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)
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Traffic Creates Barrier

[Image of traffic congestion]

[Graph showing increasing traffic and percent of possible crossings]
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

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Barrier = Repelled + Killed

![Graph showing the relationship between percent of possible crossings and increasing traffic. The graph indicates an increasing trend as traffic volume increases.]
Road Mortality

![Graph showing the relationship between percent of possible crossings and increasing traffic, with lines indicating successful, killed, and repelled categories.](image)
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
a. Infrastructure
b. Traffic

Road mortality

Decrease in habitat quality

Increased human access (secondary)
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Transportation Infrastructure

[Map of transportation infrastructure with markers and labels, including 'Trans Mongolian Railroad']
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

Submit Report

Report Date

Species

- select a species
- type in a new species

Gender

- Male
- Female
- Unknown

Age Class

- Juvenile
- Adult
- Unknown

Xyphoid (mm)

☑ Unavailable

Collar/Tag #

Comments

optional

Limited to 255 characters.

Location

Latitude/Longitude

UTM

Route/Milepost

Street Address

Latitude

e.g. 40.2345

Longitude

e.g. -111.2345

WGS84

Verify Location

Submit

Clear
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

![Graph showing vehicle activity at different hours of the day. The graph indicates the peak and valley times for Mines and Khulan activities. Mines are least active between 3 AM and 5 AM, while Khulan is most active between 8 AM and 10 AM.](image-url)
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

- Overpass
  - Typical
  - Lowered Road
- Underpass
  - Typical
  - Raised Road

Source: Daniel J. Smith, University of Central Florida
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
References


References