UN environment programme

Convention on the Conservation of Migratory Species of Wild Animals

CMS

BfN Federal Agency for Nature Conservation

First Range State Meeting for the Asiatic Wild Ass (Khulan)

Vilm, Germany, 26 June – 1 July 2023

UNEP/CMS/AWARS1/Doc.5

RANGE-WIDE THREATS TO THE CONSERVATION OF THE ASIATIC WILD ASS

This document was prepared for the CMS Secretariat by Ms. Petra Kaczensky, professor at the Inland Norway University of Applied Sciences and member of the IUCN Species Survival Commission Equid Specialist Group with input from experts from Wild Ass Range States. This work was funded in the framework of the cooperation between the CMS Secretariat and the International Academy for Nature Conservation of the German Federal Agency for Nature Conservation (BfN INA) by the German Federal Ministry for the Environment, Nature Conservation and Consumer Protection. The views expressed herein are those of the author and do not necessarily reflect official opinions of the involved institutions.

The Meeting is invited to take note of this document.

Contributing Authors:

Amosh Bouskila, Dept. of Life Sciences, Ben-Gurion University of the Negev, Beer Sheva, ISRAEL
Bayarbaatar Buuveibaatar, Wildlife Conservation Society Mongolia, Ulaanbaatar, MONGOLIA
Elena Bykova, Institute of Zoology, Uzbek Academy of Sciences, Tashkent, UZBEKISTAN
Nandintsetseg Dejid, Senkenberg Biodiversity and Climate Research Center (SBiK-F), Frankfurt, GERMANY
Mahmoud-Reza Hemami, Department of Natural Resources, Isfahan University of Technology, Isfahan, IRAN
Natalya Marmazinskaya, Institute of Zoology, Uzbek Academy of Sciences, Tashkent, UZBEKISTAN
Shirin Karryeva, CEPF/CLLC Project Manager, Ashgabat, TURKMENISTAN
Sarah King, IUCN Equid specialist group, Colorado State University, Fort Collins, USA
Patricia Moehlman, IUCN Equid specialist group, USA
Rustam Murzakhanov, Michael Succow Foundation, Greifswald, GERMANY
Adriana Prahl, EEP Persian Onager coordinator; Tierpark Hagenbeck Hamburg, GERMANY
Qamar Qureshi, Wildlife Institute of India, Dehra Dun, INDIA
Albert Salemgareev, Association for the Conservation of Biodiversity of Kazakhstan (ACBK), KAZAKHSTAN
Nita Shah, Independent expert, c/o Wildlife Institute of India, Dehra Dun, INDIA
Chris Walzer, Wildlife Conservation Society, New York, USA
Jens Wunderlich, Michael Succow Foundation, Greifswald, GERMANY
Wenxuan Xu, Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, Urumqi, CHINA
Weikang Yang, Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, Urumqi, CHINA

Contents

Background

The drivers and threats to Asiatic wild ass conservation were compiled based information published in scientific papers and technical reports, on expert assessment, discussions with species experts from the range states in the field and during past workshops, and while working on this draft (Appendix 1). They are also linked to the Programme of Work (PoW) for the Central Asian Mammals Initiative 2021-2026 (UNEP/CMS 2020)(Appendix 2).

Global constraints and drivers of change

Past Asiatic wild ass population decreases and range contractions have been attributed to a combination of land conversion, overhunting, and displacement by, and competition with, livestock for pasture and water (Bannikov 1981; Kaczensky et al. 2015; Moehlman 2002; Ransom and Kaczensky 2016). This has led to the eradication of the Asiatic wild ass from 80% of their former range. The same threats remain in place today while the pace of infrastructure and socio-economic development has dramatically increased, and climate change compounds the situation. The understandable goal of all range countries to improve the wellbeing and livelihoods of their citizens can result in conflicts with conservation goals. The constraining impact of the desire for rapid development is magnified by generally limited capacity and investment (manpower, knowledge, money, political action) available for wildlife conservation, protected area management, and land usage planning in general.

Within the context of these broad constraints there are multiple specific drivers that have direct impacts on Asiatic wild ass conservation. The Problem Tree in Figure 1 shows these drivers, and how they link to specific threats. Broadly speaking these diverse drivers can be clustered into thematic areas that are interconnected via multiple mechanistic links and causal paths (Codes in brackets refer to the specific constraints and drivers in the Problem tree in Fig. 1)

1) The need to feed a human population, with an increasing demand for dairy and meat products (Benton et al. 2021) has resulted in a dramatic increase in livestock numbers and changes in the agricultural systems which causes conflicts over land use priorities. [D2, D3, D6, D6]

2) The rapid development of the resource extraction sector and the associated influx of people and technical infrastructure has resulted in huge socio-economic changes, but also causes habitat degradation and destruction, and creates new sources of disturbance. [D4, D13]

3) The rapid expansion and upgrading of transport infrastructure (road and rail) to meet the needs of trade and resource extraction to connect Central Asia to international markets, has resulted in the construction of numerous new highways and railways, many of which remain unmitigated for the barrier effect they have on wildlife (UNEP/CMS 2019; USAID 2021). [D7]

4) The goal to ensure universal access to affordable, reliable and modern energy services (Sustainable Development - Goal SDG 7) in combination with Climate change actions is encouraging ambitious renewable energy projects across the open arid and semi-arid landscapes. These require large areas, potentially reducing wildlife habitat and hindering movements (Bennun et al. 2021; CMS 2020; Trommetter 2017) [D4]

5) Political instability, growing concerns for national security and unwelcome human migration, and the need to secure Customs Unions have resulted in the reinforcement of existing and the erection of new border fences. This development has created barriers for wildlife movements and challenges transboundary conservation and management of wildlife (Linnell et al. 2016; Mason et al. 2020; Michel 2019). [D12]

6) Poorly designed and not enforced legislation and corruption hinder the implementation of existing policies, result in weak law enforcement, low capacity of protected areas, and often favour poorly planned development over conservation. [D8-D11]

7) In general, there is an insufficient degree of institutional capacity across the region to effectively implement existing legislation and policies, and to ensure that the needs of mobile species like Asiatic wild ass are incorporated into the rapid land use changes and development planning which characterises the region [D8, D9, D12].

8) Climate change with increasing temperatures and an expected higher frequency of extreme events such as droughts, severe winter storms, fires, and long-term changes in water and pasture availability can be expected to result in local or regional mass mortalities of wild ungulates unless large scale connectivity is maintained (Hijioka 2014; IPBES 2018; Kauffman et al. 2021). [D1]

8) At the same time, historical threats, based on social values/pressures, cultural norms and ignorance persist and threaten population persistence and recovery in parts of the range (Kaczensky et al. 2020; Kaczensky et al. 2015). [D13]

The following sections provides an overview of the specific threats resulting from these drivers with a short description of how and why these threats are relevant to Asiatic wild ass conservation.

Threats

T1 Pasture degradation

Livestock numbers keep increasing throughout the CAMI region, with high densities of extensively grazed livestock, especially sheep and goats, present in many parts of the Asiatic wild ass range. In Mongolia, livestock numbers have reached a historic record, numbering over 71 million heads in 2022. Increasing grazing pressure has triggered widespread concern over unsustainable pasture use, leading to pasture degradation and loss of biodiversity. Degraded pastures have a low productivity and are often dominated by low quality fodder plants.

T2 Pasture competition

In the cold desert regions of Central Asia, pasture competition between different herbivores is highest during the long and cold non-growing season in winter when energy expenditure for maintaining body temperature is high and vegetation is sparse, low in energy content and once grazed does not regrow before spring.

Grazing reduces the overall available plant biomass, which can lead to competition in times of pasture shortage. Unfortunately, it is still common practise to open protected areas for livestock grazing during times of climate extremes as a disaster relief strategy for local herders. With livestock numbers still growing, competition between livestock and wild ungulates like Asiatic wild ass can be expected to increase strongly, even in protected areas during ow productivity seasons and years.

Livestock grazing in Central Asian drylands is constrained by water availability. Daily commuting distances of herders and their livestock between pasture and water are shorter than those of Asiatic wild asses. This leaves more distant pastures less impacted by livestock grazing and human disturbance. Drilling new wells, as a measure to combat local overgrazing by livestock, and the use of water trailers and water tanks (to bring water to livestock herds) threaten to bring livestock into the heart of the last remaining Asiatic wild ass refuges.

Asiatic wild asses avoid areas of higher livestock density and other human activity. With increasing livestock numbers, it will be increasingly difficult for them to find undisturbed areas.

Near settlements, herder camps or guarded livestock flocks, Asiatic wild asses additionally risk being attacked or chased by dogs.

T3 Fencing pastures

In most of central Asia and Mongolia, pastureland is publicly owned and fencing of rangeland remains rare. In northern China, on the other hand, pasture degradation due to overgrazing has led to the erection of large-scale grazing exclosures to keep livestock out. However, this measure not only protects the pasture from livestock, but also excludes wild ungulates. What is more, within the Asiatic wild ass range, these fences can block migration routes and access to water while also acting entanglement death traps.

Privatisation of rangeland is and has been discussed as a measure to combat pasture degradation and modernise the livestock production sector. If it were to happen, there is a high risk that private owners will start fencing their pastures as has happened in other parts of the world, where rangeland is primarily privately owned.

T4 Commercial harvest of “wild hay”

In the steppe regions, near oases, or along rivers, hay harvest for winter fodder also limits access to high quality grazing for wild ungulates, including Asiatic wild asses. In the steppes of Mongolia and Kazakhstan, commercial scale harvest of “wild hay” seems to be increasing.

T5 Disease transmission

Asiatic wild asses are subject to the same diseases and parasites as other wild and domestic equids. Free-ranging Asiatic wild asses have tested PCR-positive for various equine herpes viruses and seroconverted to a variety of influenza A viruses. To our knowledge, large disease outbreaks among Asiatic wild asses have not been documented in the past decades and are possibly very rare.

However, the outbreak of African horse sickness in the 1960s in India resulted in a catastrophic collapse and the subsequent extinctions of smaller Asiatic wild ass populations in India. The Asiatic wild ass’s high mobility, large ranges, seasonal aggregations, and shared pastures with domestic equids has potential for livestock-Asiatic wild ass spill over events. The large ranges of Asiatic wild asses would potentially facilitate the subsequent disease spread over large areas.

Given the combination of increasing livestock numbers, climate change, and newly emerging or re-emerging diseases globally, this issue of disease transmission certainly requires more attention in the future.

T6 Habitat loss

Grasslands are globally among the least protected biomes, and the conversion of grasslands into agricultural areas, particularly the ploughing of the Eurasian steppe to grow cereals, has dramatically reduced the habitat available for large ungulates like Asiatic wild asses.

The growth of urban areas, industrial, and mining developments also destroy habitat by converting pastures into built-up areas, fencing off access, potentially polluting pastures with chemicals or dust, and by creating disturbance.

Increased car ownership results in an increasing network of dirt roads, reducing available pasture area. Car or motorbike ownership can also lead to the “recreational chasing” of Asiatic wild asses. The recent use of snowmobiles creates novel opportunities for chasing Asiatic wild asses in winter.

Illegal artisanal gold mining ("ninja mining") emerged in Mongolia in the 1990s and has resulted in the localized mechanical destruction of pastures, pollution of water sources, and subsistence poaching. Legalizing small-scale gold mining and the rapid development of legal mining has reduced but not eliminated this land-conflict. In Great Gobi B Strictly Protected Area in SW Mongolia, one ranger and one local police officer must guard one particular area against illegal miners 24/7, binding already scarce resources.

When Asiatic wild asses enter cereal fields, melon plantations, or orchards, conflicts arise with farmers, which either result in the exclusion of Asiatic wild asses through fencing, farmers chasing them away, or illegally killing them (i.e., in Iran, Turkmenistan, Kazakhstan, and Israel). Consequently, conversion of drylands into agricultural plots (i.e., by irrigation) results not only in Asiatic wild ass habitat loss but is often coupled with increased conflict and mortality.

T7 Invasive plants

Increased international travel and the human desire to introducing new plant species to grow as crops, ornamental plants, or for habitat modification has resulted in the spread of many invasive species, some with highly detrimental consequences for the native ecosystem. So far invasive plants have not been discussed much in the context of grassland conservation and the conservation of migratory ungulates in Central Asia. However, *Prosopis juliflora,* introduced to the Little Rann of Kutch in the 1950s and 1960s is spreading at an alarming rate, reducing pasture for livestock and wildlife including Asiatic wild ass.

T8 Habitat fragmentation

Asiatic wild asses have become largely confined to semi-desert and desert areas with a high variability in water and pasture availability. To cope with this unpredictable environment and track the scarce resources available, Asiatic wild asses need to have access to large tracts of land. This is particularly true in times of weather extremes when Asiatic wild asses need to outrun summer droughts, extreme winters, or large steppe fires. Although protected areas may provide important refuges, most are too small. It is therefore crucial that long-term planning for conservation of Asiatic wild asses occurs at the landscape scale!

A key driver of habitat fragmentation is the rapid development of linear infrastructure. Although the structural presence of roads and railways *per se* does not seem to constitute a major obstacle to Asiatic wild ass movements, traffic volume and steep embankments reduce and hinder movements. In areas with high traffic volumes, vehicles – wild ass collisions also occur and constitute a safety risk for drivers and a mortality risk for Asiatic wild asses.

Fenced linear infrastructure reduces the risk of vehicle collisions. However, without wildlife crossings, fenced highways and railways become absolute barriers. The fact that Asiatic wild asses are unwilling to jump over, or crawl under fences has been well demonstrated in Mongolia by the fence along the Trans-Mongolian railway (TMR). For decades, this fence has acted as range-restricting barrier, blocking Asiatic wild asses from former habitat in the Eastern Steppe.

Unfortunately, fencing railways is common practice in the region. In Mongolia, three new railways which cross through the heart of the Asiatic wild ass range in the South Gobi region have recently been completed. One of these railways is completely fenced, one partly fenced, and more fencing is discussed due to the risk of livestock being hit. This is a very worrying development which may well threaten connectivity goals developed for Mongolia previously (UNEP/CMS 2015).

In northern India, in the Rann of Kutch, dams and canals also threaten to fragment the habitat of the Asiatic wild ass. In addition, the need for renewable energy has sparked the construction of wind and solar parks, which require large tracts of land.

T9 Border fences

Border fences are a particular case of fences as they tend to stretch over hundreds of kilometres of land otherwise often little impacted by human activities. Access to the border regions tends to be restricted and entry may require special permissions. All the Asiatic wild ass range countries have border fences and transboundary cooperation is particularly relevant for the Asiatic wild ass populations on the Ustyurt plateau and in the Gobi. Several protected areas which are highly relevant for Asiatic wild ass conservation are found along fenced international borders, which severely hinders or blocks population connectivity and results in mortalities due to fence entanglement. Where Asiatic wild ass populations are recovering, such as in India's Rann of Kutch, the fenced international border prevents recolonisation of suitable habitat on the Pakistan side (N. Shah and Q. Qureshi pers. comm. 2023).

T10 Reduced access to water

Asiatic wild asses need regular access to water ideally daily, within commuting distances of no more than 15-20 km. In large parts of the Asiatic wild ass range, water points are rare and distances between them are large. Hence, if Asiatic wild asses get cut off from water sources due to habitat fragmentation or disturbance (including livestock presence), the pastures in the areas surrounding these water points also become unavailable to them. This not only reduces the overall pasture available to the population, but also forces Asiatic wild asses to concentrate at fewer waterpoints, thereby increasing the risk for parasite and disease transmission and making them more vulnerable to predation and illegal hunting.

Rising temperatures due to climate change are also likely to reduce the availability of open water in parts of the range. Several wild ass populations in the hotter, dryer part of the range are already heavily dependent on artificial water sources or water trucks which refill cisterns (e.g., Israel, Iran, Turkmenistan, Kazakhstan – Barsa Kelmes). Without there interventions, these populations would most likely decrease dramatically or even cease to exist. This makes these Asiatic wild ass populations very vulnerable to disruption of funding streams (e.g., for manpower, vehicles, technical maintenance of pumps and repair) necessarily for these interventions.

T11 Small and isolated of populations

Forcing migratory or nomadic species like Asiatic wild ass to become range resident greatly lowers the carrying capacity of the landscape by restricting the population's ability to track resources, avoid predators, and minimize exposure to parasites. Reduced mobility in combination with smaller population sizes makes populations more vulnerable to localized events and reduces their resilience to climate change. Small, isolated populations are also demographically and genetically more vulnerable and prone to extinction, particularly in habitats with frequent environmental extremes. Small and localised populations also have limited resilience to disease outbreaks.

T12 Illegal killing

Asiatic wild asses are poached for meat, hides, and certain body parts such as bone marrow fat, liver, and lung (which are believed to have medicinal properties). Asiatic wild ass may also be killed for recreation, curiosity, or as "by-catch" while legally or illegally hunting for other wildlife.

Poaching in Mongolia peaked in the early 2000s and included large scale market hunting, but currently seems to be much reduced. However, Asiatic wild ass lung has been offered on social media as a remedy for lung problems cause by COVID-19. Poaching in Inner Mongolia in northern China also no longer seems a serious threat, due to the species strict protection status which results in severe punishment of poachers

Poaching remains a key threat in Turkmenistan, parts of Kazakhstan, Uzbekistan, and Iran. In Turkmenistan poaching has resulted in the recent eradication of the last autochthonous population of *E. h. kulan* in Badhyz and in Kazakhstan it has negatively impacted reintroduction to the central steppe and does seem to hinder expansion beyond Altyn Emel National Park and Barsa Kelmes State Nature Reserve.

Where abundant, Asiatic wild ass are considered pasture competitors and there are occasions when herders kill Asiatic wild asses to discourage other Asiatic wild asses from using certain pastures. Retaliation killings happen where Asiatic wild ass enter agricultural plantation raiding and trampling crops and knocking down fences. Asiatic wild ass – human conflicts are particularly of concern in India Israel, and Iran and previously in Turkmenistan.

T13 Illegal trade

There is currently little indication of any trade in meat or body parts of Asiatic wild asses across international borders.

The huge demand for Chinese medicine known as “Ejiao” or “Ah-Chiao” is threatening donkey stocks in Africa and several countries have banned the export of skins. This has also sparked some concern that closely related Asiatic wild asses, could also be targeted. However, the sheer volume of the industry (nearly 4.8 million donkeys are estimated to be killed each year to manufacture Ejiao) makes it obvious that the limited populations of Asiatic wild ass cannot meet demands. Ejiao can obtain donkey skins more easily from the market and don’t need to risk penalties by using Asiatic wild ass skin. There is currently no indication for the use of Asiatic wild ass skins nationally in China nor for cross-boundary trade (W. Xu pers. comm. 2023).

However, it would generally be prudent to monitor markets and social media feeds throughout the Asiatic wild ass range for novel trends in the use of and demand for Asiatic wild ass body parts to be able to counteract these developments early. In Mongolia, such monitoring has for example revealed the novel use of Asiatic wild ass lung as a remedy against COVID-19 related lung problems (B. Buuveibaatar pers. comm. 2023).

T14 Harassment & disturbance

Throughout their range, Asiatic wild asses are regarded as pasture competitors when perceived as being “too numerous”. Furthermore, local herders fear that Asiatic wild asses destroy the pasture with their hooves, digging out plants and their roots, thereby causing erosion. In the Mongolian Gobi, herders are particularly concerned about Asiatic wild asses depleting their winter pastures. When large groups of Asiatic wild asses are encountered in fall or winter near these pastures, herders actively chase them away.

Chasing Asiatic wild asses by motorbike or car for “fun” seems common practise of people, including rangers, and tour guides. With increasing car ownership and better road access to the Asiatic wild ass range, this can result in frequent disturbance. These chases are energy demanding for Asiatic wild asses, can disrupt groups, and risk separating foals from mothers.

Asiatic wild asses need to drink daily, which makes them vulnerable to disturbance at water points. Evidence from the Mongolian Gobi suggest that in areas with higher human and livestock presence, Asiatic wild ass primarily drink at night. Where poaching pressure is high and animals have long flight distances, human presence at water points or activity near water points will likely result in Asiatic wild ass displacement, potentially forcing the animals to move potentially large distances to find water elsewhere or wait until human activity ceases at night.

T15 Mass mortality

The current climate prediction models for Central Asia are associated with a high degree of uncertainty concerning both the timing and amount of precipitation and the interactions between temperature and precipitation on pasture and water dynamics.

Of special concern is the future frequencies of droughts in summer and extreme winter storms. These can and have resulted in mass mortalities of livestock and wildlife. The severity of the impact on wild ungulates can be expected to be especially severe, where livestock numbers are high, and barriers hinder Asiatic wild ass migration to less impacted areas.

If the frequency and/or severity of extreme weather events increases, Asiatic wild ass populations may not be able to recover before the next extreme event hits, resulting in declining populations which may eventually face extinction. In steppe habitats, the occurrence of large-scale fires may also result in mass mortalities if escape routes are blocked by barriers.

Of longer-term concern is the uncertainty surrounding the future northwards expansion of the desert zone and how this will impact habitat and water availability. Especially where Asiatic wild asses live in the driest and hottest habitats (Israel, Iran, Turkmenistan, and the southern parts of Kazakhstan and Uzbekistan), water already comes almost exclusively from artificial water points or is provided by water trucks. If it gets even hotter and driers, even these sources may eventually dry up or it will become too expensive to drill for alternative water sources.

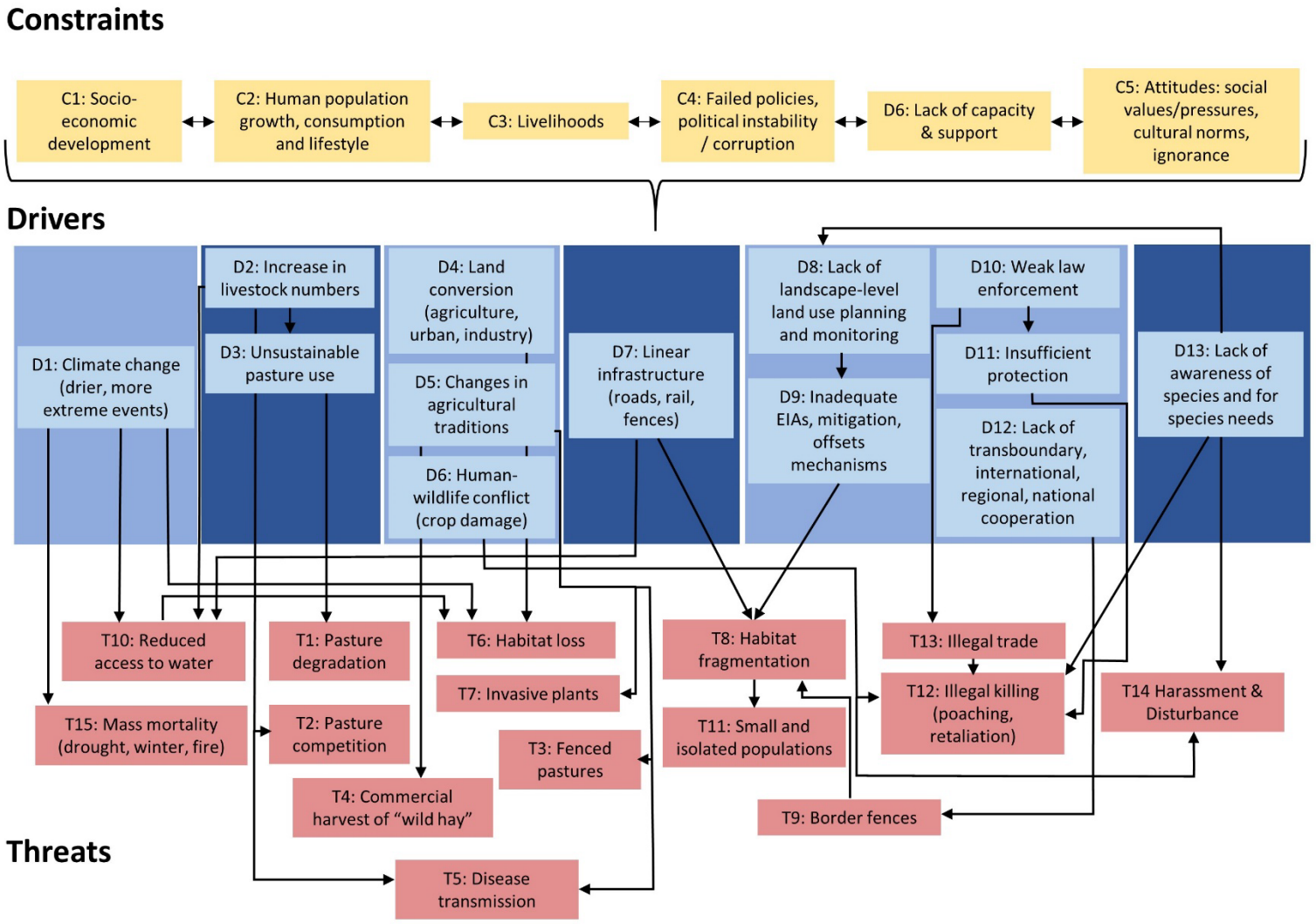

Fig. 1: Problem tree for Asiatic wild ass conservation.

Summary of population specific threats by country

Threats in northern **China** from intensified resource extraction and degazetting of parts of Kalamaili Mountain Ungulate National Nature Reserve (KNR; Xia et al. 2014) have been largely addressed. Kalamaili was upgraded to National Park in 2022, and habitat restoration and wildlife crossings along the central highway seem to have resulted in the recovery of the population (Xu et al. 2022). Furthermore, all livestock has been banned from KNR (Qing Cao, pers. comm. 2022). The border fence along the international border with Mongolia is making transboundary movements extremely difficult. The situation in Inner Mongolia is unclear, although the fence along the international border with Mongolia largely inhibits population exchange; breaches seem to happen and may be the main source of khulan presence on the Inner Mongolian side. Poaching does exist, but it is sporadic and no longer a serious threat in China, likely due to the strict protection regime and severe punishments poachers face. Like Mongolia (Kaczensky et al. 2020), rapid infrastructure development poses the major threat to Asiatic wild ass in China, especially those related to the resource extraction industry (mining), which creates new barriers to migration/nomadic movement and results in habitat loss and degradation (Xu et al. 2022; Zhuo et al. 2022).

Threats to Asiatic wild ass in the Little Rann of Kutch in **India** stem from increasing human activities. Land use patterns have changed since the Mega Narmada Dam Project which resulted in the Sardar Sarovar canals all around the protected area (Goyal et al. 1999). Uninformed release of Sardar Sarovar canal excess waters into the Rann is having an impact on the micro-habitat, the short grasslands and is restricting the movement of Asiatic wild ass and other species across the saline desert. Exotic weeds are brought along by the Narmada water which are displacing the Rann grassland species (N. Shah 2018-2020 unpubl.). Increased agricultural practices have converted fallow lands into irrigation fields, resulting in shrinking habitat for the existing Asiatic wild ass population. Crop diversity has largely shifted from food to cash crops leading to heavy use of insecticides and pesticides which are polluting ground and surface waters. Religious activities, cattle breeding and influx of people have accelerated on the Islands or Bets of the Rann. *Prosopis juliflora* invasion is an additional threat to the habitat (Sinha et al. 2009). An estimated 30-35% of the Asiatic wild ass population lives outside the protected area and human-Asiatic wild ass conflicts are increasing, particularly crop raiding. The increased use of electric fencing is threatening to fragment remaining movement corridors for Asiatic wild asses (Shah pers. obs. 2013-2018). The uncontrolled salt “mining” and transport is causing disturbance and barriers to wildlife movements and threatens to degrade creek habitats. In recent years Asiatic wild ass have also been increasingly hit on the major express highway, especially the Viramgam Dhrangadhra National highway. The International Boundary with Pakistan has been fenced thus restricting transboundary movements for Asiatic wild asses. Although the population is on the rise, foaling rates have been on the decline in recent years (N. Shah pers. comm. 2014). Of further concern is the relatively low genetic diversity (Khaire et al. 2017) which may be enhances if the population within the Wild ass sanctuary becomes separated from the animals outside. Disease remains a risk, especially given the increasing Asiatic wild ass – livestock interface. In recent years, small outbreaks of surra were observed and reported to the authorities in (N. Shah pers. obs. 2018, 2019 and 2020). With climate change dust storms, heat waves, and unseasonal rainfall are becoming increasingly frequent, while delayed seasonal rainfall is a grave concern for the biodiversity and human survival in the landscape (N. Shah unpubl. data)

In **Iran** climate change is likely the most important threat enhancing the threats currently caused by limited availability of water and pasture competition with livestock. Upgrading the core zone of Bahram-e-Goor protected area to Qatrouiyeh National Park and providing water supplies and occasional hay resulted in an increase of the Asiatic wild ass population. In

contrast, the large adjacent Bahram-e-Goor protected area seems to provide only limited living space for Asiatic wild asses due to occupation of water sources and pastures by livestock and insufficient capacity of rangers for patrolling. As a result, the Asiatic wild ass population is concentrated in Qatrouyeh National Park, where signs of high herbivory pressure from Asiatic wild asses are starting to show. An expansion into adjacent protected areas towards the north is currently observed, but also triggers concerns over conflicts with local people over crop raiding (Esmaeili et al. 2019) and Asiatic wild ass – vehicle collisions (Mohammadi et al. 2023). In Touran protected area the distribution range and abundance of Asiatic wild asses seems to have stabilised and may even increase. Occupation of suitable Asiatic wild ass habitats by livestock (sheep and goats and camels), poaching (usually by chasing the animal by motorbike) and insufficient protection are the most important threats to the species in this reserve.

The reintroduced Asiatic wild ass population in **Israel** lives in an extremely arid environment prone to droughts and in summer. There are at present seven artificial, permanent water sources within the current distribution area. There are four natural springs too, but they are often visited by many people and this usually prevents the wild asses from using them. Presently the major known mortality cause is Asiatic wild Ass vehicle collisions. Although the population size has doubled since 1999, an increase in the probability of extreme events under the predicted climate change scenario may still make this population vulnerable to extinction as modelled by (Saltz et al. 2006). Another simulation model, based on changes in allele frequencies, suggests that a strong polygynous mating system is leading to increased genetic drift (Renan et al. 2015) and small effective population size (Renan et al. 2018). Researchers from Ben Gurion University of the Negev recommended to the Israel Nature and Parks Authority that they add water sources to increase the potential sites for male territories. In 2020 three new artificial water sources were opened. At the same time, one of the previous water sources was closed, due to proximity to a paved road and the risk of vehicle collisions. The impact of the water sources manipulation on the social network and the number of males participating in reproduction is currently being studied. Damages to new vineyards (planted since 2007 near the wild ass range) cause conflicts with the farmer. The vineyards are only loosely fenced, and the animals can cross these fences easily. The farmers try to chase them away, but so far there is no indication of illegal killings. However, some activists are concerned that the wild ass population has "increased too much".

In **Kazakhstan**, Asiatic wild asses in Altyn Emel National Park are thriving but are believed to have reached carrying capacity. The population in Barsa Kelmes seems stable but remains confined to the area around Kaska kulan with its three artesian wells. Reintroduction of Asiatic wild asses from Altyn Emel National Park to Andassay Sanctuary have stopped and the status and whereabouts of the reintroduced animals is largely unknown due to a lack of post-release monitoring. Two new reintroduction projects have been initiated (Kaczensky et al. 2021; Salemgareyev et al. 2023). Limited capacity and poaching, especially outside protected areas remains a threat. Along the southern border with Uzbekistan and Turkmenistan, border fences block cross-border movements.

The main threats to Asiatic wild ass in **Mongolia** remain competition for water and pasture with a growing livestock population, which threatens to degrade the pastureland. The temporally high illegal offtake in Mongolia seen in the early 2000s seems to be greatly reduced but could be resumed if the economic situation becomes unstable and high inflation persists. Newly emerging threats are rapid infrastructure development particularly in connection with resource extraction industries (mining) that is resulting in new barriers to migrations/nomadic movements and habitat loss and degradation (Kaczensky et al. 2020). The situation is

complicated by a lack of binding standards, capacity, and funding to implement landscape scale planning and conservation (Wingard et al. 2014). Climate change was identified as an important future threat due to its predicted impact on the scarcity of resource base (pasture and surface water) and increased frequency and severity of extreme weather events.

The situation of Kulan in **Turkmenistan** has deteriorated as poaching outside and inside the protected area remains a problem. The autochthonous population in the Badkhyz Strictly Protected Area is functionally extinct. The remaining group of Asiatic wild asses in Gury Howdan is very small, shows signs of inbreeding, and has little prospect for expansion. The occurrence in the Kaplankyr region seems to be restricted to within the border security zone which is connected to Uzbekistan; outside the fence signs of wild ungulates are extremely rare. Border fences dissect several protected areas which are or once were Asiatic wild ass habitat (Kaczensky and Linnell 2015; Kaczensky et al. 2019).

The situation of Kulan in **Uzbekistan** has improved due to the discovery of a kulan population in South Ustyurt near Lake Sarykamush (Marmazinskaya et al. 2016; Marmazinskaya 2019; Marmazinskaya et al. 2012). Animals also recorded in areas of Sukhoe ozero (Dry Lake), Uzunkui and Kulan takyr close to the border with Turkmenistan on the plains between the Kaplankyr and Assake Audan depression, including the area along the border with Kazakhstan. Most likely animals migrated from Turkmenistan and then stayed in the Uzbek part of the area. In addition, kulan have been translocated from the captive population at the Jeyran Ecocenter to two protected areas in the Ustyurt (Saigachy reserve) and Aralkum region (Sudochie-Akpetki reserve) in 2021-2022. Small population size, border fences, climate change, disturbance by fishermen and poaching remain key threats to kulan conservation in Uzbekistan.

Table 1: Main drivers and threats by country based on the material send.

County	**Drivers**	**Threats**
China	Land conversion, Linear infrastructure, Lack of Transboundary cooperation	Habitat loss, Habitat fragmentation, Border fence
India	Climate change, Changes in agricultural traditions, Human-wildlife conflict, Linear infrastructure	Habitat loss, Habitat fragmentation, Harassment & Disturbance, Invasive plants, Disease transmission
Iran	Climate change, Reduced access to water, Competition for pasture, Linear infrastructure, Human-wildlife conflict, Lack of awareness for species	Reduced access to water, Pasture degradation, Pasture competition, Habitat fragmentation, Small and isolated populations
Israel	Climate change, Human-wildlife conflict	Reduced access to water, Small and isolated populations
Kazakhstan	Insufficient protection, Weak law enforcement, Lack of awareness, Climate change	Illegal killing, Reduced access to water, Border fences
Mongolia	Increased livestock numbers, Linear infrastructure, Climate change, Land conversion	Competition for pasture, Pasture degradation, Habitat fragmentation, Reduced access to water, Mass mortality
Turkmenistan	Insufficient protection, Weak law enforcement, Increased livestock numbers, Unsustainable pasture use, Climate change, Lack of	Illegal killing, Reduced access to water, Pasture degradation, Pasture competition, Border fences

County	Drivers	Threats
	awareness for the species, Lack of transboundary cooperation, Land conversion	
Uzbekistan	Climate change, Lack of Transboundary cooperation, Insufficient protection	Reduced access to water, Border fences, Illegal killings, Small and isolated populations

References

Bannikov, A.G., 1981. The Asian Wild Ass. Lesnaya Promyshlennost, Moscow, Russia. [original in Russian, English translation by M. Proutkina, Zoological Society of San Diego].

Bennun, L., van Bochove, J., Ng, C., Fletcher, C., Wilson, D., Phair, N., Carbone, G., 2021. Mitigating biodiversity impacts associated with solar and wind energy development. Guidelines for project developers. Gland, Switzerland: IUCN and Cambridge, UK: The Biodiversity Consultancy.

Benton, T.G., Bieg, C., Harwatt, H., Pudasaini, R., Wellesley, L., 2021. Food system impacts on biodiversity loss Three levers for food system transformation in support of nature. Research paper, Energy, Environment and Resources Programme. The Royal Institute of International Affairs Chatham House, London, United Kingdom.

CMS, U., 2020. Renewable energy and migratory species. UNEP/CMS/Resolution 11.27 (Rev.COP13); https://www.cms.int/sites/default/files/document/cms_cop13_res.11.27_rev.cop13_e.pdf.

Esmaeili, S., Hemami, M.R., Goheen, J.R., 2019. Human dimensions of wildlife conservation in Iran: Assessment of human-wildlife conflict in restoring a wide-ranging endangered species. PLoS ONE 14, e0220702.

Goyal, S.P., Sinha, B., Shah, N., Panwar, H.S., 1999. Sardar Sarovar Project – a conservation threat to the Indian wild ass (Equus hemionus khur). Biological Conservation 88, 277-284.

Hijioka, Y., E. Lin, J.J. Pereira, R.T. Corlett, X. Cui, G.E. Insarov, R.D. Lasco, E. Lindgren, and A. Surjan, 2014. Asia. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L.White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1327-1370.

IPBES, 2018. The IPBES regional assessment report on biodiversity and ecosystem services for Europe and Central Asia. Rounsevell, M., Fischer, M., Torre-Marin Rando, A. and Mader, A. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 892pp.

Kaczensky, P., Buuveibaatar, B., Payne, J.C., Strindberg, S., Walzer, C., Batsaikhan, N., Bolortsetseg, S., Victurine, R., Olson, K.A., 2020. A conservation strategy for khulan in Mongolia: background and key considerations. NINA report 1889.

Kaczensky, P., Linnell, J.D.C., 2015. Rapid assessment of the mammalian community of the Badhyz Ecosystem, Turkmenistan, October 2014. Norwegian Institute for Nature Research, NINA Report 1148.

Kaczensky, P., Lkhagvasuren, B., Pereladova, O., Hemami, M.-R., Bouskila, A., 2015. *Equus hemionus*. The IUCN Red List of Threatened Species 2015: e.T7951A45171204.

Kaczensky, P., Rustamov, E., Karryeva, S., Iankov, P., Hudaykuliev, N., Saparmyradov, J., Veyisov, A., Shestopal, A., Mengliev, S., Hojamyradov, H., Potaeva, A., Kurbanov, A., Amanov, A., Khekimov, G., Tagiyev, C., Rosen, T., Linnell, J.D.C., 2019. Rapid assessments of wildlife in Turkmenistan 2018. NINA report 1696, Trondheim, Norway.

Kaczensky, P., Salemgareyev, A., Linnell, J.D.C., Zuther, S., Walzer, C., Huber, N., Petit, T., 2021. Post-release Movement Behaviour and Survival of Kulan Reintroduced to the Steppes and Deserts of Central Kazakhstan. Frontiers in Conservation Science 2, 703358.

Kauffman, M.J., Cagnacci, F., Chamaillé-Jammes, S., Hebblewhite, M., Hopcraft, J.G.C., Merkle, J.A., Mueller, T., Mysterud, A., Peters, W., Roettger, C., Steingisser, A., Meacham, J.E., Abera, K., Adamczewski, J., Aikens, E.O., Vynne, C., Bartlam-Brooks, H., Bennitt, E., Berger, J., Boyd, C., Côté, S.D., Debeffe, L., Dejid, N., Donadio, E., Dziba, L., Fagan, W.F., Fischer, C., Focardi, S., Fryxell, J., Fynn, R.W.S., Geremia, C., González, B.A., Gunn, A., Gurarie, E., Heurich, M., Hilty, J., Hurley, M., Johnson, A., Joly, K., Kaczensky, P., Kendall, C.J., Kochkarev, P., Kolpaschikov, L., Kowalczyk, R., Langevelde, F.v., Li, B., Lobora, A.L., Loison, A., Madiri, T.H., Mallon, D., Marchand, P., Medellin, R.A., Meisingset, E., Merrill, E., Middleton, A.D., Monteith, K.L., Morjan, M., Morrison, T.A., Mumme, S., Naidoo, R., Novaro, A., Ogutu, J.O., Olson, K.A., Oteng-Yeboah, A., Ovejero, R.J.A., Owen-Smith, N., Paasivaara, A., Packer, C., Panchenko, D., Pedrotti, L., Plumptre, A., Rolandsen, C.M., Said, S., Salemgareyev, A., Savchenko, A., Savchenko, P., Sawyer, H., Selebatso, M., Skroch, M., Solberg, E., Stabach, J.A., Strand, O., Suitor, M.J., Tachiki, Y., Trainor, A., Tshipa, A., Virani, M.Z., Ward, S., Wittemyer, G., Xu, W., Zuther, S., 2021. Mapping out a future for ungulate migrations. Science 372, 566-569.

Khaire, D., Atkulwar, A., Farah, S., Baig, M., 2017. Mitochondrial DNA analyses revealed low genetic diversity in the endangered Indian wild ass Equus hemionus khur. Mitochondrial DNA A DNA Mapp Seq Anal 28, 681-686.

Linnell, J.D., Trouwborst, A., Boitani, L., Kaczensky, P., Huber, D., Reljic, S., Kusak, J., Majic, A., Skrbinsek, T., Potocnik, H., Hayward, M.W., Milner-Gulland, E.J., Buuveibaatar, B., Olson, K.A., Badamjav, L., Bischof, R., Zuther, S., Breitenmoser, U., 2016. Border Security Fencing and Wildlife: The End of the Transboundary Paradigm in Eurasia? PLoS Biol 14, e1002483.

Marmazinskaya, N., Gritsyna, M., Mitropolsky, M., Murzakhanov, R., J., W., 2016. Rare ungulates of Central, Southern Ustyurt and Sarykamysh depression: the current state. Pages 118-127 in: Recent problems for the conservation of rare, endangered and protected animals of Uzbekistan. Scientific conference. 9-10 September 2016 in Tashkent, Uzbekistan. [in Russian].

Marmazinskaya, N.V., 2019. Turkmenian kulan. Red Book of the Republic of Uzbekistan. V.II. Tashkent. Chinor Enk.. pp. 352-353.

Marmazinskaya, N.V., Gritsyna, M.A., Mitropolsky, M.G., 2012. New data on rare mammal species of the south of Karakalpak Ustyurt and the north Sarykamysh Basin (Uzbekistan). Pages 204-211 in: Terrestrial vertebrates animals of arid ecosystems. International conferences dedicated to the memory of N. A. Zarudny. 24-27 October 2012 in Tashkent, Uzbekistan. [in Russian].

Mason, N., Ward, M., Watson, J.E.M., Venter, O., Runting, R.K., 2020. Global opportunities and challenges for transboundary conservation. Nat Ecol Evol 4, 694–701.

Michel, S., 2019. Mapping Transboundary Conservation Hotspots for the Central Asian Mammals Initiative. Draft report for CAMI Range States Representatives and Species Focal Points, revised based on comments by the CMS Secretariat; https://www.cms.int/sites/default/files/document/cms_cami2_inf.3_mapping-transboundary-hotspots-for-cami_e.pdf.

Moehlman, P., 2002. Equids: Zebras, Asses and Horses. IUCN Publication Services Unit, Cambridge, UK.

Mohammadi, A., Nayeri, D., Alambeigi, A., Glikman, J.A., 2023. Evaluation of motorists perceptions toward collision of an endangered large herbivore in Iran. Global Ecology and Conservation 41.

Ransom, J.I., Kaczensky, P., 2016. Equus: An ancient genus surviving the modern world. Pages 1-4 in J. Ransom and P. Kaczensky (Eds), Wild Equids: Ecology, Conservation, and Management. John Hopkins University Press.

Renan, S., Greenbaum, G., Shahar, N., Templeton, A.R., Bouskila, A., Bar-David, S., 2015. Stochastic modelling of shifts in allele frequencies reveals a strongly polygynous mating system in the re-introduced Asiatic wild ass. Mol Ecol 24, 1433-1446.

Renan, S., Speyer, E., Ben-Nun, T., Ziv, A., Greenbaum, G., Templeton, A.R., Bar-David, S., Bouskila, A., 2018. Fission-fusion social structure of a reintroduced ungulate: Implications for conservation. Biological Conservation 222, 261-267.

Salemgareyev, A.R., Kaczensky, P., Putilin, A., Ward, S., Dohrmann, A., 2023. «Reintroduction of kulan into the central steppe of Kazakhstan» Annual report 2022. Annual report.

Saltz, D., Rubenstein, D.I., White, G.C., 2006. The impact of increased environmental stochasticity due to climate change on the dynamics of Asiatic wild ass. Conserv Biol 20, 1402-1409.

Sinha, B.C., Goyal, S.P., Krauseman, P.R., 2009. How the Use of Mesquite Impacts Grass Availability, Wild Ass Sanctuary, India. Desert Plants (University of Arizona (Tucson, AZ)), 3-9.

Trommetter, M., 2017. Climate and biodiversity. Reconciling renewable energy and biodiversity. Research Report. Orée. Entreprises, territoires et environnement. hal-01649134.

UNEP/CMS, 2019. Central Asian Mammals Migration and Linear Infrastructure Atlas. CMS Technical Series Publication No. 41.

UNEP/CMS, 2020. Program of Work for the Central Asian Mammals Initiative (2021-2026). UNEP/CMS/Resolution 11.24 (Rev.COP13), Adopted by the Conference of the Parties at its 13th Meeting (Gandhinagar, February 2020); https://www.cms.int/sites/default/files/document/cms_cop13_res.11.24_rev.cop13_e.pdf.

USAID, 2021. Final Report: Building a foundation for linear infrastructure safeguards in Asia. Authors: Ament R, Stonecipher G, Butynski M, Creech T, Clevenger AP, Neelakantan A, Gangadharan A, Krishna C, Bell M, Vilela T, Bonine K, Monga M, Van Epp T, Laur A, Breuer A, Parashar S, Weinheimer CG, Hoff K. Prepared by Perez, APC for Contract no. AID-OAA-I-15-00051/AIDOAA-TO-16-00028, ESS WA#13. U.S. Agency for International Development (USAID), Washington, DC. 54 pp.https://largelandscapes.org/wp-content/uploads/2021/09/LISA_FinalReport_FINAL.pdf

Wingard, J., Zahler, P., Victurine, R., Bayasgalan, O., Bayarbaatar, B., 2014. Guidelines for Addressing the Impact of Linear Infrastructure on Large Migratory Mammals in Central Asia. UNEP/CMS/COP11/Doc.23.3.2: Guidelines, UNEP/CMS Secretariat, Wildlife Conservation Society; https://www.cms.int/sites/default/files/publication/cms-cami_pub_linear-infrastructure_wcs_e.pdf.

Xu, W., Liu, W., Ma, W., Wang, M., Xu, F., Yang, W., Walzer, C., Kaczensky, P., 2022. Current status and future challenges for khulan (Equus hemionus) conservation in China. Global Ecology and Conservation 37.

Zhuo, Y., Xu, W., Wang, M., Chen, C., da Silva, A.A., Yang, W., Ruckstuhl, K.E., Alves, J., 2022. The effect of mining and road development on habitat fragmentation and connectivity of khulan (Equus hemionus) in Northwestern China. Biological Conservation 275.