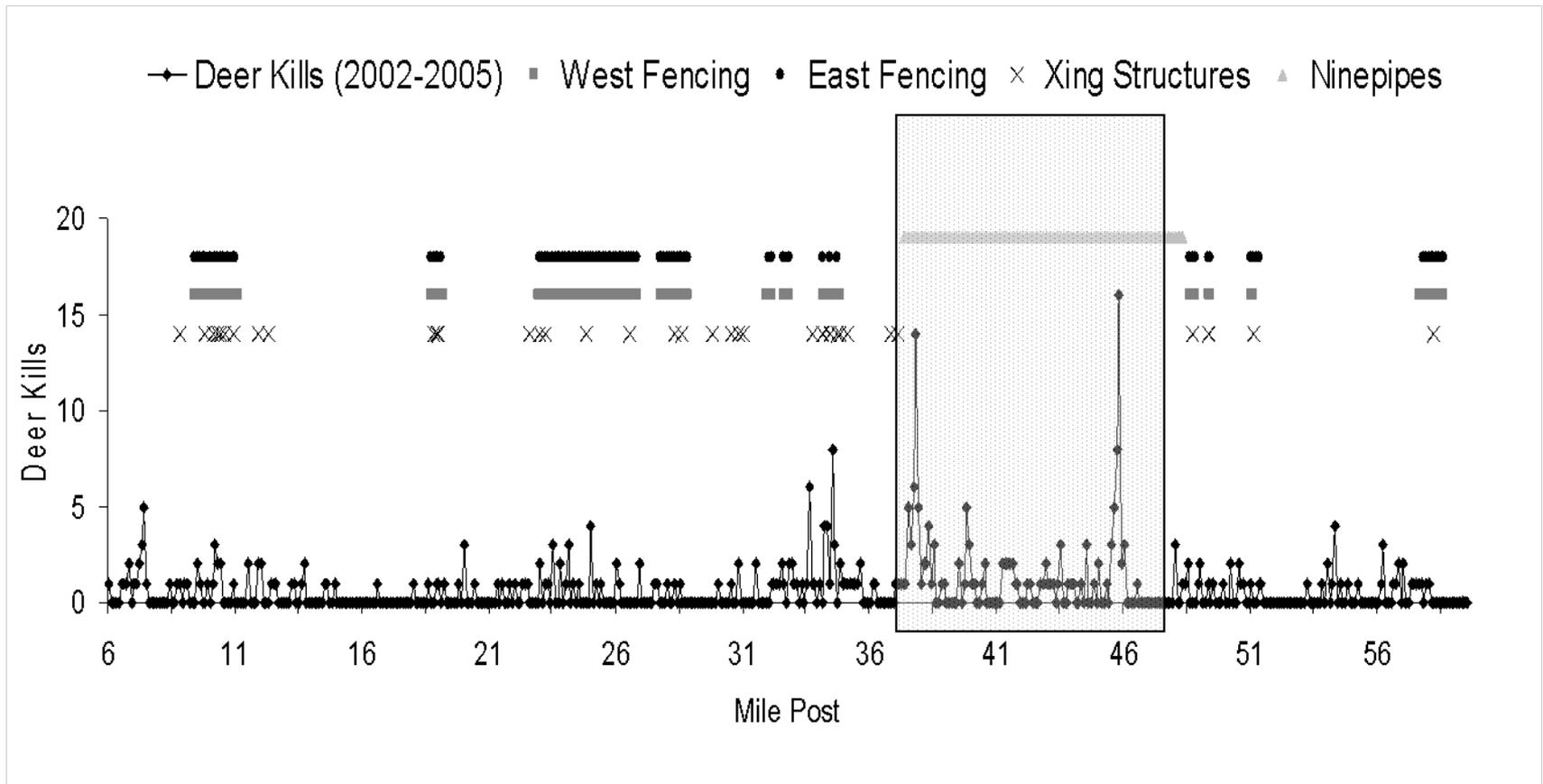
1998:
mandatory MDT
carcass
reporting



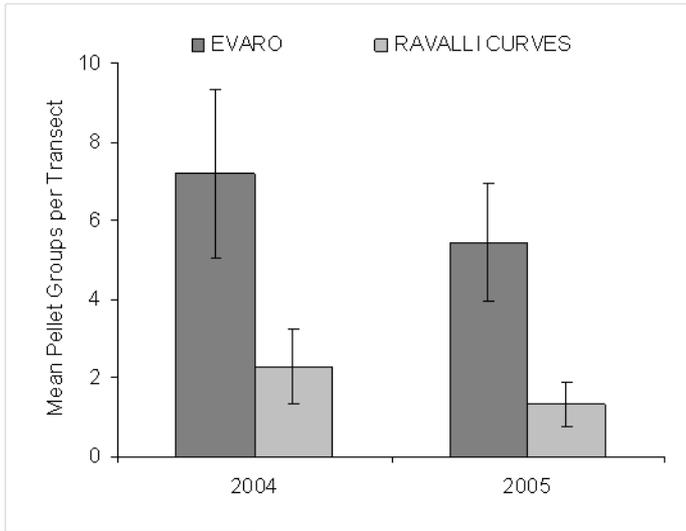
2002/2003:
Increased
search and
reporting
effort MSc
study



Location deer road kill and mitigation measures



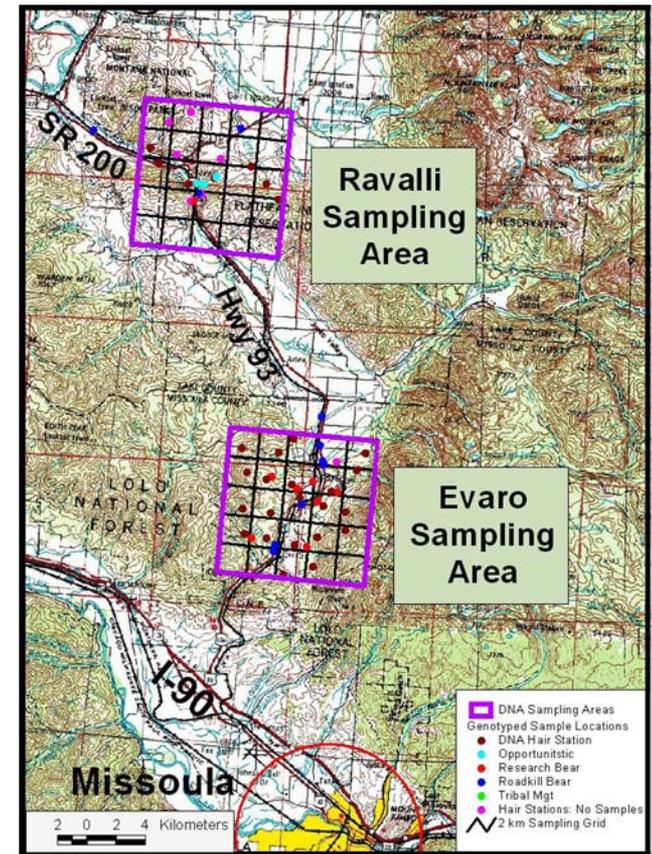
Control for population size/density



Deer:
pellet group
surveys



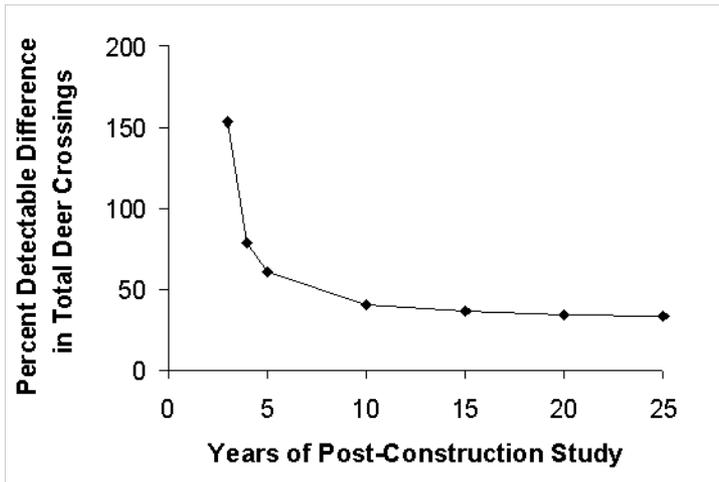
Black bear:
Hair snare
stations: DNA
(McCoy, 2005)



Maintaining Habitat Connectivity

If 1396-2068 (corresponding to the overall preconstruction DHC average plus and minus 2 SD) post-construction DHCs per year (yearly average over a 4 year period) are observed between June and October, across the three areas combined, the mitigation is considered to have resulted in similar number of deer movements across the road and is considered effective in terms of a management goal to maintaining such movements

Power analyses



Deer: 80% change
detectable after 4 years

Occurrence unlikely!

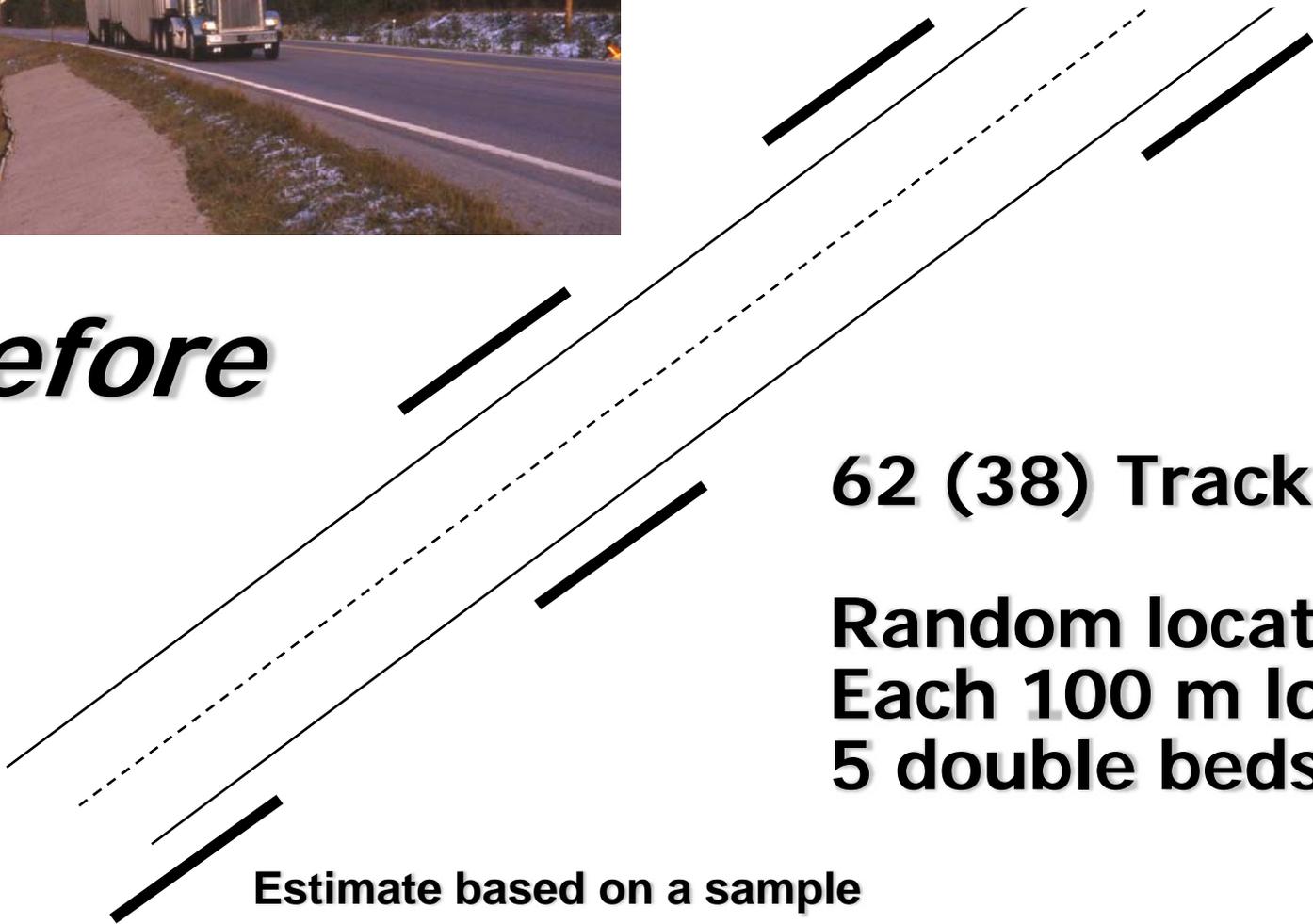


Black bear: 410% change
detectable after 4 years

Deer and black bear



Before



62 (38) Tracking beds

**Random locations
Each 100 m long
5 double beds**

Estimate based on a sample



Check and erase



Black bear

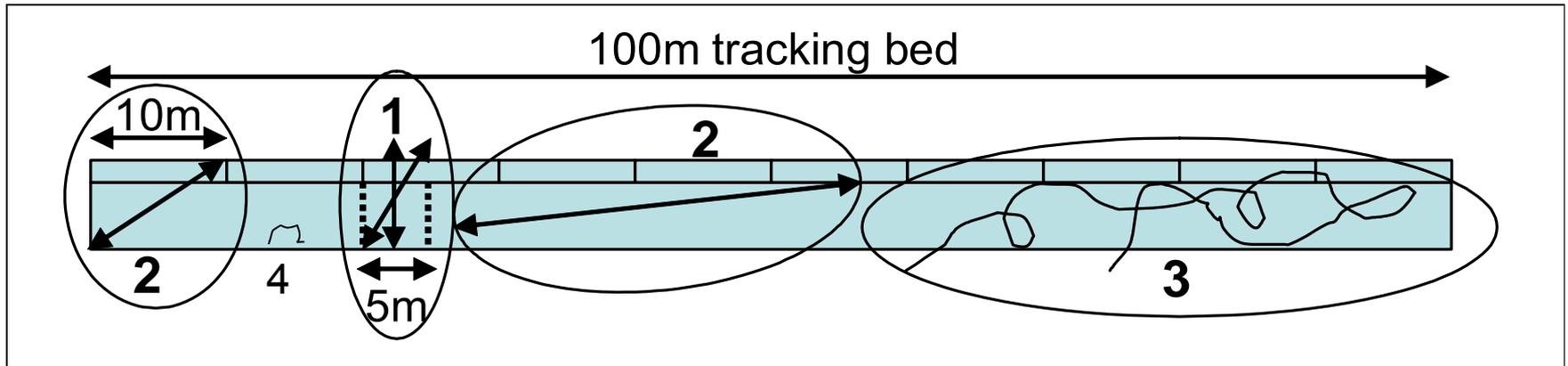


Deer

Twice a week

Jun-Oct

Classification of tracks

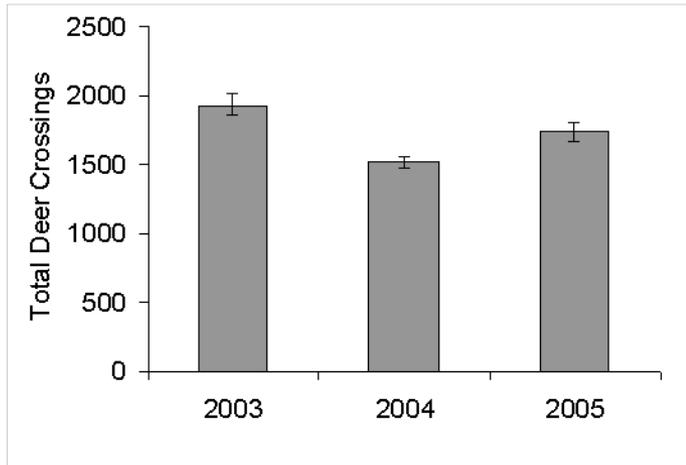


1 = Crossing

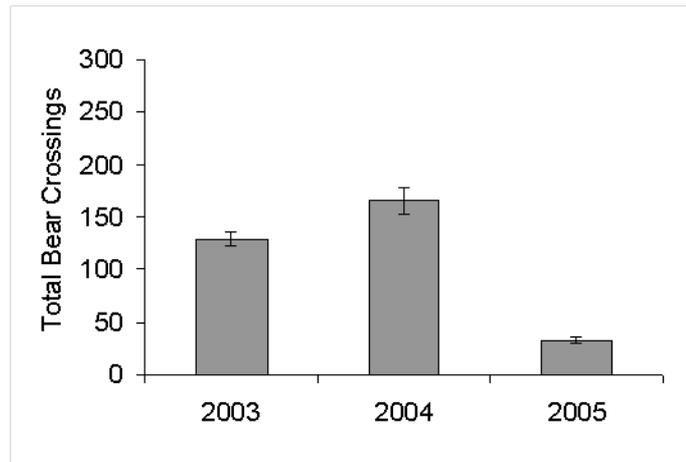
2, 3 = "Parallel" movements

4 = Presence

Crossings in the 3 areas (based on 38 tracking beds)



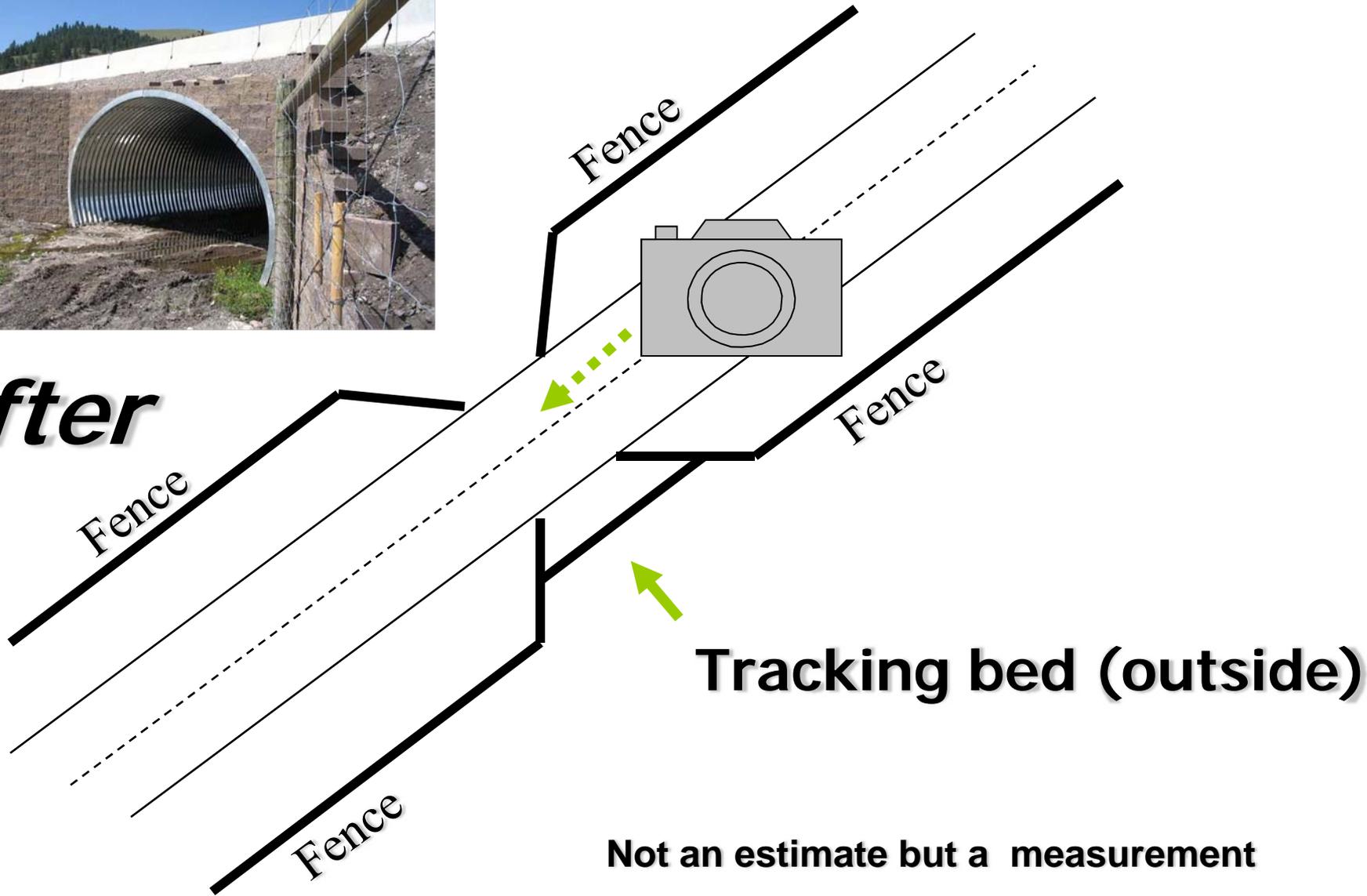
Deer



Black bear



After



Tracking bed (outside)

Not an estimate but a measurement

Sample Use Underpasses



Sample Wildlife Guards



Sample jump-outs



Field Work Schedule

Table 1: Number of years that data will be available for for the different road sections with continuous fencing. Note that the time periods relate to data collection only, excluding preparations, and data analyses and reporting.

Year	Evoro	Ravalli Curves	Ravalli Hill	Isolates structures
2008		Since May	Since May	*1
2009		X	X	*1
2010		X	X	Start in May
2011	Start in January	X	X	X
2012	X	End in May	End in May	X
2013	X			X
2014	End in December			End in May
2015				
Total	4 years	4 years	4 years	4 years

*1 = some isolated structures were monitored in 2008 and 2009 already by CSKT.

End date: 15 July 2015

Cost-Benefit Analyses

- Costs (specifically for US93):
Equipment, installation, construction, operation, maintenance, removal
- Benefits (update general estimates):
Reduced costs collisions

Benefits: Costs of collisions

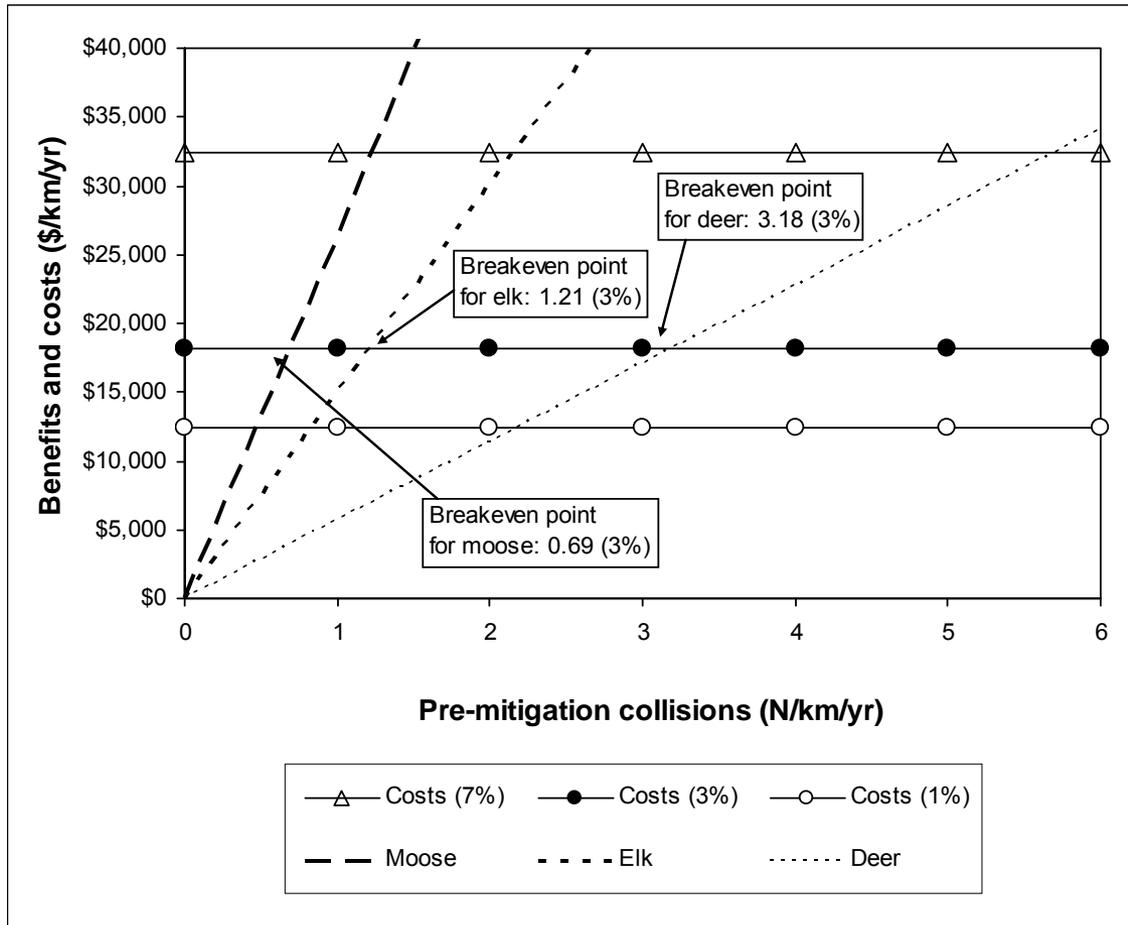
Description	Deer	Elk	Moose
Vehicle repair costs per collision	\$2,622	\$4,550	\$5,600
Human injuries per collision	\$2,702	\$5,403	\$10,807
Human fatalities per collision	\$1,002	\$6,683	\$13,366
Towing, accident attendance and investigation	\$125	\$375	\$500
Hunting value animal per collision	\$116	\$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

Cost-benefit analyses

- 75 year long period
- Discount rate: 1%, 3%, 7%

Break-even points (fencing, underpasses, jump-outs)



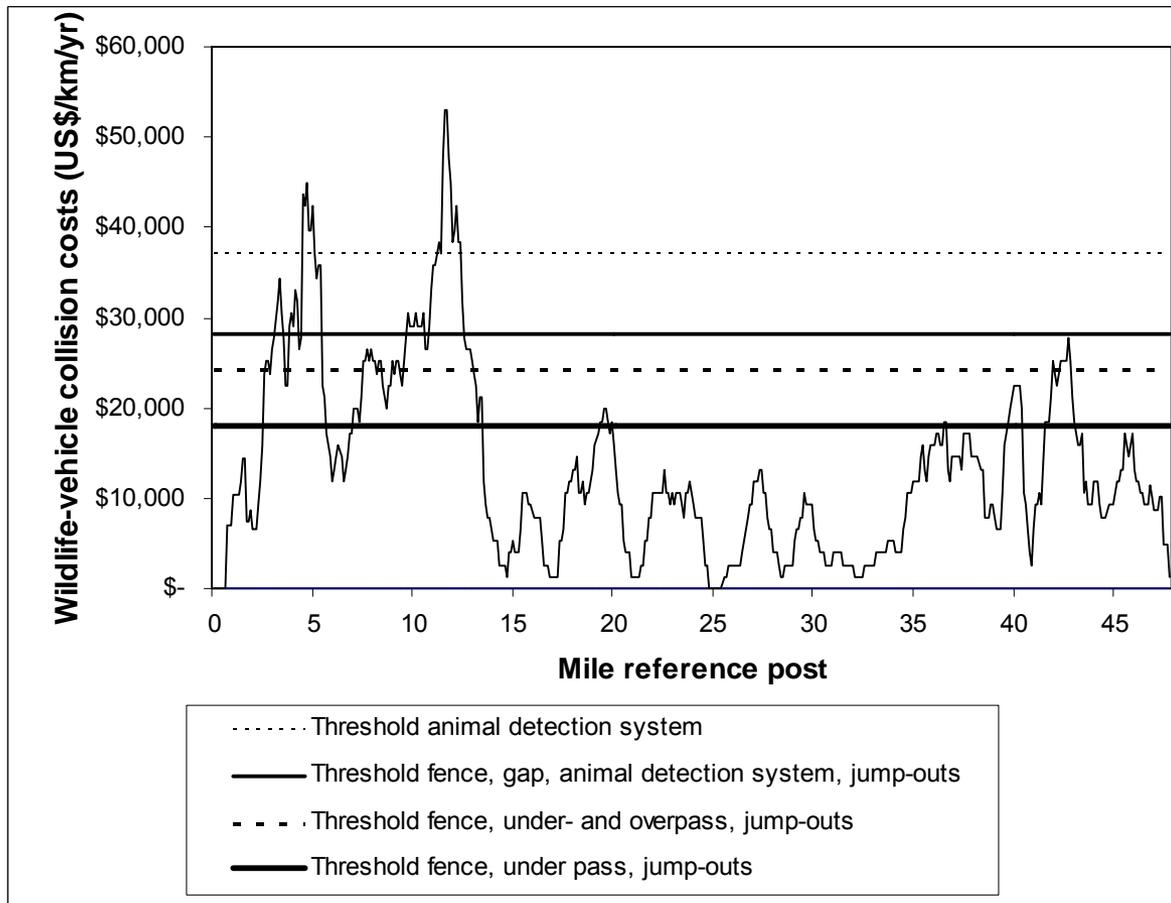
Huijser et al.,
Ecology and Society,
2009

≥80% reduction

Threshold values	Discount rate	Fence	Fence, under pass, jump-outs	Fence, under- and overpass, jump-outs	ADS	Fence, gap, ADS, jump-outs	Elevated roadway	Road tunnel
\$/yr	1%	\$5,223	\$12,437	\$15,975	\$35,279	\$25,634	\$2,233,094	\$3,328,567
\$/yr	3%	\$6,304	\$18,123	\$24,230	\$37,014	\$28,150	\$3,109,422	\$4,981,333
\$/yr	7%	\$8,931	\$32,457	\$45,142	\$41,526	\$34,437	\$5,369,961	\$9,246,617
deer/km/yr	1%	0.92	2.19	2.81	6.13	4.45	337.48	503.03
deer/km/yr	3%	1.11	3.18	4.26	6.43	4.89	469.91	752.81
deer/km/yr	7%	1.57	5.70	7.93	7.21	5.98	811.54	1397.40
elk/km/yr	1%	0.35	0.83	1.06	2.32	1.69	127.73	190.39
elk/km/yr	3%	0.42	1.21	1.61	2.43	1.85	177.85	284.92
elk/km/yr	7%	0.59	2.16	3.00	2.73	2.26	307.15	528.89
moose/km/yr	1%	0.20	0.47	0.60	1.32	0.96	72.60	108.21
moose/km/yr	3%	0.24	0.69	0.92	1.38	1.05	101.09	161.94
moose/km/yr	7%	0.34	1.23	1.71	1.55	1.29	174.58	300.61

Huijser et al.,
Ecology and Society,
2009

Example road section (MT Hwy 83, MT, USA)



Huijser et al.,
Ecology and Society,
2009

Questions

- Marcel Huijser
- E-mail: mhuijser@coe.montana.edu
- Phone: 406-543-2377

Table 12: Expectations for MDT.

1. Continue to collect carcass data with consistent search and reporting effort.
2. Allow the research to take place within the right-of-way of US 93 for the duration of the project and beyond, should additional funding from other sources allow for longer term research.
3. Dump sand at 4 underpasses for tracking beds outside 4 underpasses. WTI will distribute the sand on the actual tracking beds.
4. Install tracking bed on center of the wildlife overpass.
5. Install tracking beds on top and bottom of all the jump-outs in the <u>Evano</u> section that has continuous fencing.
6. Assist with/allow installation of wildlife cameras at underpasses, overpass, wildlife guards and potentially fence ends and in right-of-way of US 93.
7. Provide crash and carcass the data for US 93 for the previous calendar year by 1 March. For example, data from 2009 (and previous years) are requested to be received by 1 March 2010.
8. Provide actual cost data for the design, implementation and maintenance of the mitigation measures along US 93 as available when requested.
9. Should major vandalism or theft occur with essential research equipment (e.g. cameras), WTI and MDT will have to reconsider the research methods, associated budgets and if and how to proceed with the project.

Safety Requirements

- Safety vest (color/striping?)
- Safety helmet?

Potential Additional Funding Sources

- USFWS Tribal Wildlife Grant Program
- WTI fellowship for MSc student 2010-2012
- Federal Highway Administration
- Private Foundations

Schedule Field Trip May 2010