

# Solutions to mitigate impacts of roads on wildlife movements

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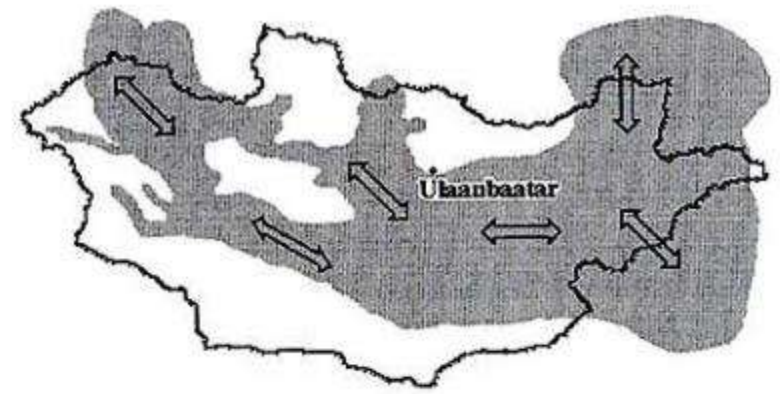
‡ Arid Land Research Center, Tottori University, Tottori, Japan



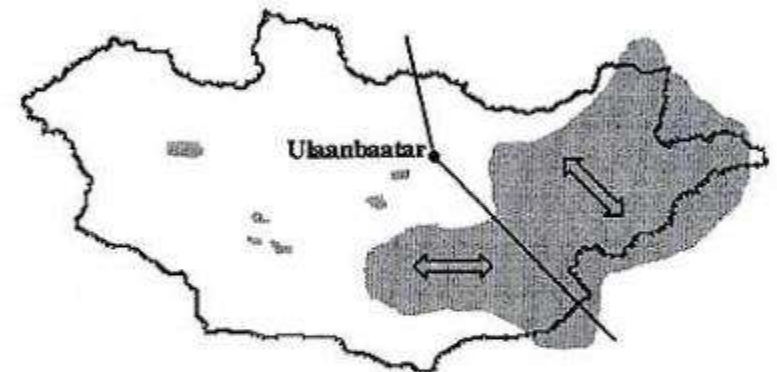
# Change in distribution of Mongolian gazelle



Source: Reading et al. 1998



1930

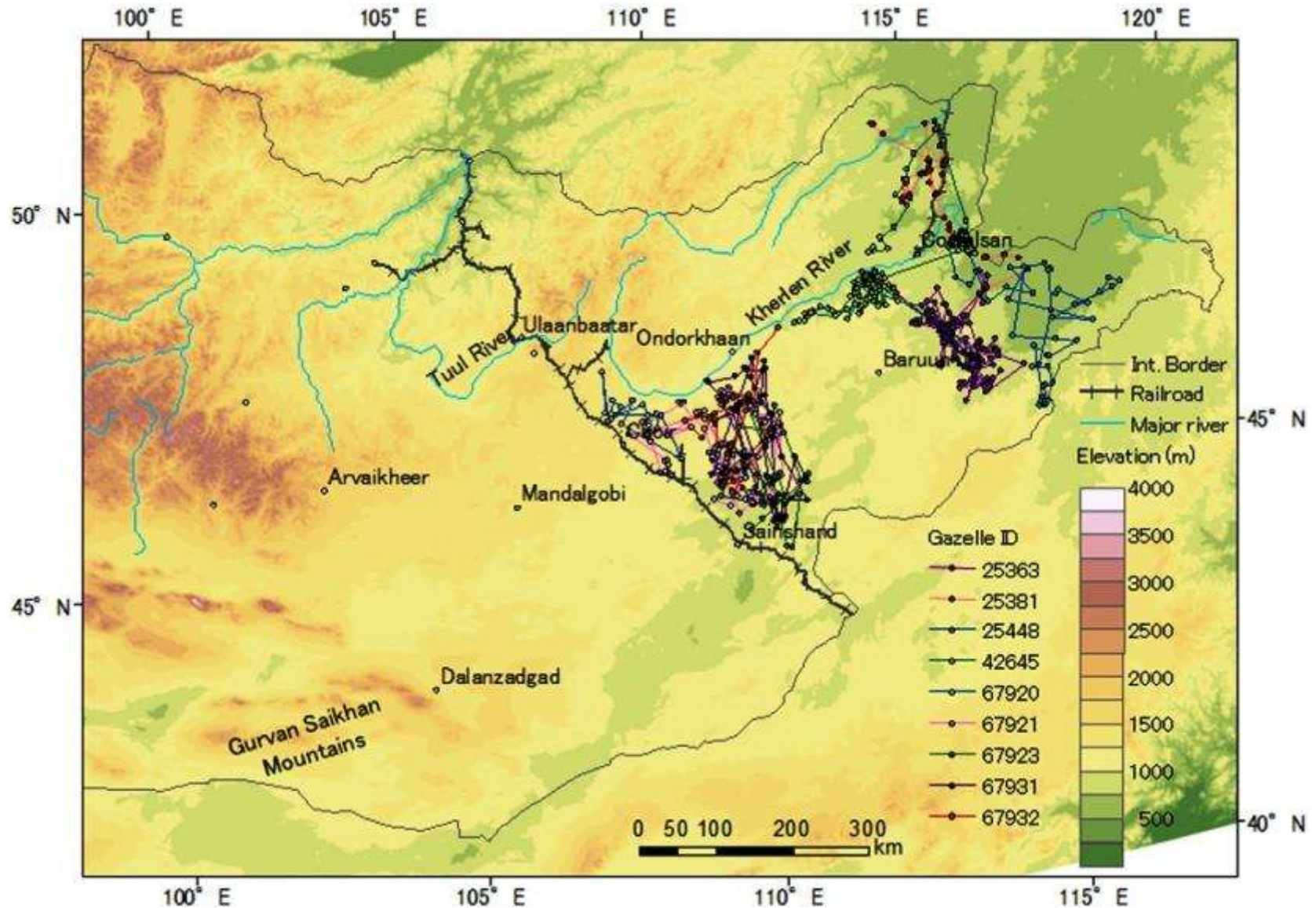


1965



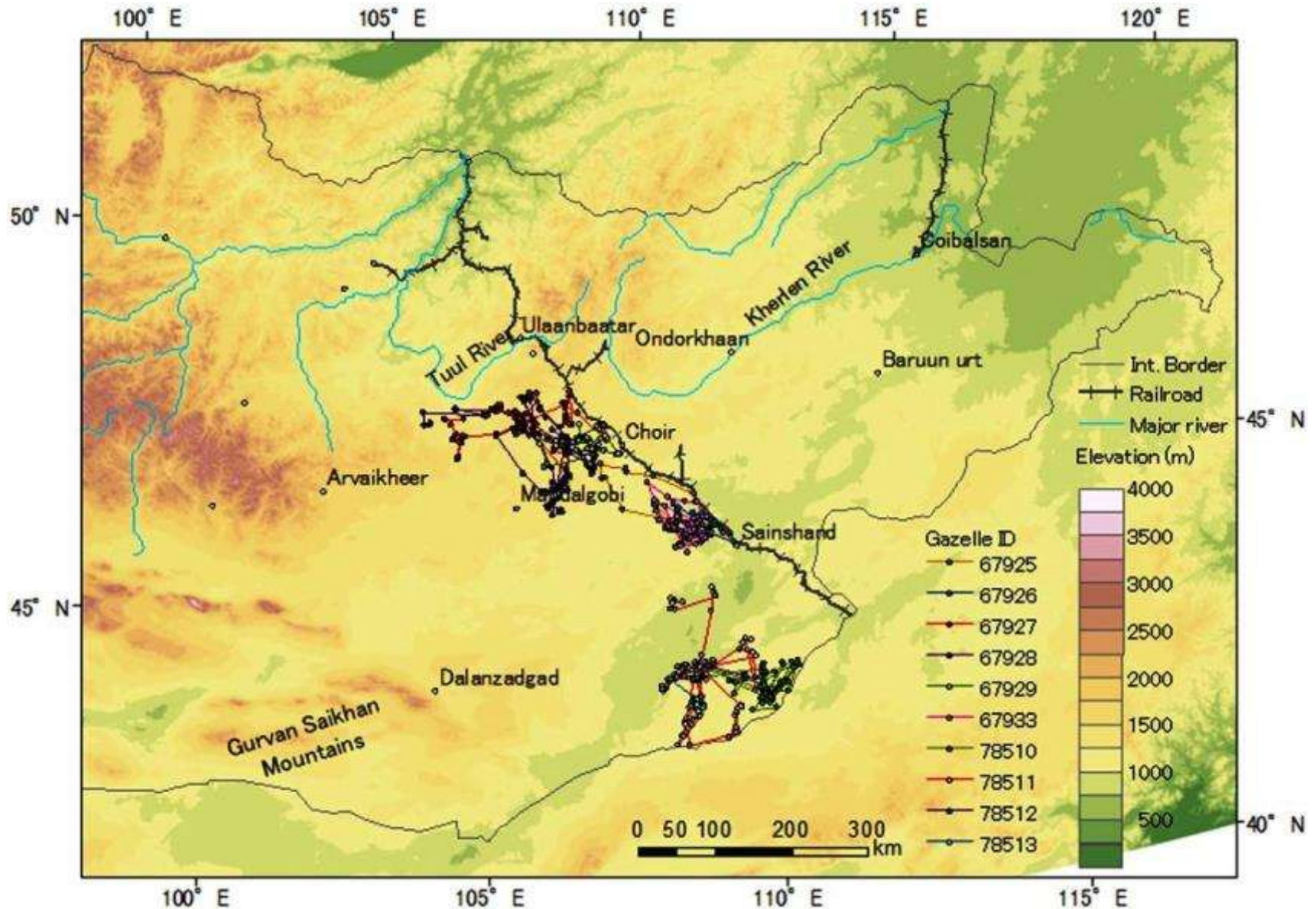
1995

# Movements of satellite collared Mongolia gazelles



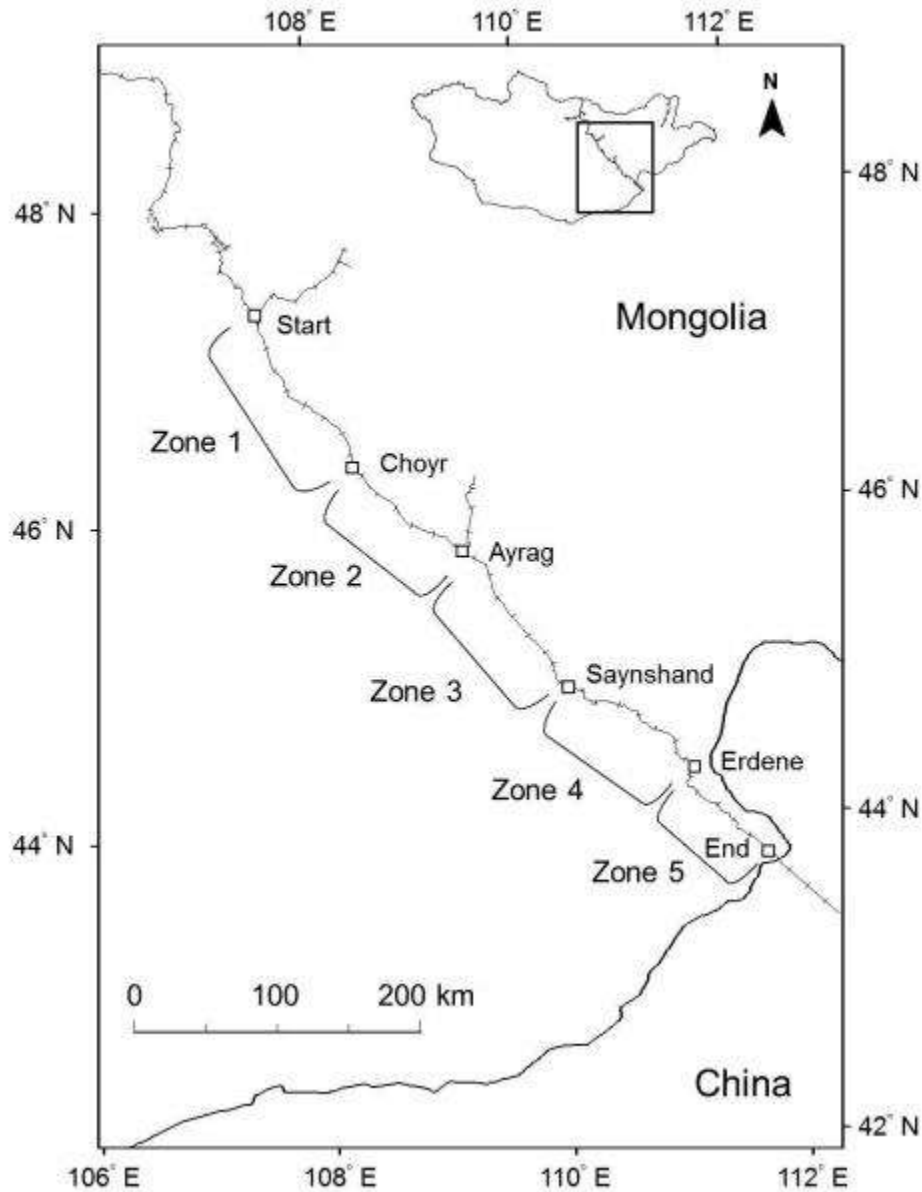
Source: Ito et al. 2013

# Movements of satellite collared Mongolia gazelles



Source: Ito et al. 2013

# Mongolian gazelle carcass study



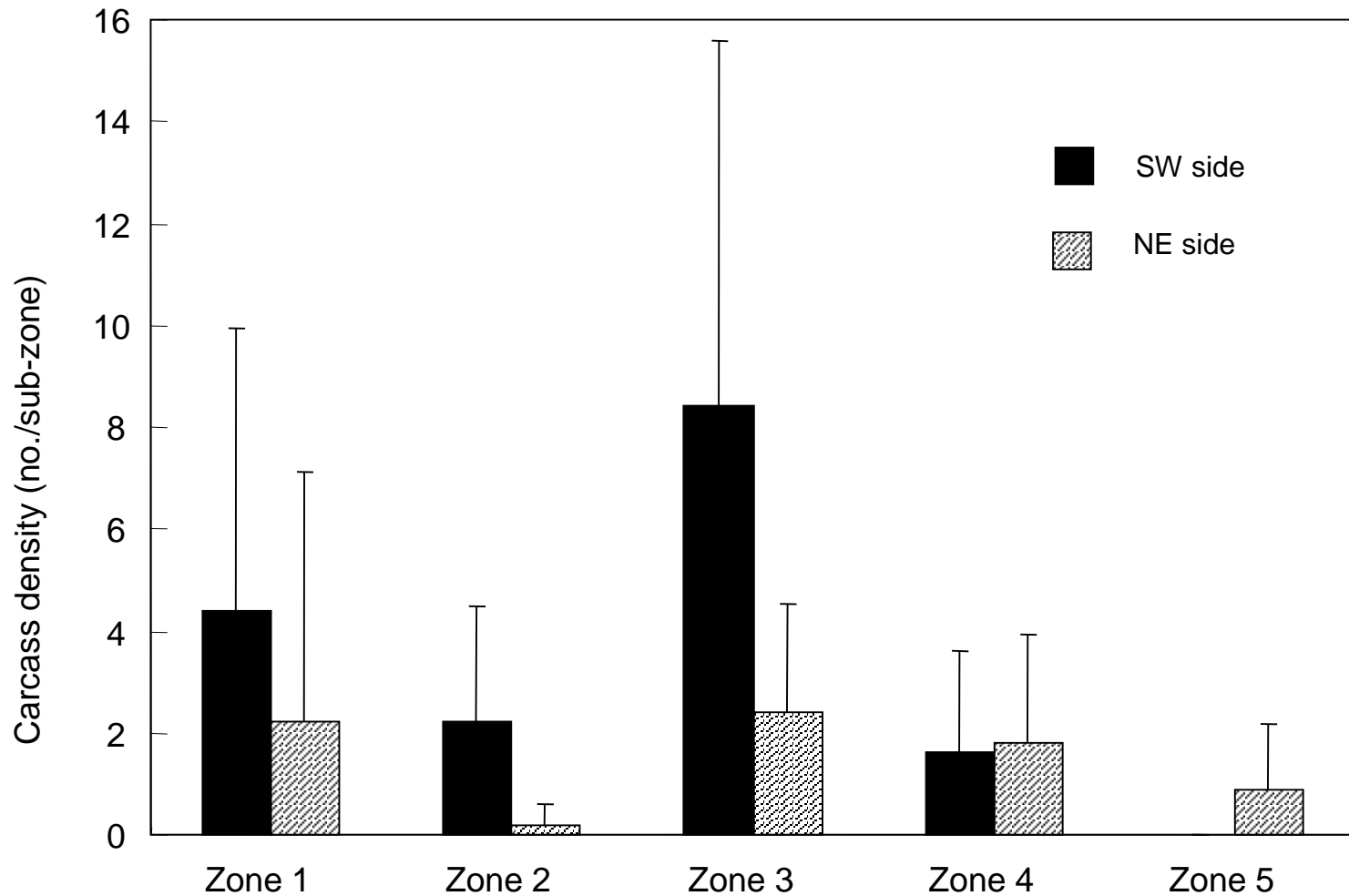
Source: Ito et al. 2008

**In 2005, 241 gazelle carcasses recorded, along 630 km of the railroad, estimated to have died < 12 months.**



**Source: Ito et al. 2008**

# Distribution of Mongolian gazelle carcass along the railroad



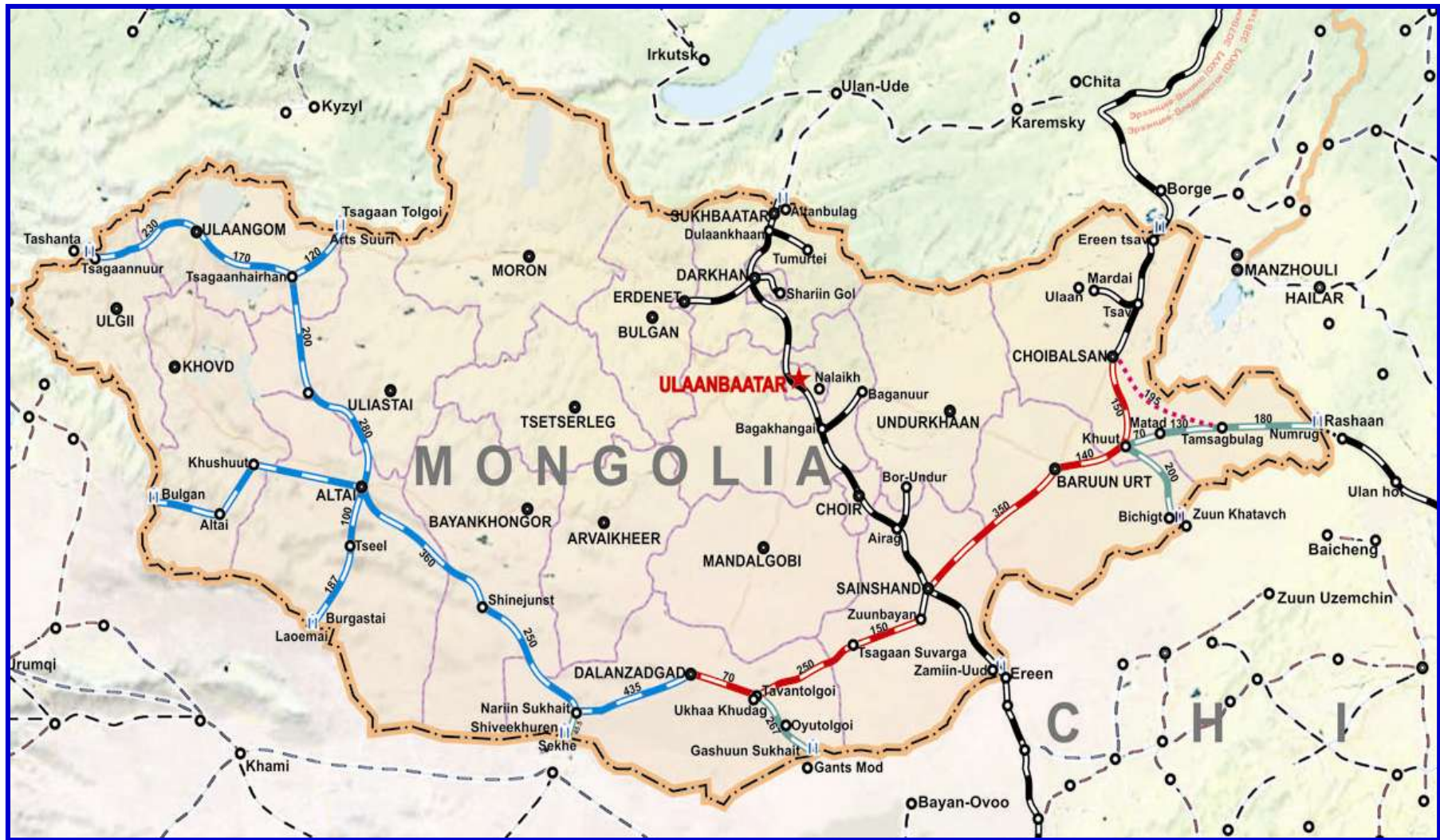






# STATE POLICY ON RAILWAY TRANSPORTATION

*(Parliament Resolution No.32, June 24, 2010)*



Existing railways



Phase I - 1100 km



Phase II - 900 km



Phase III - 3600 km

# Ecology transportation study tour

WILDLIFE

## Mongolian officials look to western Montana wildlife crossings as model

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MARTIN KIDSTON/Mountain

Marcel Huisser, a research ecologist with the Western Transportation Institute at Montana State University, discusses the engineering design of a U.S. Highway 93 wildlife underpass with government and mining officials from Mongolia on Monday.

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# Study tour participants



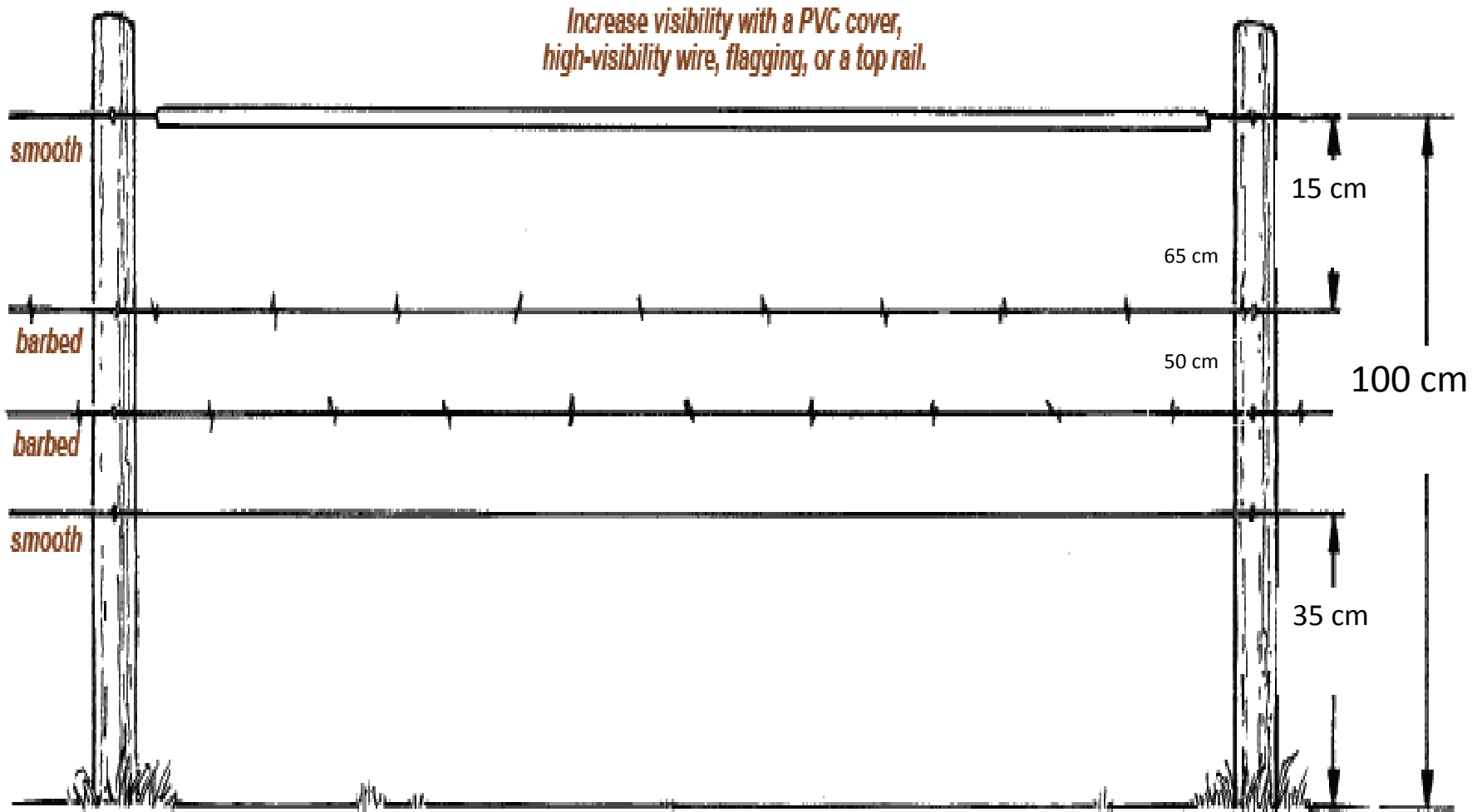
# Post study tour-WCS initiatives

- WCS hosted the first National Workshop on Road and Railway Wildlife in Ulaanbaatar-May 2013
- Established a joint ministerial working group
- WCS launched the documentary 'Wildlife Crossing' to the Mongolian public at a local cinema –June 2014
- WCS wrote the '*Guidelines for Addressing the Impact of Linear Infrastructure on Large Migratory Mammals in Central Asia*'

# Post study tour-WCS initiatives

- Field trips for identification of areas
- Co-hosted WS on Mitigating the impact of linear infrastructure on the movement of wildlife- Nov, 2014
- WCS will continue to advocate for wildlife friendly measures

# Measures to mitigate impacts of existing railroads



## Measures to Mitigate Impacts



# Khulan does not benefit from modification of fence design

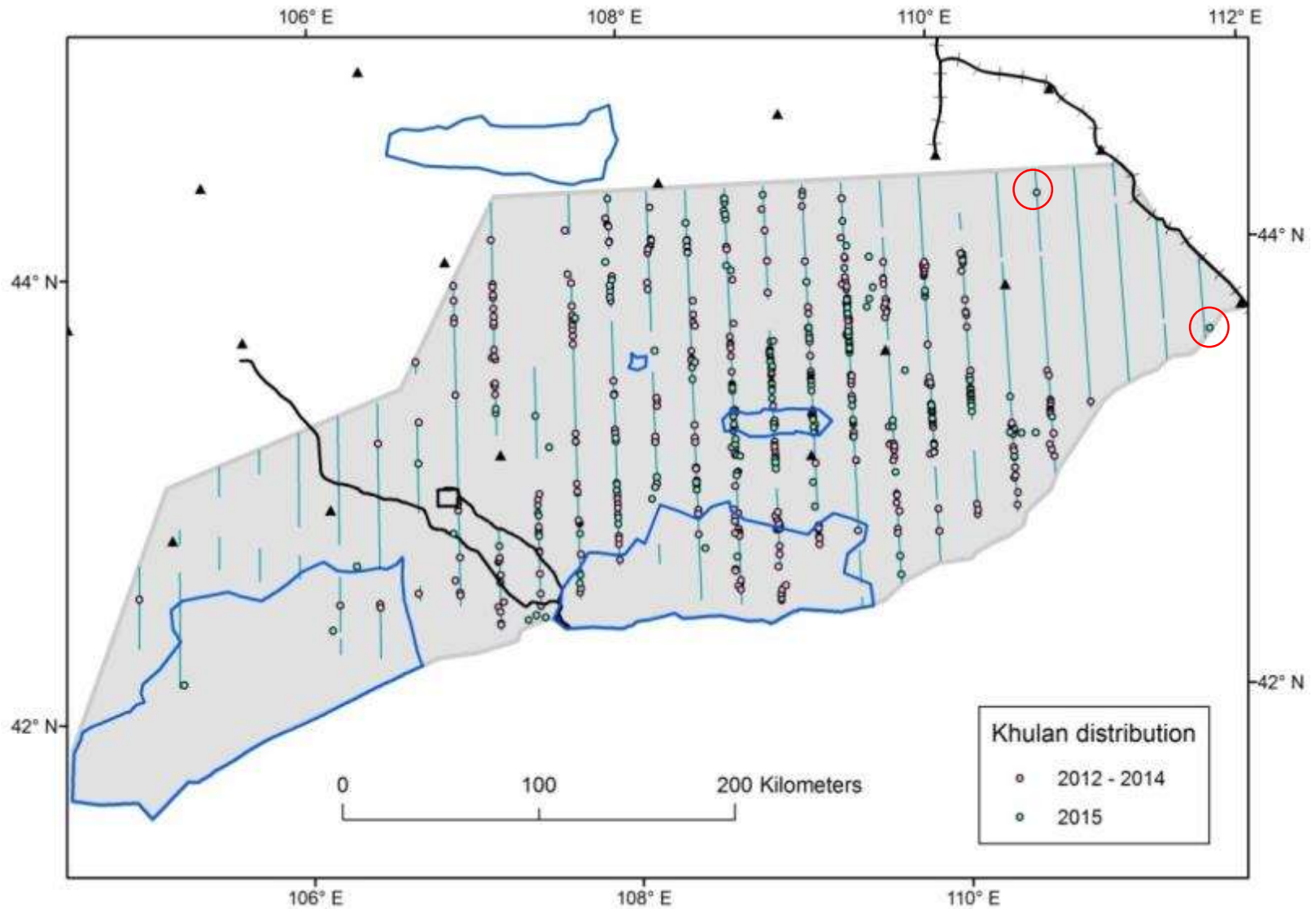




**Fence removal would allow khulan access  
to large parts of their former range**



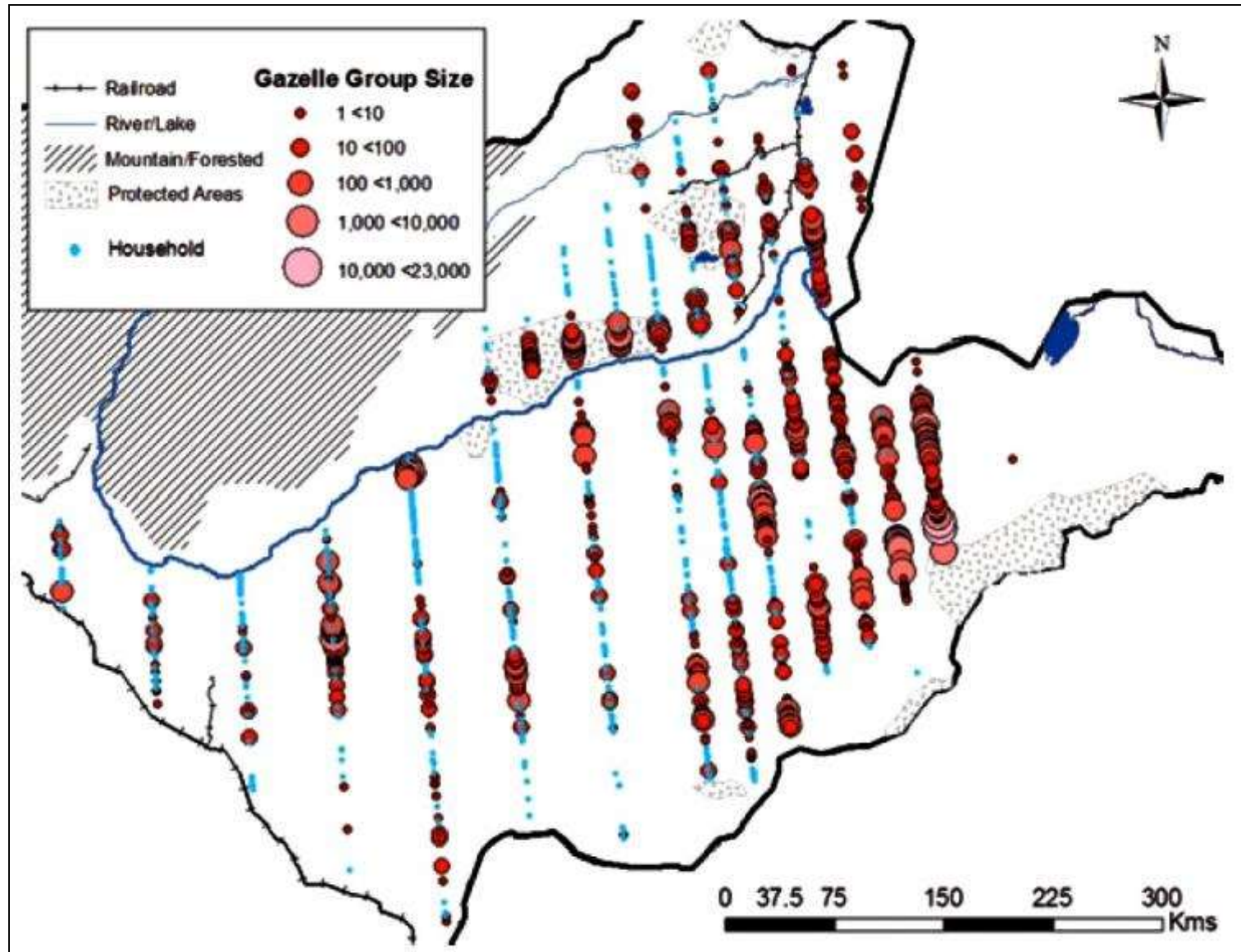
# Distribution of khulan during 2012-2015



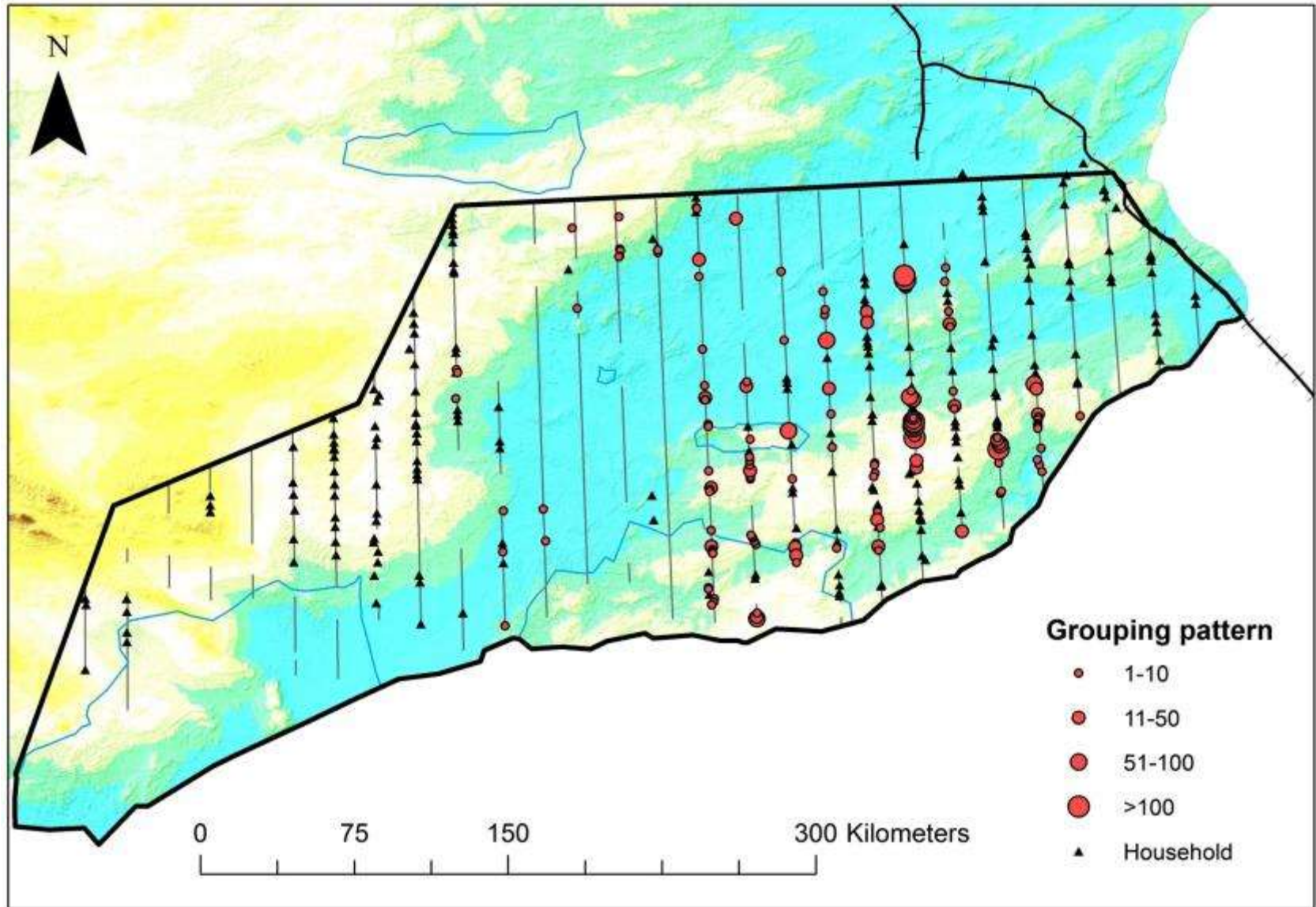
# Where mitigation measures should be taken?



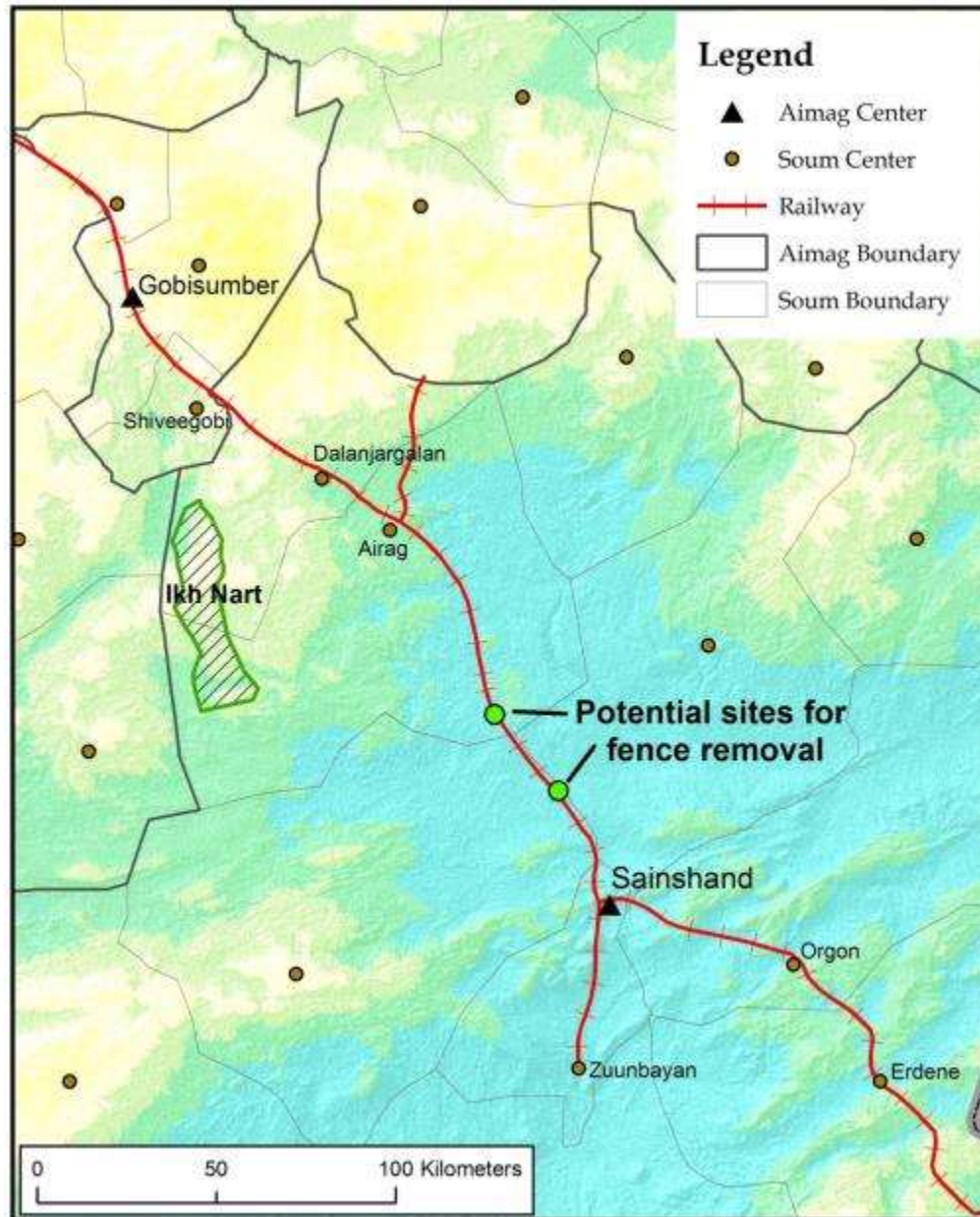
# Distribution of Mongolian gazelle + household



# Distribution of khulan + household

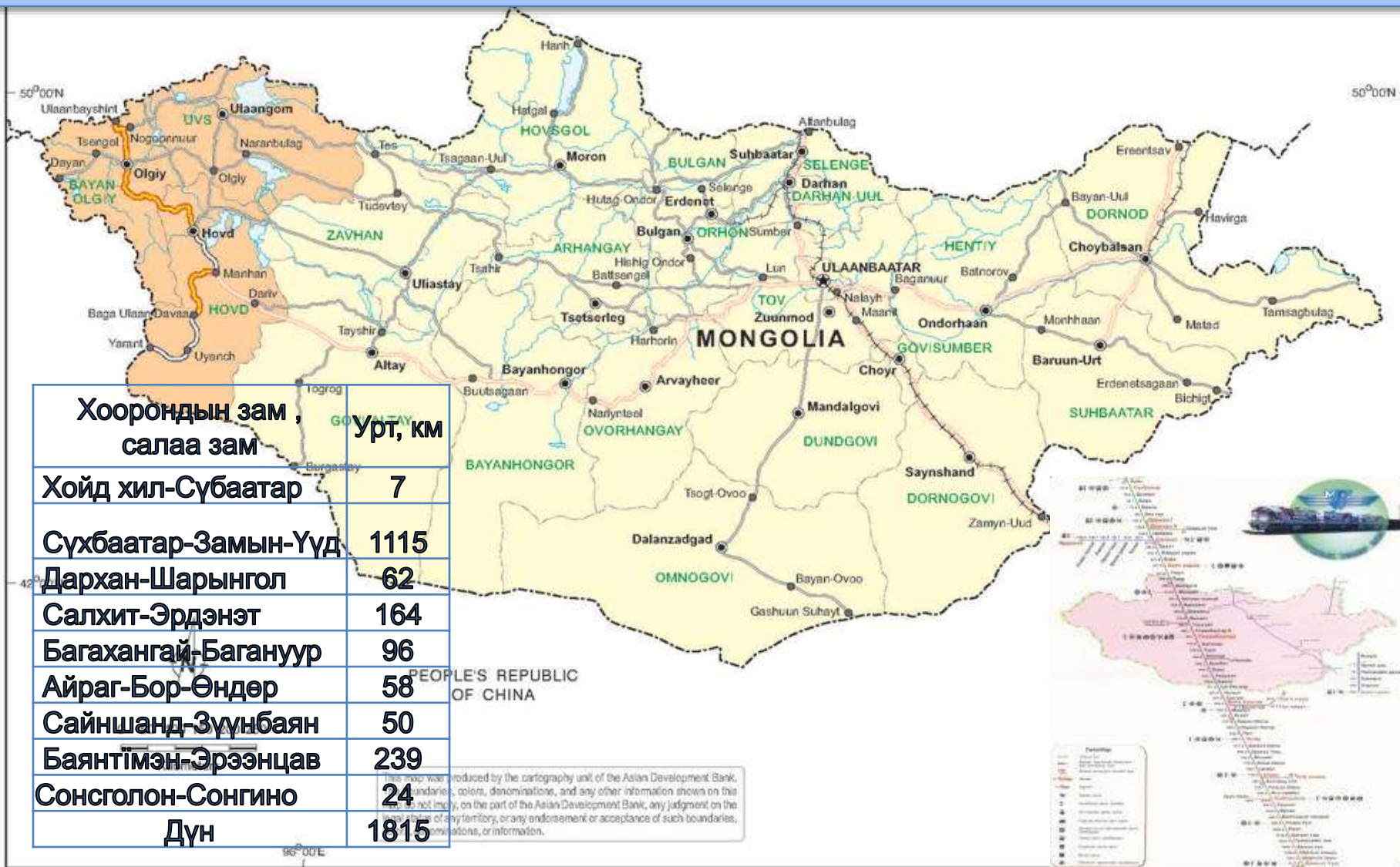


# Potential sites for mitigation





# Төмөр замын шугам



Хоорондын зам , салаа зам	Урт, км
Хойд хил-Сүбаатар	7
Сүхбаатар-Замын-Үүд	1115
Дархан-Шарынгол	62
Салхит-Эрдэнэт	164
Багахангай-Багануур	96
Айраг-Бор-Өндөр	58
Сайншанд-Зүүнбаян	50
Баянтүмэн-Эрзэнцав	239
Сонсголон-Сонгино	24
<b>Дүн</b>	<b>1815</b>

This map was produced by the cartography unit of the Asian Development Bank. It does not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, denominations, or information.

## Just two FACTS

- Maintenance cost - 3 million tugrugs per km fence a year
- 6 million tugrugs for both sides
- $1815\text{km} \times 6 \text{ million} = 10.890.000.000\text{₮}$
- 80% of herders reside along railroad happy to have the fence removed



# Mitigation site (fence removal & design modification)



# Mitigation site (overpass)



# Solutions for mitigations

Species	Overpass, m			Underpass, m		
	500-1000	200-300	50-70	500-1000	200-300	50-70
Khulan	+++	++	-	+	+	--
Goitered gazelle	+++	+++	+	++	++	--
Mongolian gazelle	+++	+++	+	++	++	--
Argali sheep	+++	+++	++	-	-	--



Source:  
Huijser et al. 2013

# Recommendations

- **Partial fence removal**

Fence segments of the railroad should be removed in areas where herder density is low

- **Fence design modification**

Increasing the distance from the ground of the lowest fence strand and using barbless strands to encourage gazelles to crawl underneath

- **Overpass**

Wildlife crossing structure, for instance, overpass needs to be built in sections where mitigation measures are desired

# Recommendations

- Economical calculations must be done-safety, compensation etc.
- Working groups should consider all aspects such as policy, planning, mitigation measures etc.

**Thank you!**

