

Traffic Considerations

Capacity Building for MEGD Staff
in Relation to Biodiversity and
Conservation in the Southern
Gobi Desert

Funded By

- European Bank for Reconstruction and Development



In Cooperation With

- Mongolian Ministry of Environment and Green Development



Project Led by

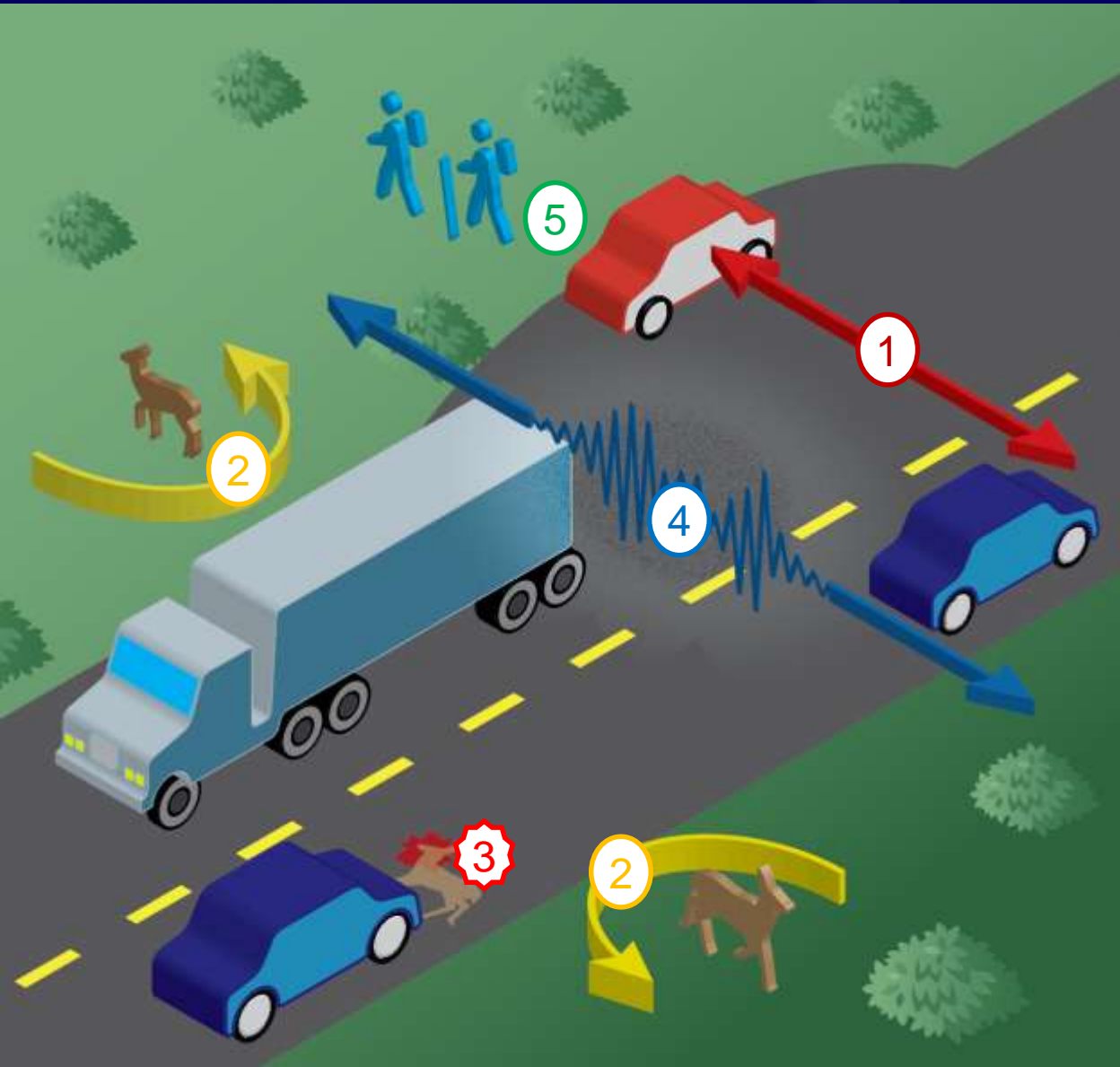
- The Nature Conservancy



Focal Species Movement

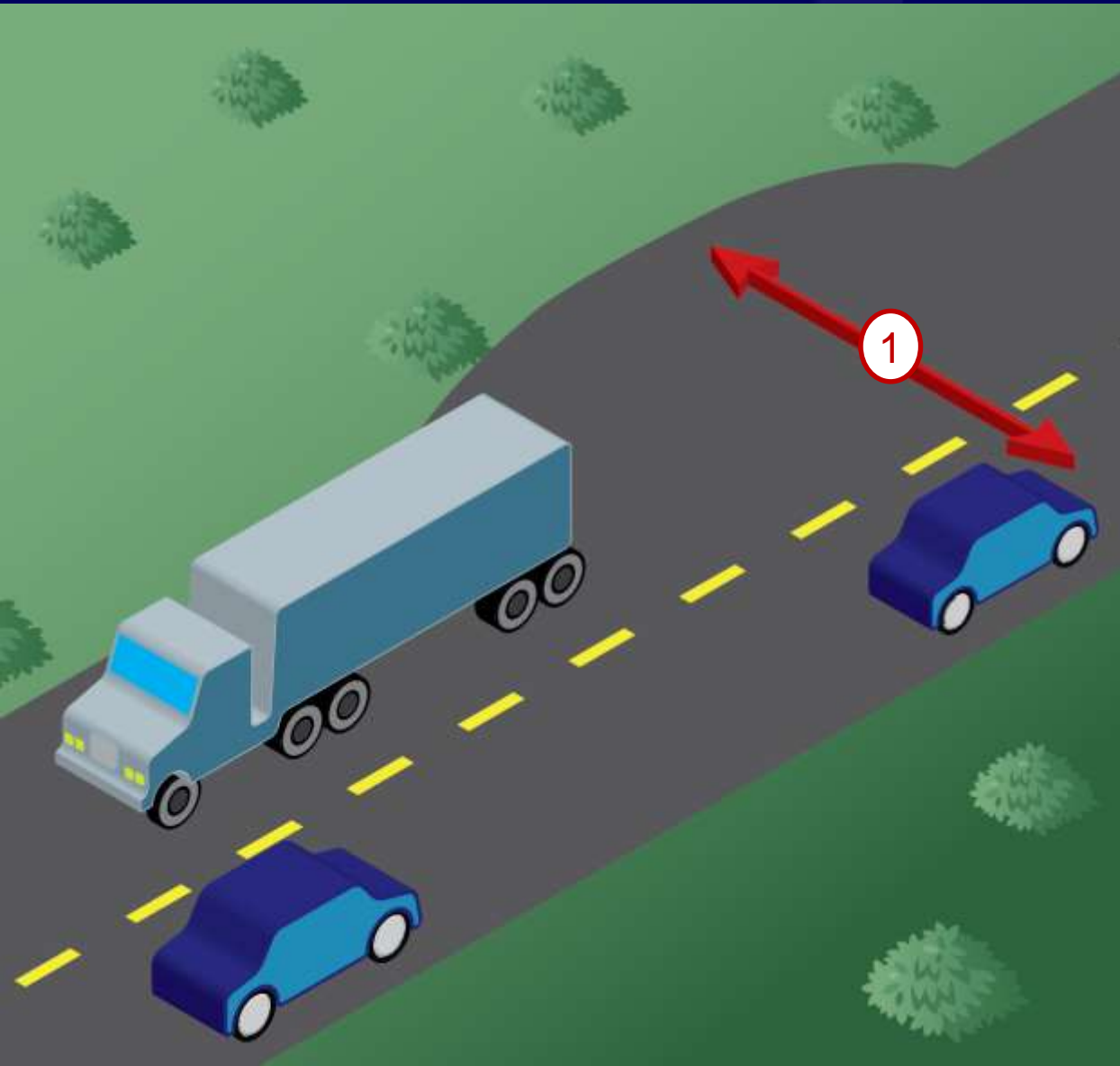
- Khulan / Asiatic Wild Ass (*Equus hemionus*)
 - Home range in South Gobi 18,000 to 70,000 km²
 - Moving along barrier 12 km per day (Kaczensky 2011)
- Black-tailed / goitered gazelle (*Gazella subgutturosa*)
 - Home range 14,000-32,000 km² annually (Olson et al. 2010)
 - Can move 10-30 km per day in the winter (Mallon & Kingswood 2001)
- Both
 - “Nomadic” movements, not necessarily predictable in space or time (Olson et al. 2010, IUCN 2013, Ito et al. 2013)

Impacts of Roads on Wildlife



- ① Loss of wildlife habitat
- ② Barrier effect
 - a. Infrastructure
 - b. Traffic
- ③ Road mortality
- ④ Decrease in habitat quality
- ⑤ Increased human access (secondary)

Impacts of Roads on Wildlife



1 Loss of wildlife habitat

Barrier effect
a. Infrastructure
b. Traffic

Road mortality

Decrease in habitat quality

Increased human access (secondary)

Impacts of Roads on Wildlife



Loss of
wildlife habitat

- 2 Barrier effect
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Impacts of Roads on Wildlife



Loss of
wildlife habitat

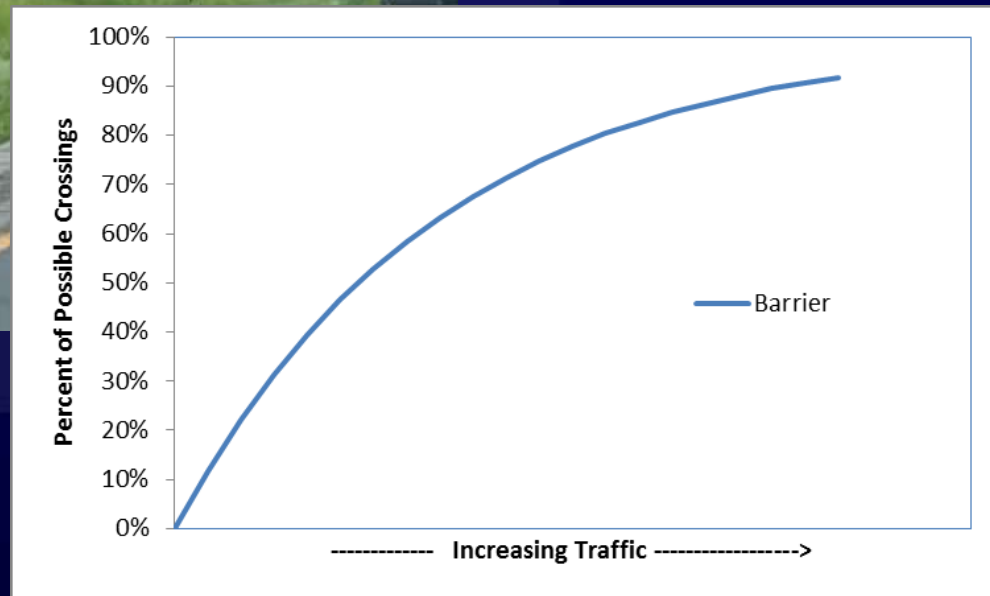
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Road mortality

Decrease in
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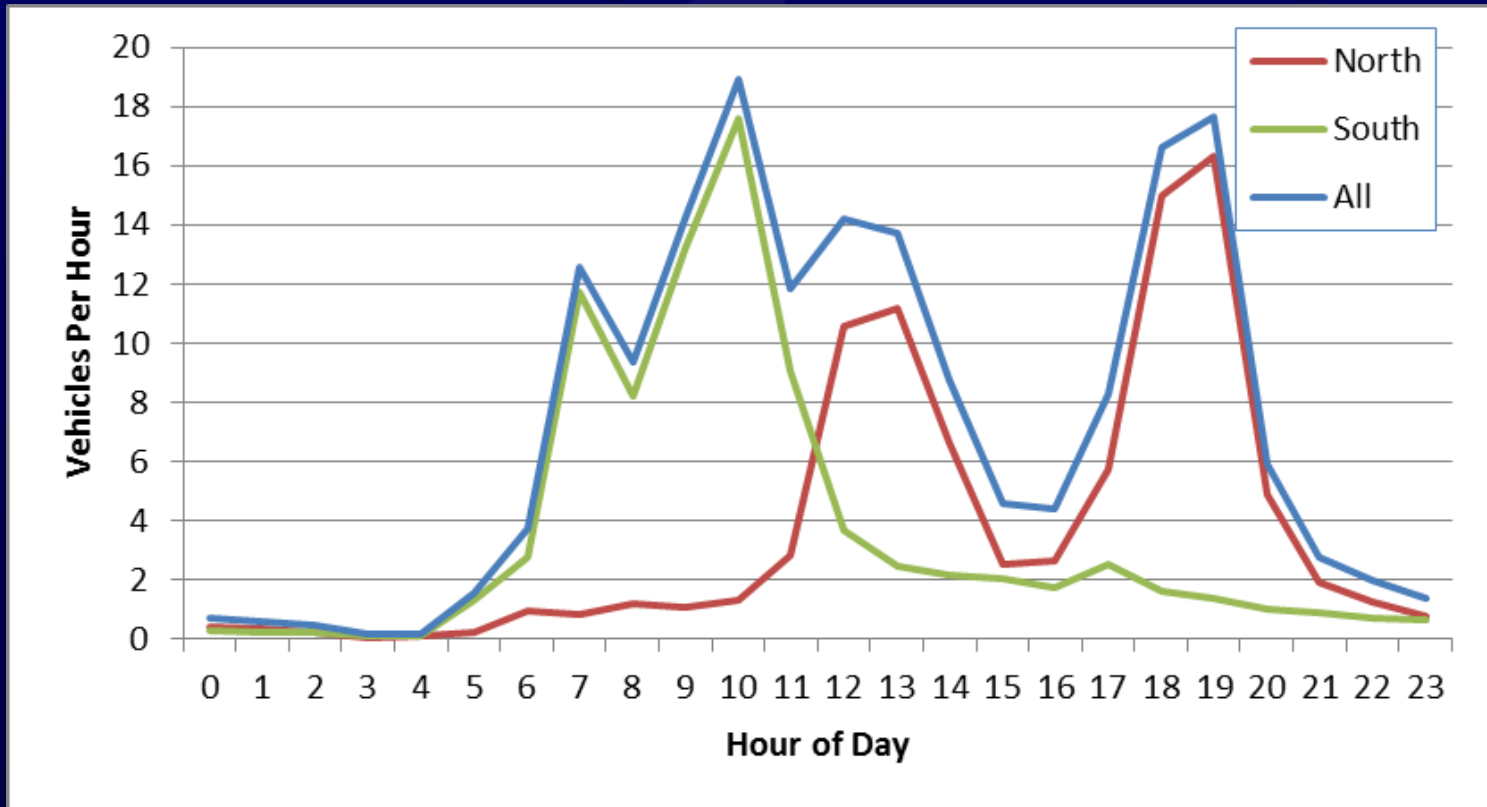
Traffic Creates Barrier



Traffic Creates Barrier

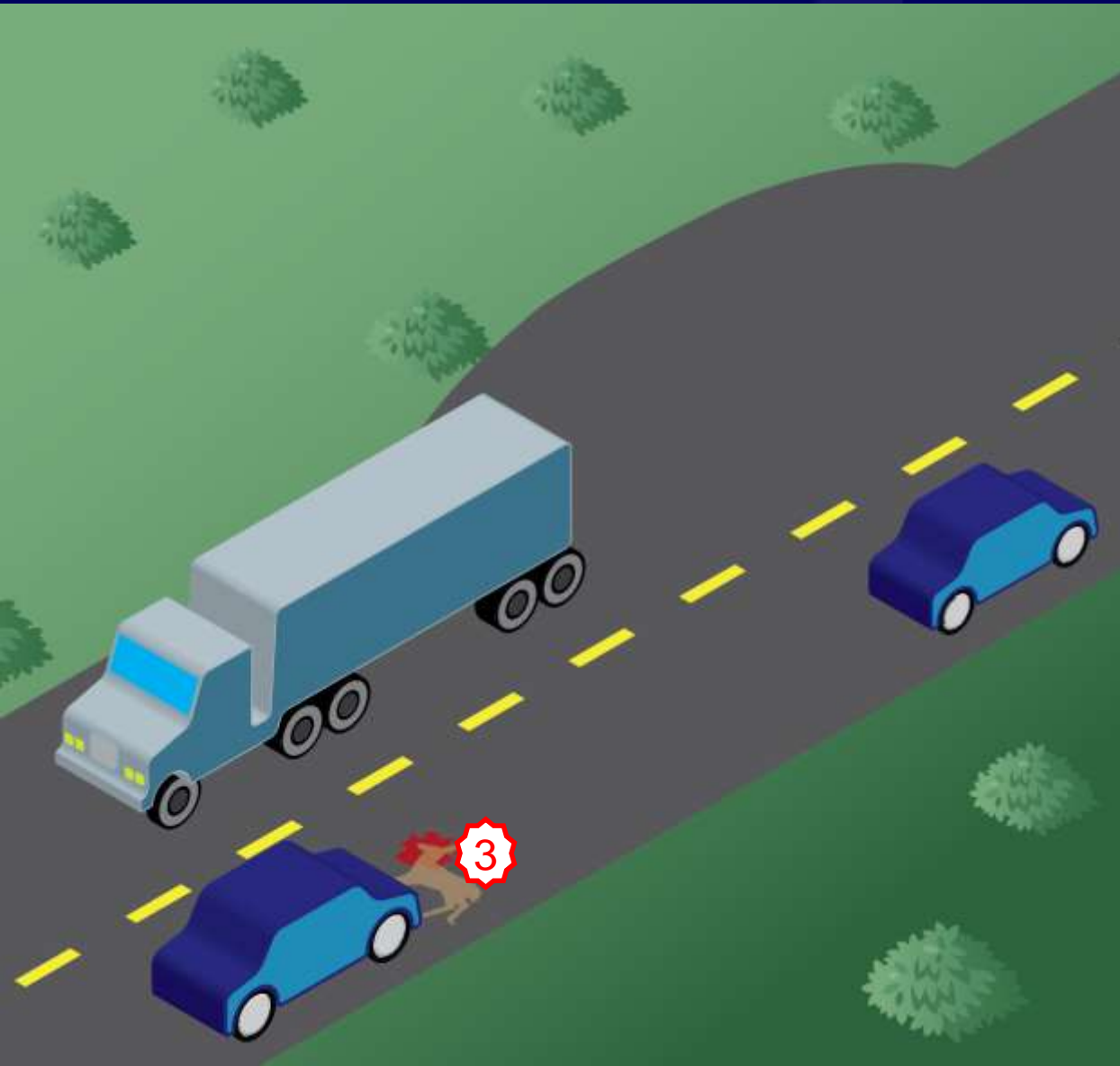
- Common metric is vehicles per day (vpd)
- North American Ungulates
 - 200 vpd increase vigilance (Gavin and Komers 2006)
 - 2,000 vpd noticeable barrier (Sawyer & Rudd 2005, Clevenger & Huijser 2011)
 - 4,000 vpd strong barrier (Mueller & Berthoud 1997)
 - 10,000 vpd near total barrier (Dodd et al. 2011)
- Khulan (TBC and FFI 2011)
 - 400 vpd serious barrier
 - 1,000 vpd complete ecological barrier
 - Note: based on assumptions about khulan, 1 km avoidance and traffic gaps

Traffic by Time of Day



Daily Distribution of Traffic on OT-GS Road
Near OT Mine Site (Data Source: Oyu Tolgoi)

Impacts of Roads on Wildlife



Loss of
wildlife habitat

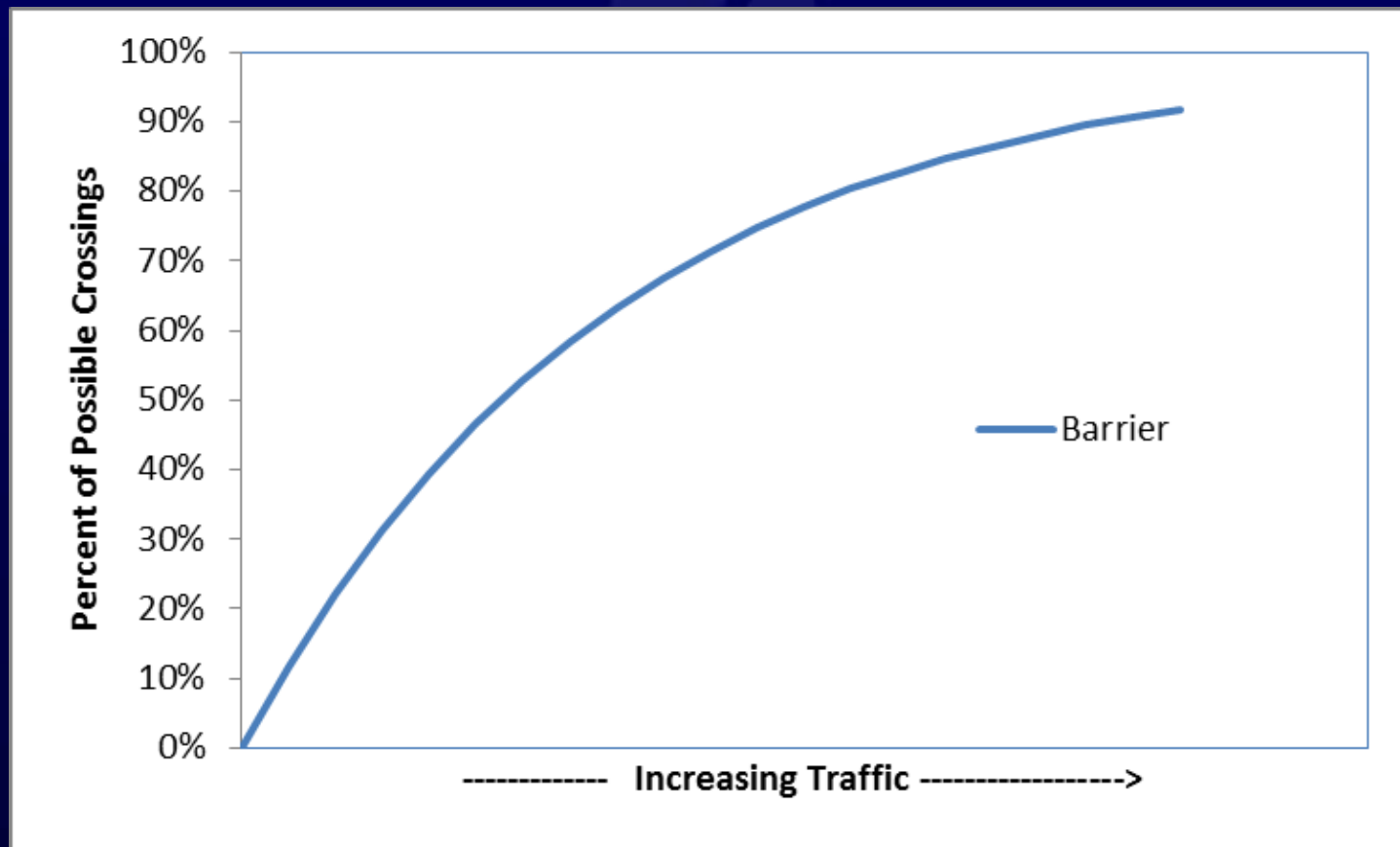
Barrier effect
a. Infrastructure
b. Traffic

3 Road mortality

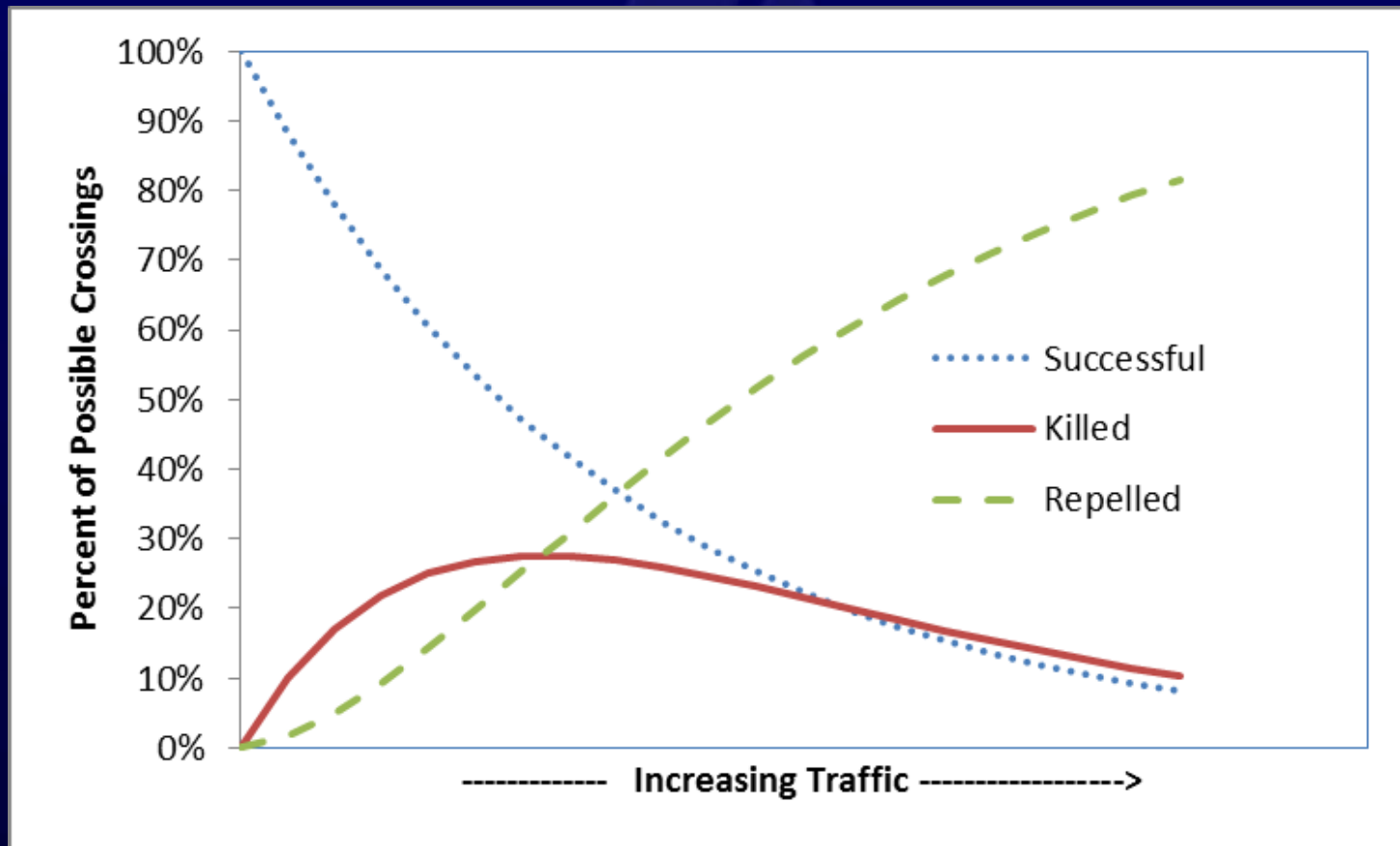
Decrease in
habitat quality

Increased human
access (secondary)

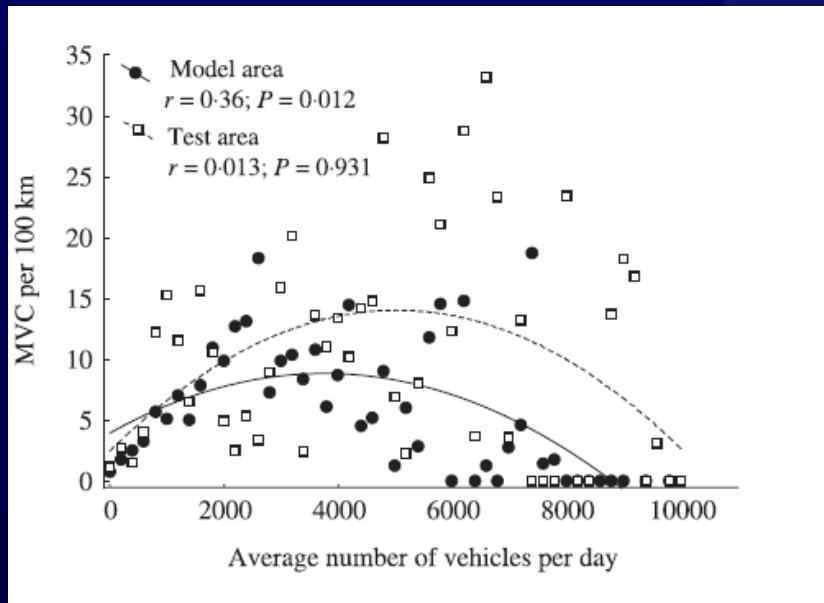
Barrier = Repelled + Killed



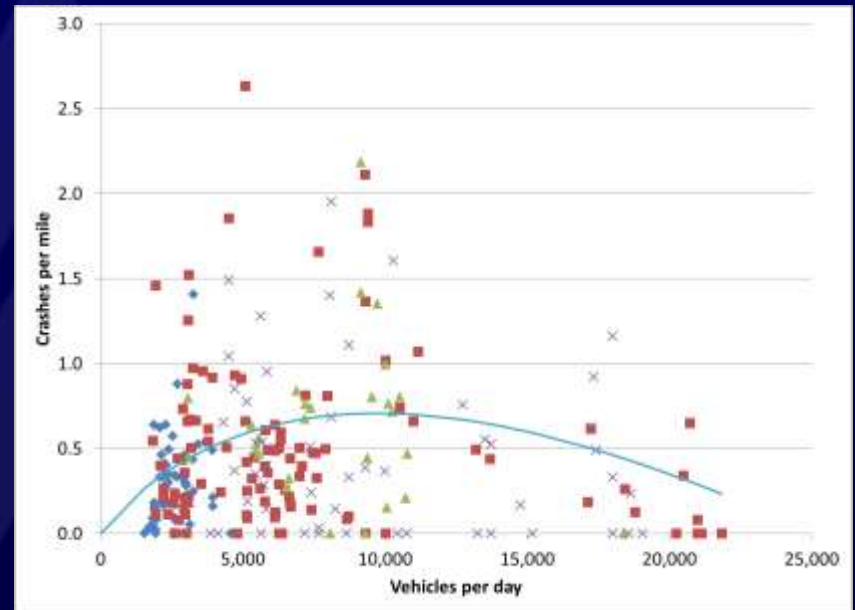
Road Mortality



When are Collisions a Problem?



Moose in Sweden (Seiler 2005)



White tailed deer in US
(Dezort and McGowen 2010)

Minimal Collision Data

- Mongolian Ministry of Transportation only tracks crashes in a few urban areas with high crash numbers.
- OT responds to reports of injured wildlife, almost entirely within mine site.
- Railroad carcass counts are primarily fence entanglements.

Impacts of Roads on Wildlife



Loss of
wildlife habitat

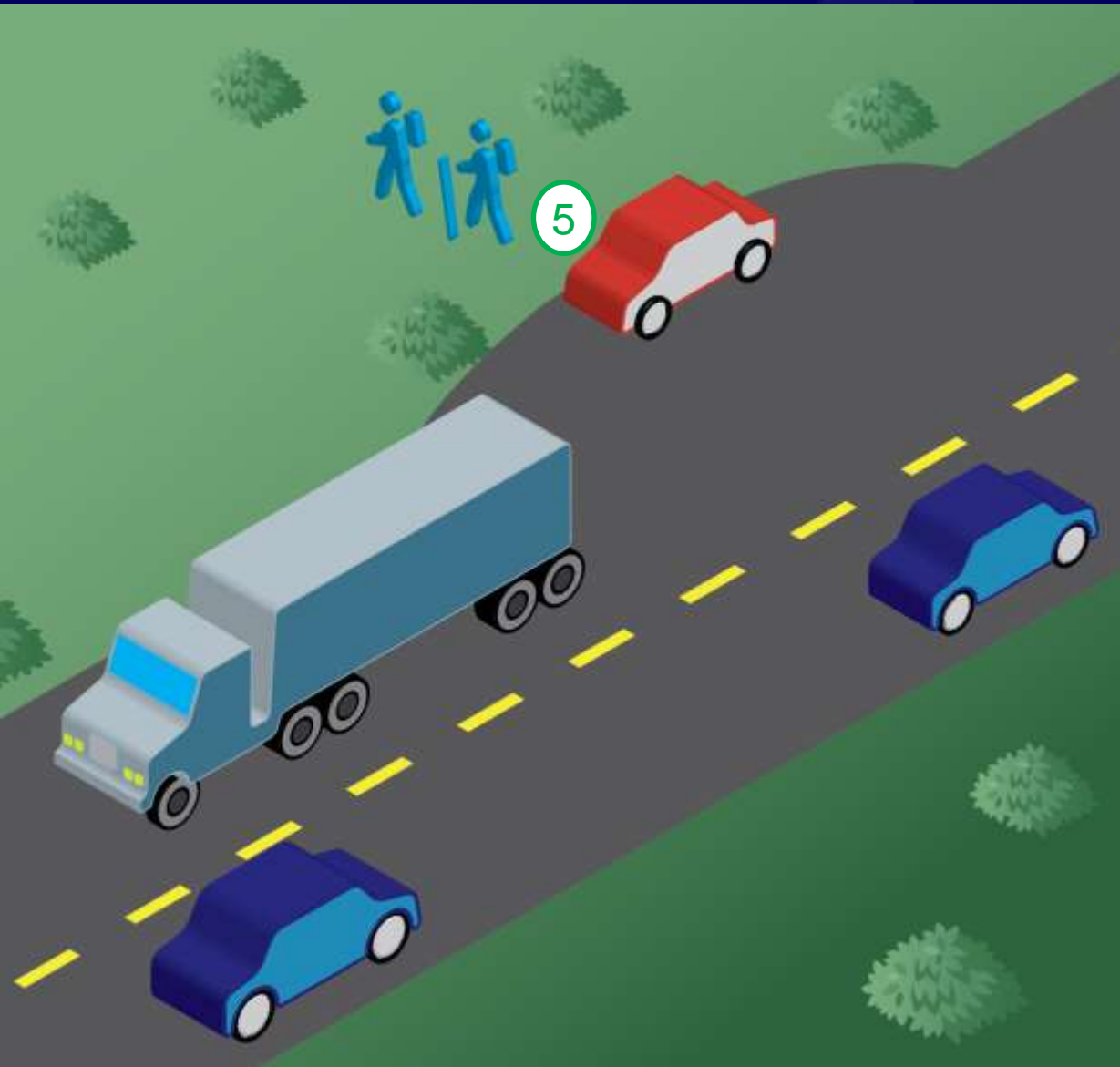
Barrier effect
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Road mortality

4 Decrease in
habitat quality

Increased human
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Impacts of Roads on Wildlife



Loss of
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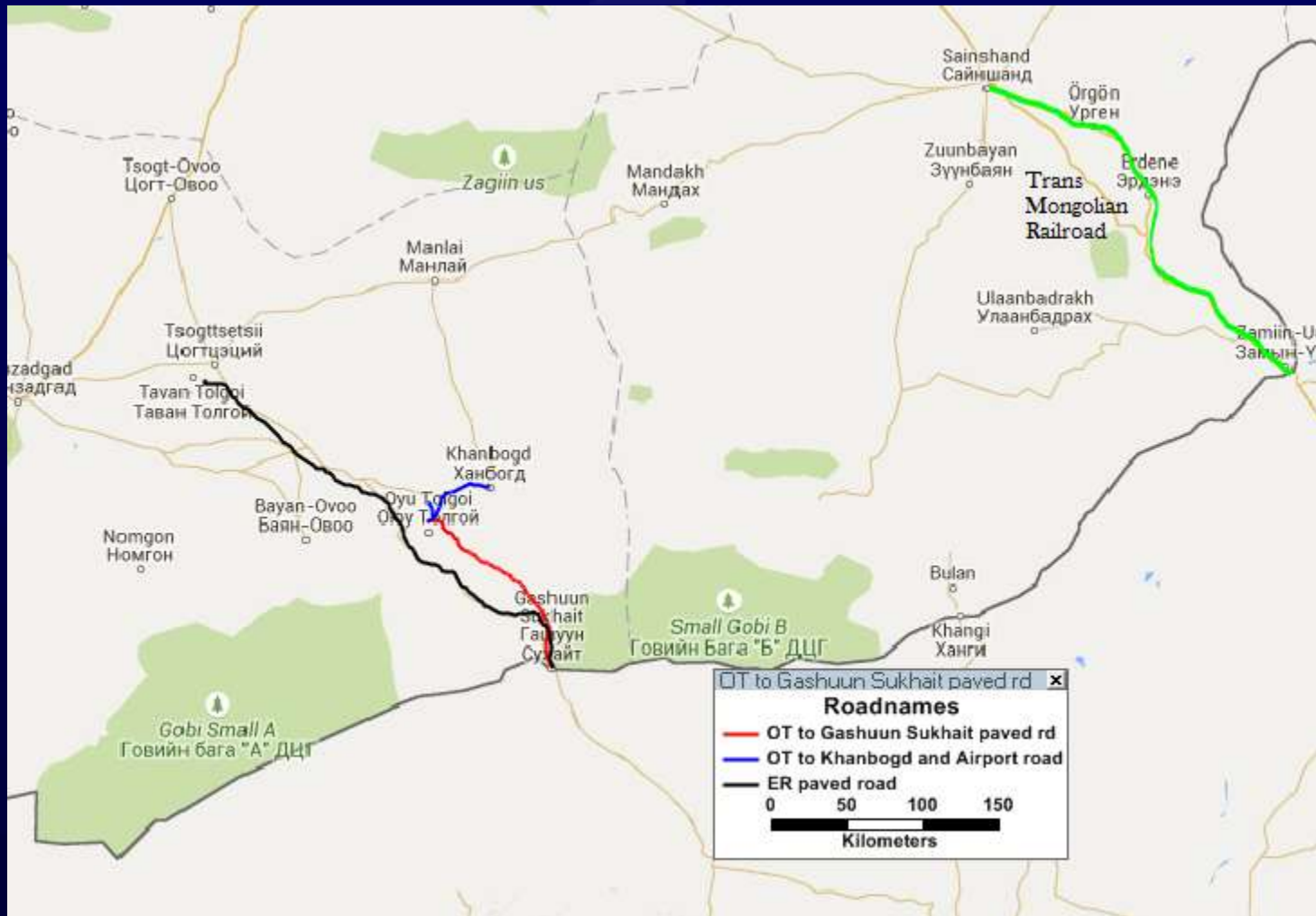
Barrier effect
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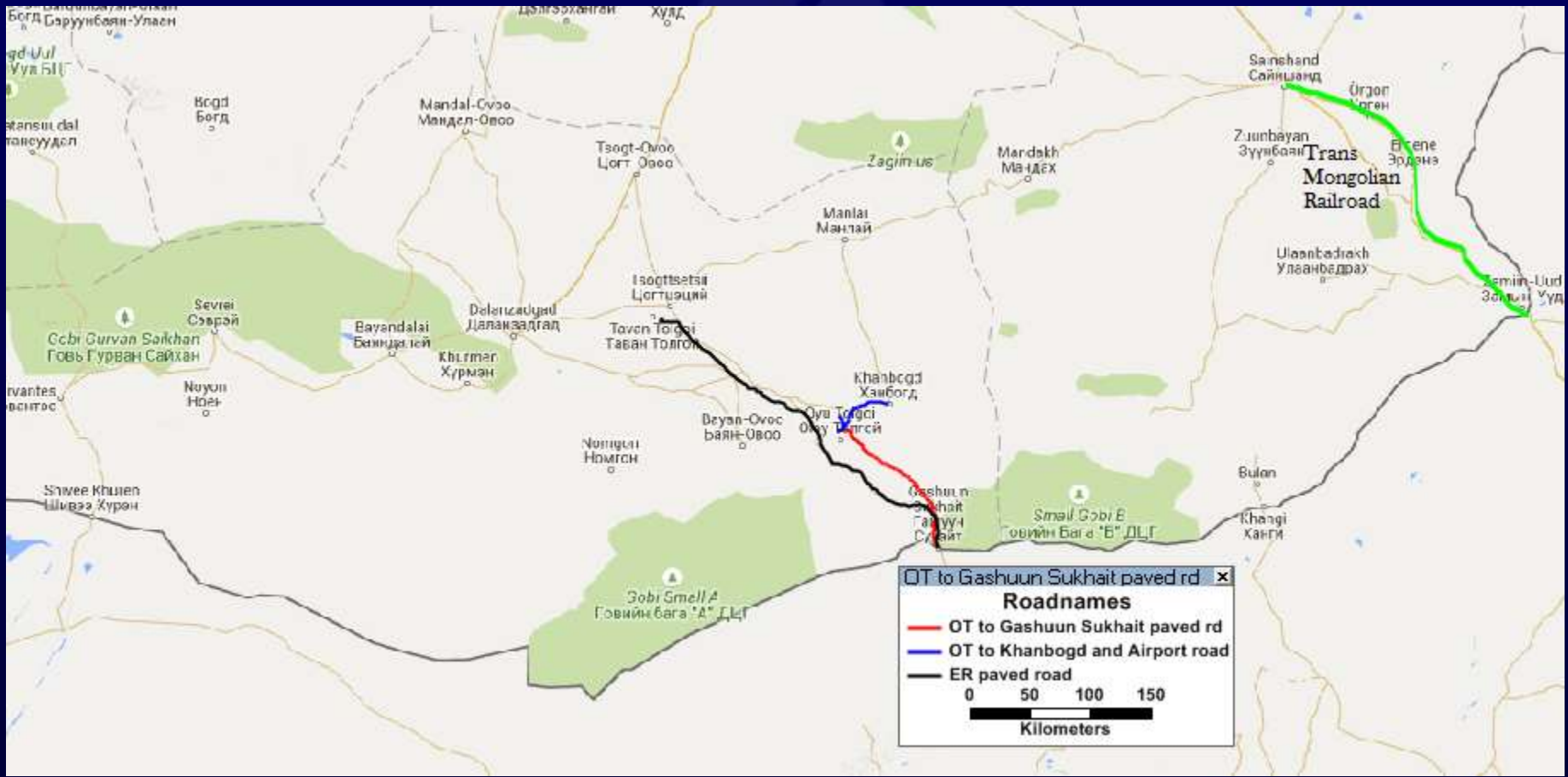
Decrease in
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5 Increased human
access (secondary)

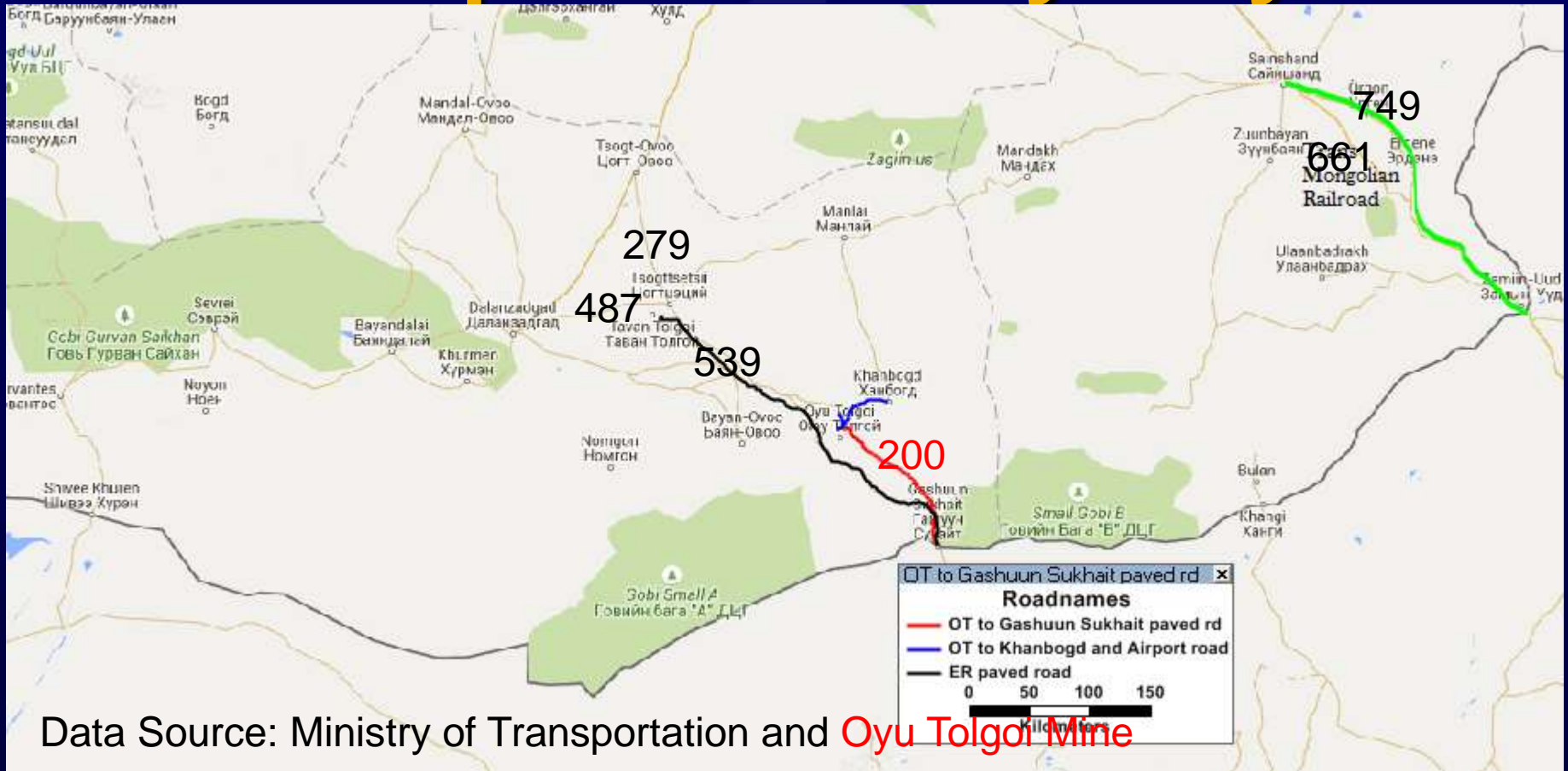
Transportation Infrastructure



Planned Transportation Infrastructure

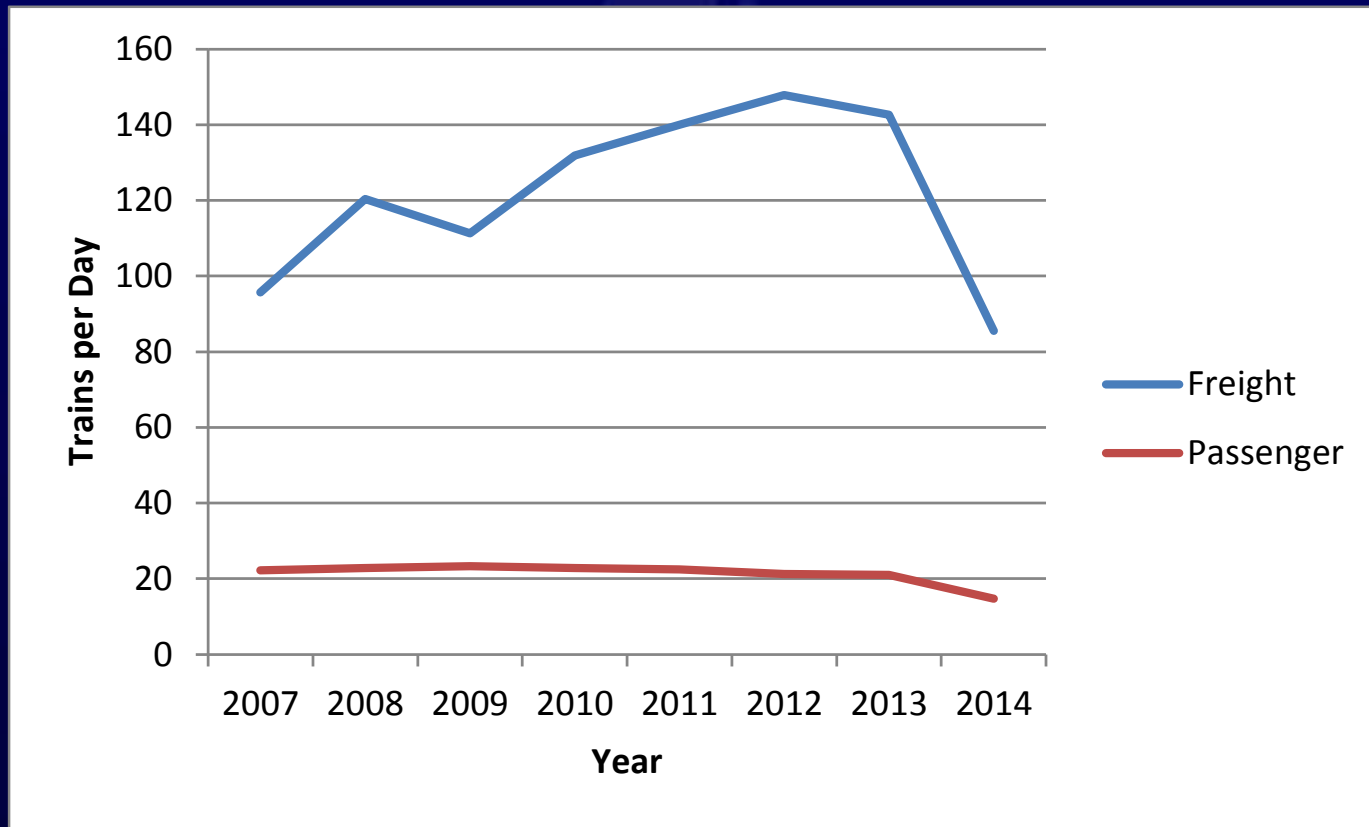


Vehicles per Weekday May 2014



Data Source: Ministry of Transportation and Oyu Tolgoi Mine

Railroad Traffic



Data Source: Ministry of Transportation
Sukhbaatar-Zamiin Uud

Mitigations

Data Needs

- Traffic data
- Continue wildlife movement studies
 - Traffic thresholds that create barrier
 - Width of degraded habitat (avoidance distance) adjacent to roads and railways
- Mitigation monitoring
- Wildlife collision data

Online/Smartphone Reporting

Utah Wildlife-Vehicle Coll... x
mapserv.utah.gov/wvc/desktop/dataentry.php

Utah WVC Reporter Home Map Download

Submit Report

Report Date

Species

or

Gender

- Male
- Female
- Unknown

Age Class

- Juvenile
- Adult
- Unknown

Xyphoid (mm)

Unavailable

Collar/Tag #

Comments

Limited to 255 characters.

Location

Latitude

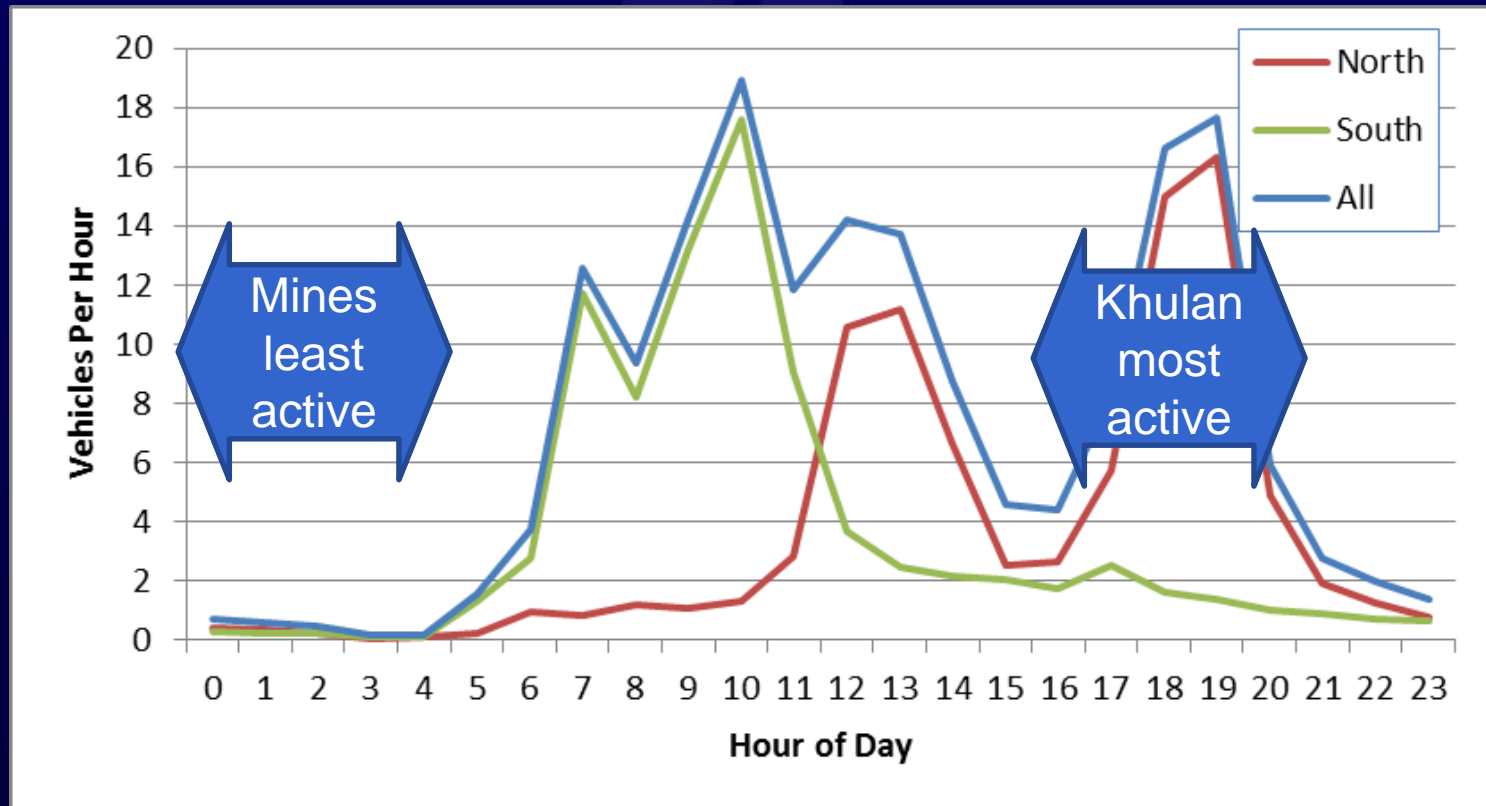
Longitude

WGS84

Managing Traffic Demand

- Shipping by truck versus by rail
- Ship coal versus convert to electricity and move by power-line
- 30 percent reduction by washing coal (Ukhaa Hudag Environmental Plan)

Time of Day Travel Restrictions



Time of Day Restrictions

**FOR WILDLIFE PROTECTION
TRAVEL ON THIS ROAD
RESTRICTED
10 PM TO 6 AM
EMERGENCY USE ONLY**

Truck Platoons



Average Headway = 2 min.



3 sec. headway * 10 vehicles = 30 sec

19 min gap

Pilot Test

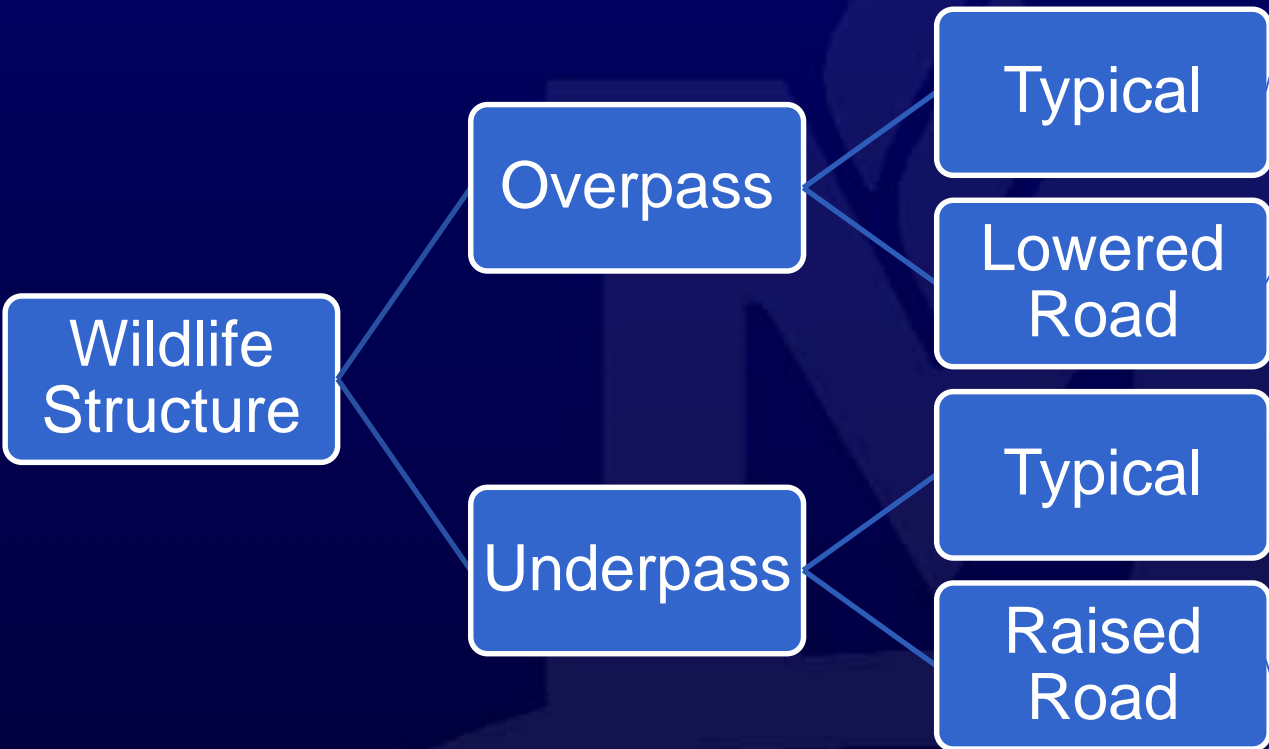


Public Education

- Need for conservation
- Stay on road
- Stopping and exiting vehicle may startle wildlife
- Time of day restrictions
- Reporting wildlife collisions

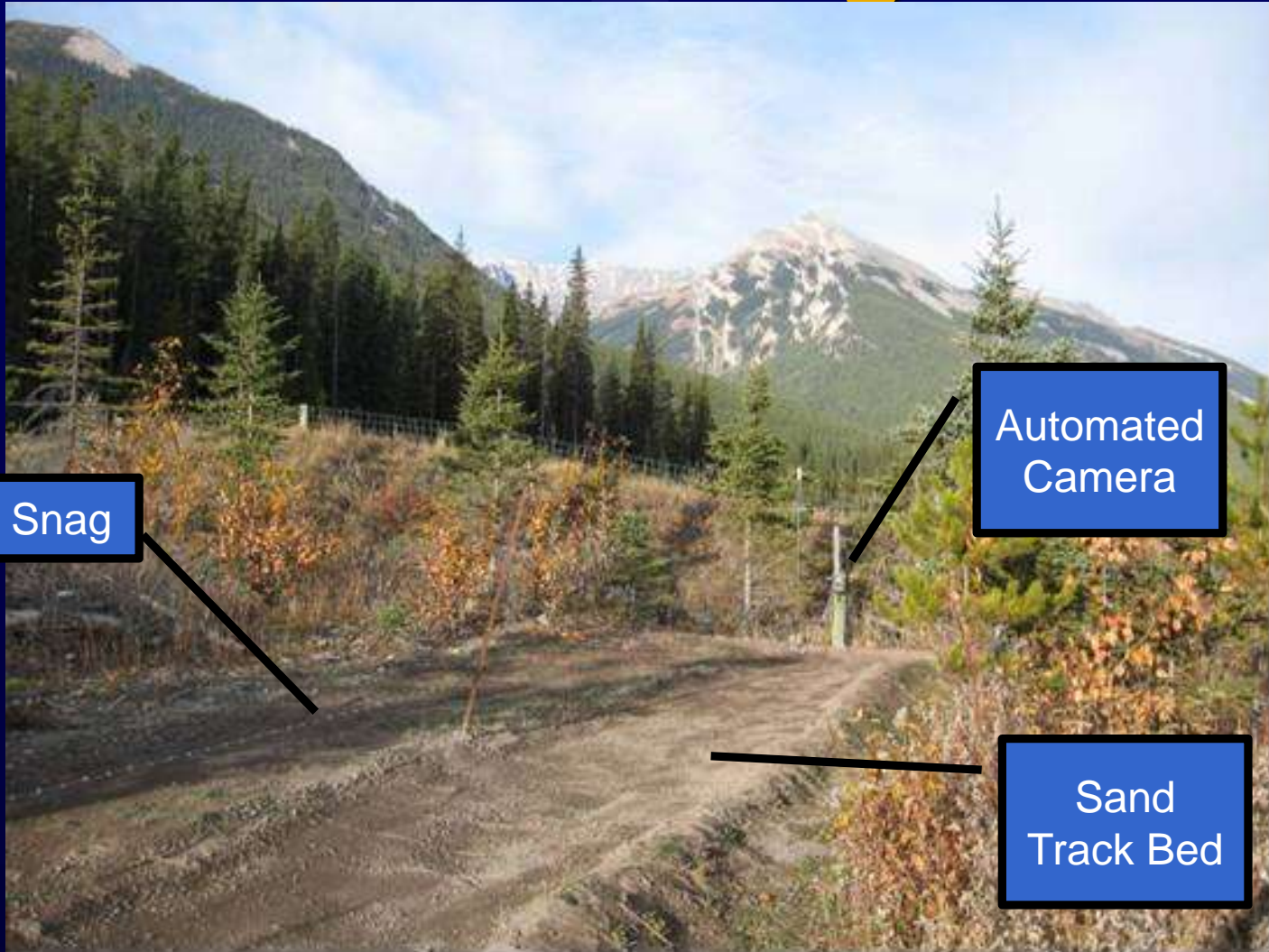


Wildlife Crossing Structures



Source: Daniel J. Smith, University of Central Florida

Monitoring

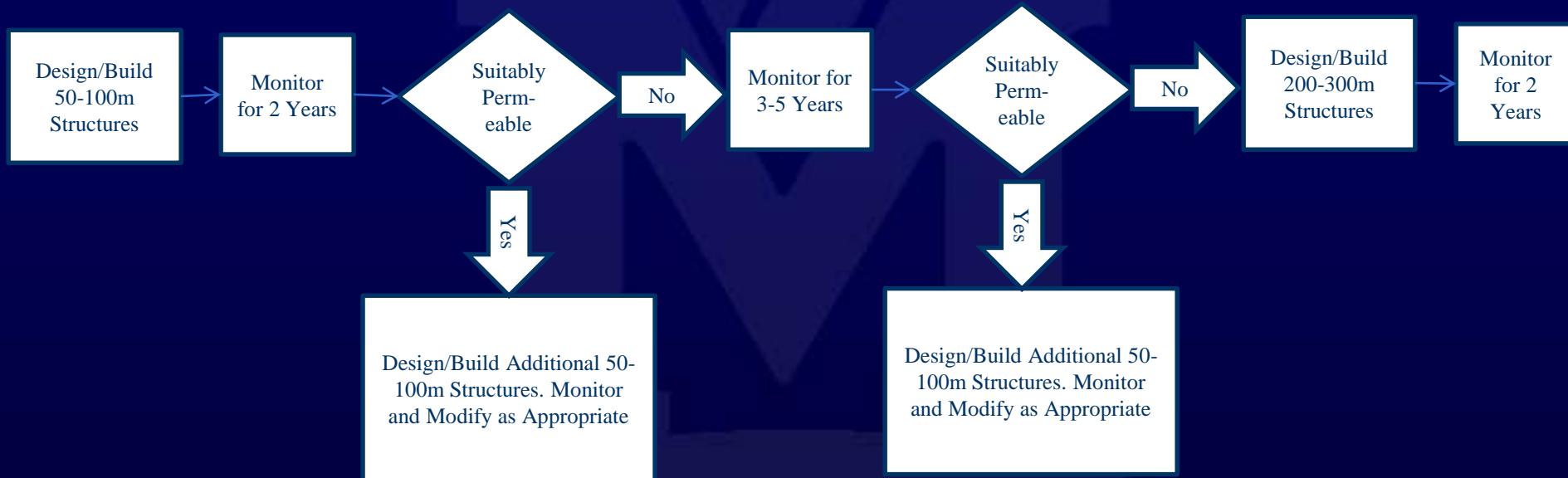


Hair Snag

Automated
Camera

Sand
Track Bed

Adaptive Management



(Huijser et al. 2013)

Summary of Mitigations

- Standard wildlife-vehicle collision and carcass reporting form
- Manage demand
- Time of day restriction
- Truck platoons
- Public education
- Wildlife crossing structures
- Railroad fencing standard
- Monitor mitigations



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