Central Asian Mammals Migration and Linear Infrastructure Atlas (CAMI Atlas)

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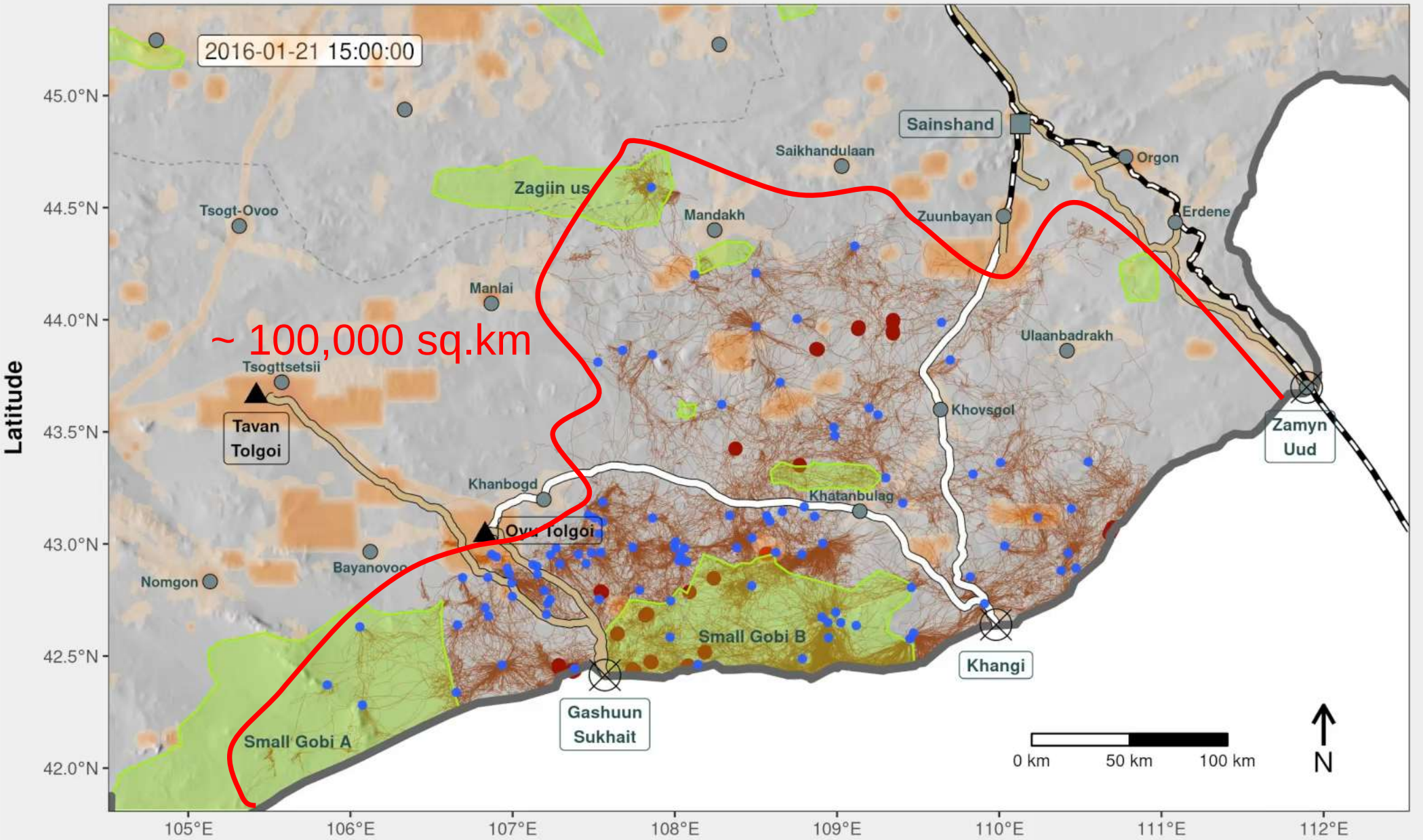
2.8 million Saiga Antelope

Central Asia - Biodiversity hotspot

Mountains
Grasslands
Deserts

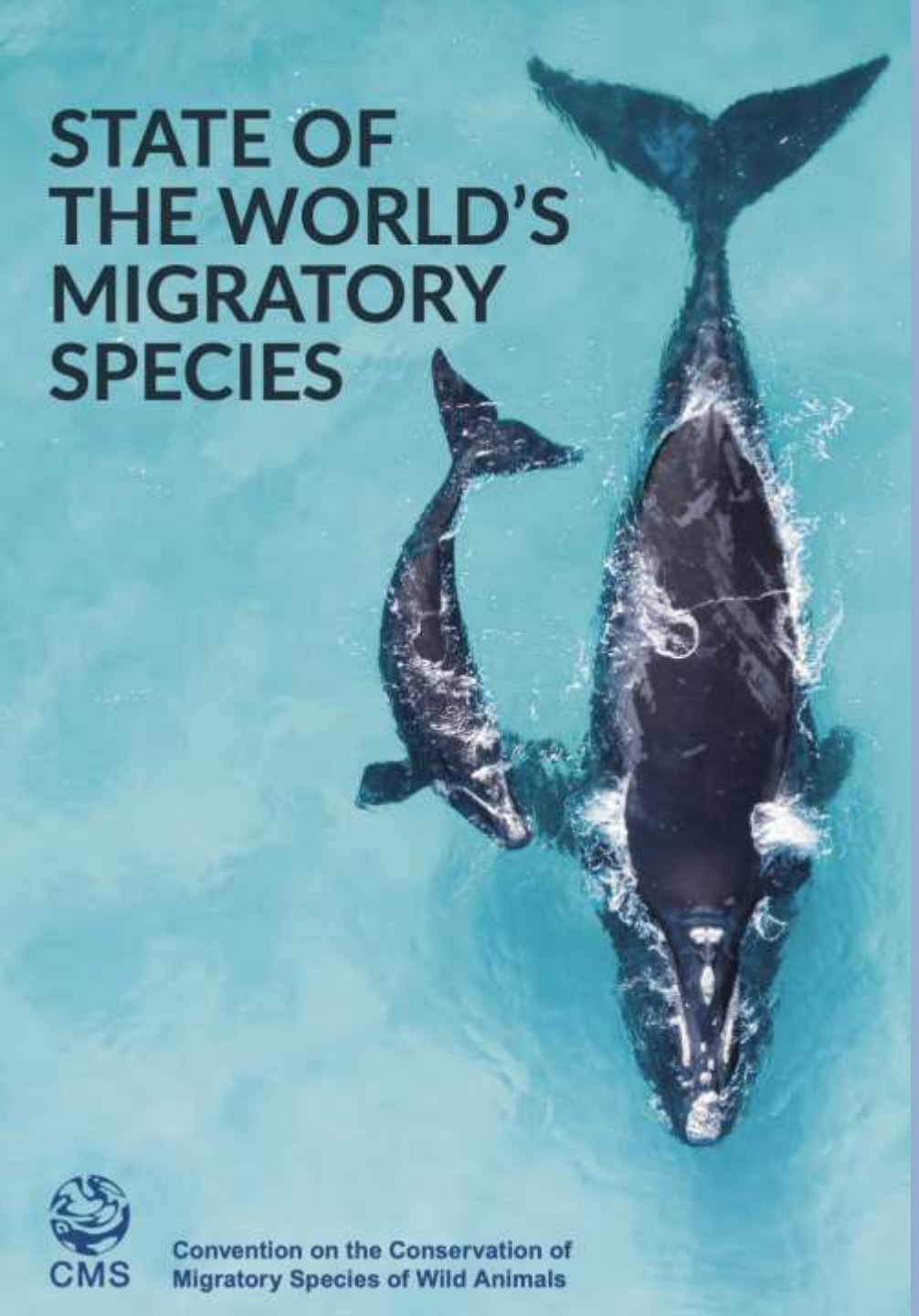
2.1 million Mongolian Gazelle

Khulan (Mongolian wild ass)



- Protected area
- Dirt road
- Paved road
- Fenced railway
- Aimag boundary
- Border fence Mongolia - China
- Aimag centre
- Soum centre
- Border crossing
- Mining site
- Main water source
- Light disturbance
- Intermediate disturbance

Movements of 71 Khulan tracked between 2013 and 2021. Projection: Geographic, WGS84.
Animation by Senckenberg (Germany) with data collected by WCS Mongolia and INN University (Norway).



The first global assessment of migratory animals

Recommendations given by the report

1) Establish key biodiversity areas on the migration pathways

2) Reduce infrastructure that impact migration pathways

3) Create corridors of protected land

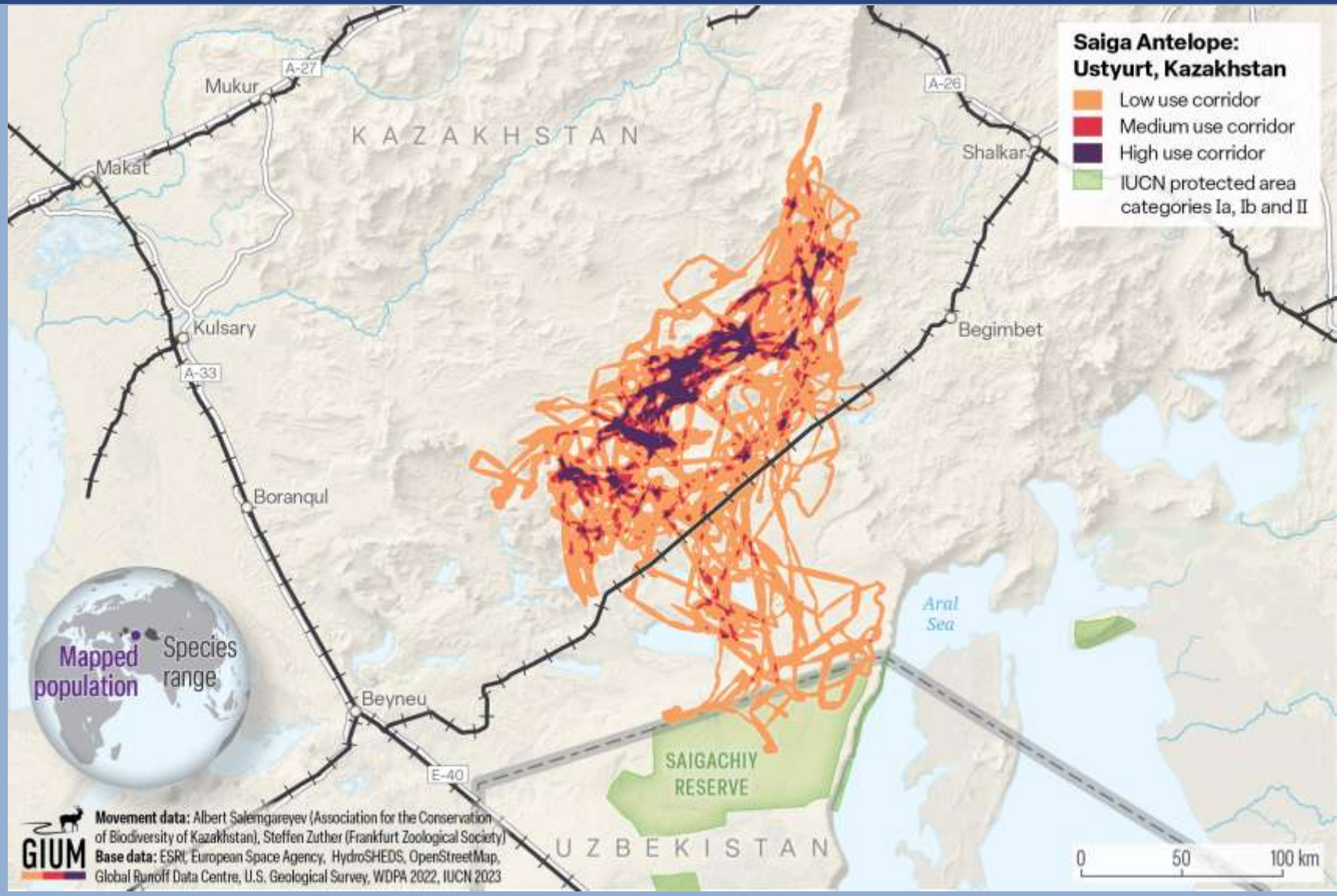
4) Ensure restoration of at least 30% of degraded land and marine areas

5) Map migration corridors to protect animals from human activities

CMS GIUM

Global Initiative on Ungulate Migration

To create a Global Atlas of Ungulate Migration (an inventory) using tracking data and expert knowledge and to make corridor map files publicly available.



CENTRAL ASIAN MAMMALS MIGRATION AND LINEAR INFRASTRUCTURE ATLAS

CMS Technical Series Publication No. 41

UN environment CMS

CAMI Atlas 2019

Aim: To provide expert knowledge to enable decision-makers and other stakeholders to integrate the needs of migratory mammals in the planning of new linear infrastructure or the modification of the existing ones.

CAMI Atlas 2019

Species

1. Argali Sheep
2. Asiatic Cheetah
3. Asiatic Wild Ass
4. Bukhara Deer
5. Chinkara
6. Goitered Gazelle
7. Mongolian Gazelle
8. Saiga Antelope
9. Snow Leopard
10. Wild Camel

Linear Infrastructure

- Fences
- Railroads
- Roads
- Canals
- Pipelines

- Corridors
- Conflict Areas

The majority of the data for the Atlas published in 2019 (UNEP/CMS, 2019a) was collected during a three-day workshop attended by 25 experts on specific species and regions.

CAMI Atlas Update

2. Update draft maps based on feedback and additional data from experts

Draft maps shared with experts

Feedback returned to the core team

Spatial files and metadata shared with for the web poral

3. CAMI Atlas web portal

1. Update species ranges and linear infrastructure

<u>Maps and fact sheets used by:</u>

- NGOs, federal, provincial, tribal agencies, development banks, policy makers, etc.

CAMI Atlas 2025

Chapter 4: Species specific facts with detailed description

For each species:

- Maps illustrate **various types of linear infrastructure** within species range, **areas of conflict**, and **corridors** identified by experts.

SENCKENBERG NATURE RESEARCH

Asiatic Cheetah

© Iranian Cheetah Society/Department of Environment
Asiatic Cheetah in Iran

SPECIES FACTS

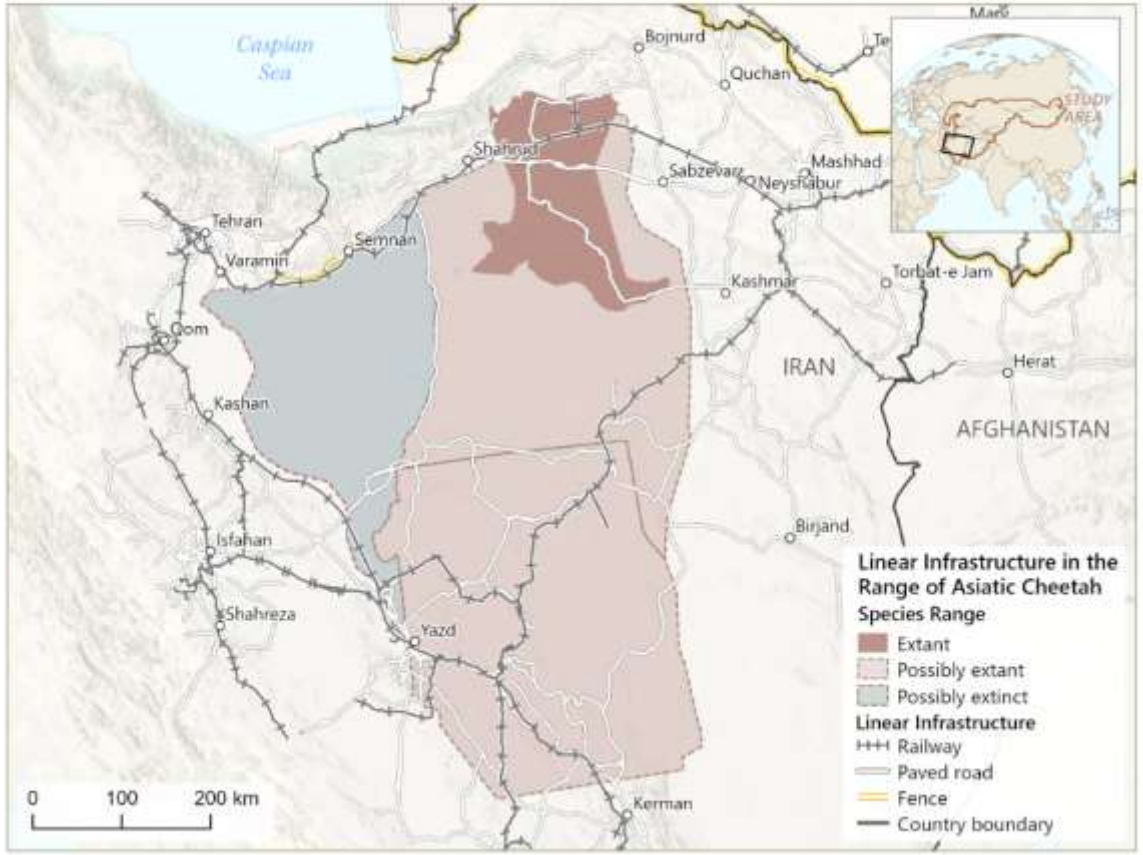
Common Name: Asiatic Cheetah
Scientific Name: *Acinonyx jubatus venaticus*
Geographic Range: Iran (Islamic Republic of Iran)
Habitat: Arid and semi-arid deserts of Iran
Global Population: <40 (Farhadinia et al., 2017)
Conservation Status: Critically Endangered (IUCN Red List, 1996), CITES Appendix I (1975), CMS Appendix I

The Asiatic Cheetah (*Acinonyx jubatus venaticus*), a subspecies of Cheetah, once roaming across a historic range from the Arabian Peninsula to India, now faces critical habitat limitation. Currently, its range is confined to small, isolated areas within Iran. Before World War II, the Iranian population of Cheetah was estimated at almost 400 individuals (Harington, 1971). In recent decades, its population has been estimated as less than 40 individuals (Farhadinia et al., 2017). The main cause of Cheetah mortality is largely attributed to human-induced pressures, including illegal human killing, mainly by herders and their dogs or poachers, as well as vehicle collisions (Durant et al., 2017).

MOVEMENT BEHAVIOUR

The Asiatic Cheetah has been observed as a wide-ranging, nomadic predator, which moves exceptionally long distances to find resources and cope with harsh environments. A multiple year of camera trapping data showed that an adult female moved 150 km multiple times between protected areas in three years, covering an estimated 3,629 km^2 (Farhadinia et al., 2013). A female with 3 cubs covered an area of 3,600 km^2 while a coalition of 3 males moved 4,800 km^2 over 3 years (Farhadinia et al., 2016). In addition, GPS tracking data also showed that over 4.5 months of tracking, a cheetah moved over a range of 1137 km^2 (Cheraghi et al., 2018). On average, cheetahs move 8.87 km/day when they move. An extreme observation showed that the cheetah moved 130 km in over a two-weeks. These wide-ranging behaviors of Asiatic Cheetah in Iran underscore the need for extensive, interconnected habitats to support sustainable populations.

LINEAR INFRASTRUCTURE IN THE RANGE OF ASIATIC CHEETAH



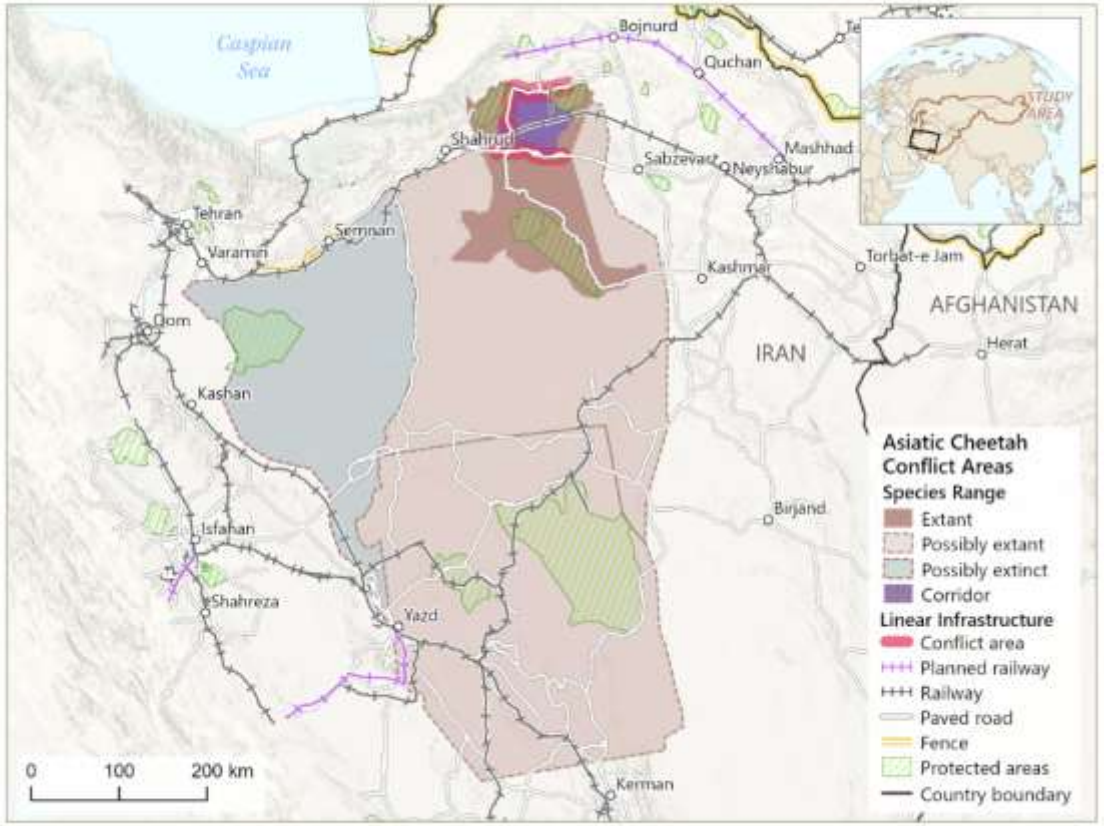
Estimated Linear Infrastructure in the Species Range

6 km	Fence
1,958 km	Railroad
4,303 km	Paved road
6,267 km	Total existing linear structure
70 km	Planned railroad

Key Linear Threats to Movements and Habitat Fragmentation of Asiatic Cheetah in Iran

The railroad and paved road networks intersect with the species' range, but **highway or paved roads pose a significant barrier to the movement of the Asiatic Cheetah and cause vehicle collisions. Specifically, the highway 44 between Tehran and Mashhad is of particular concern as it transects a key corridor between the core habitats of Touran Biosphere Reserve (1) and Miandasht Wildlife Refuge (2) used by the only known breeding population.** There are no fences within the species' range, and railroads remain unfenced.

CONFLICT AREAS AND CORRIDORS IN THE RANGE OF ASIATIC CHEETAH



CONFLICTS WITH LINEAR INFRASTRUCTURE

As the Asiatic Cheetah requires an extensive home range to thrive, the fragmentation of its habitat has become one of the most pressing threats. **The Asiatic Cheetah is in conflict with the growing network of roads and particularly primary roads transecting its suitable habitat - a threat that markedly increases its risk of extinction** (Mohammadi et al., 2018, Farhadinia et al., 2017). There are several conflict areas within the species range, which overlap with the suitable habitats. **Specifically, the highway 44 between Tehran and Mashhad is of particular concern as it transects a key corridor between the core habitats of Touran Biosphere Reserve (1) and Miandasht Wildlife Refuge (2) used by the only known breeding population.**

At least 14 Asiatic Cheetahs were killed on roads within or between core areas during 2005-2016, making it the major cause of documented mortality for Cheetahs in Iran (Ahmadi et al., 2017, Mohammadi et al., 2018). Among these, **seven Asiatic Cheetahs were killed on Semnan-Mashhad highway. Between 2021 and 2023, three accidents occurred on this highway, resulting in the loss of two cubs and one adult** (Triennial Report 2021-2023).

As a result of the **growing mining industry within Cheetah habitat, the railroad network is projected to grow accordingly and may cause a suite of conservation threats in the future, such as a fragmentation of Cheetah prey populations driving their distribution.**

MITIGATION/REMEDIATION STRATEGY
ROAD

In 2018, Iran took a proactive step by establishing a 3-kilometer fenced area near a wildlife reserve to enhance the safety of Cheetahs by preventing them from accessing the road. This initiative successfully reduced road accidents involving Cheetahs until 2022. However, since the fence only covered a portion of the reserve's border and monitoring was not implemented, the reasons for the temporary decline in roadkill remain unclear.

To build on this progress, Iran has proposed several constructive measures aimed at further reducing collisions. These include plans to extend the fence from 3 kilometers to 36 kilometers on both sides of the road, retrofit culverts beneath the road to function as wildlife corridors, install roadway lighting for better visibility, and deploy speed control cameras to regulate traffic. These efforts could significantly enhance wildlife protection while promoting safer roadways for all.

- Fence dangerous stretches of roads, and create accompanying wildlife passages, to minimize collisions with cars at documented "hotspots."
- Install effective, reflective signage close to the road.
- Connect existing underpasses in the case of separated highway lines and monitor for effectiveness.
- Investigate efficacy of speed bumps on low-volume roads.

More information:

Asiatic cheetah and CMS

Asiatic cheetah on the IUCN Red List

Iranian Cheetah Society Triennial Report-2021-2023

Acknowledgements

Maksatbek Anarbaev, Lkhagvasuren Badamjav, Buuveibaatar Bayarbaatar, Gantulga Bayandonoi, Chimeddorj Buyanaa, Nandintsetseg Dejid, Li Diqiang, Kim Fisher, Rodney Jackson, Petra Kaczensky, Zairbek Kubanychbekov, Natalya Marmazinskaya, Stefan Michel, Thomas Müller, Rustam Murzakhanov, Kirk Olson, Polina Orlinskiy, Stephane Ostrowski, Olga Pereladova, Yelizaveta Protas, Christiane Röttger, Albert Salemgareyev, Eric Sanderson, Oliver Schall, Bahareh Shahriari, Christopher Spagnoli, Andrea Strauss, Adiya Yadamsuren, Peter Zahler, Steffen Zuther, Saeideh Esmaeili, Mohammad Farhadinia, Mahmoud-Reza Hemami, Shirin Karryeva, Ismoil Kholmatov, Valery Kuznetsov, Alireza Mohammadi, Clara Nobbe, Batbayar Nyambayar, Morteza Pourmirzai, Eldar Rustamov, Tazarf Shamirova, Ito Takehiko, Atie Taktehrani, Enkhtsetseg Tuguldur, Xue Yadong for their collaboration and contribution of data and expertise for the both versions of the Atlas.

Thank you for your attention