Mapping Transboundary Conservation Hotspots for the Central Asian Mammals Initiative

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Abbreviations

AoI	–	Area of Interest
AOO	–	Area of Occupancy
CAMI	–	Central Asian Mammals Initiative
CADI	–	Central Asian Deserts Initiative
CITES	–	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	–	Convention on the Conservation of Migratory Species of Wild Animals
COP	–	Conference of the Parties
EOO	–	Extent of Occurrence
GEF	–	Global Environment Facility
GIZ	–	Gesellschaft für Internationale Zusammenarbeit (Germany)
GSLEP	–	Global Snow Leopard & Ecosystem Protection Program
ICIMOD	–	International Centre for Integrated Mountain Development
IUCN	–	International Union for the Conservation of Nature
MME	–	Mass Mortality Event(s)
MSF	–	Michael Succow Foundation (Germany)
NABU	–	Nature and Biodiversity Conservation Union (Germany)
NP	–	National Park
PoW	–	Program of Work
PPR	–	Peste des Petits Ruminants (sheep and goat plague)
SPA	–	Strictly Protected Area (*zapovednik*)
SSC	–	Species Survival Commission of the IUCN
TA(s)	–	Transboundary area(s)
WCS	–	Wildlife Conservation Society (USA)
WWF	–	Worldwide Fund for Nature
UNDP	-	United Nations Development Programme

1. Background

The Central Asian Mammals Initiative (CAMI) is implemented under the Convention on the Conservation of Migratory Species of Wild Animals (CMS). CAMI aims at the conservation of migratory large mammal species in the wider Central Asian region throughout their range covering 14 countries. When adopted by CMS Parties at the 11th Meeting of the Conference of the Parties (COP11) in Quito, Ecuador (Resolution 11.24 *Central Asian Mammals Initiative*) in 2014, CAMI addressed 15 species. Through adoption of Resolution 11.24 (Rev.COP13), the 13th meeting of the Conference of the Parties to CMS, held in Gandhinagar, India in 2020 added three more species to CAMI.

At the Midterm Review Meeting of CAMI, held on 16-19 April 2018, on Vilm Island, Germany, participants recommended focusing on the promotion of transboundary conservation as a main priority within CAMI until 2020. They recommended identifying and analyzing transboundary conservation hotspots of major importance to CAMI species in the region and develop recommendations for their conservation, building on existing projects and information available within CAMI. In addition, CMS Resolution 12.7 (Rev.COP13) *The Role of Ecological Networks in the Conservation of Migratory Species* also reinforces the commitment of CMS Parties to protect transboundary habitats.

In line with these recommendations and with funding from the Government of Switzerland, the CMS Secretariat in 2019 commissioned a study "Mapping Transboundary Conservation Hotspots for the Central Asian Mammals Initiative" aiming at i) identifying key trans-boundary conservation areas in the CAMI region, ii) developing recommendations for progressing transboundary cooperation and effective conservation of those areas and their wildlife populations and iii) preparing information on those areas and populations to guide decision-makers in strengthening transboundary cooperation. This study built on the Central Asian Mammals Migration and Linear Infrastructure Atlas (further CAMI Atlas), prepared under CAMI by Wildlife Conservation Society WCS and finalized in 2019 (CMS Secretariat, 2019). This Atlas presents information on distribution of and threats resulting from linear infrastructure to populations of CAMI species. The Atlas covers the following Range States: Afghanistan, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan and adjacent range areas of target species in China and Russian Federation.

The Area of Interest (AoI) of the study prepared in 2019 was therefore identical with the area covered by the CAMI Atlas as this study also built on the maps developed in the frame of that project. To some extent, additional border areas of China that are part of the range of at least one target species were also considered. This study also covered the same species as the CAMI Atlas: Asiatic Cheetah, Wild Camel, Bukhara Deer, Asiatic Wild Ass, Chinkara, Goitered Gazelle, Argali Sheep, Mongolian Gazelle, Saiga Antelope and Snow Leopard. Additionally, this study included Przewalski's Horse or Takhi, which is listed in CMS Appendix I and included in CAMI, but was not covered in the CAMI Atlas. Two additional species had also been taken into consideration since they share the same habitat and are an important part of the respective ecosystem, namely the Persian Leopard (listed on CMS Appendix II) and the Urial Sheep (at COP 13 listed on CMS Appendix II). However, since those species had not yet been formally included into CAMI during the time of preparing this study, they were not yet considered for the prioritization of the identified areas.

The draft first version of this study was discussed during the CAMI Range State Meeting held from 25 to 28 September 2019 in Ulaanbaatar, Mongolia, where participants reviewed the pre-identified areas. Their comments were incorporated into the first version of this study. Participants also provided information about additional important transboundary sites from Bhutan, India, Nepal and Pakistan, suggested expanding the geographic scope of the study and recommended sending the report for final review to Range States and experts. It was also recommended that the final report cover all CAMI species as adopted by COP13.

Subsequently, CMS COP13 by revising Resolution 11.24 (Rev.COP13) adopted the CAMI POW 2021-2026. In accordance with measure 1.3 (a) and (f), it requested the CMS Secretariat to:

- continue the process to highlight priority sites for transboundary conservation;
- review and update the study "Mapping Transboundary Conservation Hotspots for CAMI" by the next CAMI Range State Meeting in 2026.

Therefore, in accordance with the mandates described above, the CMS Secretariat commissioned the revision of the study "Mapping Transboundary Hotspots for the Central Asian Mammals Initiative (CAMI)" with the funding from the Government of Germany, expanding its scope to include:

1) Himalaya regions of Pakistan and India and any relevant adjacent areas that are to be agreed with the Secretariat;
2) Species that were included in CAMI by CMS COP13: Gobi Bear, Persian Leopard and Urial.

The author of the study furthermore, in accordance with the recommendations by the participants of the CAMI Range State Meeting 2019 and the expansion of the geographic scope to the Himalaya region, took into consideration the CAMI species occurring in this region. These species, Wild Yak, Kiang, Chiru and Tibetan Gazelle, had not been covered by the first version of this study.

Table 1 at page 14 provides an overview of the species covered in this study. In this assessment, the focus is on populations or subpopulations of transboundary character within the geographic scope of this study.

Finally, selected recommendations concerning the Asiatic Wild Ass were updated at the BfN-CMS Technical Worksop for the Asiatic Wild Ass in 2023 and some corrections integrated, suggested during the Argali Range State meeting, Almaty, Kazakhstan, 12-13 September 2024.

The following Range States are covered in this study:

Afghanistan, Islamic Republic of
Bhutan, Kingdom of
China, People's Republic of
India, Republic of
Iran, Islamic Republic of
Kazakhstan, Republic of
Kyrgyz Republic or Kyrgyzstan
Mongolia
Nepal
Pakistan, Islamic Republic of
Russian Federation
Tajikistan, Republic of
Turkmenistan
Uzbekistan, Republic of

2. Working approach and methods

2.1 General approach and methods

The author, in preparing the first version of the study, followed the approach and steps outlined in the Terms for Reference:

1) Key transboundary populations and the associated transboundary areas (TAs) were identified by:
   a. Using the CAMI Atlas and other available literature and data on species distribution to identify Range States of the species and transboundary populations of these species;
   b. Using available literature and data on species distribution to prepare a long-list of potentially relevant TAs and its target species;
   c. In close consultation with the CMS Secretariat, liaising with the CAMI Species Focal Points and CMS National Focal Points in the region, relevant IUCN Specialist Groups, experts and NGOs to obtain additional information on the potential TAs, species distribution and movements, important transboundary populations and areas, barriers to migration and other threats and past, ongoing, planned and desirable conservation action in the TAs;
   d. Compiling a list of the transboundary populations of each species and the associated transboundary areas;
   e. Identifying and analyzing TA-specific threats to these populations and respective conservation needs;
   f. Analyzing and listing current and existing work and initiatives that are already ongoing and/or planned to enhance the conservation of species in those TAs as well as main decision-making bodies and stakeholders in respective countries.

2) An initial prioritization and selection of TAs according to conservation importance and feasibility was undertaken by:
   a. Assessing the importance of each area for the respective species,
   b. Assessing the need, urgency and feasibility for implementing conservation action in each TA;
   c. Considering the requirements for implementation of CMS instruments and mandates (CAMI Programme of Work, Resolutions and Decisions), as well as other existing agreements and trans-boundary projects;
   d. In cooperation with the CMS Secretariat, liaising with the National Focal Points in the Range States for information on existing efforts to strengthen transboundary conservation and inquire about their interest, and the overall feasibility to enhance cooperation in those areas.

3) The feasibility of implementing effective transboundary cooperation to enhance conservation of those transboundary populations and areas was assessed.

4) A set of key recommendations for promoting cooperation and transboundary conservation of the most important TAs in the context of CMS and CAMI was developed.

The draft report presented the findings at the Second Range State Meeting of CAMI on 25-28 September in Mongolia. The representatives of the Range States, the Species Focal Points and other experts provided input and guidance with regard to the prioritization of important TAs, the assessment of feasibility of implementing transboundary cooperation in those areas as well as the finalization of key recommendations.

The basis for the maps of the range areas of the species are those of the CAMI Atlas and the IUCN Red List. The areas were further specified and modified based on own expertise and information from various experts, where sufficient information was available.

The spatial information gathered in the process was provided to the CMS Secretariat in form of GIS files in appropriate format for further processing to create accurate maps of the selected TAs.

2.2 Revision and expansion of the study

For the revision and expansion of the study the consultant followed the same approach as for the first version. Specifically, the consultant:

1) Compiled a list of relevant TAs by:

a. Researching available literature and data on species distribution and movements;
b. Compiling the list of the transboundary populations with the associated TAs and updating the list in the existing study, where necessary;
c. Preparing maps of TAs with species distribution in GIS format and updating the maps in the existing study, where necessary;

2) Based on literature, unpublished sources and own expertise, compiled recommendations for conservation actions in the identified TAs and updated the recommendations in the existing study, where needed, by:

a. Identifying and analyzing threats to the populations of CAMI species in the TAs and compiling respective conservation needs;
b. Analyzing and listing work and initiatives that are already ongoing and/or are planned to enhance the conservation of species in those TAs;
c. Listing the main decision-making bodies and stakeholders in the respective countries with respect to managing the species and habitats in question;
d. Identifying conservation actions that would be necessary in each TA, including local and transboundary conservation efforts;

3) Prioritized (including revising the prioritization in the existing study), based on literature, unpublished sources and own expertise, the identified TAs in terms of importance for the species, urgency, and feasibility of conservation action, taking into consideration the mandate of CMS in the context of the CAMI POW, by:

a. Assessing the urgency and feasibility of implementing identified conservation actions in each TA;
b. Assessing the importance of each TA for the conservation of the respective species;
c. Considering the requirements for implementation of CMS instruments and mandates (CAMI POW 2021-2026, Resolutions and Decisions), as well as other existing agreements and transboundary projects;
d. Liaising with conservation experts in the additional countries for information on existing efforts to strengthen transboundary conservation and inquire about their interest and overall feasibility (expert opinion) to enhance cooperation in those areas;
e. Producing a set of recommendations for the most important TAs in terms of species conservation and feasibility of transboundary conservation action.

4. Provided the study electronically in Word and PDF formats to the Secretariat. Maps were included in the report as well as provided in the format of ESRI shape files. The final draft was provided to the Secretariat and finalized upon inclusion of the feedback from the Secretariat.

2.3 Determination of priority sites

Determining priority sites is a challenging task, given the multitude of aspects to be considered. Considering too many aspects may lead to an overly sophisticated approach. Not considering sufficiently the complexity of the issue may lead to inadequate priority setting.

For the purpose of this study, an attempt to prioritize the identified TAs was made by combining the following criteria:

- **The importance of the area** with regard to the number of CAMI species occurring in it and its importance for the population (e.g. regularity of occurrence, population sizes or densities, share of global or regional populations);
- **Potential for conservation success**, including recovery of small populations and the technical feasibility of rehabilitating populations and migrations;
- **The existence of problems**, which are to be addressed in a transboundary context;
- **The urgency** of intervention to prevent continuing declines or even local extinction of target species;
- **The feasibility of interventions**, which consists of several elements, like the economic feasibility and political willingness of actors of addressing barriers.

For the purpose of priority ranking for every TA, each of the criteria was assigned a score:

Criteria		**Score**
Importance of the area	*Number of species*	Total number of confirmed target species
	Population status	1 = occurrence irregularly or previously 2 = regularly 3 = substantial numbers
Potential for conservation success		0 = none 1 = low 2 = medium 3 = high
Existence of problems		
Urgency		
Feasibility of interventions		

The importance of an area can be determined by the number of target species present in the area. However, it is often difficult to determine whether a species is actually present in a particular area or not. The approach taken here is that only those species were counted as present, if they are known to have likely occurred in the area at least during the past 50 years.

Another aspect of importance is the **population status** of species, i.e., the degree of occurrence of the species: has it occurred in the area only historically or irregularly, in small or large numbers and density or what share of the global or regional population is present. Some species occur only in small numbers in a very fragmented range area, but the survival of each population patch is important despite only small local population numbers. Some sites may represent bottleneck areas of key importance for connectivity within metapopulations. With only one species as the most important in an area, this aspect can be assessed if sufficient information is available. For sites with more than one focus species, it is difficult to determine the total importance of the site, because it can be of different importance for the different species. In these cases, either the score for the species with the most important population was applied or a combined score.

The potential for conservation success can be assessed from various angles. For areas with several species present in viable populations the assigned score would be high. However, the potential for recovery of currently low and even of locally extinct populations also needs to be considered. As an example, until recently the Badghyz area (Afghanistan, Iran, Turkmenistan) had the last autochthonous and for many years the largest population of the Kulan *Equus hemionus kulan*, a subspecies of Asiatic Wild Ass. The population has decreased

to very low numbers and most likely the Kulans have been completely exterminated by poaching. However, the area has still the potential for a recovery of the species if poaching is prevented and other measures are implemented. The potential thus has a technical dimension. Where recolonization or reintroduction of extinct species is very difficult or impossible or where revival of transboundary populations cannot be achieved because of the biological features of the species, the potential would be zero or low.

Existence of problems: Areas might become higher priority for conservation action if there are problems or threats, which require transboundary interventions or where transboundary collaboration would help solving the problem. This is especially the case where border fences hinder migration that is vital for the survival of the respective populations in the short or mid-term. Similarly, high priority would be assigned to sites where migrations take place, but threats in one part of the range area threaten the survival of the whole population. For example, limited suitable habitat for a target species on one or either side of a border, may require for conservation of a population that it is managed as transboundary population.

Urgency can be defined by the pace of negative trends in populations caused by barriers to migration as well as by other threats. A high urgency would be assigned where existing problems require urgent attention in order to retain or restore the integrity of the site and/or prevent further population declines.

Feasibility refers to interventions needed to address problems including those of transboundary character, but also threats at the national level and to which extent it is feasible to implement the actions needed. Feasibility has technical and political dimensions, but there might also be economic aspects to be considered, which can be covered within the political dimension of feasibility.

The sum of the scores for each area was used for determining the preliminary priority rank of each sites, from 1 (highest priority) to 12 (lowest).

3. Characteristics of the species

3.1 General remarks

The species listed in Table 1 are considered in this assessment. This section briefly characterizes the status of these species, their Range States and ranges as well as the significance of transboundary movements and migrations for their conservation.

The scientific names used in this report are those applied by the respective IUCN SSC Specialist Groups in the IUCN Red List. In a few cases, these names differ from the nomenclature in Wilson and Reeder (2005), which is the standard taxonomic reference adopted by CMS Parties. In those cases, the scientific name as listed on the CMS Appendices is provided in Table 1.

The CMS standard taxonomic reference (Wilson and Reeder, 2005) applies in some cases the names of domestic animals to their wild ancestors and even to other related taxa, which are not the ancestors of the respective domestic species. This is not in line with the respective ruling by the International Commission on Zoological Nomenclature (ICZN 2003; Gentry et al., 2004). Among the species covered in this study, this discrepancy concerns Wild Yak, Wild Camel, Przewalski's Horse and Urial Sheep. Wilson and Reeder (2005) named the Wild Yak *Bos grunniens* (the name of the domesticated yak), while *Bos mutus* should be the valid name for the wild species. Similarly, they named the wild camel *Camelus bactrianus* (the name of the domestic camel), although *Camelus ferus* should be the correct name. Wilson and Reeder (2005) also included the Urial Sheep *Ovis vignei* in *Ovis aries* (the name of the domestic sheep) and used *Equus caballus* for both the wild and domestic forms of horse. In the case of Urial Sheep and Przewalski's Horse, the CMS as exemptions applied the names *O. vignei* and *E. ferus przewalskii* in line with IUCN instead of following Wilson and Reeder (2005).

The naming of Bukhara Deer in this study follows the IUCN Red List, which treats *Cervus hanglu* as a species separate from *Cervus elaphus*, and Bukhara Deer as subspecies *bactrianus* of this species.

In this study the Snow Leopard is named *Panthera uncia* as in the IUCN Red List.

Saiga tatarica is treated here as one species consisting of two subspecies *S. t. tatarica* and *S. t. mongolica*, instead of considering the latter a separate species *S. borealis*.

Table 1: Overview of the species covered by this assessment

Common species name	***Scientific name***	**Different scientific name applied by CMS**	**CMS Appendix**
Asiatic Cheetah	*Acinonyx jubatus venaticus*	*Acinonyx jubatus*	I
Wild Yak	*Bos mutus*	*Bos grunniens*	I
Wild Camel	*Camelus ferus*	*Camelus bactrianus*	I
Bukhara Deer	*Cervus hanglu bactrianus*	*Cervus elaphus yarkandensis*	I+II
Przewalski's Horse or Takhi	*Equus ferus przewalskii*		I
Asiatic Wild Ass	*Equus hemionus*		II
Kiang	*Equus kiang*		II
Chinkara	*Gazella bennettii*		Not listed
Goitered Gazelle	*Gazella subgutturosa*		II
Argali Sheep	*Ovis ammon*		II
Urial Sheep	*Ovis vignei*		II
Persian Leopard	*Panthera pardus saxicolor*		II
Snow Leopard	*Panthera uncia*	*Uncia uncia*	I

Chiru	*Pantholops hodgsonii*		Not listed
Mongolian Gazelle	*Procapra gutturosa*		II
Tibetan Gazelle	*Procapra picticaudata*		Not listed
Saiga Antelope	*Saiga tatarica*	*Saiga tatarica and S. borealis*	II
Gobi Bear	*Ursus arctos isabellinus*		II

3.2 Asiatic Cheetah *Acinonyx jubatus venaticus*

Status

Asiatic Cheetah is assessed as a Critically Endangered subspecies in the IUCN Red List (Jowkar et al., 2008). The global population might be now below 50 individuals. Between 2015 and 2017, 26 different individuals were recorded in protected areas based on camera-trapping and direct observation. The number of confirmed reproducing females was likely below ten (Khalatbari et al., 2017). The human induced mortality, mainly road kills and other accidental (e.g., due to dogs) and deliberate killings (Cheraghi et al., 2019), is the largest threat to the survival of the Asiatic Cheetah. The major indirect threat factors are the reduction of prey species by poaching, and habitat degradation.

Range areas

The Asiatic Cheetah is now restricted to a few areas in Central and Northern Iran (Figure 1). Given the low numbers, the mapped extent of occurrence and area of occupation are probably much larger than the habitat actually used.

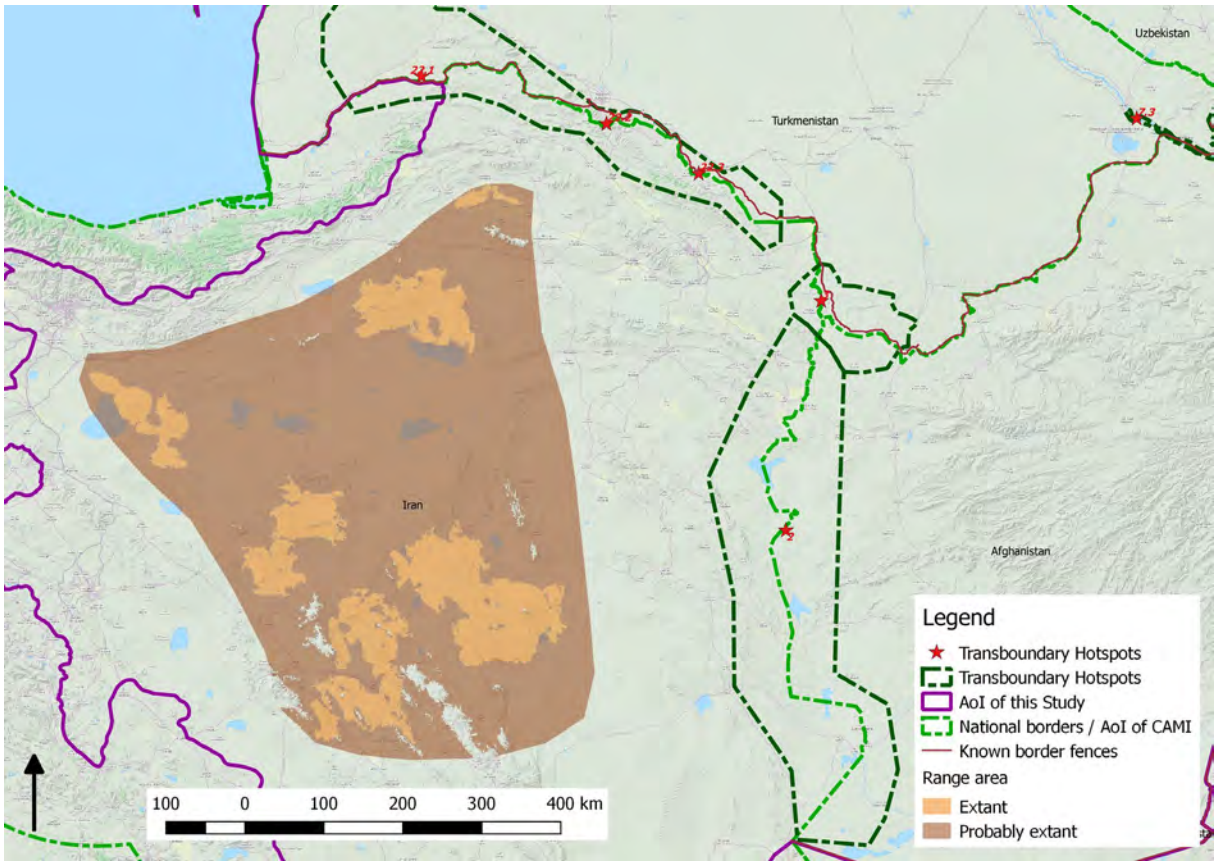


Figure 1. Range map of Asiatic Cheetah. Source: CAMI Atlas

Range States

- Extant: Iran;
- Likely extinct: Afghanistan and Turkmenistan;
- Extinct: Kazakhstan, India, Pakistan, Tajikistan and Uzbekistan.

Conservation significance of transboundary populations, migrations and movements

Research on Iranian Cheetahs has shown that Cheetahs make long-distance movements of at least 150 km (Farhadinia et al., 2013). So, there might be a small possibility of occasional incursions into Afghanistan and Turkmenistan. However, no confirmed records are documented in these countries for several decades.

The Asiatic Cheetah persisted in Turkmenistan until the late 1970s. There are some unconfirmed reports from the 1980s and even the 1990s for the Ustyurt Plateau in the north of the country.[1] Rosen (2017) in a National Geographic blog described her encounter with a Turkmen, who told her about a Cheetah he allegedly had spotted in the west of the Kopet Dagh Mountains in 2015. Breeding Cheetahs occur in Miandasht Wildlife Refuge in north-eastern Iran, some 150 km from the Turkmen border as well as in Touran Biosphere Reserve, further ca. 150 km south of Miandasht. Individual Cheetahs are occasionally reported more than 100 km outside these protected areas.

In Afghanistan, the Cheetah is considered extinct since the 1950s. A Cheetah skin, possibly from an Asiatic Cheetah, claimed to originate from Samangan Province, more than 700 km east of the nearest confirmed Cheetah presence record in Iran, was offered for sale in 2006 in Mazar-e Sharif, Afghanistan (Manati and Nogge 2008).

Although the chances of reproducing subpopulations being established from these possible transboundary movements are extremely low, attention is warranted. First, the precarious status of Asiatic Cheetah makes the survival of any single individual extremely important and second, in the – albeit unlikely – case of an overall recovery of the Cheetah numbers, such long-distance migrations might provide the chance for the recolonization of parts of the former range area in the future.

Potential areas for transboundary conservation include the western edges of the Kopet Dagh between Iran and Turkmenistan and the border regions between Iran and Afghanistan.

Proposed TA of significance for the species

ID No.	2	**Working Name**	Afghanistan-Iran Border Region
Countries		Afghanistan, Iran	
Geographic location		Entire border area	
Coordinates		N 33.320370°, E 60.789269°	

ID No.	22	**Working Name**	Kopet Dagh
Countries		Iran, Turkmenistan	
Geographic location		Entire mountain range	
Coordinates		N 38.138427°, E 56.020189°; N 37.649680°, E 58.440410°; N 37.131702°, E 59.647731°	

[1] http://www.catsg.org/Cheetah/04_country-information/Asia/turkmenistan.htm

3.3 Wild Yak *Bos mutus*

Status

The Wild Yak is assessed as Vulnerable in the IUCN Red List with a declining population (Buzzard and Berger, 2017). Probably, the population size is no more than 10,000 mature individuals. Poaching had been a major threat in the past but has been reduced thanks to the confiscation of firearms. Protection from poaching has stabilized or possibly allowed for recovery of local population sizes, although available habitat is limited due to competition with livestock (Harris, 2007). Low tolerance of wild yaks to disturbance make the expansion of livestock grazing areas a major limiting factor for wild yak occurrence. Interbreeding with domestic yaks, sometimes caused by deliberate cross-breeding, but also due to abduction of domestic yak cows into wild herds by wild yak bulls, threatens the genetic integrity of the wild yak. The latter incidents also cause conflict with herders and had triggered retaliatory killing. Disease transmission from livestock is a potential although so far poorly known threat (Buzzard and Berger, 2017).

Range areas

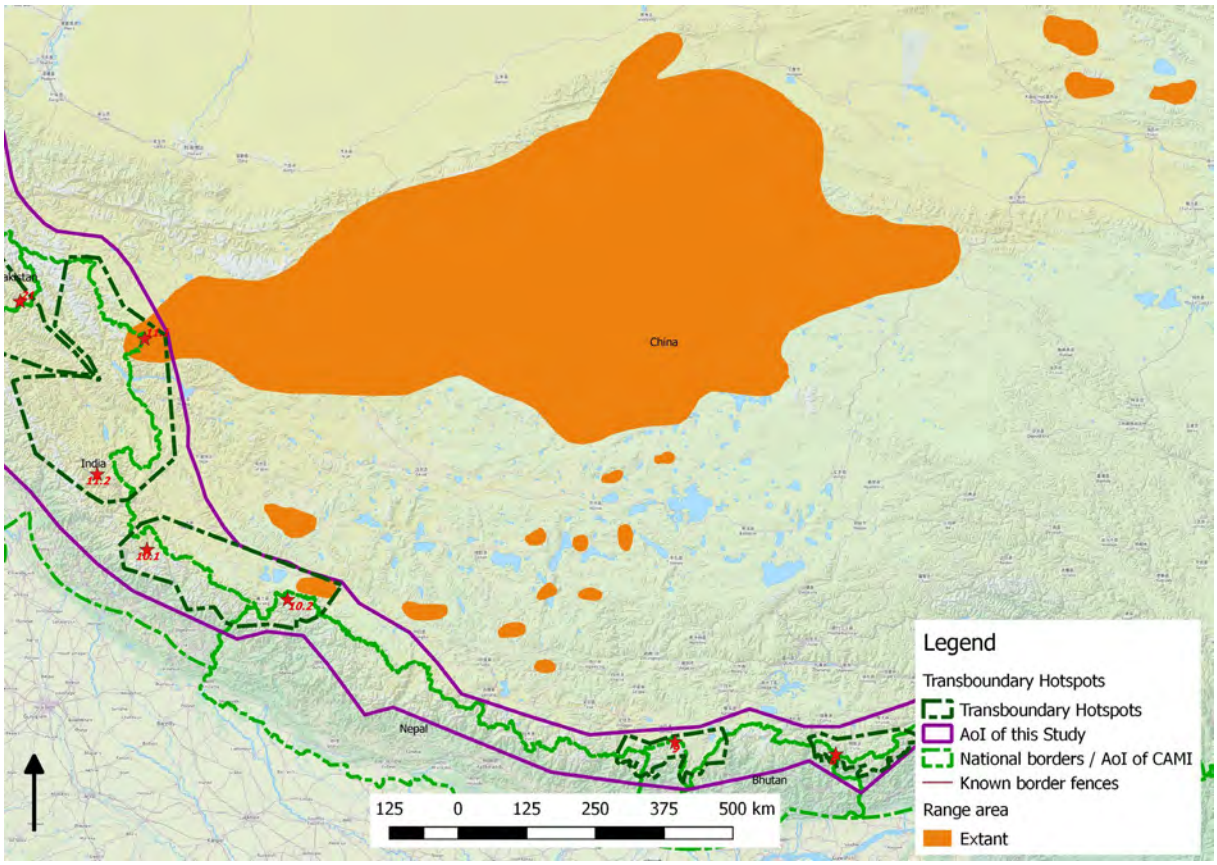


Figure 2. Range map of wild yak. Note that areas of uncertain presence or extinction are either not differentiated or not depicted. Source: IUCN Red List.

Historically, wild yak occurred all over the Tibetan plateau and at its edges in northern India (Ladakh) and Nepal. Most of the current range area of wild yak (Figure 2) is located in China (Gansu, Qinghai, Xinjiang, Tibet) with the main areas being the Chang Tang Reserve, covering 284,000 km² in northern Tibet, the Arjin Shan area of southeastern Xinjiang, and Kekexili Nature Reserve in Qinghai and adjacent areas of the Kunlun Mountains. There are further isolated populations to the east and to the south of the main range area.

In India, the species is known from Ladakh (Changthang Wildlife Sanctuary), where a maximum of around 110 animals remained, with some seasonal migration from areas controlled by China. Shrotriya et al. (2015) confirmed the presence of the species although their survey approach yielded only observations of three animals. Until the 1990s, wild yak from China penetrated northern Nepal, but more recent reports had not been confirmed and consequently the species was considered extinct, although the IUCN Red List map shows a range area close to the border with Nepal. Kusi et al. (2021) showed that wild yak is still extant in Nepal, in Upper Humla. There, wild yaks were confirmed in 2013 and 2014 by observations and genetic samples, although population size was extremely small and poaching and hybridization may immediately threaten their further survival.

Range States

- Extant: China, India, Nepal;
- Extinct: Bhutan.

Conservation significance of transboundary populations, migrations and movements

With the approximately 99% of the world population of wild yak occurring in China, the population in India and the potentially transboundary part of the population might appear being of limited conservation significance at species level. However, since the wild yak is a threatened species with its overall population being in decline and the high likelihood that threat factors across its range areas will further accelerate, also small populations at the edge of the main range of the species are of growing conservation significance. The political, economic, legal and cultural differences between the Range States may in the future cause different trends in the conservation status of the species and thus the importance of this population may increase. Transboundary seasonal migration and movements that support genetic exchange are crucial for the viability of the wild yak in Ladakh and in Nepal.

Proposed TA of significance for the species

ID No.	10	**Working Name**	Western Trans-Himalaya
Countries		China (Tibet), India (Uttarakhand), Nepal	
Geographic location		Upper Humla valley in northern Nepal and adjacent areas	
Coordinates		N 31.091263°, E 79.062512°; N 30.309320°, E 81.623352°	

ID No.	11	**Working Name**	Changthang and Spiti
Countries		China (Tibet, Xinjiang), India (Ladakh and Himachal Pradesh)	
Geographic location		Changthang plateau in Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau	
Coordinates		N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°	

3.4 Wild Camel *Camelus ferus*

Status

The wild camel was assessed as Critically Endangered in the IUCN Red List by Hare (2008), stating that in the year 2004, there had been approximately 600 individuals surviving in China and 350 in Mongolia. There is general consensus that wild camel populations are declining or are at best stable, primarily because recruitment appears low (Kaczensky, 2014). Causes of decline likely include legal and illegal mining, poaching, loss of water sources, hybridization with domestic camel, as well as negative influences of local pastoralists and their livestock (Adiya, 2019).

Range areas

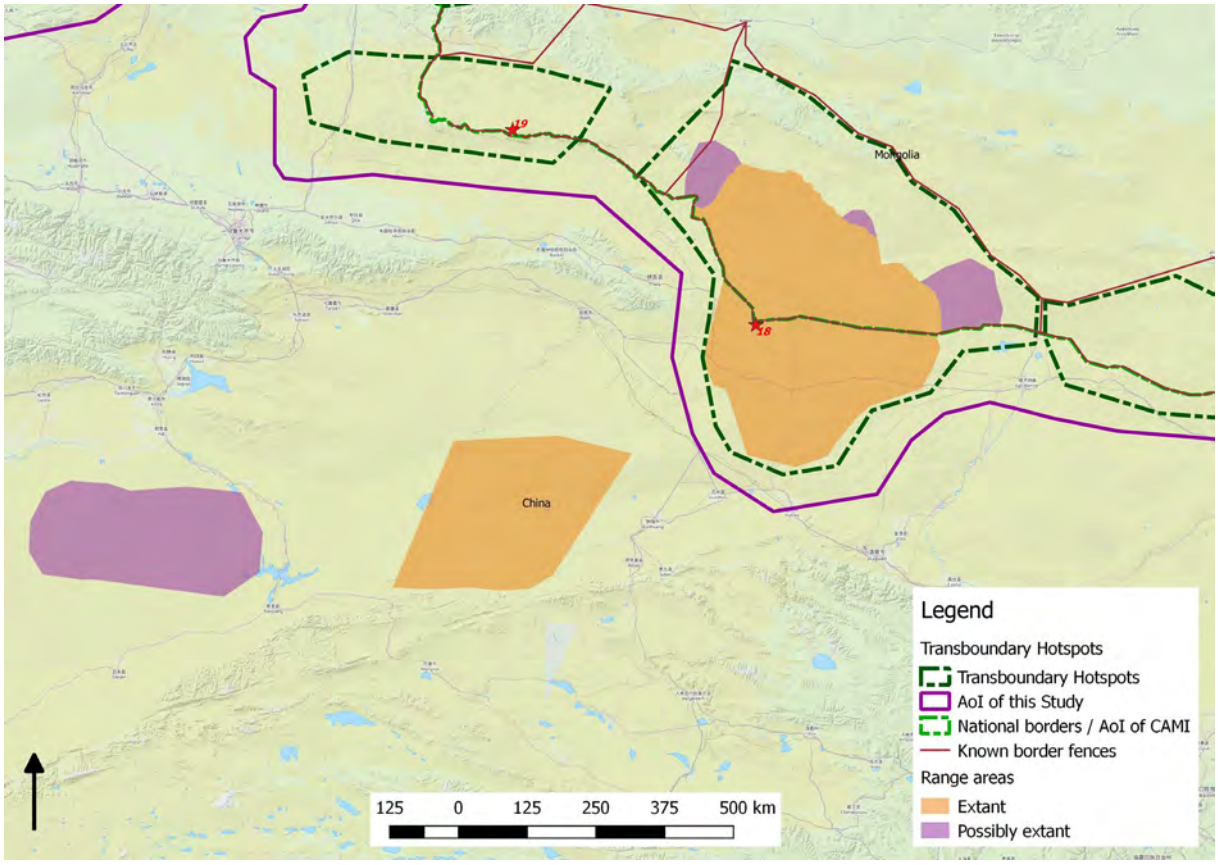


Figure 3. Range map of Wild Camel. Source: IUCN Red List

Wild Camels are surviving in three small, disjunctive populations in China and Mongolia (Figure 3). The maps provided by Hare (2008) in the IUCN Red List and by the CAMI Atlas are not fully consistent. The species' distribution in Mongolia was reported to have shrunken by 70% since the last century, and possibly as early as the 1940s, and became restricted to the area of today's Great Gobi A Strictly Protected Area (SPA) in the Transaltai Gobi by the 1970s (Kaczensky et al., 2014). There are three groups in China, namely a small area of the Taklamakan Desert, the Gashun Gobi in the north of Lop Nur, and Arjin Mountain (Adiya et al., 2012).

Range States

- Extant: China, Mongolia

Conservation significance of transboundary populations, migrations and movements

The range area of wild camel in the Great Gobi A SPA in southern Mongolia reaches into China, making this population potentially transboundary. Wild Camels have been recorded crossing the border in winter (Guoying et al., 2002) to reach Dacoatan Spring in China's Gansu Province, which lies 80 km south of the Atas Mountain Range in the Great Gobi A SPA in Mongolia and 15 km from the border. Chinese authorities lifted a ban on mining in this area in 1990 and mining poses a considerable threat to the wild camels that use this spring, because miners use potassium cyanide to extract gold, thereby contaminating large grazing areas (Adiya et al., 2012). Telemetry by Kaczensky et al. (2014) did not show transboundary movements of wild camel in this area (Figure 4).

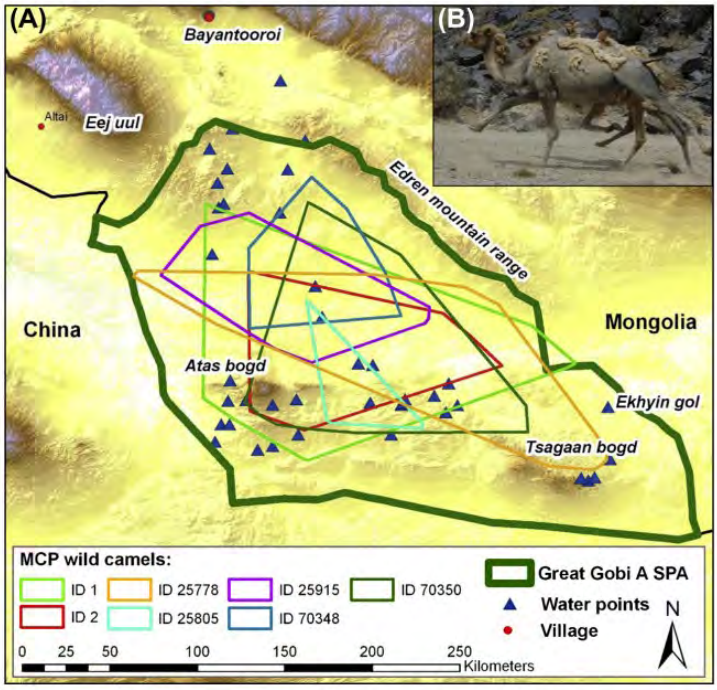


Fig. 1. (A) Home ranges, expressed as 100% minimum convex polygons (MCPs), of seven wild camels monitored 2002–2007 in the Great Gobi A SPA in southern Mongolia. (B) Two wild camels running from disturbance by research jeep.

Figure 4. Movements of collared camels in Great Gobi A SPA. Source: Kaczensky et al., 2014

This highly endangered animal nowadays faces the disadvantaged situation of being dispersed in at least three isolated populations with a still unidentified number of individuals. Adiya et al. (2012) recommended establishing a transboundary park between China and Mongolia and creating corridors for wild camels to move between isolated habitats within Mongolia.

Proposed TA of significance for the species

ID No.	18	**Working Name**	Trans-Altai Gobi
Countries		China, Mongolia	
Geographic location		Mongolian Trans-Altai Gobi desert, largely identical with Great Gobi A SPA.	
Coordinates		N 42.683870°, E 96.422978°	

3.5 Bukhara Deer *Cervus hanglu bactrianus*

Bukhara Deer is listed in Appendices I and II of CMS as "*Cervus elaphus yarkandensis* (populations in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan and Afghanistan)" in line with Wilson and Reeder (2005). Molecular data suggested the Tarim Red Deer from Central Asia should be recognized as a species separate from *Cervus elaphus*, including the populations from the Yarkand-Tarim and Bukhara regions and Indian Kashmir, which were formerly considered as subspecies of *C. elaphus*. The Tarim Red Deer should be recognized as *Cervus hanglu* Wagner, 1844 (with the provisional subspecies *C. h. yarkandensis*, *C. h. bactrianus* and *C. h. hanglu*) (Brooks et al., 2017).

Status

Brook et al. (2017) for the first time assessed *Cervus hanglu* as separate species in the IUCN Red List assessment. The entire species was assessed as Least Concern (LC), justified by an increasing population of 2,000 – 2,500 mature individuals, extent of occurrence (EOO) of >1,000,000 km² and area of occupancy (AOO) not known, but not likely to approach the threshold of less than 2,000 km² to qualify for Red List status Vulnerable (Brook et al., 2017).

The latest Bukhara Deer Overview Report (CMS Secretariat, 2020) based on national reports by the Range States and experts' assessments stated that the overall population number was stable and increasing. The report provided the following figures for national population sizes of the subspecies (including immature individuals and fenced groups):

- Kazakhstan: >900, increasing;
- Tajikistan: >500 – stable/increasing;
- Turkmenistan: ~250– stable/slightly increasing;
- Uzbekistan: >2,000 – increasing, with overpopulation in Baday-Tugay causing degradation of the ecosystem and the population itself;
- Total 3,735-3,900.

Given that the total population and AOO of *Cervus hanglu* are close to the thresholds for EN and VU, the species would be better assigned to the category Near-Threatened. In addition, the subspecies Bukhara Deer *C. h. bactrianus* appears to qualify for the category Near-Threatened, while *C. h. yarkandensis* might be Endangered. *C. h. hanglu* has been assessed in the IUCN Red List at subspecies level, assigning the category Critically Endangered by Brook et al. (2017a).

Range areas

The Bukhara Deer occurs in eight distinct areas along the Amu-Darya and Panj rivers in Afghanistan, Tajikistan, Turkmenistan and Uzbekistan. In most areas (except Tigrovaya Balka in Tajikistan and Baday-Tugay in Uzbekistan) the Bukhara Deer populations were established by reintroduction efforts since the 1970s. Between some of these areas, limited exchange might occur, in particular of males searching for mates. Another, entirely isolated range area is located in the Zarafshon River valley in Tajikistan and Uzbekistan. This population originated from (re-)introductions during the 1980s and 2000s. A free-ranging and self-sustaining population is established.

The recent status of Bukhara Deer in Afghanistan remains poorly documented owing to the lack of recent extensive investigation resulting from insecurity along the Amu Darya River. A team of researchers from WCS in December 2007 did not find indices of presence of the species in surveyed areas of Imam Sahib, Aye Khanum and Darqad (along the Panj river valley). Although none of the local persons interviewed had seen a live specimen of Bukhara Deer in recent years, they reported that the species is overhunted and still present in very small numbers, likely moving between Afghanistan and Tajikistan. Eventually in 2013, Moheb et al.

(2016) reported indisputable evidence of presence of the species in Darqad, and confirmed the regular movements of specimens within and across the riparian habitat of the international Afghan-Tajik border.

Thanks to reintroductions, Kazakhstan qualifies again as Range State for the Bukhara Deer. The areas indicated in the CAMI Atlas and in the IUCN Red List (Brooks et al., 2017) are certainly larger than the areas occupied by the species in the country. These populations are not transboundary.

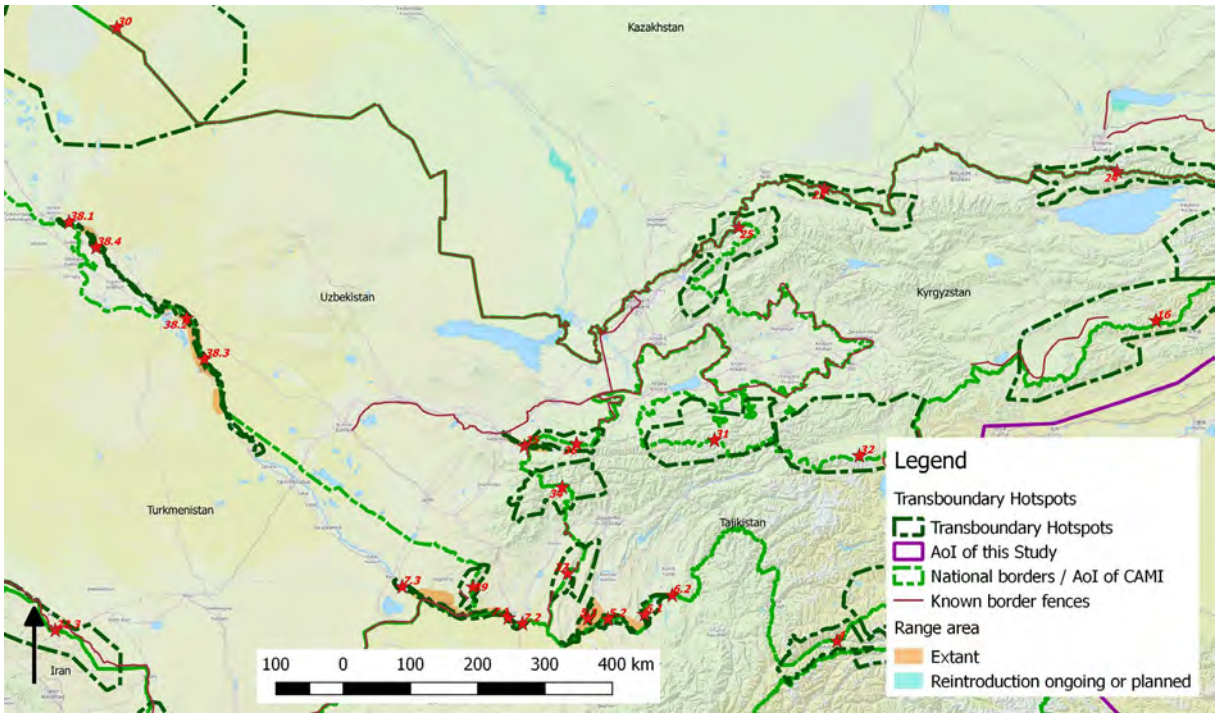


Figure 5. Range map of Bukhara Deer. Sources: IUCN Red List, CAMI Atlas, modified

In the privately owned Karachingil Game Management Area at the Ili River, Bukhara Deer have been introduced in a large fenced area since 1981. This population currently consists of about 700 animals in a 10,000 ha enclosure. There is contradictory information if there is a free-ranging population (Levitin, pers. comm. 2019). The National Report for CMS (2011a) suggested that in 2011, there had been 40 free-ranging Bukhara Deer, which had escaped from the fenced area during different years, but as far as it is known, they have not formed a sustainable population. According to Levitin (pers. comm. 2019), once about 30 deer had escaped from the enclosure and had been repeatedly observed in the hunting grounds “Manul”, but had disappeared after about one year. However, the recent Overview Report (CMS Secretariat, 2020) considers the entire population of Karachingil Game Management Area as free-ranging. Furthermore, since 2018, reintroductions began in the Ili-Balkhash area, with five free-ranging individuals reported in 2019 (CMS Secretariat, 2020).

In the region of Turkestan in the Syr Darya River valley in 2019 about 85 Bukhara Deer were kept in an enclosure for the purpose of future reintroduction. The already free-ranging population is increasing and was assessed with 75 individuals in 2019 (CMS Secretariat, 2020). They seem to expand their range area and deer have been observed at a distance of up to 140 km from the enclosure. (Levitin, pers. comm. 2019)

Range States

- Extant: Afghanistan, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan

Conservation significance of transboundary populations, migrations and movements

Except one area, Baday-Tugay with the currently probably largest population size, all populations at the Amu Darya, Panj and Zarafshon Rivers occur in areas shared between two or three Range States or at least immediately adjacent to international borders. At least some individuals, but likely also larger groups of Bukhara Deer regularly cross these international borders. The main habitat of the deer, the riparian forests and associated bushes and reeds (so called *tugay*), became heavily fragmented during the last at least five decades, and remnants of *tugay* are typically very small. In many locations, only transboundary areas provide sufficient habitat for groups of deer to survive. Furthermore, the Amu Darya and Panj rivers form the international boundaries over large sections and at the same time act as corridors for movements and connection between the populations. Therefore, transboundary populations, migrations and movements are of essential importance for the conservation of Bukhara Deer.

The reintroduced populations in Kazakhstan are located far from international borders and the extent of suitable habitats for future range expansion excludes transboundary movements.

Proposed TA of significance for the species

ID No.	5	**Working Name**	Panj River valley-Tigrovaya Balka
Countries		Afghanistan, Tajikistan	
Geographic location		Area between the Vakhsh and Panj Rivers, including Tigrovaya Balka SPA	
Coordinates		N 37.286642°, E 68.450740°; N 37.279697°, E 68.780875°	

ID No.	6	**Working Name**	Panj River valley
Countries		Afghanistan, Tajikistan	
Geographic location		Panj River valley in the districts Yangi Qaleh (AFG), Farkhor, Hamadoni and Shamsidin Shohin (TJK)	
Coordinates		N 37.338443°, E 69.388120°; N 37.593436°, E 69.846198°	

ID No.	7	**Working Name**	Aral Paygambar
Countries		Afghanistan, Uzbekistan	
Geographic location		Riparian areas near Termez, incl. former Aral Paygambar SPA, closed in the 1990s and upstream of “Friendship“ bridge	
Coordinates		N 37.297403°, E 67.137200°; N 37.219264°, E 67.368819°	

ID No.	35	**Working Name**	Zarafshon river valley
Countries		Tajikistan, Uzbekistan	
Geographic location		Zarafshon Reserve and Zarafshon NP	
Coordinates		N 39.520217°, E 67.404043°	

ID No.	38	**Working Name**	Lower Amu Darya
Countries		Turkmenistan, Uzbekistan	
Geographic location		Amu Darya s of “Kungrad”/Imeni Telmana; incl. Nazarkhan core zone (Uzbekistan) Amu Darya near Lebap between Khorezm and Kyzylkum SPA, Amu Darya SPA and Kyzylkum SPA	
Coordinates		N 42.307920°, E 42.307920°; N 41.124536°, E 61.821193°; N 40.612679°, E 62.112579°	

3.6 Przewalski's Horse or Takhi *Equus ferus przewalskii*

The Przewalski's Horse or Takhi is not covered in the CAMI Atlas as it was not yet included in CAMI when the Atlas was being prepared. The species was listed on Appendix I of the CMS by COP12 in 2017, i.e., only after launching of CAMI, and was included in CAMI with the adoption of the POW by CMS COP13.

Status

The Takhi is currently assessed in the IUCN Red List as Endangered by King et al. (2015), after having been considered as Extinct in the Wild until 2008, when it was assessed as Critically Endangered. At the end of 2012, there had been 178 mature individuals in the wild, all descendants from reintroductions. Since then, the population has grown further (see Site 16).

Range areas

According to the IUCN Red List, Takhi currently exist in five locations in their native range area (Figure 6). In Mongolia, they occur in three locations: in Hustai NP, in Great Gobi B SPA, and in Khomiin Tal. In China, Takhi have been released into the Kalamaili Nature Reserve since 2001. The Gansu Endangered Species Research Center (GESRC) released at least seven Takhi into the Dunhuang Xihu National Nature Reserve in 2010 and 2012 (King et al., 2015).

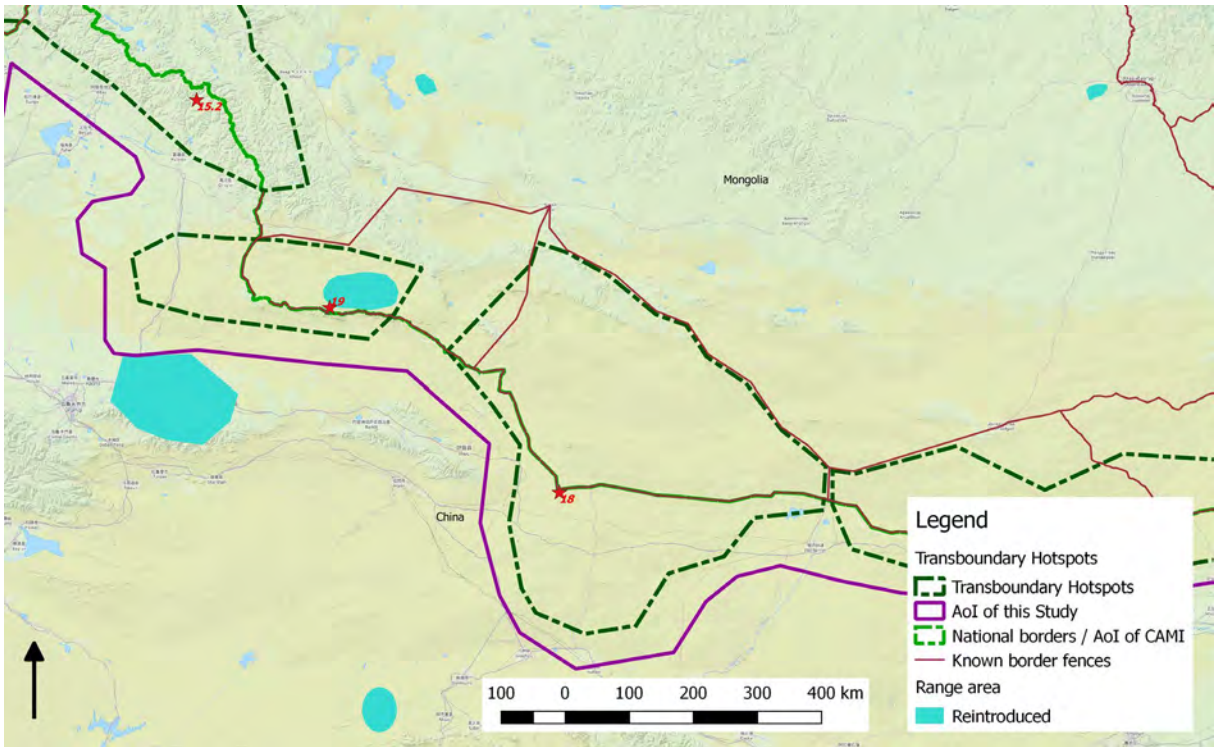


Figure 6. Range map of Takhi. Source: IUCN Red List

Range States

- Extant and reintroduced: China, Mongolia;
- Extinct: Kazakhstan, Russian Federation, Ukraine

Conservation significance of transboundary populations, migrations and movements

So far, none of the reintroduced populations is transboundary. The still small population in Mongolia's Great Gobi B SPA inhabits an area in the Jungarian Gobi close to the border with China's Xinyang province. The immediate border region within the range area is mountainous and might not be suitable for transboundary movements of the Takhi.

The locations of Kalamaili Nature Reserve and Dunhuang Xihu National Nature Reserve in China could not be exactly identified, but their administrations seem to be in towns rather far from the border with Mongolia and its Great Gobi B SPA. The map provided in the assessment of the IUCN Red List (King et al., 2014) suggests that the range area may approach the border with Mongolia and thus Great Gobi B SPA by 120 km, a distance that the Takhi might be able to cover, although reintroduced Takhi groups so far appear to be of limited mobility, the reasons of which are not yet known. (pers. comm. Schnidrig, 2019).

Currently transboundary populations, migrations and movements do not exist and their future conservation significance is not yet clear.

Proposed TA of significance for the species

ID No.	19	**Working Name**	Jungarian Gobi
Countries		China, Mongolia	
Geographic location		Great Gobi B SPA; Khovd-Xinjiang	
Coordinates		N 45.087319°, E 92.261473°	

3.7 Asiatic Wild Ass *Equus hemionus*

Status

The Asiatic Wild Ass is assessed as Near Threatened by Kaczensky et al. (2020) in the IUCN Red List. This status represents an improvement compared to the classification as Endangered by Moehlman et al. (2008). The population data supporting the Near Threatened listing show that the change of category does not indicate a genuine improvement, but rather that new data suggest a larger than previously assumed population. Kaczensky et al. (2020), projected a population decline of at least 20% over the next three generations, based on old, prevailing and newly emerging risks, including illegal killing, conflict with farmers, competition with livestock, habitat loss as a result of human settlement and cultivation, overgrazing and degradation, and limited access to open water sources as well as continued and increasing habitat fragmentation by linear infrastructure development projects (mostly roads and railways) associated with the booming extractive industry in Mongolia and China.

The global estimate of population size and trends is primarily driven by the Mongolian population, which makes up more than 75% of the total. The Mongolian subspecies or Khulan *E. h. hemionus* was specifically assessed by Kaczensky et al. (2020a) as Near Threatened. Its population reportedly is large (estimated 23,000 mature individuals) and currently appears stable, but there are a number of old (competition with livestock for water and pasture, poaching) and newly emerging threats (mainly infrastructure development and resulting barriers to migration, influx of people in the habitat causing an increasing pressure from livestock and poaching). Two of three Wild Ass populations in China are very small and data deficient, the population in Mazongshan (Gansu) may even be already extinct.

The socalled Turkmen Wild Ass or Kulan *E. h. kulan* has the status EN (Kaczensky et al., 2016). Its number was estimated with around 1,600-2,000 mature individuals and a declining population trend. The last autochthonous population in Badghyz in Turkmenistan, where Kaczensky and Linnell (2015) still recorded 59 observations of Kulan, became most likely extirpated during recent years (Kaczensky, pers. comm. 2018). The largest population is currently the reintroduced population in Altyn Emel NP in Kazakhstan, but this habitat already reached or exceeded the habitat's carrying capacity, which limits further growth. Two more reintroduced populations in Kazakhstan are much smaller and a third group is currently in the stage of being established. The population sizes and trends of four more reintroduced populations (three in Turkmenistan, one transboundary with Uzbekistan) are currently not exactly known, but all are small, most likely declining, mainly driven by poaching, and some might already be extirpated (Rustamov, pers. comm. 2018). All reintroduced populations originate from only a few founder animals and some have even gone through two or three bottlenecks, possibly resulting in allelic losses and genetic impoverishment.

The third subspecies occurring in the area of interest, the Persian Wild Ass or Onager *E. h. onager* has been separately classified as Endangered (EN) at subspecies level in the IUCN Red List. Its population size is the smallest of all Asiatic Wild Ass subspecies, with only 395 mature individuals, one subpopulation having shown positive trends and a second population experiencing severe declines (Hemami et al., 2015).

The Asiatic Wild Ass in India, commonly called Khur *Equus hemionus khur*, occurs outside of the area of interest. It is listed as Near Threatened (NT) in the IUCN Red List with a population size of around 2,000 mature individuals (Kaczensky et al., 2016a).

The fifth subspecies, the Syrian Wild Ass *Equus hemionus hemippus* is assessed as Extinct (EX) in the IUCN Red List (Moehlmann and Feh, 2015).

Range areas

The Mongolian wild ass (Khulan) has an apparently continuous range area from the northern Xinjiang province of China through the entire southern Gobi in Mongolia. Genetic analysis of samples collected from 2002–2005 suggested gene flow over the entire range in Mongolia (Kaczensky et al., 2011), but this may have been compromised by recent infrastructure development (Kaczensky et al., 2020a). With the upgrading of the fence along the international border in the 1980s and 1990s, population exchange between Mongolia and China has likely ceased or at least become minimal (Kaczensky et al., 2011a, Kaczensky unpubl. data). Consequently, the Chinese populations should be regarded as separate from Mongolia (Kaczensky et al., 2020a).

The Turkmen wild ass (Kulan) most likely recently became extirpated from its last autochthonous range area. Currently, there are three sites with reintroduced populations in Kazakhstan, three in Turkmenistan only (possibly some already extirpated), and one transboundary range area between Turkmenistan (possibly already extirpated; Murzakhanov pers. comm. 2019) and Uzbekistan (likely expanding also into Kazakhstan). In Kazakhstan, reintroduction at one new side has started in 2018. In terms of known population numbers and trends currently only two sites (Altyn Emel NP and Barsa-Kelmes SPA/western Aral Sea in Kazakhstan) can be considered secure. In all other sites, the risk of extirpation within a short period is high.

The Persian wild ass (Onager) is restricted to three sites (two autochthonous, one very small reintroduced; map in Kaczensky et al., 2015 a) and reintroduction into a fourth side is planned (CAMI Atlas).

The Khur only occurs in one area, in and around the Little Rann of Kutch in the Indian state of Gujarat, near the Gulf of Kutch at the Arabian Sea, close to the border with Pakistan. This range area is located outside of the area of interest of this study.

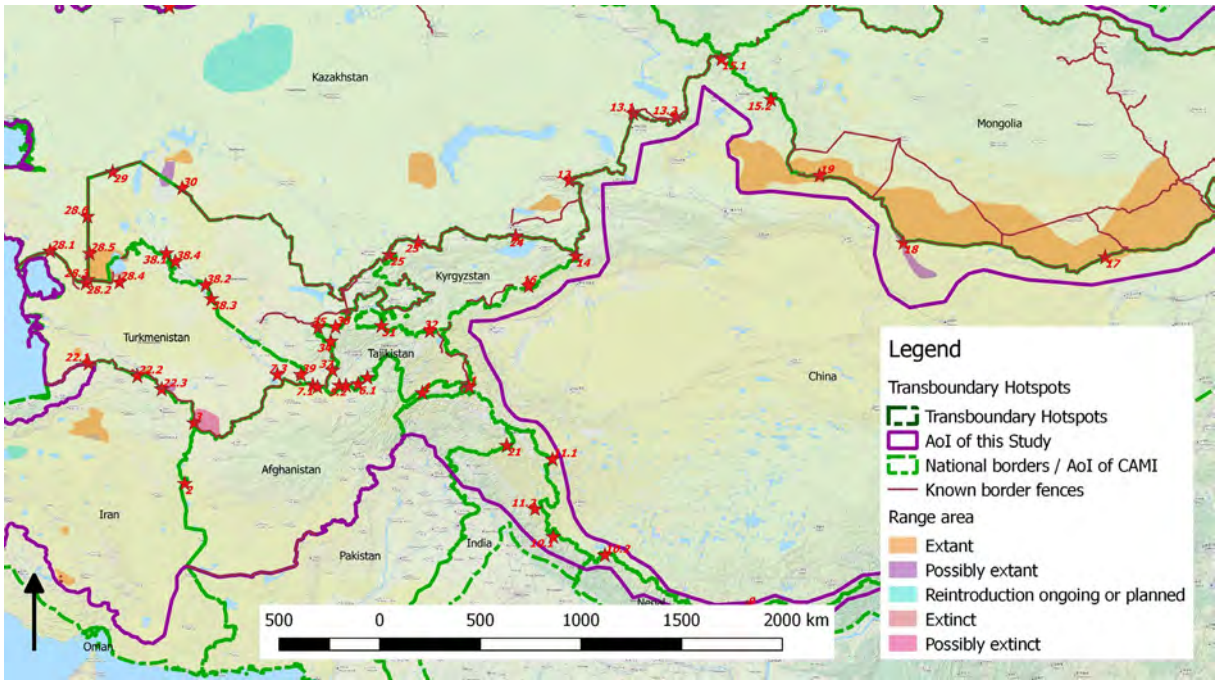


Figure 7. Range map of Asiatic Wild Ass within the AoI. Source: CAMI Atlas, modified

Range States

- Extant: China, Iran, Mongolia (extant);
- Extant and reintroduced: Kazakhstan, Turkmenistan, Uzbekistan;

- Possibly extinct: Afghanistan;
- Outside of the area of interest: India (extant), Israel (extant and reintroduced).

Conservation significance of transboundary populations, migrations and movements

The Chinese and Mongolian populations of wild ass are effectively isolated by border fences since the 1980s and 1990s (Kaczensky, 2020a). Therefore, there is currently no transboundary population and some of the national populations in both countries are large and may survive in the long term without being connected.

The only currently known transboundary population of Asiatic Wild Ass, consisting of Kulan, is found in the wider Kaplankyr area between Kazakhstan, Turkmenistan (there possibly already extirpated; Murzakhanov pers. comm. 2019) and Uzbekistan. The founder animals of this reintroduced Kulan population likely originated directly from Badghyz, the last autochthonous population. Given the precarious situation of the species in Turkmenistan and the likely loss of the Badghyz population, this area might be of particular importance also from the perspective of preservation of the genetic diversity. The area is heavily fragmented by border fences of Kazakhstan and Turkmenistan.

The situation of the wild ass in the northwest part of Afghanistan, along the border with Turkmenistan, is critical and the species is possibly extinct nowadays. In April 2007, a mission of WCS failed to find any indices of presence and based on interviews concluded that a few wild asses (as well as Goitered Gazelles) might still remain between the Turkmen border fence and the actual border. It was speculated that in spring some of these animals might venture south into Afghanistan where they are shot. There has been no documented record of wild ass in Afghanistan for more than four decades (pers. com. S. Ostrowski, WCS, 2019).

Most zoologists consider the Onager in Iran as a separate subspecies or at least as a population long isolated from the Turkmen Kulan. Their range areas are located too far from any international border for any considerations of current or future transboundary conservation activity. While there might be still some small reintroduced populations of Kulan in the Kopet Dagh in Turkmenistan, any movements into Iran are effectively prevented by the border fence.

Proposed TA of significance for the species

ID No.	3	**Working Name**	Badghyz
Countries		Afghanistan, Iran, Turkmenistan	
Geographic location		Hills between Badghyz province (Afghanistan) and Mary (Turkmenistan)	
Coordinates		N 35.394097°, E 62.892003°; N 35.891563°, E 63.466927°	

ID No.	17	**Working Name**	South Gobi
Countries		China, Mongolia	
Geographic location		Possibly several separate sections.	
Coordinates		N 42.163084°, E 106.423024°	

ID No.	18	**Working Name**	Trans-Altai Gobi
Countries		China, Mongolia	
Geographic location		Mongolian Trans-Altai Gobi desert, largely identical with Great Gobi A SPA.	
Coordinates		N 42.683870°, E 96.422978°	

ID No.	19	**Working Name**	Jungarian Gobi
Countries		China, Mongolia	

Geographic location	Great Gobi B SPA; Khovd-Xinjiang
Coordinates	N 45.087319°, E 92.261473°

ID No.	28	**Working Name**	South-western Ustyurt
Countries		Kazakhstan, Turkmenistan, Uzbekistan	
Geographic location		Ustyurt SPA and areas south of it; Kaplankyr Plateau se of shor (TKM), chink = border between KAZ-TKM, UZB-TKM; Kazakhly shor; Kaplankyr SPA south of Sarygamysh lake; areas south of the road Barsa Kelmes – Jaslyk	
Coordinates		N 42.382329°, E 54.111493°; N 41.194460°, E 55.881960°; N 41.235781°, E 57.550095°; N 42.293289°, E 56.077211°; N 43.634792°, E 55.961138°	

ID No.	31	**Working Name**	Aral Sea / Western Kyzylkum Desert
Countries		Kazakhstan, Uzbekistan	
Geographic location		E Aral Sea with Barsa-Kelmes SPA/BR	
Coordinates		N 44.642783°, E 60.664708°	

3.8 Kiang or Tibetan wild ass *Equus kiang*

Status

The Kiang or Tibetan wild ass is assessed as Least Concern (LC) by Shah et al. (2015) in the IUCN Red List. The species occurs across a large range area and high numbers, making a fast decline that would qualify it for a threatened category unlikely. The current global population estimate is about 60,000 – 70,000 mature individuals, with the majority of more than 90% in China, the remaining animals mostly in India and only few individuals in Nepal and Pakistan.

While since the 1990s due to stricter enforcement of wildlife legislation, poaching of Kiang has declined and in some areas Kiang numbers have likely recovered, the major threat to Kiang is conflict with various human interests. The most important conflict is between livestock herders and Kiang. The animals are perceived as forage competitors for livestock, an issue exacerbated by local concentration of Kiang on particularly productive pasture areas. On the other hand, increase in human population and livestock numbers together with loss of traditional mobile grazing practices increase pressure on the pasture lands. Furthermore, fencing of pastures increasingly prevents Kiang from access to key forage and in some areas use of limited water sources by pastoralists and livestock reduces access of Kiang to water. Disease transmission from domestic animals might be another problem (Shah et al., 2015; Hussain et al., 2010).

Range areas

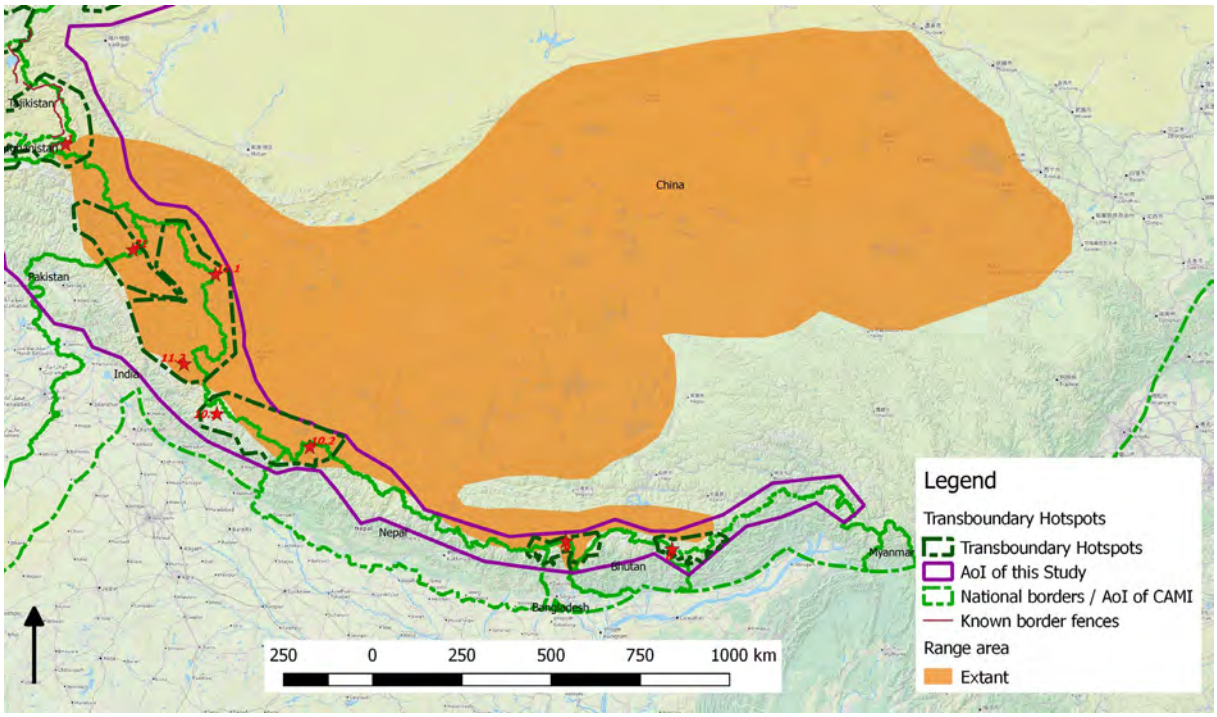


Figure 8. Range map of Kiang. Source: IUCN Red List

The range area of Kiang (Figure 8) includes large areas of the Tibetan Plateau, namely the Chang Tang, across Tibet and Qinghai. Comparably few Kiang exist in Gansu and Sichuan. To the northwest, the range area of Kiang stretches into the south of Xinjiang. In Taxkorgan Nature Reserve in the Pamirs, Kiang were last seen in the 1950s (Shah et al., 2015) and no Kiang records are known from the Pamirs of Tajikistan and Afghanistan. Towards the west the range area includes India (Ladakh) and Pakistan (Gilgit-Baltistan). In Gilgit-Baltistan Kiang is, however, limited to the border areas with China and occurring in low numbers (probably <50). During the past decade, the species was reported namely from the Shimshal Valley (Khunjerab

National Park). In Ladakh, Kiang occur in several areas in the east, over an estimated range of 15,000 km². In adjacent Himachal Pradesh, Kiang occur in the upper Zanskar catchment. At the southern edges of the range area, Kiang presence was reconfirmed from a 200 km² area near the border with China (Tibet) in India (Sikkim) in the mid-1990s, with estimated 74-120 animals. Kiangs are present in several areas in the northern parts of Nepal, but the overall population might be around 100 animals only (Shah et al., 2015).

Range States

- Extant: China, India, Nepal, Pakistan;
- Presence Uncertain: Bhutan

Conservation significance of transboundary populations, migrations and movements

With the vast majority of range area and population size within China, the conservation significance of transboundary populations, migrations and movements appears limited. The comparably good conservation status of Kiang may further suggest that small populations outside of China and at the edges of the overall range area are less important for the long-term survival of the species based on the current status. However, the ongoing infrastructure, industrial and agricultural development in all parts of the range area and conflicts between Kiang occurrence and land use interests may affect the conservation status of the species in the future. Large-scale population declines and fragmentation of range areas cannot be excluded. In these scenarios, populations that currently appear marginal may become more important. Furthermore, the Range States India, Nepal and/or Pakistan may have their own interest in the conservation of Kiang within their national boundaries. All populations of Kiang in these countries are either confirmed to be transboundary or depend by all likelihood for their long-term survival on connectivity and genetic exchange with Kiang groups in China. Thus, transboundary conservation will be required for securing these populations at the edge of the larger range area of the species.

Proposed TA of significance for the species

ID No.	9	**Working Name**	Khangchendzonga-Sikkim Plateau
Countries		China (Tibet), India (Sikkim), Nepal	
Geographic location		Khangchendzonga region (India, China, and Nepal) and Northern plateau of Sikkim and adjacent areas	
Coordinates		N 28.045832°, E 88.6680373°	

ID No.	10	**Working Name**	Western Trans-Himalaya
Countries		China (Tibet), India (Uttarakhand), Nepal	
Geographic location		Trans-Himalaya between Bandarpunch Mountain range in the west and the eastern watershed of Upper Humla in the east.	
Coordinates		N 31.091263°, E 79.062512°, N 30.309320°, E 81.623352°	

ID No.	11	**Working Name**	Changthang and Spiti
Countries		China (Tibet, Xinjiang), India (Ladakh and Himachal Pradesh)	
Geographic location		Changthang plateau in Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau	
Coordinates		N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°	

3.9 Chinkara *Gazella bennettii*

Status

The IUCN Red List assessed Chinkara as LC but declining due to “over-hunting”. Numbers in India are allegedly still high and there is no evidence that the rate of decline is close to meeting a threshold for threatened status (IUCN SSC Antelope SG, 2017a).

The global population is mainly located in India and Pakistan. Within the area of interest, the species is very rare with no figures known for Afghanistan and around 1,300 estimated for Iran in 2001 (IUCN SSC Antelope SG, 2017a).

Range areas

The exact range areas of Chinkara (Figure 9) are not known. The maps in the CAMI Atlas and in the IUCN Red List show large range areas that are not fully in line with each other, and it is unclear which parts of these are actually occupied by the species.

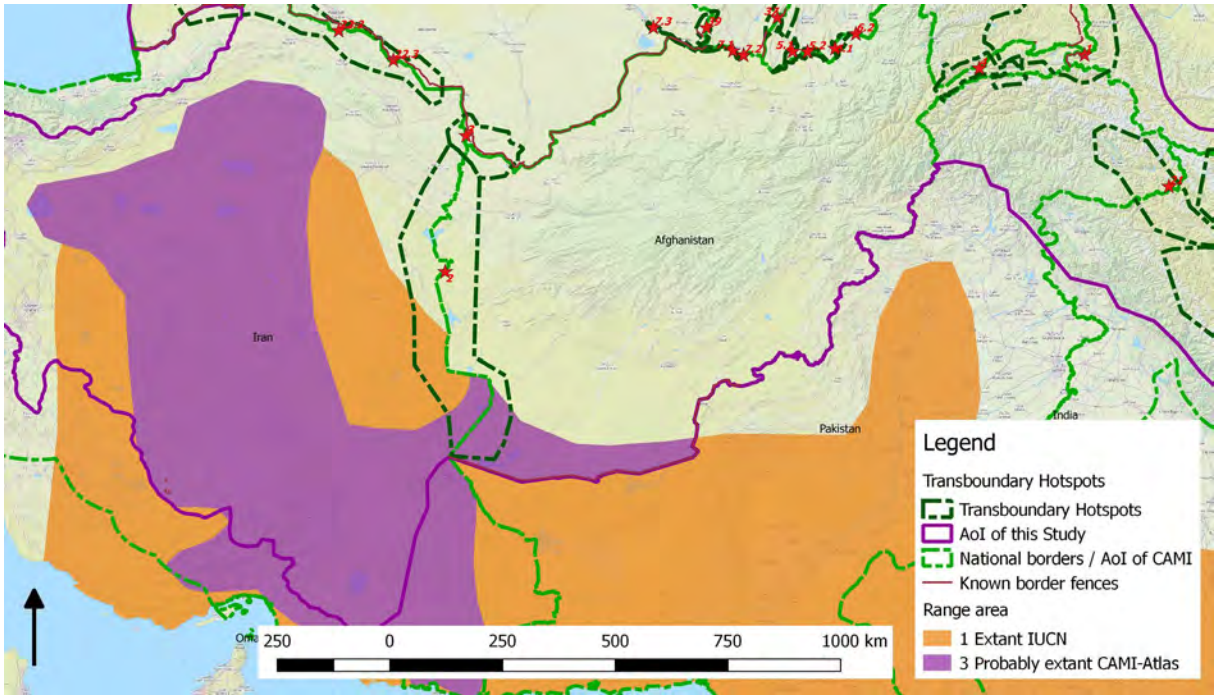


Figure 9. Range map of Chinkara. Sources: IUCN Red List and CAMI Atlas

Range States

- Extant: Afghanistan, Iran;
- Outside of the area of interest: India, Pakistan (extant)

Conservation significance of transboundary populations, migrations and movements

Given the low numbers inside the area of interest, the unknown range areas and the rather large population outside of the area of interest, the conservation significance of possible transboundary populations, migrations and movements cannot be assessed. The border fence between Pakistan and Afghanistan transects part of the distribution range. The effects of this border fence on Chinkara are not documented but can be inferred from the effect of fencing on the sympatric *Gazella subgutturosa*. In case of drought, weakened *G. subgutturosa* are reported to aggregate and die along stretches of fence that prevent their movements in the direction of a better forage area (e.g., Zafar-ul Islam et al., 2010 quoted in

CAMI Atlas, 2019). Transboundary populations of the species, if existing, would not only be affected by typical border related threats, but perhaps even more by poaching, habitat degradation and drought.

Proposed TA of significance for the species

ID No.	2	**Working Name**	Afghanistan-Iran Border Region
Countries		Afghanistan, Iran	
Geographic location		Entire border area	
Coordinates		N 33.320370°, E 60.789269° (most southern areas only, if at all)	

3.10 Goitered Gazelle *Gazella subgutturosa*

Status

The Goitered Gazelle is globally assessed as EN (IUCN SSC Antelope SG, 2017b) in the IUCN Red List). Population numbers are declining and there seems to be a substantial discrepancy between the huge range area indicated in the map and the assumed population numbers, indicating low densities and probably local extinctions over large areas. Continuing poaching and habitat loss are the main reasons of decline indicated by IUCN SSC Antelope SG (2017b).

As an example of the general trends, the IUCN SSC Antelope SG (2017b) stated that the former population in Turkmenistan had virtually disappeared. Rustamov (pers. comm. 2018) assumed that in 2014 at least 850 Goitered Gazelles (plus about 500 at an island in the Caspian Sea) existed in Turkmenistan, while the Red Book of Turkmenistan indicated 4,200 individuals and an increasing population (Annabayramov, 2011). Furthermore, in Mongolia, holding an estimated 40-50% of the global population, the population size has been heavily reduced by poaching and this decline is continuing (IUCN SSC Antelope SG, 2017b). In North-western China (Abduriyim, 2018) and Iran (Khosravi et al., 2019) numbers of Goitered Gazelles have reportedly declined to an extent that has already caused a reduction of local genetic diversity. Numbers in Kazakhstan and Uzbekistan are unknown but certainly much below the potential carrying capacity of the available habitat. Substantial populations exist in Altyn Emel NP (Kazakhstan) and in the fenced “Ecocenter Jeyran” (Uzbekistan). In Kyrgyzstan Goitered Gazelle is probably extinct (not indicated in IUCN Red List and CAMI Atlas range maps) with last documented observations at the southern edges of Issyk-Kul Lake in 2005 and in Lyalyak district in 2007 (Davletbakov and Michel, 2015). In Tajikistan, the Goitered Gazelle occurs in two small and isolated populations perhaps in quasi-extinction state.

Range areas

While the IUCN Red List (IUCN SSC Antelope SG, 2017b) presents a large and continuous range area of the species, the CAMI Atlas (which does not include China) shows a much more fragmented distribution (Figure 10). The low population numbers, however, make it likely that over large parts of these distribution patches the species is already extinct or occurs only occasionally. E.g., Khosravi et al. (2019) state that in Iran the remnant populations are confined to fragmented habitats. Often such small range areas are effectively isolated. Such populations can survive for decades, as for example the gazelles north of Kayrakkum Reservoir in Tajikistan (Michel et al., 2009), but these groups are particularly prone to become extirpated. Even after a recovery of such small groups their low genetic diversity may threaten their long-term survival (Abduriyim, 2018; Khosravi et al., 2019).

Range States

- Extant: Afghanistan, China, Iran, Mongolia, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan;
- Probably extinct: Kyrgyzstan;
- Outside of the area of interest: Azerbaijan, Pakistan (extant); Armenia (extinct); Georgia (reintroduced), Turkey?

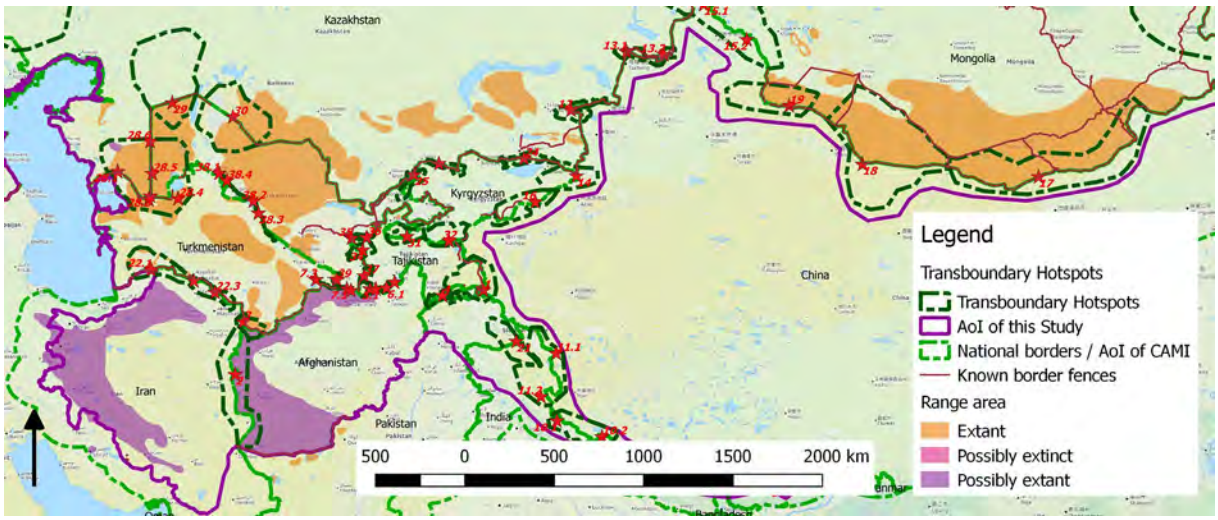


Figure 10. Range map of Goitered Gazelle within the AoI

Conservation significance of transboundary populations, migrations and movements

Several of the range areas indicated in the CAMI Atlas are certainly transboundary. However, existing barriers may limit movements across international borders although Goitered Gazelles are known to jump well and or squeeze through fences. Thus, they can possibly cross some border fences, although such attempts often cause injury or death (injured gazelles reported by Kazakhstan border guards from southern Ustyurt and own observations by Pestov (pers. comm. 2019). Furthermore, it appears that despite their general ability to jump, Goitered Gazelles hesitate to pass fences, as suggested by various observations (e.g., Zafar-ul Islam et al. 2010 quoted in CAMI Atlas, 2019). Goitered Gazelles seem to occur regularly close to border fences and try to pass ahead of approaching vehicles, which in areas with regular border patrols may pose an important mortality factor (Dieterich, pers. comm. 2021). The Kyzylkum range area, east of the Aral Sea is shared between Kazakhstan and Uzbekistan, but Gritsyna et al. (2016) consider the fence a serious threat possibly blocking access to seasonally critical habitats and causing injuries and mortality in the case of crossing attempts. The areas in the southern Ustyurt, shared by Kazakhstan, Turkmenistan and Uzbekistan are locally cut by two fences, which may form effective barriers or even traps. Several range areas seem to end at national borders, e.g. in the northern/eastern Ustyurt between Kazakhstan and Uzbekistan or in the Kopet Dagh between Iran and Turkmenistan. But to what extent the species really occurs at any side of the respective border is not exactly known. Some of these border areas may actually have no gazelles anymore; others may have unrecorded transboundary populations. The occurance of Goitered Gazelles in various dryland habitats, including some of the driest regions in Central Asia, suggests that they have evolved considerable behavioral and physiological flexibility in response to drought and prevailing aridity. This flexibility is largely associated to an opportunistic mobility in search of most favorable habitats. Transboundary movements can therefore be a critical need, depending on differences of rangeland status, overall plant moisture content and/or access to water across an international border.

Proposed TA of significance for the species

ID No.	2	Working Name	Afghanistan-Iran Border Region
Countries		Afghanistan, Iran	
Geographic location		Entire border area	
Coordinates		N 33.320370°, E 60.789269°	

ID No.	3	Working Name	Badghyz
Countries		Afghanistan, Iran, Turkmenistan	
Geographic location		Hills between Badghyz province (Afghanistan) and Mary (Turkmenistan)	
Coordinates		N 35.394097°, E 62.892003°; N 35.891563°, E 63.466927°	

ID No.	22	Working Name	Kopet Dagh
Countries		Iran, Turkmenistan	
Geographic location		Entire mountain range	
Coordinates		N 38.138427°, E 56.020189°; N 37.649680°, E 58.440410°; N 37.131702°, E 59.647731°	

ID No.	28	Working Name	South-western Ustyurt
Countries		Kazakhstan, Turkmenistan, Uzbekistan	
Geographic location		Ustyurt SPA and areas south of it; Kaplankyr Plateau se of shor (TKM), chink = border between KAZ-TKM, UZB-TKM; Kazakhly shor; Kaplankyr SPA south of Sarygamysh lake; areas south of the road Barsa Kelmes – Jaslyk	
Coordinates		N 42.382329°, E 54.111493°; N 41.194460°, E 55.881960°; N 41.235781°, E 57.550095°; N 42.293289°, E 56.077211°; N 43.634792°, E 55.961138°	

ID No.	29	Working Name	Eastern Ustyurt
Countries		Kazakhstan, Uzbekistan	
Geographic location		Ustyurt east of Atyrau-Nukus road; Saygachiy reserve	
Coordinates		N 45.207123°, E 57.217359°	

ID No.	31	Working Name	Aral Sea / Western Kyzylkum Desert
Countries		Kazakhstan, Uzbekistan	
Geographic location		E Aral Sea with Barsa-Kelmes SPA/BR	
Coordinates		N 44.642783°, E 60.664708°	

ID No.	37	Working Name	Babatag
Countries		Tajikistan, Uzbekistan	
Geographic location		Babatag Mountains along the border	
Coordinates		N 37.877689°, E 68.114596°	

3.11 Argali *Ovis ammon*

Status

The Argali *Ovis ammon* is assessed as Near Threatened in the IUCN Red List (Reading et al., 2020). The population size is believed to be in significant decline due to poaching and competition with livestock, likely exacerbated by the impact of ongoing climate change. The decline is probably at a rate below the threshold for a threatened category. Following the listing of the Argali on Appendix II of CMS in 2011, an International Single Species Action Plan has been prepared in cooperation with Range States and international experts, and with financial support of the German Federal Government and the European Union and has been adopted at CMS COP 11 in November 2014 (CMS, 2014).

The IUCN Caprinae Specialist Group recognizes nine subspecies (CMS, 2014), with only three assessed in the IUCN Red List on subspecies level (Reading et al., 2020):

O. a. ammon	-	Altai Argali;
O. a. collium	-	Kazakhstan Argali;
O. a. darwini	-	Gobi Argali;
O. a. hodgsoni	-	Tibetan Argali;
O. a. jubata	-	North China Argali, Shansi Argali (Extinct);
O. a. karelini	-	Tian Shan Argali;
O. a. nigrimontana	-	Karatau Argali (Endangered);
O. a. polii	-	Marco Polo sheep, Pamir Argali;
O. a. severtzovi	-	Severtzov's Argali (Vulnerable).

Different stakeholders not always apply this classification consistently and the assignment of certain populations to one or another subspecies can vary with consequences for the status assessment and legal regulation concerning the respective population or subspecies. A phenotype-based classification is adopted by the CIC International Council for Game and Wildlife Conservation, which identifies 15 Argali phenotypes and is intended to be complementary to formal taxonomy. The Safari Club International (SCI 2002) classification system for wild sheep recognizes 14 Argali subspecies. (CMS, 2014)

No global estimates of the total population size are provided in the IUCN Red List (Reading et al., 2020) and the Single Species Action Plan (CMS, 2014). The figures in CMS (2014) summed up to a total number of about 107,000 Argali, but population information by Reading et al. (2020) suggests a substantially lower number. Available figures are of varying reliability and refer to different spatial and temporal scales. Apparent increases in numbers are likely mainly due to more intensive surveys. Area-specific reports suggest locally stable or increasing population sizes, but over large areas trends of decline. Major causes of decline are poaching and increasing livestock grazing in Argali habitats causing displacement, forage competition, habitat degradation and disease transmission. Barriers to migration in form of border fences in some areas prevent access to key seasonal habitats. (Reading et al., 2020)

On the other hand, successful protection from poaching has been incentivized by income from sport hunting in assigned game management areas in some countries, while some trophy hunting has not been beneficial for the conservation of the respective populations. Where illegal and unethical practices, like shooting more than one animal per license and manipulating of trophies occur, abundance of old rams and quality of trophies have declined. Poor involvement of communities in the implementation of hunting programs and insufficient sharing of benefits from hunting have in some areas reduced the commitment local people to protection of Argali and the conservation of its habitat. (Reading et al., 2020, Michel and Rosen, 2016)

Range areas

The map of Argali range areas in the CAMI Atlas had been based on the map in the IUCN Red List. With the Red List assessment update by Reading et al. (2020), this map has been further revised (Figure 11). The extent of some range areas within the area of interest of this study is well known. In particular the patchy distribution in Mongolia is now represented in the map. Some range areas, e.g., in central and eastern Kazakhstan, northwestern China and China's Tibetan plateau, are rather generalized and the available population figures suggest that large sections of the mapped range areas are not occupied by Argali.

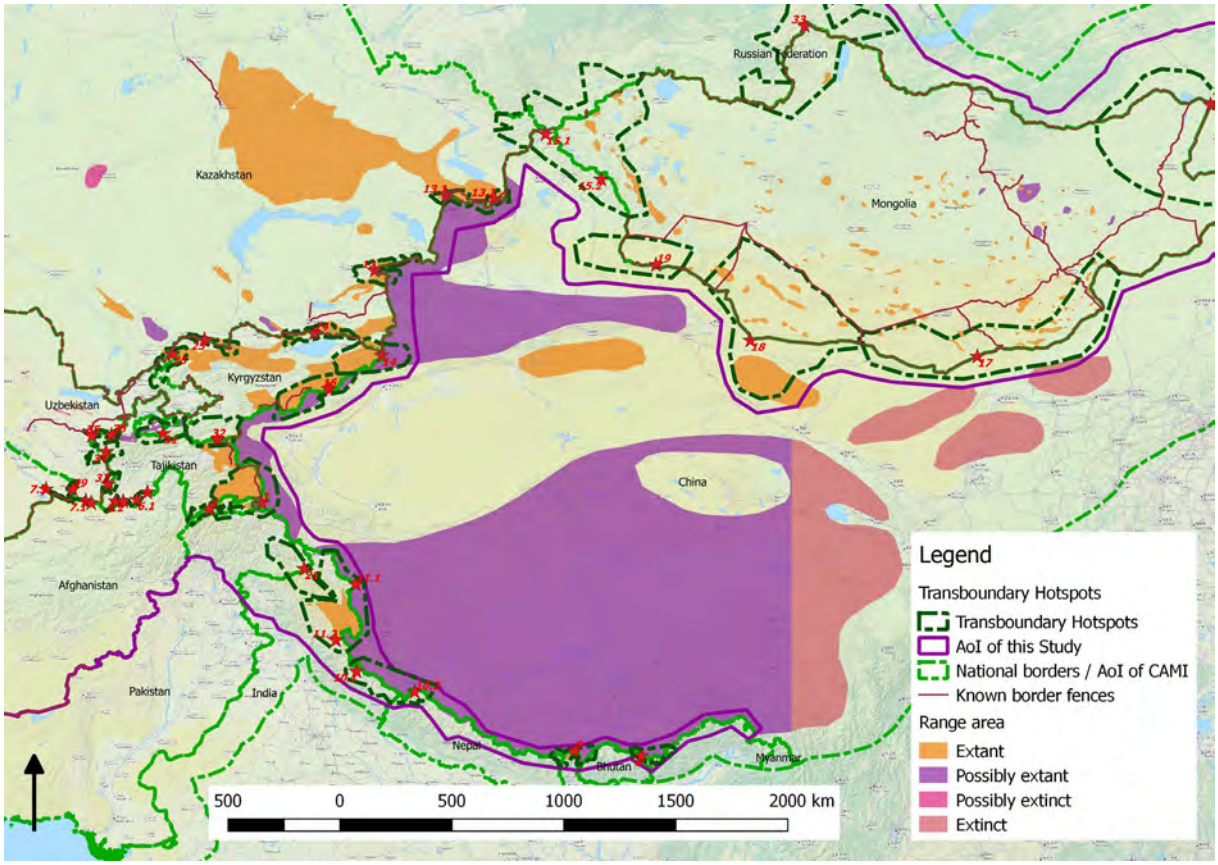


Figure 11. Range map of Argali. Source: IUCN Red List

Range States

- Extant: Afghanistan, China (Xinjiang, Qinghai, Tibet, Gansu, Inner Mongolia), India (Ladakh, Himachal Pradesh, Sikkim), Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russian Federation, Tajikistan, Uzbekistan.

Conservation significance of transboundary populations, migrations and movements

The overall large range area of Argali may suggest that transboundary populations, migrations and movements might be of relatively lower significance for the conservation of the species. However, there are several populations and subspecies, which have their key habitats and the highest numbers of individuals in areas close to international borders or are transboundary in a substantial extent. For instance, Argali in the Altai move seasonally between Mongolia and Russian Federation; in the Pamirs some Argali groups move between Afghanistan, China and Tajikistan; in the Jungarian Alatoo, Tarbagatay and Saur Mountain ranges Argali move between China and Kazakhstan; in the Tian Shan movements occur between China, Kazakhstan and Kyrgyzstan and in the Turkestan Range between Kyrgyzstan, Tajikistan and Uzbekistan. Survival of Argali in China's Inner Mongolia is likely to depend on the ability of

dispersing individuals from Mongolia to supplement existing groups or colonize new areas (Harris et al., 2009). Furthermore, in Pakistan continuing Argali presence is likely dependent on migrations from China (Haider et al., 2018). In Sikkim (India) Argali are transboundary with Tibet (China) (Bhatnagar, pers. comm. 2021).

Argali populations in many transboundary areas are fragmented by border fences, which hinder migrations and movements, reducing effective population sizes, hampering access to essential seasonal habitats and forage resources (e.g., reported from the Altai between Mongolia and Russian Federation) and reducing genetic exchange and diversity (Luikart et al., 2011; Rosen, 2012). In some areas, like along sections of the border between Kazakhstan and China, Argali habitats are fragmented by two parallel fences. Transboundary collaboration in such areas should primarily aim at the restoration of connectivity and at joint population monitoring and coordinated conservation management.

Proposed TA of significance for the species

ID No.	1	**Working Name**	High Pamirs
Countries		Afghanistan, China, Tajikistan	
Geographic location		South-eastern Tajik Pamirs, Great and Little Pamir, Sarikol Pamir (Tashkorgan)	
Coordinates		N 37.225377°, E 74.889355°	

ID No.	9	**Working Name**	Khangchendzonga-Sikkim Plateau
Countries		China (Tibet), India (Sikkim), Nepal	
Geographic location		Khangchendzonga region (India, China, and Nepal) and Northern plateau of Sikkim and adjacent areas	
Coordinates		N 28.045832°, E 88.6680373°	

ID No.	10	**Working Name**	Western Trans-Himalaya
Countries		China (Tibet), India (Uttarakhand), Nepal	
Geographic location		Trans-Himalaya between Bandarpunch Mountain range in the west and the eastern watershed of Upper Humla in the east.	
Coordinates		N 31.091263°, E 79.062512°, N 30.309320°, E 81.623352°	

ID No.	11	**Working Name**	Changthang and Spiti
Countries		China (Tibet, Xinjiang), India (Ladakh and Himachal Pradesh)	
Geographic location		Changthang plateau in Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau	
Coordinates		N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°	

ID No.	12	**Working Name**	Jungarian Alatau
Countries		China, Kazakhstan	
Geographic location		Jungarian Alatau, entire mountain area	
Coordinates		N 44.908111°, E 79.868378°	

ID No.	13	**Working Name**	Tarbagatay and Saur Ranges
Countries		China, Kazakhstan	
Geographic location		Continuous area along the China-Kazakhstan border	
Coordinates		N 47.212407°, E 83.021317°; N 47.100329°, E 85.150187°	

ID No.	14	Working Name	Khan Tengri region
Countries		China, Kazakhstan, Kyrgyzstan	
Geographic location		Khan Tengri massif in the Tian Shan, incl. Khan Tengri NP in Kyrgyzstan	
Coordinates		N 41.993587°, E 80.126861°	

ID No.	15	Working Name	Altai
Countries		China, Kazakhstan, Mongolia, Russian Federation	
Geographic location		N-Central part and SE part of Altai mountains	
Coordinates		N 49.006372°, E 87.394649°; N 47.681114°, E 89.849796°	

ID No.	16	Working Name	Inner Tian Shan
Countries		China, Kyrgyzstan	
Geographic location		Entire mountain range along border with China	
Coordinates		N 41.092293°, E 77.839644°	

ID No.	17	Working Name	South Gobi
Countries		China, Mongolia	
Geographic location		To be defined! Possibly several separate sections.	
Coordinates		N 42.163084°, E 106.423024°	

ID No.	18	Working Name	Trans-Altai Gobi
Countries		China, Mongolia	
Geographic location		Mongolian Trans-Altai Gobi desert, largely identical with Great Gobi A SPA.	
Coordinates		N 42.683870°, E 96.422978°	

ID No.	19	Working Name	Jungarian Gobi
Countries		China, Mongolia	
Geographic location		Great Gobi B SPA; Khovd-Xinjiang	
Coordinates		N 45.087319°, E 92.261473°	

ID No.	23	Working Name	Western Kyrgyz range
Countries		Kazakhstan, Kyrgyzstan	
Geographic location		Kyrgyz range in Jambyl province (Kazakhstan) and Talas province (Kyrgyzstan)	
Coordinates		N 42.718098°, E 72.363159	

ID No.	24	Working Name	Northern Tian Shan
Countries		Kazakhstan, Kyrgyzstan	
Geographic location		Zaili-Alatoo and Kungey-Alatoo	
Coordinates		N 42.927080°, E 77.195160°	

ID No.	25	Working Name	Western Tian Shan
Countries		Kazakhstan, Kyrgyzstan, Uzbekistan	
Geographic location		Ugam-Chatkal NP, Chatkal SPA, Aksu-Zhabagly SPA, Besh Aral SPA	
Coordinates		N 42.243700°, E 70.943811°	

ID No.	31	**Working Name**	Eastern Turkestan Range
Countries		Kyrgyzstan, Tajikistan, Uzbekistan	
Geographic location		Hissaro-Alai system (eastern Turkestan Range)	
Coordinates		N 39.497213°, E 69.906661°	

ID No.	32	**Working Name**	Pamir-Alai
Countries		Kyrgyzstan, Tajikistan	
Geographic location		Transalai and Alai ranges, Alai valley	
Coordinates		N 39.549400°, E 71.902699°	

ID No.	33	**Working Name**	Eastern Sayan
Countries		Mongolia, Russian Federation	
Geographic location		Tuva/Irkutsk prov./Buryatiya – Khovsgol	
Coordinates		N 52.040283°, E 98.815337°	

ID No.	34	**Working Name**	Western Turkestan Range
Countries		Tajikistan, Uzbekistan	
Geographic location		Turkestan Range west of Shahristan	
Coordinates		N 39.550563°, E 68.262615°	

3.12 Urial *Ovis vignei*

Status

Urial *Ovis vignei* has been assessed as separate species in the IUCN Red List for the first time in 2020 (Michel and Ghoddousi, 2020). The Urial is vulnerable, given declines inferred from information about well-studied populations, loss of range area, habitat deterioration, poaching levels and competition with livestock for forage as well as disease transmission.

Urial is divided into several subspecies:

O. v. arkal	-	Transcaspian Urial
O. v. blanfordi	-	Blanford's Urial
O. v. bochariensis	-	Bukhara Urial
O. v. cycloceros	-	Afghan Urial
O. v. punjabensis	-	Punjab Urial
O. v. vignei	-	Ladakh Urial

The taxonomic status of several subspecies, their geographic distribution and the belonging of distinct populations to these are debated. Urial and Mouflon *Ovis gmelini* form natural and stable hybrid populations in parts of Iran (IUCN SSC/Caprinae Specialist Group 2000).

The global population of this species might be in the range of 30,000 animals. The population numbers do not include suspected species hybrids between *O. gmelini* and *O. vignei*, occurring in Iran. The assessment of status regarding population size, range areas and trends is challenged by insufficient coverage and quality of available data, in particular from Iran, the Range State with likely the largest population size of the species, but also from most other parts of the range. Most population data are guesses by experts or refer to small areas only. Data availability for distinct time periods is not sufficient to provide an indication of size and trends of global population size.

Available information suggests that Urial populations are fragmented and many populations are small and/or declining. The main reasons of decline are poaching, capture of lambs as pets, competition with domestic livestock and habitat degradation. Where not poached Urial populations can quickly recover, coexist with human activities like livestock grazing, and even cause damage to agriculture. Stable and increasing populations are found in the Wakhan of Afghanistan, some protected areas in Iran and outside of the area of interest in India and in areas with community-based hunting programs in parts of Pakistan. In Turkmenistan, rapid declines happened during the recent years, with Rustamov (pers. comm. 2018) reporting an overall decline from 6,100 reported in the Red Book (Annabayramov, 2011) to less than 3,000 and local declines by up to 90%. Ismailov (pers. comm., 2019) indicated declines by more than 70% in Kazakhstan during the last 20 years (c. 1,150 in 2018/2019).

Hybridization might become a threat to the genetic integrity of wild populations where both species are bred together in hunting enclosures, like in Tajikistan.

Range areas

The range areas shown in the map are of highly varying accuracy (Figure 12). Most range areas indicated as "extant" are very generalized and the actually occupied areas are much smaller. This concerns in particular the large blocks in the Ustyurt between Aral Sea and Caspian Sea, in northern Iran and Afghanistan. The areas indicated as "possibly extant" consist in a large extent of unsuitable areas and there only some small patches of actual Urial occurrence can be expected. Thus, the overall range of the species is very fragmented, and most populations are isolated. The map indicates the zone of occurrence of hybrids between *O. gmelini* and *O. vignei* as "Presence uncertain".

In accordance with the ToR for this study, in Pakistan only the Himalaya region (in the wider sense) is included in the area of interest. Thus, here only range areas in the provinces Khyber-Pakhtunkhwa and Gilgit-Baltistan are considered in the identification of hotspots for CAMI.

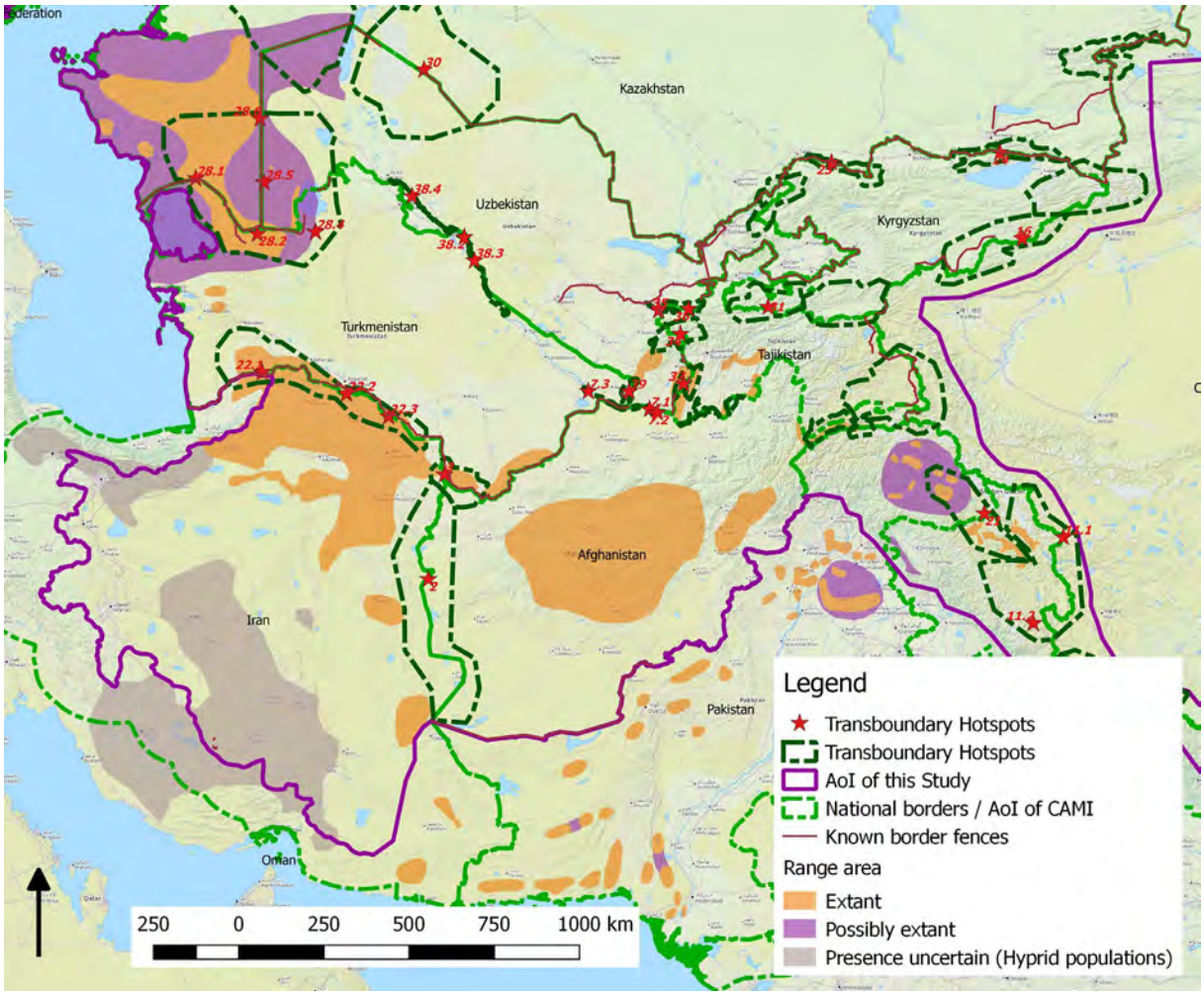


Figure 12. Range map of Urial. Source: IUCN Red List

Range States

- Extant: Afghanistan, India (Ladakh), Iran, Kazakhstan, Pakistan (northern part), Tajikistan, Turkmenistan, Uzbekistan
- Outside of the area of interest: Pakistan (southern part); Oman (presence uncertain, introduced?)

Conservation significance of transboundary populations, migrations and movements

Large parts of the range and population size of the species are either not transboundary or migrations and movements are poorly known. Populations of Turkmenistan are potentially transboundary with Afghanistan, Iran, Kazakhstan and Uzbekistan, but movements are hindered by border fences (high chain link with cover of barbed wire). The barbed wire fences of medium height at the Kazakhstan side of the Kazakhstan-Turkmenistan borders are at least occasionally crossed by Urials, but it is unclear if they crawl through the fence or jump it (Pestov, pers. comm. 2019). For some populations national borders may coincide with natural barriers, like in the case of the lower Panj River between Afghanistan and Tajikistan or the highest sections of the Hindukush Range between Afghanistan and Pakistan. The probably

largest remaining populations of Bukhara Urial in the southwest of Tajikistan and south of Uzbekistan is likely transboundary in the Babatag Mountains. The population of Urial (possibly Ladakh subspecies *O. v. vignei*) in the Wakhan of Afghanistan stretches over one mountain pass into northern Pakistan. This population also seems to be the source population of Urial groups occasionally observed in the Pamirs of Tajikistan. The Ladakh Urial populations in Gilgit-Baltistan (Pakistan) and in Ladakh (India) are likely connected across the border (Bhatnagar, pers. comm. 2021). Thus, transboundary populations and movements are of high significance for the conservation of certain populations and subspecies.

Proposed TA of significance for the species

ID No.	2	**Working Name**	Afghanistan-Iran Border Region
Countries		Afghanistan, Iran	
Geographic location		Entire border area	
Coordinates		N 33.320370°, E 60.789269°	

ID No.	3	**Working Name**	Badghyz
Countries		Afghanistan, Iran, Turkmenistan	
Geographic location		Hills between Badghyz province (Afghanistan) and Mary (Turkmenistan)	
Coordinates		N 35.394097°, E 62.892003°; N 35.891563°, E 63.466927°	

ID No.	4	**Working Name**	Wakhan
Countries		Afghanistan, Pakistan, Tajikistan	
Geographic location		Wakhan corridor and upper Panj from downstream of Eshkashem up to Sarhad-e Baroghil (Afghanistan) and Tupkhana valley (Tajikistan), Upper Yarkhun (Baroghil) valley south of Baroghil Pass (Pakistan)	
Coordinates		N 36.988622°, E 72.568698°	

ID No.	11	**Working Name**	Changthang and Spiti
Countries		China (Tibet, Xinjiang), India (Ladakh and Himachal Pradesh)	
Geographic location		Changthang plateau in Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau	
Coordinates		N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°	

ID No.	21	**Working Name**	Eastern Karakoram
Countries		India (Ladakh), Pakistan (Gilgit-Baltistan)	
Geographic location		Upper Indus Valley and valleys of tributaries upstream from Leh to downstream from Skardu.	
Coordinates		N 34.878674°, E 76.7505049°	

ID No.	22	**Working Name**	Kopet Dagh
Countries		Iran, Turkmenistan	
Geographic location		Entire mountain range	
Coordinates		N 38.138427°, E 56.020189°; N 37.649680°, E 58.440410°; N 37.131702°, E 59.647731°	

ID No.	28	**Working Name**	South-western Ustyurt
Countries		Kazakhstan, Turkmenistan, Uzbekistan	
Geographic location		Ustyurt SPA and areas south of it; Kaplankyr Plateau se of shor (TKM), chink = border between KAZ-TKM, UZB-TKM; Kazakhly shor; Kaplankyr SPA south of Sarygamysh lake; areas south of the road Barsa Kelmes – Jaslyk	
Coordinates		N 42.382329°, E 54.111493°; N 41.194460°, E 55.881960°; N 41.235781°, E 57.550095°; N 42.293289°, E 56.077211°; N 43.634792°, E 55.961138°	

ID No.	37	**Working Name**	Babatag
Countries		Tajikistan, Uzbekistan	
Geographic location		Babatag Mountains along the border	
Coordinates		N 37.877689°, E 68.114596°	

ID No.	39	**Working Name**	Kugitang/Koytendag
Countries		Turkmenistan, Uzbekistan	
Geographic location		Koytendag SPA and Surkhan SPA	
Coordinates		N 37.701902°, E 66.552273°	

3.13 Persian Leopard *Panthera pardus saxicolor*

Status

The Leopard *Panthera pardus* as entire species is assessed by Stein et al. (2020) as Vulnerable in the IUCN Red List. The subspecies Persian Leopard *P. p. saxicolor* was assessed in the IUCN Red List in 2008 and according to Stein et al. (2020) should retain the status Endangered with only between 800 and 1,000 mature individuals as assumed by Khorozyan (2008). Although the subspecies has been recorded in previously undocumented areas of the Caucasus and in Kazakhstan, due to overall low numbers, restricted range and overall population decline, its Red List status remained unchanged. The main threat is illegal killing, mainly in the context of (perceived) human-wildlife conflict (Bleyhl et al., 2021).

Range areas

The current range area of Persian Leopards (Figure 13) represents only a patchwork of tiny sections of its previous distribution. Thanks to long-distance movements of several hundred kilometers (Pestov et al., 2019) the populations in the remaining range areas may still be in some extent connected, at least through the migration of young males. In 2018, a male leopard was recorded for the third time after 2007 and 2015 in the Ustyurt of Kazakhstan, where the species so far has not been considered as part of the native fauna. This individual was repeatedly recorded in the Ustyurt SPA, but found dead in June 2021 about 250 km further to the north. Furthermore, probably, the fact that females tend to be much less mobile and to remain close to the area where they were born makes the colonization of new areas by reproducing subpopulations a rather rare occasion.

Most Persian Leopards occur in Iran's Zagros and Alborz Mountains and adjacent areas. Other confirmed range areas within the area of interest are the Kopet Dagh Mountains at the border of Iran and Turkmenistan and in Afghanistan's Central Plateau. There might still be leopards in areas where it had occurred in the past – the Babatag Mountains at the border of Tajikistan and Uzbekistan, in the Koytendagh/Kugitang, shared between Turkmenistan and Uzbekistan and in Afghanistan's Badakhshan province. In particular in the Kugitang and Babatag (and adjacent Baysuntau and southern Hissar Range) of Uzbekistan oral reports suggest that leopards are still present there (Marmazinskaya, 2016)

Range States

- Extant: Afghanistan, China, Iran, Kazakhstan (vagrant), Turkmenistan;
- Possibly extinct: Pakistan, Tajikistan, Uzbekistan;
- Outside of the area of interest: Armenia, Azerbaijan, Iraq (extant); Georgia (extinct); Russian Federation (reintroduced)

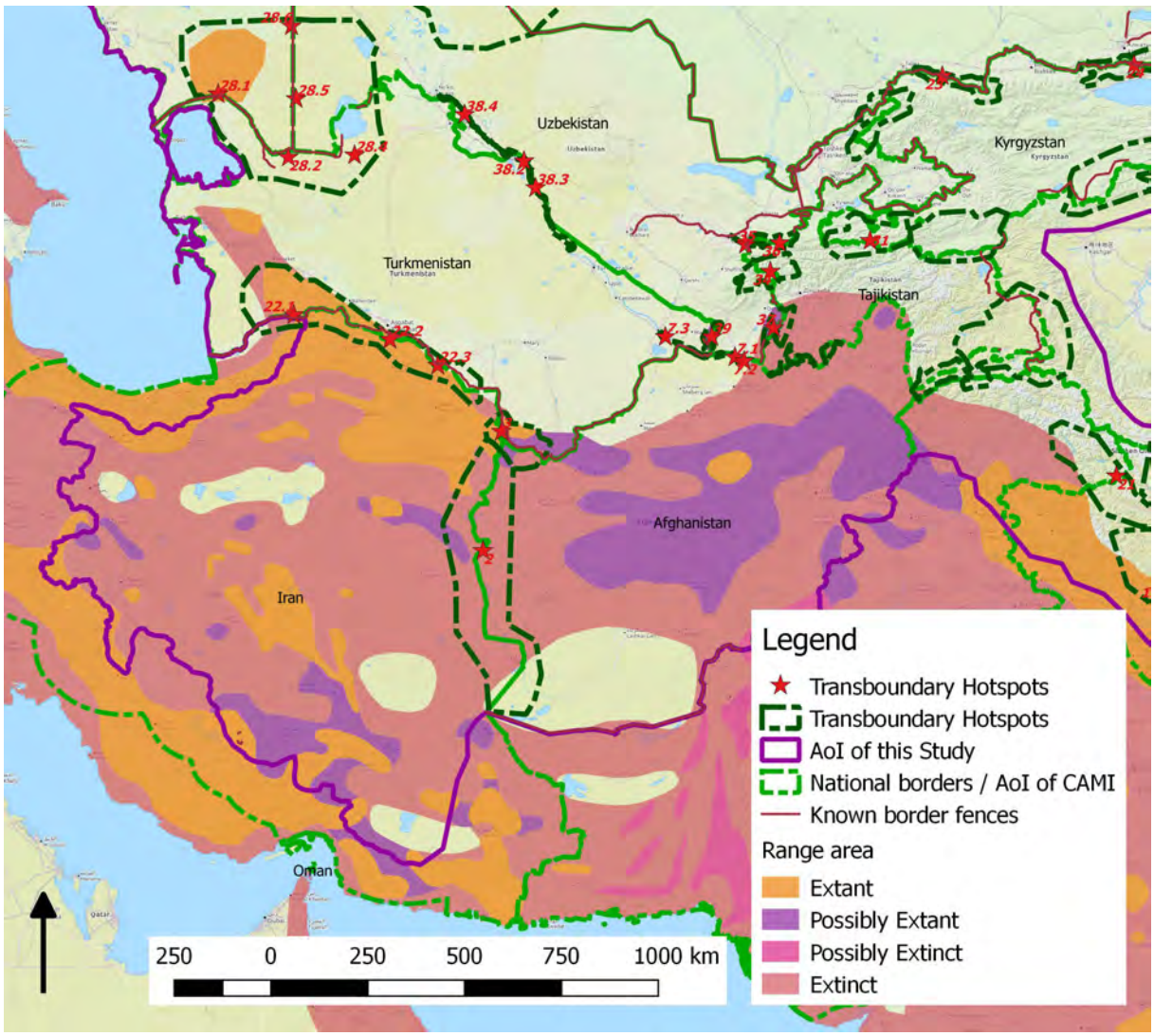


Figure 13. Range map of Persian Leopard within the Area of Interest (AoI). Source: IUCN Red List; amended by adding the new range area in Kazakhstan

Conservation significance of transboundary populations, migrations and movements

In Iran (which hosts by far the largest population of Leopards in area of interest) the vast majority of leopard localities (Alborz, Zagros, Central Plateau) are not nearby any international border. As the leopard distribution extends beyond borders, some populations move between Azerbaijan and Iran, Iran and Turkmenistan, and possibly Afghanistan and Iran. However, the transboundary populations are not the majority. In Afghanistan, the three known recent records are all distant from international borders; actually, there are relatively few recent records of leopards located near or across borders compared to localities inside countries (S. Ostrowski, WCS, pers. comm. 2021). In Turkmenistan, Uzbekistan and Tajikistan, most confirmed or suspected range areas of the leopards are located close to or across national borders. These border areas are often comparably scarcely populated areas due to their natural conditions and/or security-related restrictions, which may have increased the chance that leopards survived there. Either way, the overall low numbers of leopards, their potentially large individual home ranges, long-distance movements and the need for genetic exchange between fragmented subpopulations require conservation activities for the species' transboundary range areas and populations.

Proposed TA of significance for the species

ID No.	2	**Working Name**	Afghanistan-Iran Border Region
Countries		Afghanistan, Iran	
Geographic location		Entire border area	
Coordinates		N 33.320370°, E 60.789269°	

ID No.	3	**Working Name**	Badghyz
Countries		Afghanistan, Turkmenistan	
Geographic location		Hills between Badghyz province (Afghanistan) and Mary (Turkmenistan)	
Coordinates		N 35.394097°, E 62.892003°; N 35.891563°, E 63.466927°	

ID No.	7	**Working Name**	Aral Paygambar
Countries		Afghanistan, Uzbekistan	
Geographic location		Riparian areas near Termez, incl. former Aral Paygambar SPA, closed in the 1990s and upstream of “Friendship“ bridge	
Coordinates		N 37.297403°, E 67.137200°; N 37.219264°, E 67.368819°	

ID No.	22	**Working Name**	Kopet Dagh
Countries		Iran, Turkmenistan	
Geographic location		Entire mountain range	
Coordinates		N 38.138427°, E 56.020189°; N 37.649680°, E 58.440410°; N 37.131702°, E 59.647731°	

ID No.	28	**Working Name**	South-western Ustyurt
Countries		Kazakhstan, Turkmenistan, Uzbekistan	
Geographic location		Ustyurt SPA and areas south of it; Kaplankyr Plateau se of shor (TKM), chink = border between KAZ-TKM, UZB-TKM; Kazakhly shor; Kaplankyr SPA south of Sarygamysh lake; areas south of the road Barsa Kelmes – Jaslyk	
Coordinates		N 42.382329°, E 54.111493°; N 41.194460°, E 55.881960°; N 41.235781°, E 57.550095°; N 42.293289°, E 56.077211°; N 43.634792°, E 55.961138°	

ID No.	37	**Working Name**	Babatag
Countries		Tajikistan, Uzbekistan	
Geographic location		Babatag Mountains along the border	
Coordinates		N 37.877689°, E 68.114596°	

ID No.	39	**Working Name**	Kugitang/Koytendag
Countries		Turkmenistan, Uzbekistan	
Geographic location		Koytendag SPA and Surkhan SPA	
Coordinates		N 37.701902°, E 66.552273°	

3.14 Snow Leopard *Panthera uncia*

Status

The Snow Leopard *Panthera uncia* was assessed in the IUCN Red List as Vulnerable by McCarthy et al. (2017). This assessment was based on the total numbers provided by the Range States, the recalculation of the share of mature individuals within the entire population, and reconsideration of likely densities across the Snow Leopard's large distribution range. This assessment and the assigned category have been challenged (e.g., Ale and Mishra, 2018), yet without rigorous application of the Guidelines for Using the IUCN Red List Categories and Criteria (IUCN Standards and Petitions Committee, 2019)[2] and assuming that the change from Endangered to a category of lower extinction risk may have negative implications for the conservation of the species, but also considering the low percentage of the Snow Leopard range area covered by scientific population surveys. As there is no alternative justified assessment of the Snow Leopard's status, the alternatively applicable category could only be Data Deficient, which would not be appropriate when comparing the knowledge about this charismatic species with most other taxa in that category.

Range areas

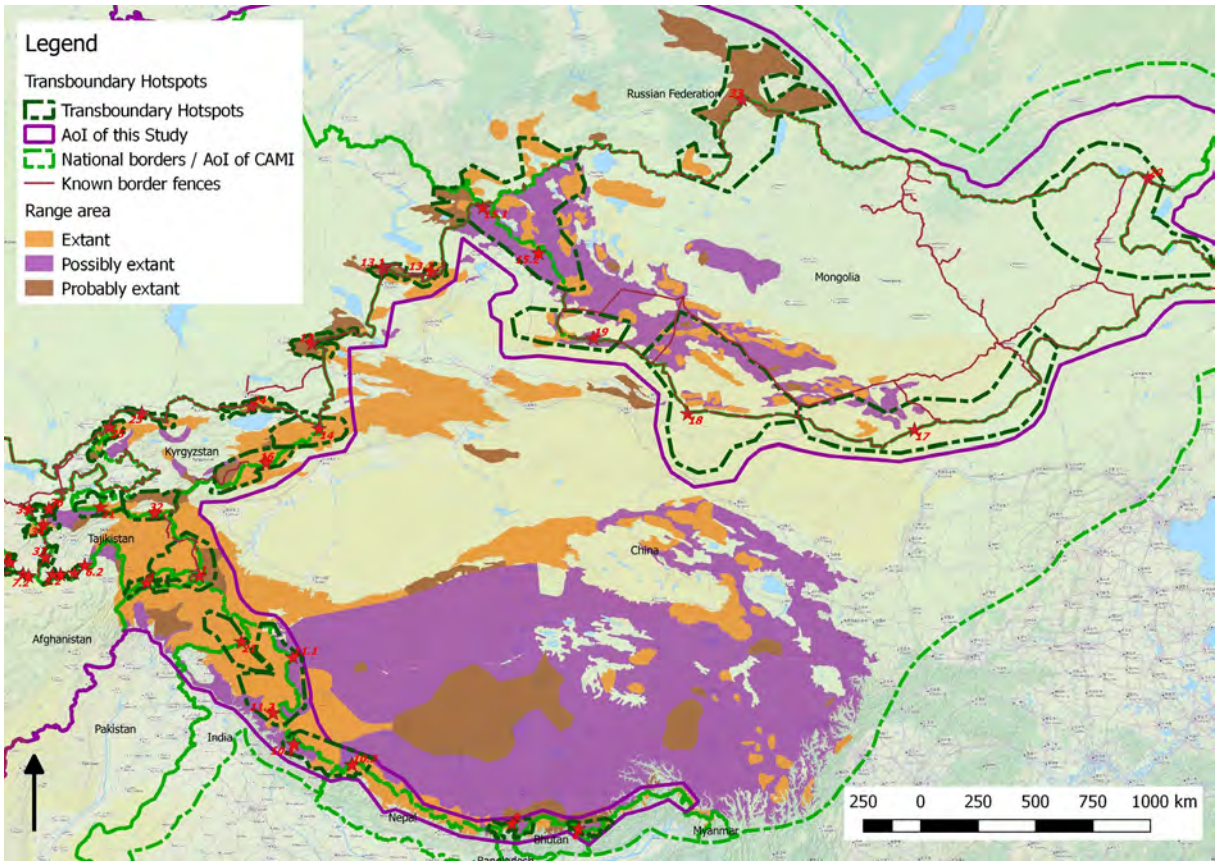


Figure 14. Range map of Snow Leopard. Source: IUCN Red List, CAMI-Atlas

The Snow Leopard's range areas (Figure 14) appear largely well connected from the northern part in the Altay, Sayan and adjacent mountain ranges, through the Saur, Tarbagatay, Jungarian Alatoo, Tian Shan and Pamir Mountains to the southern part of the range area in the Hindukush, Karakoram, Himalaya and Tibetan Plateau.

[2] During the time of preparation of the referenced paper the most recent version was Version 13 (March 2017).

However, local extinction might already have caused some fragmentation of the distribution range, in particular in its northern and southeastern parts. Climate change may cause further habitat fragmentation in the future by habitat transformation due to expansion of forests and/or cultivated lands, land use changes and local deterioration of prey populations (e.g., Lovari et al., 2013).

Lukarevski (pers. comm. 2015) expressed concerns that in some smaller range area patches in the Russian Federation, the Snow Leopard may go extinct because of the low likelihood that reproducing females recolonize abandoned home ranges as females (in contrast to males) rarely move across long distances, although such movements over hundreds of kilometers have been documented from collared female individuals (e.g., McCarthy et al., 2007).

Range States

- Extant: Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Russian Federation, Pakistan, Tajikistan, Uzbekistan.

Conservation significance of transboundary populations, migrations and movements

Key range areas of the Snow Leopard within the area of interest are located in areas close to national borders or are transboundary. Many national borders are ridgelines of mountain ranges and thus can lie either within or spatially close to Snow Leopard habitats. Due to large home ranges and long-distance movements, many Snow Leopard populations are transboundary and their connectivity across national borders is of utmost importance for maintaining sufficiently large effective population sizes and allowing for the recolonization of abandoned home ranges. Increasing pressure on Snow Leopard habitats caused by land-use and its impact on prey species, in particular increasing livestock numbers and expansion of extractive industries, and climate change causes fragmentation of range areas and the importance of transboundary connectivity of range areas will even increase (Mishra, et al., 2016, Heiner et al., 2016, Farrington and Li, 2016).

Border fences divide transboundary Snow Leopard areas. In particular along the borders with China, in some areas two lines of fences run parallel. Typically, border fences are not impermeable for Snow Leopards (Jackson, pers. comm. 2017), but they hamper movements and may cause injuries. Indirectly, border fences affect Snow Leopards by their negative impact on the fitness of their ungulate prey. For argali Luikart et al. (2011) detected genetic effects of isolation caused by border fences. Reduced access to seasonally important vital resources impacts on ungulate populations as, e.g. shown for argali in the Altai (Paltsyn et al., 2011).

Proposed TA of significance for the species

ID No.	1	**Working Name**	High Pamirs
Countries		Afghanistan, China, Tajikistan	
Geographic location		South-eastern Tajik Pamirs, Great and Little Pamir, Sarikol Pamir (Tashkorgan)	
Coordinates		N 37.225377°, E 74.889355°	

ID No.	4	**Working Name**	Wakhan
Countries		Afghanistan, Tajikistan	
Geographic location		Wakhan corridor and upper Panj from downstream of Eshkashem up to Sarhad-e Baroghil (Afghanistan) and Tupkhana valley (Tajikistan)	
Coordinates		N 36.988622°, E 72.568698°	

ID No.	9	**Working Name**	Khangchendzonga-Sikkim Plateau
Countries		China (Tibet), India (Sikkim), Nepal	
Geographic location		Khangchendzonga region (India, China, and Nepal) and Northern plateau of Sikkim and adjacent areas	
Coordinates		N 28.045832°, E 88.6680373°	

ID No.	10	**Working Name**	Western Trans-Himalaya
Countries		China (Tibet), India (Uttarakhand), Nepal	
Geographic location		Trans-Himalaya between Bandarpunch Mountain range in the west and the eastern watershed of Upper Humla in the east.	
Coordinates		N 31.091263°, E 79.062512°, N 30.309320°, E 81.623352°	

ID No.	11	**Working Name**	Changthang and Spiti
Countries		China (Tibet, Xinjiang), India (Ladakh and Himachal Pradesh)	
Geographic location		Changthang plateau in Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau	
Coordinates		N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°	

ID No.	12	**Working Name**	Jungarian Alatau
Countries		China, Kazakhstan	
Geographic location		Jungarian Alatau, entire mountain area	
Coordinates		N 44.908111°, E 79.868378°	

ID No.	13	**Working Name**	Tarbagatay and Saur Ranges
Countries		China, Kazakhstan	
Geographic location		Continuous area along the China-Kazakhstan border	
Coordinates		N 47.212407°, E 83.021317°; N 47.100329°, E 85.150187°	

ID No.	14	**Working Name**	Khan Tengri region
Countries		China, Kazakhstan, Kyrgyzstan	
Geographic location		Khan Tengri massif in the Tian Shan, incl. Khan Tengri NP in Kyrgyzstan	
Coordinates		N 41.993587° E 80.126861°	

ID No.	15	Working Name	Altai
Countries		China, Kazakhstan, Mongolia, Russian Federation	
Geographic location		N-Central part and SE part of Altai mountains	
Coordinates		N 49.006372°, E 87.394649°; N 47.681114°, E 89.849796°	

ID No.	16	Working Name	Inner Tian Shan
Countries		China, Kyrgyzstan	
Geographic location		Entire mountain range along border with China	
Coordinates		N 41.092293°, E 77.839644°	

ID No.	18	Working Name	Trans-Altai Gobi
Countries		China, Mongolia	
Geographic location		Mongolian Trans-Altai Gobi desert, largely identical with Great Gobi A SPA.	
Coordinates		N 42.683870°, E 96.422978°	

ID No.	21	Working Name	Eastern Karakoram
Countries		India (Ladakh), Pakistan (Gilgit-Baltistan	
Geographic location		Upper Indus Valley and valleys of tributaries upstream from Leh to downstream from Skardu.	
Coordinates		N 34.878674°, E 76.7505049°	

ID No.	23	Working Name	Western Kyrgyz range
Countries		Kazakhstan, Kyrgyzstan	
Geographic location		Kyrgyz range in Jambyl province (Kazakhstan) and Talas province (Kyrgyzstan)	
Coordinates		N 42.718098°, E 72.363159	

ID No.	24	Working Name	Northern Tian Shan
Countries		Kazakhstan, Kyrgyzstan	
Geographic location		Zaili-Alatoo and Kungey-Alatoo	
Coordinates		N 42.927080°, E 77.195160°	

ID No.	25	Working Name	Western Tian Shan
Countries		Kazakhstan, Kyrgyzstan, Uzbekistan	
Geographic location		Ugam-Chatkal NP, Chatkal SPA, Aksu-Zhabagly SPA, Besh Aral SPA	
Coordinates		N 42.243700°, E 70.943811°	

ID No.	31	Working Name	Eastern Turkestan Range
Countries		Kyrgyzstan, Tajikistan	
Geographic location		Hissaro-Alai system (eastern Turkestan Range)	
Coordinates		N 39.497213°, E 69.906661°	

ID No.	32	Working Name	Pamir-Alai
Countries		Kyrgyzstan, Tajikistan	
Geographic location		Transalai and Alai ranges, Alai valley	
Coordinates		N 39.549400°, E 71.902699°	

ID No.	33	**Working Name**	Eastern Sayan
Countries		Mongolia, Russian Federation	
Geographic location		Tuva/Irkutsk prov./Buryatiya – Khovsgol	
Coordinates		N 52.040283°, E 98.815337°	

ID No.	34	**Working Name**	Western Hissar Mountains
Countries		Tajikistan, Uzbekistan	
Geographic location		Western section of the Hissaro-Alai mountain range	
Coordinates		N 38.995356°, E 68.027545°	

ID No.	36	**Working Name**	Western Turkestan Range
Countries		Tajikistan, Uzbekistan	
Geographic location		Turkestan Range west of Shahristan	
Coordinates		N 39.550563°, E 68.262615°	

3.15 Chiru or Tibetan antelope *Pantholops hodgsonii*

Status

The IUCN Red List (IUCN SSC Antelope SG, 2016a) assessed the status of Chiru *Pantholops hodgsonii* as Near Threatened. The assessment also reports that Chiru numbers and distribution had decreased sharply as a result of commercial hunting for the underfur in the 1980s-1990s. Rigorous protection has allowed the population to recover, possibly to double the size it was in the mid-1990s. The total number in 2016 was assumed to be in the range of 100,000 to 150,000.

Range areas

The current distribution range of Chiru (Figure 15) is almost entirely located on the Qinghai-Tibet plateau within China. A small number occurs seasonally in north-eastern Ladakh. The species formerly occurred in a small area of northwest Nepal, but is now considered extinct in the country. (IUCN SSC Antelope SG, 2016a)

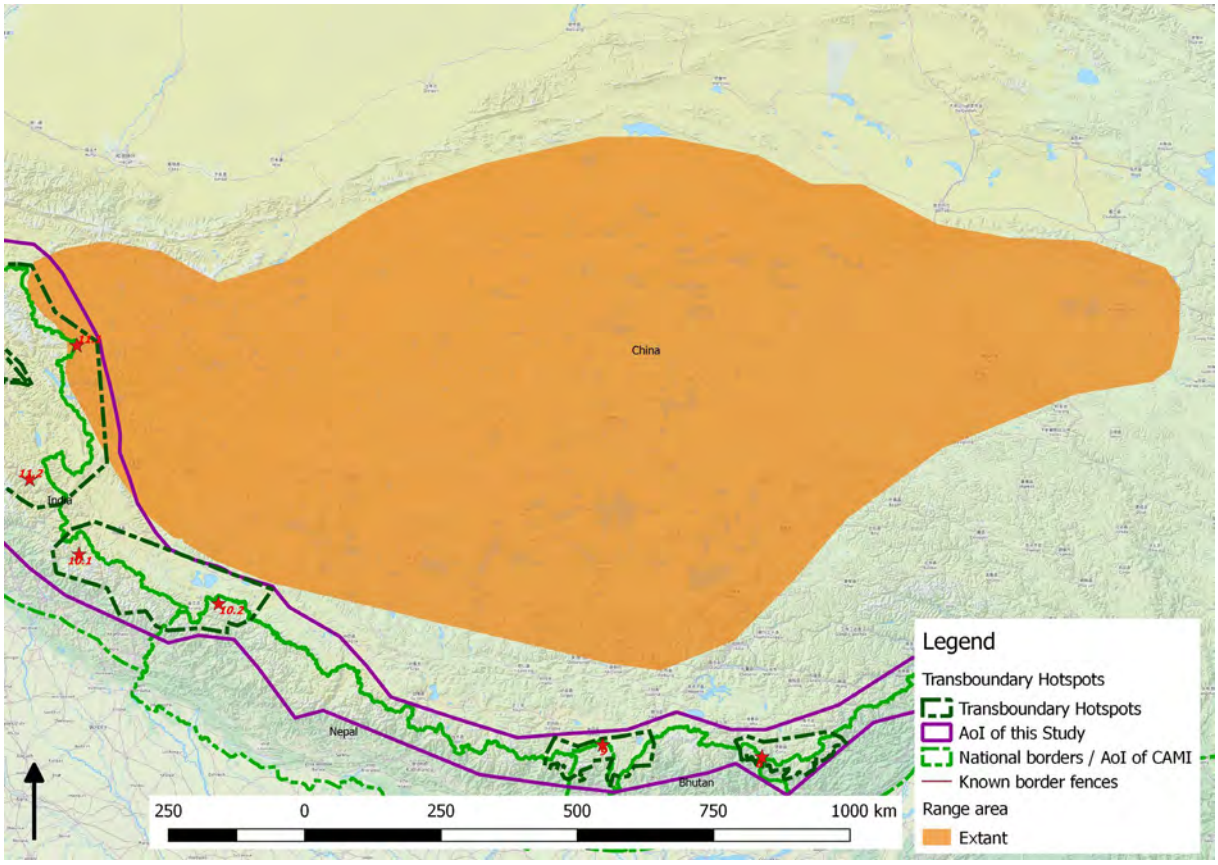


Figure 15. Range map of Chiru. Source: IUCN Red List

Range States

- Extant: China (Xinjiang, Qinghai, Tibet)
- Extant (seasonality uncertain): India (Ladakh)
- Extinct: Nepal

Conservation significance of transboundary populations, migrations and movements

Most Chiru populations are migratory, moving several hundred kilometers between seasonal ranges, although some populations move only short distances or are nonmigratory. Nearly all

migrations occur solely within China. The small population in Ladakh is transboundary with China and contiguity with the populations in Chang Tang Plateau of Tibet is crucial for their long-term survival. At least seasonally, presence of the species in the Changchenmo area (Changthang Wildlife Sanctuary) might be restricted to males, while females and young ones are likely to occupy higher slopes to the east or north of Changchenmo across the line of actual control (Rawat and Sankar, 2011). The Chiru in India's Depsang Plains (Daulet Beg Oldi in Karakoram Wildlife Sanctuary) occur in mixed herds and numbered about 250-300 (Sarkar et al. 2008). The total number of Chiru carrying out transboundary migrations may be a small proportion of the species' population, but are a crucial part of India's biodiversity. Furthermore, Chiru has experienced massive population fluctuations. Infrastructure, industrial and agricultural development, climate change and poaching for illegal trade in case of relaxation of protection may again cause massive declines, which would increase the importance of the transboundary population.

Proposed TA of significance for the species

ID No.	11	**Working Name**	Changthang and Spiti
Countries		China (Tibet, Xinjiang), India (Ladakh and Himachal Pradesh)	
Geographic location		Changthang plateau in Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau	
Coordinates		N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°	

3.16 Mongolian Gazelle *Procapra gutturosa*

Status

The IUCN Red List (IUCN SSC Antelope SG, 2016b) assessed the status of Mongolian Gazelle *Procapra gutturosa* as Least Concern with a stable population trend. However, population fluctuations due to disease and effects of severe winter conditions are common. Estimates varied between 0.4 and 2.7 million individuals. The main population in Mongolia was estimated with 0.5 to 1.5 million in the early 2000s, though some experts consider this figure too high (IUCN SSC Antelope SG, 2016). Threats are poaching, habitat loss due to expansion of livestock and arable farming, and barriers to migration, which fragment habitats and block access to critical forage during times of severe weather conditions. Severe winters can cause heavy mortality. Disease outbreaks, often associated with transmission from livestock, have also caused high losses. The population in China is nationally considered as Critically Endangered.

Range areas

Most of the current population is found in the eastern Mongolian steppes (Figure 16). Smaller populations are found in central and western Mongolia. Some move south into China in winter, but border fences may effectively prevent these migrations. The map provided in the IUCN Red List suggests the existence of range areas in China in the Northeast and Southeast of the species' distribution range.

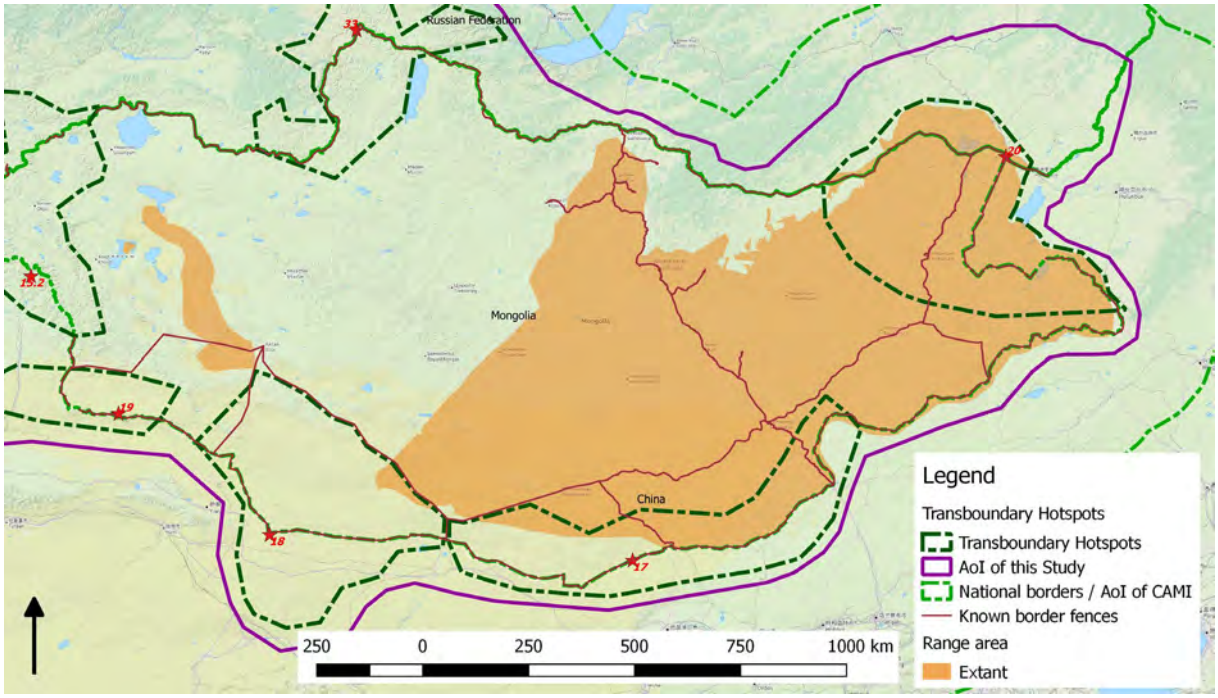


Figure 16. Range map of Mongolian Gazelle. Source: CAMI Atlas

Range States

- Extant: China, Mongolia, Russian Federation

Conservation significance of transboundary populations, migrations and movements

The majority of the distribution range of Mongolian Gazelle is located within Mongolia. Its fragmentation by fences along railways and roads likely has a higher impact on the species than fragmentation of habitat by border fences. However, border fences can become

problematic for local herds if they prevent access to critical habitats, for example, during severe weather conditions. As this species occurs in large herds, roaming vast areas any fragmentation and blockade of migration routes can cause substantial and permanent population declines (IUCN SSC Antelope SG, 2016b, pers. comm. participants of workshop "Atlas of Range-wide Mapping and Priority Setting of CAMI Species (Distribution and Movement Corridors) and Linear Infrastructure Threats across Central Asia" on the Isle of Vilm from 27 April to1 May 2017).

Proposed TA of significance for the species

ID No.	14	**Working Name**	South Gobi
Countries		China, Mongolia	
Geographic location		Possibly several separate sections.	
Coordinates		N 42.163084°, E 106.423024°	

ID No.	20	**Working Name**	Daurian steppe
Countries		China, Mongolia, Russian Federation	
Geographic location		To be defined!	
Coordinates		N 49.844536°, E 116.703908	

3.17 Tibetan Gazelle *Procapra picticaudata*

Status

The IUCN Red List (IUCN SSC Antelope SG, 2016c) assessed the status of Tibetan Gazelle as NT with a declining population trend, close to meeting the threshold for VU: The decline is due to poaching, growing competition with domestic livestock, changes in land-use and government policy of fencing rangelands (all factors that have increased over the past five years). The assessment refers to an older estimate (Schaller, 1998) by providing a number of 100,000 animals for the entire population. Only about 50 animals remained in Ladakh (Bhatnagar, Wangchuk et al., 2006; Namgail et al. 2008) but the population seems to be slowly increasing; about 65-70 have been seen frequently (Bhatnagar, pers. comm. 2021). The gazelle groups seasonally entering the Sikkim area seemed to be stable too, although no recent update is available (Bhatnagar, pers. comm. 2021).

Across the range area in China, the human population increase and related growth of livestock numbers has resulted in pasture fencing, which restricts movement and access to forage and is systematically excluding Tibetan Gazelles from parts of their former range, especially in the east. Road building has also opened previously remote areas to livestock grazing and (illegal) hunting, although the latter apparently limited due to confiscation of firearms. The major threat factors in India had been hunting in the past, and are currently habitat degradation and forage competition with livestock, in particular sheep and (cashmere) goats (Namgail et al. 2008).

Range areas

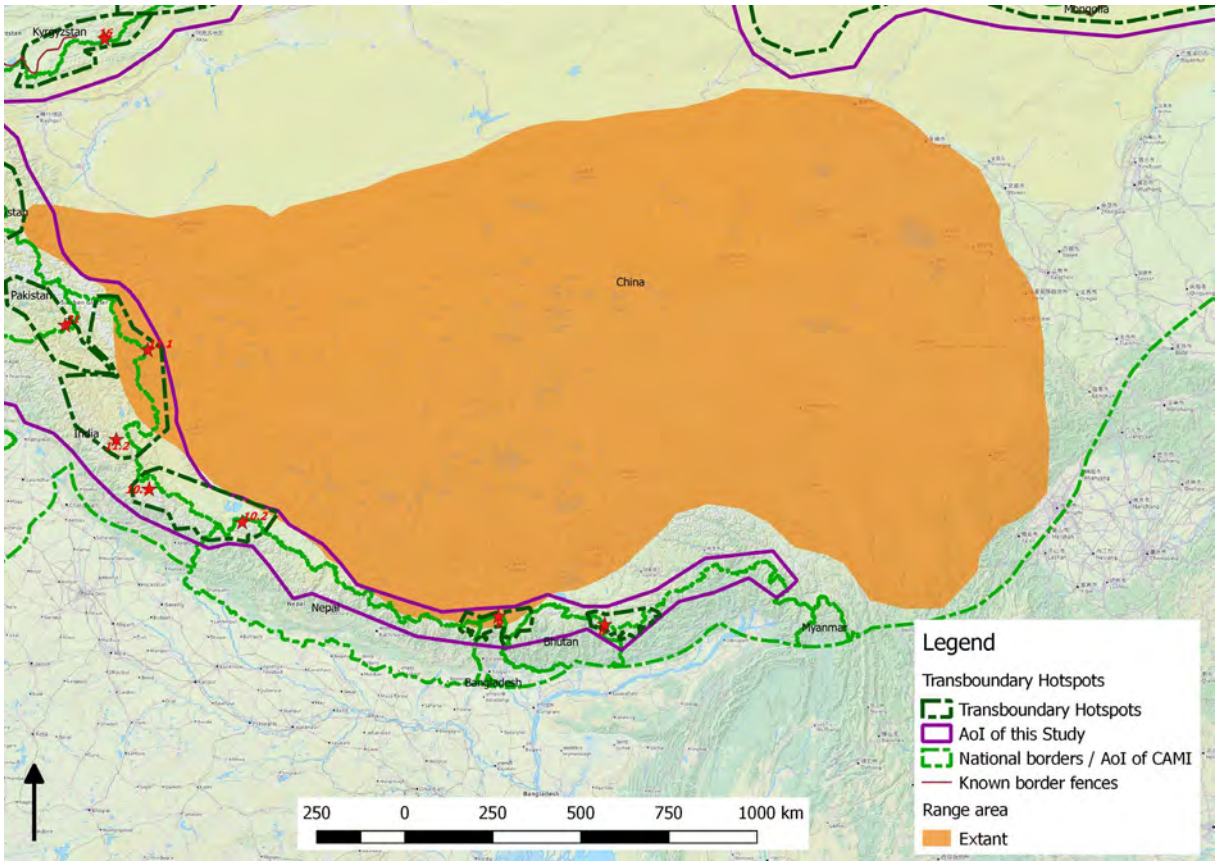


Figure 17. Range map of Tibetan Gazelle. Source: IUCN Red List

The Tibetan Gazelle occurs across the whole Qinghai-Tibet Plateau (China), extending a small distance into two adjoining areas of India (eastern Ladakh and northern Sikkim) (IUCN SSC Antelope SG, 2016c; Figure 17). In Ladakh the Tibetan Gazelle is mostly restricted to a small

section of Changthang, namely in Hanle Valley (south-eastern Ladakh). The range area in Ladakh has shrunk from >20,000 km² to <100 km² since the early 20th century (Namgail et al., 2008). The range map thus shows a much larger area in India than is actually still occupied by the species.

Range States

- Extant: China (Xinjiang, Tibet, Qinghai), India (Jammu-Kashmir, Sikkim)

Conservation significance of transboundary populations, migrations and movements

The distribution range of Tibetan Gazelle is almost completely located within China. Their migrations and access to key habitats are affected by fences of pastures as well as infrastructure development. Transboundary movements are of low conservation relevance for the species and its main populations but are crucial for the seasonal occurrence of the species in Sikkim. The maps and information about fragmentation of suitable habitat (Bhatnagar, Namgail et al., 2006) suggest that the small population in Ladakh might no longer be connected with Tibetan Gazelles in China.

Given that Tibetan Gazelles face similar threats across their range and extinction always starts locally, the conservation of the small groups in the Indian range area deserves attention beyond a purely national perspective.

Proposed TA of significance for the species

ID No.	9	**Working Name**	Khangchendzonga-Sikkim Plateau
Countries		China (Tibet), India (Sikkim), Nepal	
Geographic location		Khangchendzonga region (India, China, and Nepal) and Northern plateau of Sikkim and adjacent areas	
Coordinates		N 28.045832°, E 88.6680373°	

ID No.	10	**Working Name**	Western Trans-Himalaya
Countries		China (Tibet), India (Uttarakhand), Nepal	
Geographic location		Trans-Himalaya between Bandarpunch Mountain range in the west and the eastern watershed of Upper Humla in the east.	
Coordinates		N 31.091263°, E 79.062512°, N 30.309320°, E 81.623352°	

ID No.	11	**Working Name**	Changthang and Spiti
Countries		China (Tibet, Xinjiang), India (Ladakh and Himachal Pradesh)	
Geographic location		Changthang plateau in Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau	
Coordinates		N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°	

3.18 Saiga Antelope *Saiga tatarica*

Status

The IUCN Red List (IUCN SSC Antelope SG, 2018) assessed the status of Saiga as Critically Endangered with a decreasing trend of population size, although available data suggest an overall trend of recovery. The Saiga currently does not meet the Red List Criteria thresholds for Critically Endangered, but the previous assessment of Critically Engandered justified by criterion A2acd[3] was retained in the recent assessment because this reassessment fell under the IUCN's five-year rule. The Saiga is considered to have crossed the thresholds from Critically Endangered to Endangered around 2015; therefore, its status was supposed to be re-evaluated again in 2020, but as of Decmber 2021, no update has been published yet. Saiga currently meets the thresholds for Endangered under criterion A4 based on observed, estimated and projected declines of more than 50% over 11 years (equivalent to three generations) due to the risk of mass mortality events resulting from outbreaks of disease or severe weather conditions. The most recent mass mortality event occurred in the Mongolian population in early 2017, caused by sheep and goat plague (Peste des Petits Ruminants, PPR), and killed an estimated 54% of this population (IUCN SSC Antelope SG, 2018).

Saiga Antelopes are also subject to strong subsistence and commercial poaching pressure (IUCN SSC Antelope SG, 2018). Locally, barriers to migration and habitat degradation together with mortality caused by severe weather events are additional threats.

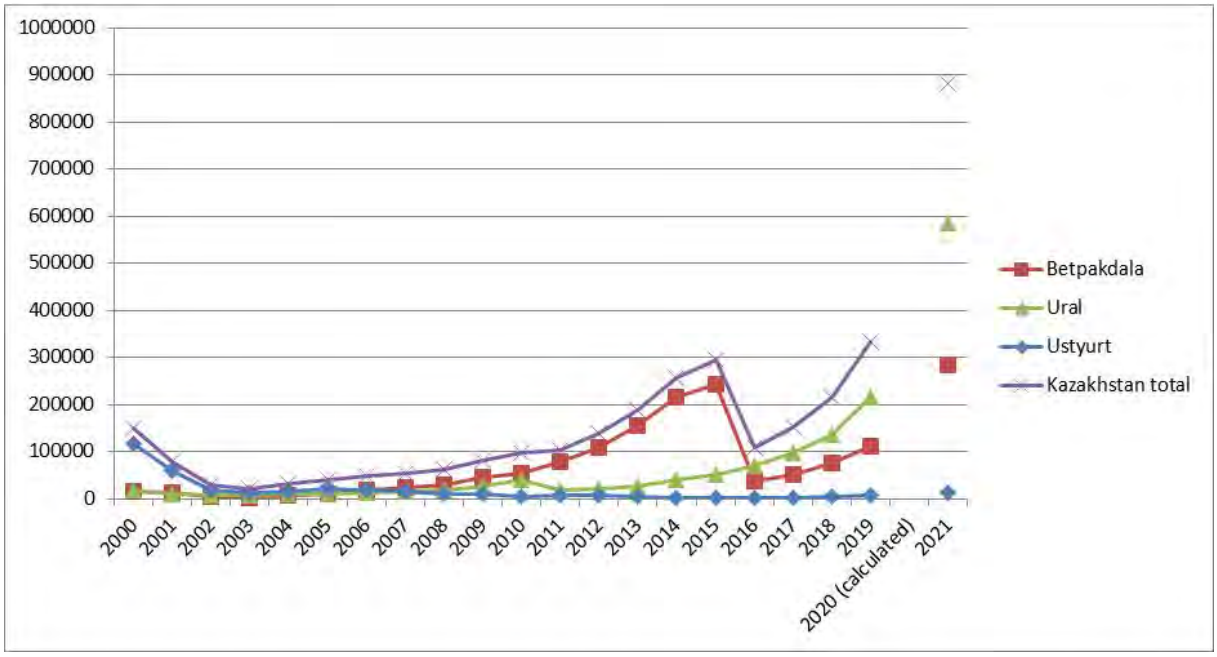


Figure 18. Estimated population sizes of Saiga tatarica tatarica *in Kazakhstan and its three major range areas, 2000-2021. Source: Milner-Gulland et al., 2020; MEGNR, 2021.*

Despite these threats, the global population of Saiga is recovering, especially in Kazakhstan. During the Joint CMS-CITES Technical Workshop under the Memorandum of Understanding (MOU) Concerning Conservation, Restoration and Sustainable Use of the Saiga Antelope (Saiga spp.). Isle of Vilm, Germany, 1-4 April 2019, experts compiled the total figure of 228,000

[3] "Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on direct observation, a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality and actual or potential levels of exploitation."

Saigas for 2018 (CMS/CITES, 2019). This figure equals 171,000 mature individuals (ratio of 75% used by the IUCN SSC Antelope SG (2018)).

Surveys in April 2019 in all three range areas in Kazakhstan yielded an estimate of 334,400 Saigas in total in Kazakhstan only (Milner-Gulland et al., 2020). No survey was conducted in April 2020 due to the COVID-19 pandemic. In April 2021, the Ministry of Ecology of Kazakhstan (MEGNR, 2021) provided the national estimate of 824,000 animals in total. However, this estimate would represent an annual growth rate of more than 60% for the two largest populations in two following seasons, which is biologically rather unlikely.

The North-west Pre-Caspian Saiga population, which had been estimated at around 800,000 in the 1950s, had declined to 4,500 animals in 2016, but since seems to have stabilized and further recovering. A survey in November 2019, using fixed-wing unmanned aerial vehicle, yielded an estimate of 6,350 animals and experts guessed that the population might even have recovered to 8,500 animals (Shmunk, 2020).

The Mongolian population seems to recover after its recent low of about 3,800 animals in December 2018, following PPR, winter dzud (weather combining snowfall and ice) and increased poaching. The population assessment in January 2020 yielded an estimate of 7,667 (95% confidence interval: 5,074-11,724), but droughts, overgrazing and infectious diseases could still have devastating effects on this vulnerable population (Chimeddorj and Buuveibaatar, 2020).

Range areas

The distribution range of *Saiga tatarica tatarica* (Figure 19) is traditionally divided in four populations (Kalmykia or Northwestern Pre-Caspian, Ural, Ustyurt and Betpakdala), which also are considered management units and used for the presentation of disaggregated monitoring figures in national and international contexts. The Mongolian saiga *Saiga tatarica mongolica* occurred in one range area, divided into two sections (IUCN SSC Antelope SG, 2018; Figure 19).

The review of the Saiga range areas in the frame of the preparation of the CAMI Atlas revealed a change in the spatial patterns of the distribution range. The range area of the Ural and Ustyurt populations shrank, but in their former ranges, another nsmaller range area is now recognized, e.g. in the CAMI Atlas (CMS Secretariat, 2019). The range area of the Betpakdala population is also smaller now than previously indicated, and stretches far less to the south. On the other hand, another isolated range area in eastern-central Kazakhstan is now recognized. Furthermore, there are two small areas with Saiga antelope at the south (former Island Vozrozhdeniya) and east (wider area of former Island Barsa-Kelmes) of the Aral Sea, both originating from introduced animals. Related saiga observations in the west of Kyzylkum desert in Uzbekistan were reported by Gritsyna et al. (2016).

In Mongolia, the distribution range of Saiga expanded. Formerly disjunctive range areas are now connected and previously abandoned range areas became recolonized. Mass mortality since 2016 (caused by PPR) and recent winter losses may have caused another reduction and thereby a fragmentation of the current range areas.

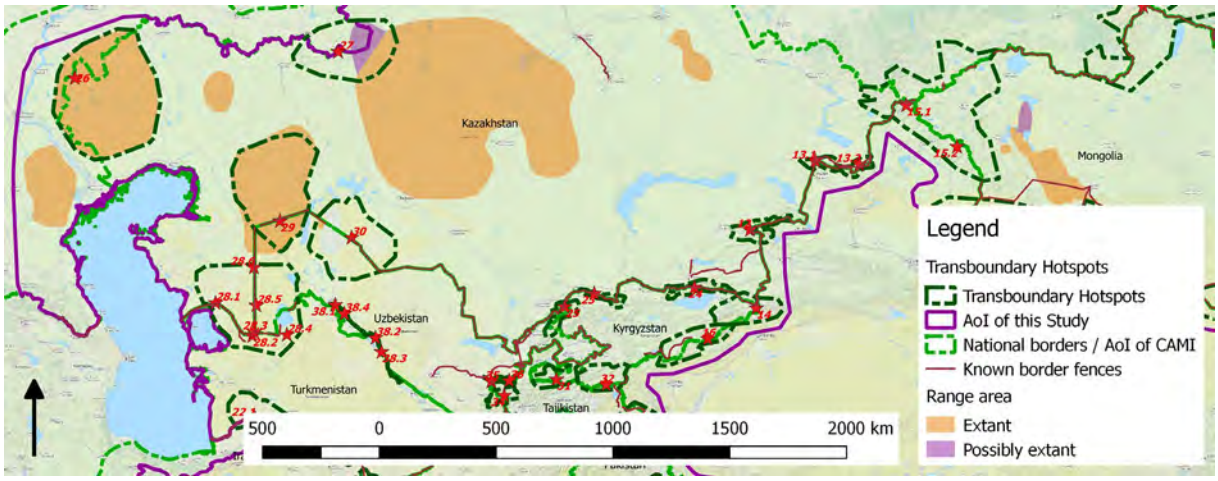


Figure 19. Range map of Saiga. Source: CAMI Atlas

Range States

- Extant: Mongolia, Kazakhstan, Russian Federation, Uzbekistan;
- Extinct: China, Turkmenistan

Conservation significance of transboundary populations, migrations and movements

At least until the recent past, the Ustyurt population used to be transboundary and carried out regular seasonal migrations between Kazakhstan and Uzbekistan. Most summer ranges and lambing sites had been in Kazakhstan, although in Uzbekistan near the border lambing sites were also known. The Uzbekistan part of the Ustyurt had mainly been winter range and in some winters saiga herds also reached Turkmenistan. Since the construction of the border fence between Kazakhstan and Uzbekistan (2011-2012) and the railway Shalkar-Beyneu crossing the Saiga range in Kazakhstan (finished in 2015), and the massive decline of the population size until 2015, seasonal transboundary migration was virtually lacking. Reportedly, Saiga in the Ustyurt, in contrast to past reports and observations from other areas, were not crossing the railway, possibly due to extreme wariness as a result of intensive poaching, and to overall low numbers not reaching the “critical mass” to cross an obstacle like the railway (Zuther, pers. comm. 2019, Salemgareyev, pers. comm. 2021). Only recently, small groups of Saiga antelopes were again observed in Uzbekistan (e.g. one group of 35 in January 2020) (Gritsyna et al., 2020), and in spring 2020, the first lambing was recorded (Mardonova et al., 2020). So far, numbers are extremely small compared to the overall population size in the Ustyurt and it is not clear how far these animals migrate. Without the option of transboundary seasonal migration, a high risk of increased mortality in severe winters exists. The recovery and survival of the population in Uzbekistan, if trapped in its southern range area without access to optimal summer pasture, might be jeopardized as well. The restoration of the transboundary migration through effective protection from poaching in both countries and the further mitigation of the barriers (railway and border fence) will be of high importance for securing the long-term conservation of the Ustyurt population.

Another Saiga population of transboundary character is the Ural population. Most of its range area is located in Kazakhstan, but larger groups of up to several thousand Saigas regularly move between there and Russian Federation (Saratov, Astrakhan and Volgograd Provinces). The maintenance of migration opportunities and the resulting effective expansion of this transboundary range area are of high importance for the continuing recovery of the Ural population.

The Betpakdala population is not generally transboundary, although regularly Saiga groups have been observed in Russian Federation’s Orenburg Province, near the border with

Kazakhstan. A border fence, built through this area, seems to prevent transboundary movements almost entirely. So far, the areas in the Russian Federation have not been considered as significant range areas of the Betpakdala population. However, their importance may increase: first, mass mortality events, which – as experienced in 2015 – can cause population size reductions by as much as 85% (Kock and Robinson, 2018) are more likely to be survived by at least parts of the population if it is spread over larger areas where the chance is higher that some groups remain unaffected, and second, in the future climate change may lead to a northward shift of suitable habitats and thus of the range area. The mitigation of the border fence may facilitate the expansion of the Betpakdala population and the establishment of subpopulations of transboundary character.

Proposed TA of significance for the species

ID No.	26	**Working Name**	Ural Steppe
Countries		Kazakhstan, Russian Federation	
Geographic location		Range area of Ural population of Saiga	
Coordinates		N 49.860873°, E 47.331539°	

ID No.	27	**Working Name**	Northern Betpakdala
Countries		Kazakhstan, Russian Federation	
Geographic location		Northern edges of range area of Betpakdala population of Saiga, southern Orenburg province	
Coordinates		N 50.673074°, E 60.027631°	

ID No.	29	**Working Name**	Eastern Ustyurt
Countries		Kazakhstan, Uzbekistan	
Geographic location		Ustyurt east of Atyrau-Nukus road; Saygachiy reserve	
Coordinates		N 45.207123°, E 57.217359°	

ID No.	30	**Working Name**	Aral Sea / Western Kyzylkum Desert
Countries		Kazakhstan, Uzbekistan	
Geographic location		E Aral Sea with Barsa-Kelmes SPA/BR	
Coordinates		N 44.642783°, E 60.664708°	

3.19 Gobi Bear *Ursus arctos isabellinus*

Status

The Gobi Bear is a local population of Brown bear *Ursus arctos*. The IUCN Red List (McLellan et al., 2017) assessed the status of Brown bear as Least Concern, but the Gobi Bear at population level as Critically Endangered. The Gobi Bear is threatened due to its very low number of individuals with a population size of 21-29 in 2008/2009 and 27-40 in 2013 estimated by DNA mark-recapture (Tumendemberel et al., 2015). The strong male bias found in the population small share of females limits the reproductive potential and effective population size. Low genetic diversity may limit the adaptation potential. Illegal mining within the range area and proposed larger mining operations may cause further threats.

Gobi Bears live in the most extreme physical environment of any Brown bear population – a high elevation desert that experiences extreme heat (+45°C), cold (-45°C), and low annual precipitation (<100-200 mm) (Supplement on Brown bear subpopulations in McLellan et al., 2017). Given these already extreme conditions, climate change and its impact on water availability and vegetation growth may pose significant threats to the survival of these bears. Mongolia experienced recently high tendency of drought in summer and heavy snow (dzud) in winter since 1990s and near furture (2016-2035) projections indicate a temperature increase by more than 2°C and increases in seasonal precipitation by 1.1 to 14.0% (GCF, 2019).

Range areas

The Gobi Bear's range area (Figure 20) is restricted to three oasis complexes in three mountain areas of the Great Gobi Strictly Protected Area in Mongolia: Atas-Inges, Shar Khuls and Tsagaan Bogd (from west to east). The entire area is approximately 15,000 km², but the actually used habitat patches are smaller and located at distances of 70-100 km from each other. Female bears seem to remain within their respective oasis complexes, while males move among all three core areas.

The range area is located directly at the border with China and there have been unconfirmed reports from China of bears adjacent to their present range during about 1950-1970. Prior to the 1970's, Gobi Bear distribution in southwestern Mongolia extended beyond its present confines and included areas adjacent to the Great Gobi Strictly Protected Area to the north and east. This area encompassed Edriin Ridge, the Eej Khayrkhan Nature Reserve to the west of Bayantoorai, and portions of Gurvan Saykhan National Park to the east. The reasons for these areas being no longer occupied are not known. (Reynolds et al., 2010)

The Gobi Bear is completely isolated from other bear populations with the known closest bears occurring in northern Mongolia 500-800 km and in western Mongolia approximately 500 km away (Supplement on Brown bear subpopulations at McLellan et al., 2017). Both are connected to the large Russian Brown bear population, while the Gobi Bear is considered (Reynolds et al., 2010) as population of the subspecies *U. a. isabellinus*, occurring in the Tian Shan and Pamir mountains to the west. Telemetry data showed that one male had travelled to the Tian Shan in China but returned to its original area in Mongolia after one month.

Range States

- Extant: Mongolia
- Presence uncertain: China

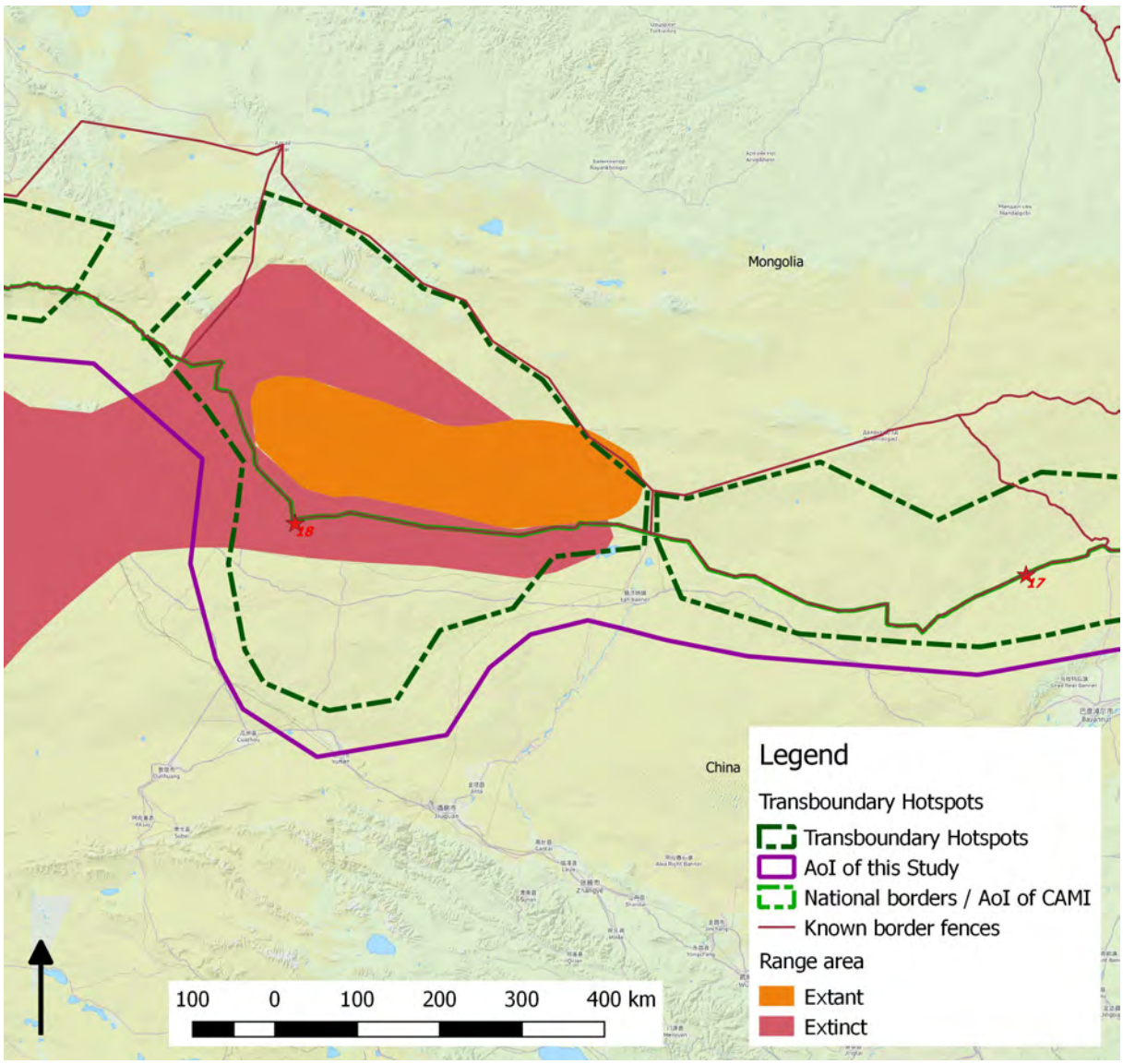


Figure 20. Range map of Gobi Bear. Source: IUCN Red List

Conservation significance of transboundary populations, migrations and movements

While there is currently no evidence of the existence of any Gobi Bears in China or of migrations or irregular movements across the border, any such fact would be of significance for the survival of this population due to the extremely small population size and restricted range area.

Proposed TA of significance for the species

ID No.	18	**Working Name**	Trans-Altai Gobi
Countries		China, Mongolia	
Geographic location		Mongolian Trans-Altai Gobi Desert, largely identical with Great Gobi A SPA.	
Coordinates		N 42.683870°, E 96.422978°	

Table 2: Overview of Range States of species and transboundary populations (Countries in italics – not yet party to CMS; Shaded cells – species in the Range States; bold font – confirmed transboundary populations; not bold fonts – transboundary population likely; in brackets – populations which are possibly transboundary or could potentially become transboundary after removal of barriers to migration, question mark – population possibly extinct)

	Afghanistan	***Bhutan***	***China***	**India**	**Iran**	**Kazakh-stan**	**Kyrgyzstan**	**Mongolia**	***Nepal***	**Pakistan**	***Russian Federation***	**Tajikistan**	**Turkmenistan**	**Uzbekistan**
Afghanistan	(Cheetah?) Bukhara Deer Chinkara Goitered Gazelle Argali Urial Persian Leopard Snow Leopard		**Argali** Snow Leopard		(Cheetah) Chinkara Goitered Gazelle (Persian Leopard)					**Urial** **Snow Leopard**		**Bukhara Deer** **Argali** Persian Leopard? **Snow Leopard** **Urial**	(Cheetah?) Bukhara Deer (Asiatic Wild Ass) (Persian Leopard) (Urial)	Bukhara Deer
Bhutan		Asiatic Wild Ass? Snow Leopard	Asiatic Wild Ass? Snow Leopard	Snow Leopard										
China			(Wild Camel) (Takhi) Goitered Gazelle Argali Snow Leopard Chiru Tibetan Gazelle (Gobi Bear?)	**Wild Yak** Kiang **Argali** Snow Leopard **Chiru** **Tibetan Gazelle**		(Argali) **Snow Leopard**	Argali **Snow Leopard**	(Wild Camel) (Takhi) (Asiatic Wild Ass) (Goitered Gazelle) **Argali** **Snow Leopard** (Mongolian Gazelle) Gobi Bear	**Wild Yak** **Argali** Snow Leopard	Kiang **Argali** Snow Leopard	Snow Leopard	**Argali** **Snow Leopard**		
India				Wild Yak Kiang Argali Urial Snow Leopard Chiru Tibetan Gazelle					Snow Leopard	Urial Snow Leopard				

	Afghanistan	***Bhutan***	***China***	**India**	**Iran**	**Kazakhstan**	**Kyrgyzstan**	**Mongolia**	***Nepal***	**Pakistan**	***Russian Federation***	**Tajikistan**	**Turkmenistan**	**Uzbekistan**
Iran					Cheetah Asiatic Wild Ass Chinkara Goitered Gazelle Urial Persian Leopard								(Ceetah) (Asiatic Wild Ass) (Goitered Gazelle) (Urial) **Persian Leopard**	
Kazakhstan						Bukhara Deer Asiatic Wild Ass Goitered Gazelle Argali Urial Saiga Persian Leopard Snow Leopard	**Argali** **Snow Leopard**				**Argali** **Saiga** **Snow Leopard**		(Asiatic Wild Ass) (Goitered Gazelle) Urial Persian Leopard (Saiga)	Asiatic Wild Ass **Goitered Gazelle** **Saiga** Snow Leopard
Kyrgyzstan							Goitered Gazelle? Argali Snow Leopard					Goitered Gazelle? **Argali** **Snow Leopard**		Argali **Snow Leopard**
Mongolia								Wild Camel *Takhi* Asiatic Wild Ass Goitered Gazelle Argali Mongolian Gazelle Saiga Snow Leopard Gobi Bear			**Argali** **Mongolian Gazelle** **Snow Leopard**			

	Afghanistan	***Bhutan***	***China***	**India**	**Iran**	**Kazakhstan**	**Kyrgyzstan**	**Mongolia**	***Nepal***	**Pakistan**	***Russian Federation***	**Tajikistan**	**Turkmeni-stan**	**Uzbekistan**
Nepal									Wild Yak Argali Snow Leopard					
Pakistan										Kiang Argali Urial Snow Leopard				
Russian Federation											Argali Saiga Persian Leopard Snow Leopard			
Tajikistan												Bukhara Deer Goitered Gazelle Argali Urial Persian Leopard? Snow Leopard		Argali Urial Persian Leopard? Snow Leopard
Turkmenistan													Bukhara Deer Asiatic Wild Ass Goitered Gazelle Urial Persian Leopard Saiga?	Asiatic Wild Ass Goitered Gazelle Saiga Urial

Uzbekistan														Bukhara Deer Asiatic Wild Ass Goitered Gazelle Argali Urial Persian Leopard? Snow Leopard Saiga

4. List of potential trans-boundary conservation hotspots

4.1 List of potential sites

The Table 2 above provides an overview of the species covered under this study and their presence within the CAMI range states. Furthermore, this table shows between which countries transboundary populations of the respective species exist, possibly exist or where populations may potentially in the future become transboundary if the barriers to migrations would be removed.

The Table 3 below lists the sites identified in this study as potential transboundary conservation hotspots and Figure 21 shows these potential transboundary sites on an overview map of the entire Area of Interest.

Table 3: List of assessed transboundary sites

ID	Site name	Countries	Geographic area	Species
1	High Pamirs	Afghanistan-China-Pakistan-Tajikistan	South-eastern Tajik Pamirs, Great and Little Pamir, Sarikol Pamir (Taxkorgan), Khunjerab Pass region of Karakoram	Argali Snow Leopard
2	Afghanistan-Iran Border Region	Afghanistan-Iran	Entire border area	Chinkara Goitered Gazelle Urial Persian Leopard Cheetah(?)
3	Badghyz	Afghanistan-Iran-Turkmenistan	Hills between Badghyz province (Afghanistan) and Mary (Turkmenistan)	Asiatic Wild Ass? Goitered Gazelle Urial Persian Leopard
4	Wakhan	Afghanistan-Pakistan-Tajikistan	Wakhan corridor and upper Panj from downstream of Eshkashem up to Sarhad-e Baroghil (Afghanistan) and Tupkhana valley (Tajikistan)	Urial Snow Leopard
5	Panj River Valley-Tigrovaya Balka	Afghanistan-Tajikistan	Area between the Vaksh and Panj Rivers, including Tigrovaya Balka SPA	Bukhara Deer
6	Panj River Valley	Afghanistan-Tajikistan	Panj River valley in the districts Yangi Qaleh (Afghanistan), Farkhor, Hamadoni and Shamsidin Shohin (Tajikistan)	Bukhara Deer
7	Aral Paygambar	Afghanistan-Turkmenistan-Uzbekistan	Riparian areas near Termez, incl. former Aral Paygambar SPA, closed in the 1990s and upstream of Friendship Bridge	Bukhara Deer Persian Leopard
8	Eastern Himalaya	China-Bhutan-Nepal	Arunachal Pradesh (India) and adjacent areas in Bhutan, China	Snow Leopard
9	Khangchendzonga-Sikkim Plateau	China-Bhutan-India-Nepal	Khangchendzonga region, northern plateau of Sikkim and adjacent areas (Bhutan, China, India, Nepal)	Argali Snow Leopard Tibetan Gazelle
10	Western Trans-Himalaya	China-India-Nepal	Uttarakhand (especially Gangotri NP) (India), Upper Humla valley (Nepal) and adjacent areas (China)	Wild Yak Kiang Argali Snow Leopard (Chiru) Tibetan Gazelle

11	Changthang and Spiti	China-India	Changthang plateau in Ladakh and Spiti in Himachal Pradesh with adjacent areas of northern Tibetan Plateau	Wild Yak Kiang Argali Urial Chiru Snow Leopard Tibetan Gazelle
12	Jungarian Alatau	China-Kazakhstan	Jungarian Alatau, entire mountain area	Argali Snow Leopard
13	Tarbagatay and Saur Ranges	China-Kazakhstan	Continuous area along the China-Kazakhstan border	Argali Snow Leopard
14	Khan Tengri region	China-Kazakhstan-Kyrgyzstan	Khan Tengri massif in the Tian Shan, incl. Khan Tengri NP in Kyrgyzstan	Argali Snow Leopard
15	Altai	China-Kazakhstan-Mongolia-Russian Federation	N-Central part and SE part of Altai mountains	Argali Snow Leopard
16	Inner Tian Shan	China-Kyrgyzstan	Entire mountain range along border with China	Argali Snow Leopard
17	Southern Gobi	China-Mongolia	Southern edges of Gobi Desert and Yin Mountains.Possibly several separate sections.	Goitered Gazelle Asiatic Wild Ass Argali Mongolian Gazelle
18	SW Gobi	China-Mongolia	Gobi-Altai - Xinjiang	Wild Camel Asiatic Wild Ass Goitered Gazelle Argali Snow Leopard
19	Jungarian Gobi	(China)-Mongolia	Great Gobi B SPA Khovd-Xinjiang	Takhi Asiatic Wild Ass Goitered Gazelle Argali Snow Leopard
20	Daurian Steppe	China-Mongolia-Russian Federation	Parts of the steppe region of Dauria extending from Eastern Mongolia to Russian Siberia and into North-Eastern China.	Mongolian Gazelle
21	Eastern Karakoram	India-Pakistan	Upper Indus catchments of Ladakh (India) and Gilgit) Pakistan	Urial Snow Leopard
22	Kopet Dagh	Iran-Turkmenistan	Entire mountain range	Goitered Gazelle Urial Persian Leopard Cheetah(?)
23	Western Kyrgyz Range	Kazakhstan-Kyrgyzstan	Kyrgyz range in Jambyl province (Kazakhstan) and Talas province (Kyrgyzstan)	Argali Snow Leopard
24	Northern Tian Shan	Kazakhstan-Kyrgyzstan	Zaili-Alatoo and Kungey-Alatoo	Argali Snow Leopard
25	Western Tian Shan	Kazakhstan-Kyrgyzstan-Uzbekistan	Ugam-Chatkal NP, Chatkal SPA, Aksu-Zhabagly SPA, Besh Aral SPA	Snow Leopard Argali?

26	Ural Steppe	Kazakhstan-Russian Federation	Range area of Ural population of saiga	Saiga
27	Northern Betpakdala	Kazakhstan-Russian Federation	Northern edges of range area of Betpakdala population of saiga, southern Orenburg province	Saiga
28	South-western Ustyurt	Kazakhstan-Turkmenistan-Uzbekistan	Ustyurt SPA and areas south of it; Kaplankyr Plateau se of shor (Turkmenistan), chink = border between Kazakhstan-Turkmenistan, Uzbekistan-Turkmenistan; Kazakhly shor; Kaplankyr SPA south of Sarygamysh lake; areas south of the road Barsa Kelmes – Jaslyk	Asiatic Wild Ass Goitered Gazelle Persian Leopard Urial
29	Eastern Ustyurt	Kazakhstan-Uzbekistan	Ustyurt east of Atyrau-Nukus road, Saygachiy reserve	Goitered Gazelle Saiga
30	Aral Sea / Western Kyzylkum Desert	Kazakhstan-Uzbekistan	E Aral Sea with Barsa-Kelmes SPA/BR	Goitered Gazelle Asiatic Wild Ass Saiga
31	Eastern Turkestan Range	Kyrgyzstan-Tajikistan-Uzbekistan	Hissaro-Alai system (eastern Turkestan range)	Argali Snow Leopard
32	Pamir-Alai	Kyrgyzstan-Tajikistan	Transalai and Alai ranges, Alai valley	Argali Snow Leopard
33	Sayan	Mongolia-Russian Federation	Tuva/Irkutsk prov./Buryatiya - Khovsgol	(Argali) Snow Leopard
34	Western Hissar Mountains	Tajikistan-Uzbekistan	Western section of the Hissaro-Alai mountain range	Snow Leopard
35	Zarafshon River Valley	Tajikistan-Uzbekistan	Zarafshon Reserve and Zarafshon NP	Bukhara Deer
36	Western Turkestan Range	Tajikistan-Uzbekistan	Turkestan Range west of Shahristan	Argali Snow Leopard?
37	Babatag	Tajikistan-Uzbekistan	Babatag Mountains along the border	Urial, Persian Leopard? Goitered Gazelle in lower areas?
38	Lower Amu Darya	Turkmenistan-Uzbekistan	Amu Darya south of “Kungrad”/Imeni Telmana; incl. Nazarkhan core zone (Uzbekistan) Amu Darya near Lebap between Khorezm and Kyzylkum SPA, Amu Darya SPA and Kyzylkum SPA	Bukhara Deer
39	Kugitang/ Koytendag	Turkmenistan-Uzbekistan	Surkhan SPA and Koytendag SPA	Urial Persian Leopard?

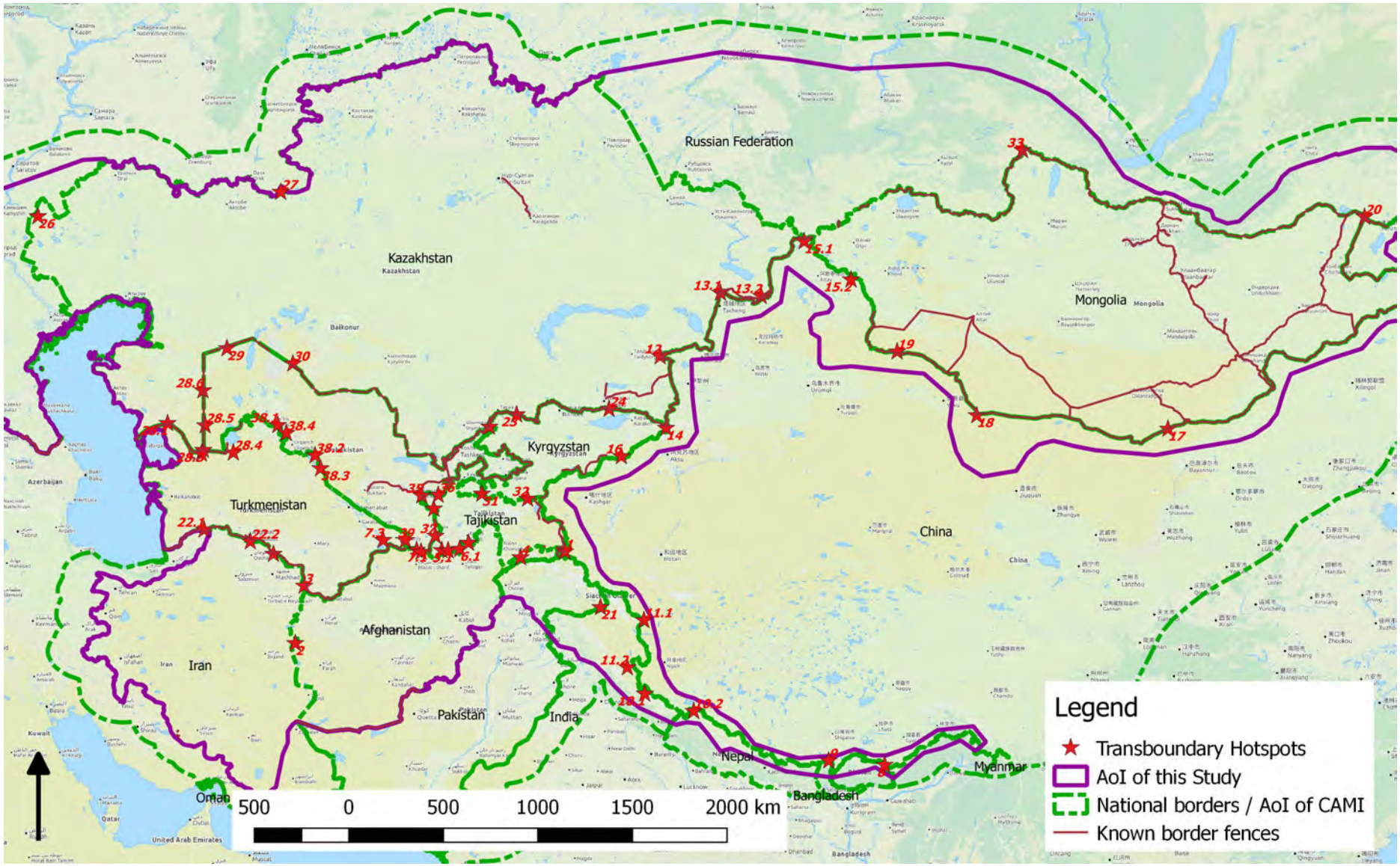


Figure 21. Overview map of potential transboundary sites. Numbers correspond with Site IDs in Table 3 (some sites consisting of several subsections).

4.2. Characteristics of sites

While section 3 analyzed the transboundary conservation needs and potentials from the perspective of each of the target species, the present section looks at these issues from the perspective of specific areas. This section provides specific analyses of sites of potential importance as hotspots for transboundary conservation of the target species. For each site listed in Table 3 and shown in the map in Figure 21 this section characterizes the site-specific potentials and conservation needs of each hotspot.

The information on the location includes administrative units, geographic area and coordinates of one or several central points at the respective international border. Furthermore, maps of each site provide information on the location of the site and its preliminary approximate boundaries, suggested on the basis of available knowledge about range areas, ecological and land use features of the area. However, in many areas potential habitat of target species is still contiguous, and actual range areas are not fully known. As the scope of this study is the identification of transboundary hotspots, the tentative boundaries of the sites in some cases had to be determined rather arbitrary and do not include entire range areas of target species populations.

The characteristics of each site further include information on the biogeographical region and the main habitat types. For each of the sites the section provides specific information on the target species covering population size, movements and importance of the local transboundary population for the conservation of the species.

The section briefly assesses the conservation significance of each site, informs about the existence of protected areas, describes barriers to migration and other threats and lists existing or planned transboundary activities. Recommendations for action are based on available publications, suggestions by experts and the author’s own knowledge.

Site ID: 1 **Name:** High Pamirs **Countries:** Afghanistan-China-Pakistan-Tajikistan

Location:
Administrative:

- Afghanistan, Badakhshan Province, Wakhan district;
- China, Xinjiang Province, Tashkorgan;
- Pakistan, Gilgit-Baltistan, Hunza district;
- Tajikistan, Gorno-Badakhshan Autonomous Region, Murghab district.

Geographic area:

- Great and Little Pamir (Afghanistan);
- Sarikol Pamir (China);
- Qarchanai and Khunjerab Pass regions of Karakoram (Pakistan);
- South-eastern Pamirs, incl. Great Pamir (Tajikistan).

Coordinates: N 37.225377°, E 74.889355°

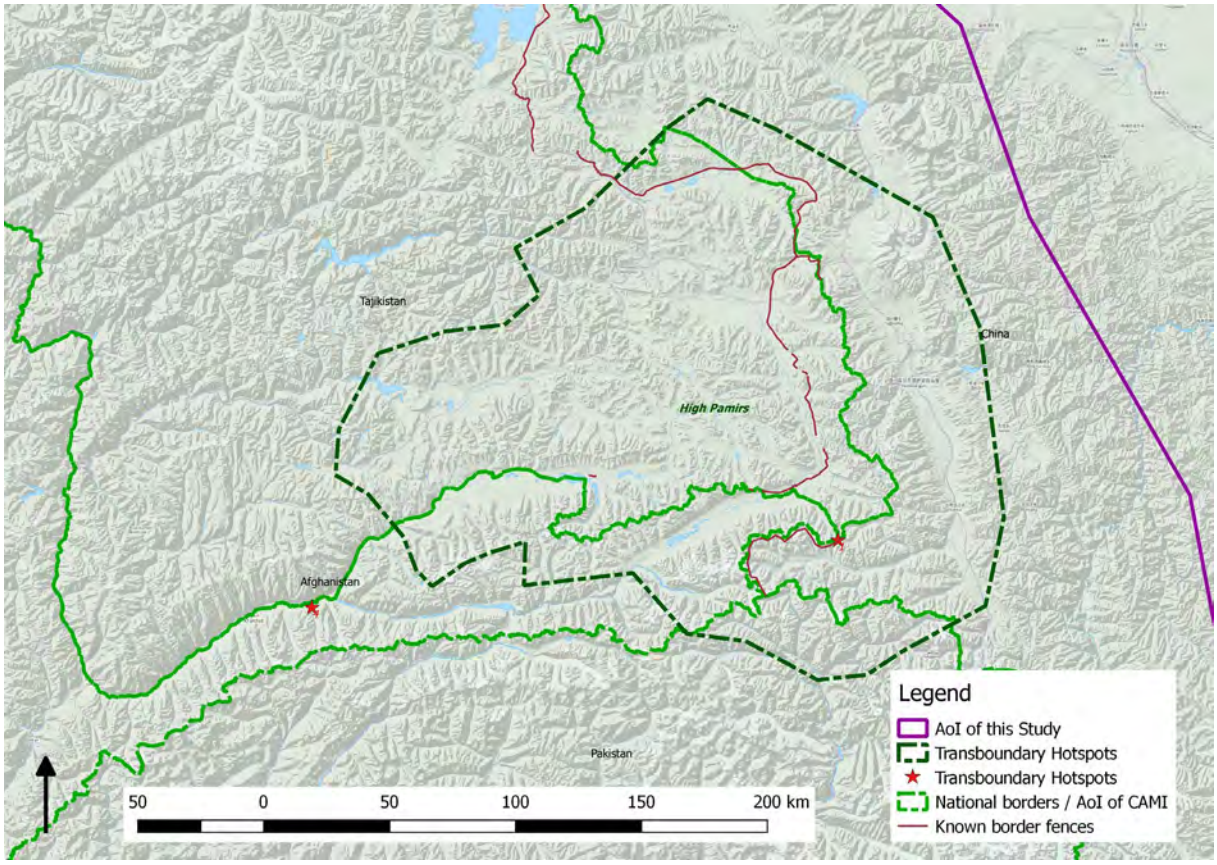


Figure 22: Location map of potential hotspot High Pamirs

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir Tien-Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Pamir alpine desert and tundra;
Ecosystems/habitat types: High mountains, high mountain desert, high mountain grasslands, wetlands, glaciers

Species:

Argali:
Population size: 15,000 (author's own guess, depending on the boundaries of the site);
Movements: in some locations, regular seasonal movements, vertical movements, locally more or less sedentary, males more mobile than females, transboundary movements: regularly between Afghanistan and Tajikistan, irregularly between Afghanistan/Tajikistan and China and between China and Pakistan;
Importance of transboundary population: The share of Argali carrying out regular transboundary movements out of the total population is not known. Genetic research (Luikart et al., 2011) and a DNA-based population study (Harris et al., 2010) suggest that the population in Afghanistan is well connected with the population in Tajikistan, but less with the population in China. Connectivity is important for the entire population, mostly for the comparably small population in Afghanistan and the possibly only seasonally occurring Argali in Pakistan (Khan et al., 2014; Ali et al. 2017, Haider et al. 2018).

Snow Leopard:
Population size: Unknown, range between 30 - 150 individuals (author's own guess);
Movements: Given typical home range sizes and known distances of dispersal, regular transboundary movements can be expected. Male Snow Leopards are more mobile than females.
Importance of transboundary population: The population should be considered as transboundary. Connectivity in this area as major link between more northern and more southern range areas is likely important for the long-term conservation of the global population of the species.

Conservation significance:
The area is of high significance for the conservation of the two target species as well as for a number of other high-mountain species and for its ecosystem values and functions. It includes one of the major sources of the rivers Panj and Amu Darya. The site covers substantial parts of the GSLEP Landscape "Pamir".

Protected areas status:
Afghanistan: Wakhan National Park (covering all of Afghanistan's part of the area);
China: Tashkorgan Nature Reserve (covering parts of China's part of the area);
Pakistan: Khunjerab National Park (covering all of Pakistan's part of the area);
Tajikistan: Zorkul Strictly Protected Area (covering parts of Tajikistan's part of the area). Other important parts are included in private hunting concessions (namely the concession of LLC "Murgab" and of associated companies and the community-based conservation area of NGO "Burgut" – depending on the boundaries of the site).

Barriers for migration:
Border fences are barriers for Argali:

- Afghanistan-China – from China side;
- Afghanistan-Tajikistan – only small section old Soviet fence from Tajikistan side, partly destroyed, still source of mortality, Ali, pers. comm. 2012);
- China-Pakistan – critical sections of the border at Kilik and Khunjerab passes are fenced (Ali et al., 2017; Haider et al. 2018), but fences could not be identified under this study;
- China-Tajikistan – partly new fence from China side (exact extent unknown), old Soviet fence from Tajikistan side, locally open or broken, still substantial barrier and source of mortality.

Other threats:

Argali:

- Poaching, partly transboundary between Afghanistan and Tajikistan, and associated disturbance;
- Livestock (reduction of available habitat caused by human and herders dogs presence, forage competition, disease transmission, habitat degradation) especially in Afghanistan, China and in lesser extent in Tajikistan;
- Mining in area handed over from Tajikistan to China.

Snow Leopard:

- Low density or decline of wild ungulate prey (mainly Afghanistan, less Pakistan, Tajikistan, China?);
- Killing in human-wildlife conflict;
- Poaching, potentially for illegal trade and for illegal trophy hunting.

Existing or planned transboundary activities:

- International Centre for Integrated Mountain Development (ICIMOD) initiative for landscape level conservation, but so far, no work on the ground (In Wakhan in Afghanistan in nearly 15 years, never anyone from ICIMOD visiting despite invitations. (pers. comm. Ostrowski, WCS, 2019))

Recommendations for action:

- Removal of dysfunctional border fence Tajikistan-Afghanistan and Tajikistan-China:
    - Would be technically easy to implement, but full removal potentially expensive and risk of dangerous remnants being left (barbed wire);
    - No obvious barriers except readiness of Tajikistan border police;
    - Along some sections of the Tajikistan-China border this old fence may also have reduced access by people and livestock and thus reduced the human impact (poaching, livestock) in some areas, but this might not be any longer the case because the fence is not maintained and protected anymore.
- New fences China-Tajikistan, China-Pakistan and China-Afghanistan: Limitation of length of new construction and mitigation of existing fences would be important to increase connectivity, transboundary migration and range expansion (into Pakistan) for Argali. Feasibility of mitigation and existing barriers (political will in China) remain unclear.
- “Belt and Road Initiative”: Assessment of potential impact and political intervention for avoidance, mitigation and compensation of impact.
- Transboundary coordinated monitoring of Argali and Snow Leopard: Coordinated Argali surveys between all four countries. Difficult access of Afghanistan Pamirs makes synchronous surveys difficult to implement. So far, coordination between all countries is lacking. Snow Leopard – information exchange and in areas with likely movements comparison of camera trap pictures and/or coordinated non-invasive DNA sampling.
- Transboundary information exchange: Collaboration between the protected areas would be meaningful. Barriers – language, unclear if protected area administrations are allowed to have direct transboundary collaboration.

Site ID: 2 **Name:** Afghanistan-Iran Border Region **Countries:** Afghanistan-Iran

Location:
Administrative:

- Afghanistan, Provinces Herat, Farah and Nimroz;
- Iran, Provinces Khorasan-e Razavi, Khorasan-e Jonubi, Sistan va Baluchistan

Geographic area:

- Entire border area

Coordinates: N 33.320370°, E 60.789269°

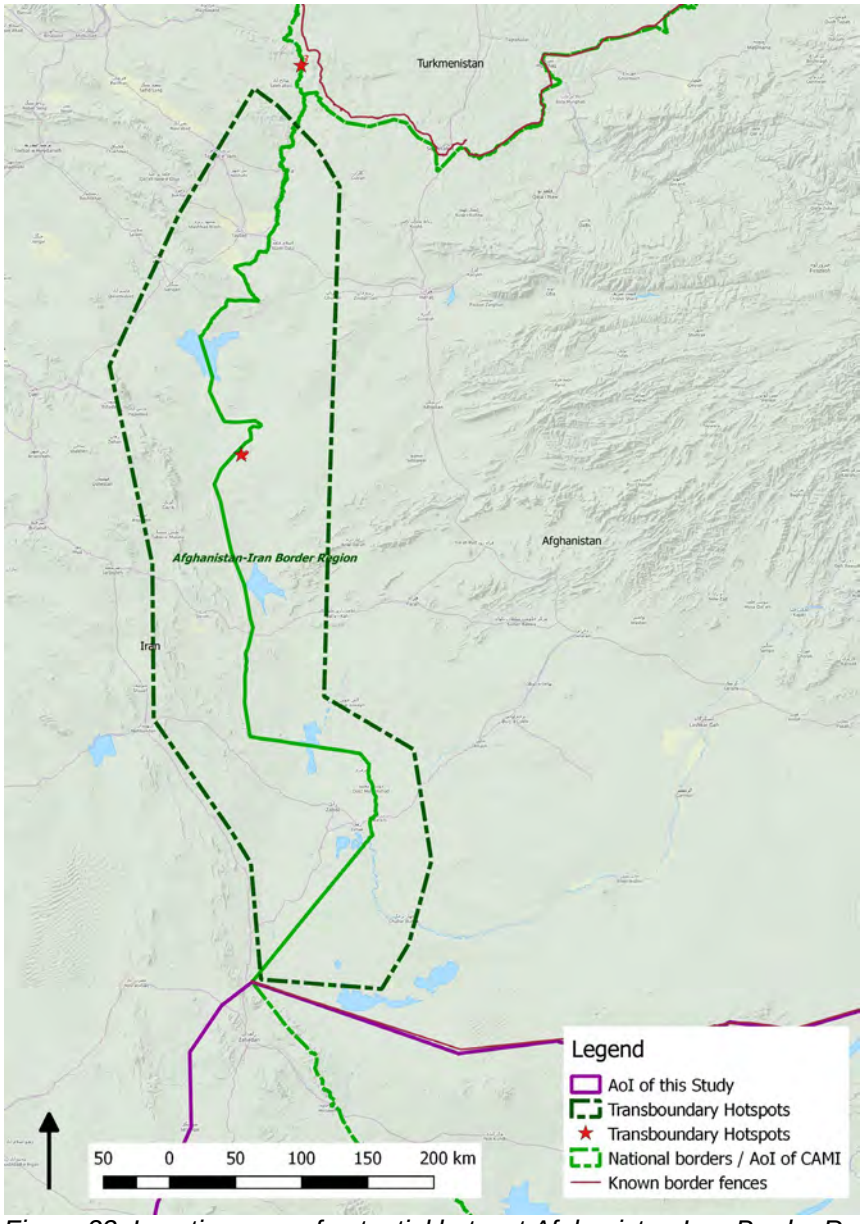


Figure 23: Location map of potential hotspot Afghanistan-Iran Border Region

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Anatolian-Iranian Desert, Iranian Desert, Edge of Hindukush Highlands;
WWF Ecoregion (Olson et al., 2001): Central Persian desert basins, Registan-North Pakistan sandy desert, Central Afghan Mountains xeric woodlands, Kuh Rud and Eastern Iran montane woodlands, Badghyz and Karabil semi-desert;

Ecosystems/habitat types: Medium mountains, semi-desert, desert (hills, loess, sand), wetlands, seasonal lakes

Species:

Asiatic Cheetah:
Population size: Unknown, possibly extinct in the area; current range maps do not indicate the area. Manati and Nogge (2008) suggest that few Cheetahs might have survived in the north-western part of Afghanistan, but do not provide any evidence to support such suggestion. Based on the lack of confirmed record of Cheetah in north-west Afghanistan for the last half century the probability of Cheetahs surviving in the area is very low. (pers. comm. Ostrowski, 2019);
Movements: Unknown;
Importance of transboundary population: Given the critical status of the subspecies any individuals would be of conservation significance. If any Cheetahs occur in the area, this would be likely only dispersing males, but no females, and therefore the chances of reestablishment of a reproducing population unit would be extremely low.

Chinkara:
Population size: Unknown; the Iranian DoE in 2009 reported 164 Chinkara in Sistan va Baluchistan.
Movements: The most southern section of the border region is included in the range area of Chinkara in the IUCN Red List and the CAMI Atlas. The Atlas of the Mammals of Iran (Karami et al., 2012) indicates one occurrence at the border with Afghanistan in northern Sistan va Baluchistan province. No information is available about the specific location, the area of occupancy and the movements.
Importance of transboundary population: The size of any potential transboundary population is unknown. The area covers only a minor section of the overall range area of the species but might be important for the connectivity of any population of the species in southern Afghanistan.

Goitered Gazelle:
Population size: unknown; The Iranian DoE in 2009 reported 497 animals in Khorasan-e Razavi and 3453 Khorazan-e Jonubi.
Movements: Range areas indicated in the CAMI Atlas are restricted to the Afghanistan side of the border in its full length, but at the Iranian side closest indicated range areas are 200 km and farer away from the border. In the IUCN Red List, the range area is entirely transboundary. Karimi et al. (2012) show occurrence of Goitered Gazelle close to the border with Afghanistan in Khorasan-e Razavi and in the north of Khorazan-e Jonubi provinces, but not in Sistan va Baluchistan. No information is available about the specific occurrence in the area and the movements.
Importance of transboundary population: The size of any potential transboundary population is unknown. Given the fragmentation of most parts of the species' range area and generally low numbers, a transboundary population in this area might be of regional or at least national significance for the two countries.

Urial:
Population size: unknown; The Iranian DoE in 2009 and 2016 reported 7193/7269 Urial in Khorasan-e Razavi, 787/2285 in Khorazan-e Jonubi and 132/152 in Sistan va Baluchistan.
Movements: Range areas indicated in the IUCN Red List and in Karimi et al. (2012) indicate occurrence in all three border provinces, but not immediately in areas close to the border. For Afghanistan no information is available about Urial in the respective provinces. Potentially suitable areas are locally transboundary, but at the Afghan side likely not connected to larger suitable habitat. Only in the north of Herat province (Afghanistan) bordering Khorasan-e Razavi

(Iran) relief conditions suggest a potential habitat connection with other Urial range areas in Afghanistan. No transboundary movements are known.
Importance of transboundary population: The size of any potential transboundary population is unknown. Compared to other non-transboundary populations the conservation significance of any potential transboundary population is likely low.

Persian Leopard:
Population size: unknown;
Movements: In the IUCN Red List the northern most part of the border is indicated as extant in Iran and possibly extant in Afghanistan. Range areas indicated in The Atlas of Mammals of Iran are close to the border in Khorasan-e Razavi and the north of Khorazan-e Jonubi. No information is available about the actual occurrence in the area and the movements.
Importance of transboundary population: The size of any potential transboundary population is unknown. Given the fragmentation of most parts of the species' range area and generally low numbers, a transboundary population in this area might be of global or at least regional significance. It would be a connecting element between the Persian Leopard's main range area in Iran and southern Turkmenistan and the evident population (Moheb and Bradfield, 2014) in the Northern Plateau in Yakawlang district of Afghanistan's Bamyan province.

Conservation significance:
Little is known about the area, which might be of high significance for the conservation of Persian Leopard, and of regional significance for the other target species.

Protected areas status:
In Iran Shileh Protected Area of 6,525 ha (NE edge: N 30.400000°, E 61.127778°) located in Seistan va Baluchistan Province, about 20 km west of the international border with Afghanistan. Chinkara may occur there (Darvishsefat, 2006).
No protected areas exist in the area in Afghanistan.

Barriers for migration:
The area does not seem to have border fences. The diverse natural relief might present local barriers to migration – flat desert for Urial and Leopard, mountains for the gazelles – as well as areas with human settlements for all target species. The southern border between Afghanistan is reportedly fenced, affecting or preventing at least the migration of Chinkara and Goitered Gazelle (Zafar-ul Islam et al., 2010 quoted in CAMI Atlas, 2019).

Other threats:
No area-specific information is available on threats. All four species are targets of poachers and poaching is likely the most important threat for them in the area. Generally, leopard is frequently a species of concern in human-wildlife conflict, but no specific information is available from this area.

Recommendations for action:
The area would deserve being more intensively studied for identifying sections of particular high conservation significance and determining the feasibility of conservation action. For Urial and Leopard the potentially most important areas are in the north of the common border (Herat and Khorasan-e Razavi), for Chinkara in the south (Nimroz and Khorasan-e Jonubi) and for Goitered Gazelle in the mid-north (Herat and Farah and Khorasan-e Razavi and Khorasan-e Jonubi).

Site ID: 3 **Name:** Badghyz **Countries:** Afghanistan-Iran(?)-Turkmenistan

Location:
Administrative:

- Afghanistan, Badghyz Province;
- Iran, Khorasan-e Razavi Province;
- Turkmenistan, Mary and Akhal Provinces.

Remark: The atlas of the Mammals of Iran (Karimi et al., 2012) shows none of the target species in the immediate area, possibly except the Persian Leopard. Therefore, the potential for including Iran, Khorasan-e Razavi Province, in this conservation hotspot is questionable.

Geographic area:

- Hill areas in the border region with main area in Turkmenistan;

Coordinates: N 35.791905°, E 61.251093°

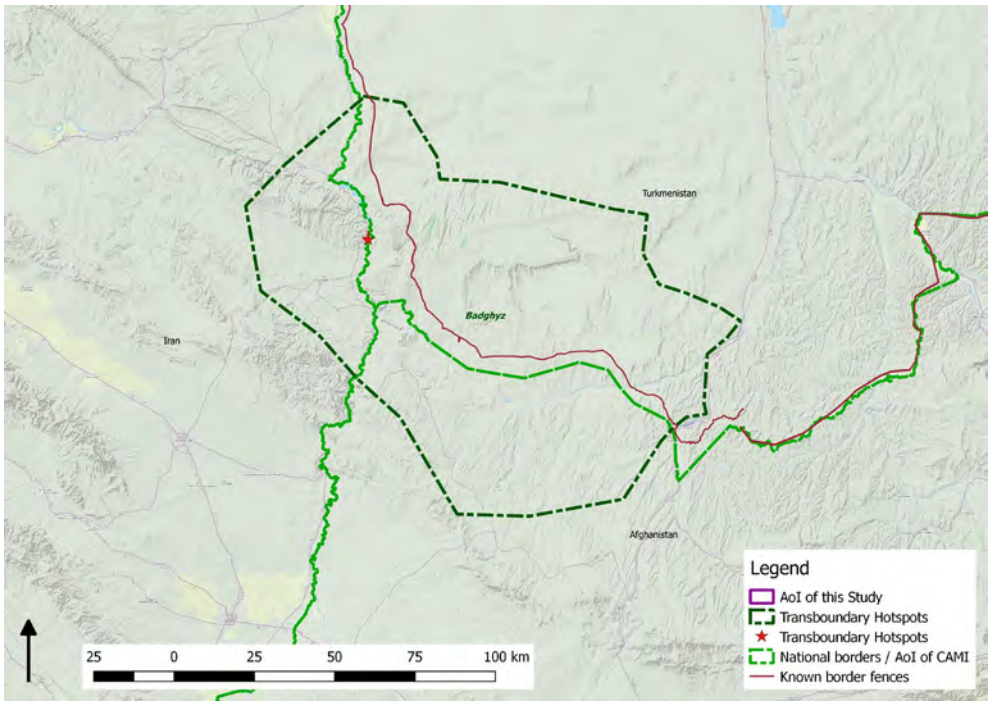


Figure 24: Location map of potential hotspot Badghyz

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Hindukush Highlands, Turanian (Kazakh desert scrub-steppe);
WWF Ecoregion (Olson et al., 2001): Badghyz and Karabil semi-desert, Kopet Dagh woodlands and forest steppe;
Ecosystems/habitat types: Semi-desert, sparse xerophytic shrubs, pistachio woodland, solonchak, riparian forest, small sections of riparian woodland, reeds and agricultural lands.

Species:

Asiatic Wild Ass:
Population size:
Afghanistan: No Wild Ass presence is known; the area is poorly studied, but due to the border fence running few kilometres inside Turkmenistan territory and reported presence of wild ass in the border zone, occurrence cannot be excluded.
Iran: No reports about permanent population from the site.

Turkmenistan: The population had been fluctuating heavily during the last decades from as low as ~200 in 1942 up to a peak population of ~5,000 in 1993-1996 (Lukarevskiy 1999, Denzau and Denzau 1999). In 1996, poaching pressure increased dramatically and numbers dropped to 2,400 by 1998 and ~500 by the beginning of the 2000s. Conservation measures started in 2000 and the population grew back to ~850-900 individuals in 2005, but was believed to have dropped again to ~600 animals in 2010 and 420 by 2013 (Kaczensky and Linnell 2015). Kaczensky and Linnell (2015) mention 59 observations in Badkhyz SPA, but were certain about having repeatedly observed several animals. The figure of 400+ reported by the SPA staff was certainly not present in the area at that time. Kaczensky (pers. comm. 2018) reported that Kulan was likely extirpated around 2016 or very few animals survived confined to the inaccessible, fenced border zone. The latter would be highly unlikely, given that border guards are likely supplying their food by poaching. Since 2017 there were no observations, camera trap records or presence signs (Kaczensky, pers. comm. 2019).
Movements: In the past Wild Ass moved seasonally between the SPA and adjacent agricultural areas. During the dry season, it is believed that approximately 70% of the Turkmenistan Kulan population migrated approximately 50-70 kilometres between the Badkhyz SPA/Gyzyljar Wildlife Sanctuary and the Chemenabat Wildlife Sanctuary in search of water along the Gushgy River, where there are numerous pools. In Iran previously, animals from Turkmenistan visited melon fields at night time. These observations ceased since the erection of a border fence from the Iranian side (Ghoddousi, pers. comm. 2019). However, Kaczensky (pers. comm. 2019) finds this unlikely, due to the existence of the border fence from Turkmenistan. So, if these reports are correct, they may indicate Kulan presence beyond the border fence of Turkmenistan. No further information about transboundary movements is available.
Importance of transboundary population: Currently the population is extinct or very small and if at all possibly surviving as transboundary population between the Turkmenistan and Iran border fences. As this had been the last autochthonous population of the subspecies, its conservation would be of high importance, although reintroduced populations despite small founder populations and repeated genetic bottlenecks so far did not show any adverse impacts of inbreeding.

Goitered Gazelle:
Population size: Turkmenistan 3,700 in 2013 (Kaczensky and Linnell 2015), 400 in 2014-2017 (Rustamov, pers. comm. 2018); Afghanistan and Iran unknown.
Movements: No documented transboundary movements known. Between Iran and Turkmenistan unlikely, due to border fences from both sides of the border. Between Afghanistan and Turkmenistan only fence from Turkmenistan side hindering migration. Between Afghanistan and Iran the situation is unclear.
Importance of transboundary population: Population estimate from 2013 for Turkmenistan indicates a significant population, but this either had been an overestimate or the population declined since rapidly. If transboundary movements would not be blocked and other threats would be effectively addressed, the population could become of at least regional importance and facilitate a good conservation status in all three countries, especially under consideration of detected genetic drift in isolated Goitered Gazelle populations of small individual numbers (Khosravi et al., 2019).

Urial:
Population size: Turkmenistan: 1,600 in 2013 (Kaczensky and Linnell 2015), 500 in 2014-2017 (Rustamov, pers. comm. 2018), Afghanistan and Iran unknown;
Movements: No documented transboundary movements known. Between Iran and Turkmenistan unlikely, due to border fences from both sides of the border. Between Afghanistan and Turkmenistan only fence from Turkmenistan side hindering migration, but habitat only suitable in small sections. Connectivity between Afghanistan and Iran - unclear;
Importance of transboundary population: Population estimate from 2013 for Turkmenistan indicates a significant population, but this either had been an overestimate or the population declined since rapidly. If transboundary movements would not be blocked and other threats would be effectively addressed, the population could gain at least regional importance and

facilitate a good conservation status in Iran and Turkmenistan, but also provide an important connecting link with the range area in Afghanistan.

Persian Leopard:
Population size: Unknown. Presence confirmed in Turkmenistan and Iran;
Movements: Transboundary movements likely despite border fence (one case published by Project Persian Leopard, 2016).
Importance of transboundary population: Given the dispersal movements and potentially large home ranges, the leopards of this area are part of a larger meta-population. The area has likely high regional importance for the connectivity of Persian Leopards in the eastern part of their range.

Conservation significance:
The area is of significance for the conservation of four target species – Asiatic Wild Ass (Kulan), Goitered Gazelle, Urial and Persian Leopard. The conservation status of at least the first three species is highly unfavourable at the moment with massive declines in the so far best-preserved area in Turkmenistan. The area still retains a high potential for a recovery of these species and thus maintains high conservation significance. While the population of Asiatic Wild Ass is (or has been) isolated, the other populations are part of or connected with the larger range areas of these species and are thus of importance for their conservation at a regional scale.

Protected areas status:
Turkmenistan: Badkhyz SPA (Figure 24) with current size of 87,700 ha. Three reserves (or Wildlife Sanctuaries = zakazniks in Russian) are associated with the SPA: Pulhatyn (15,000 ha) to the NW, Gyzyljar (30,000 ha) to the east and Chemenabat (12,000 ha) to the SE (Kaczensky and Linnell, 2015).
Iran: Bagh-e Keshmir protected area (eastern edge: N 35.772222°; E 60.652778°) with 20, 299 ha is located in a distance of 46 to 60 km from the border (Darvishsefat, 2006).

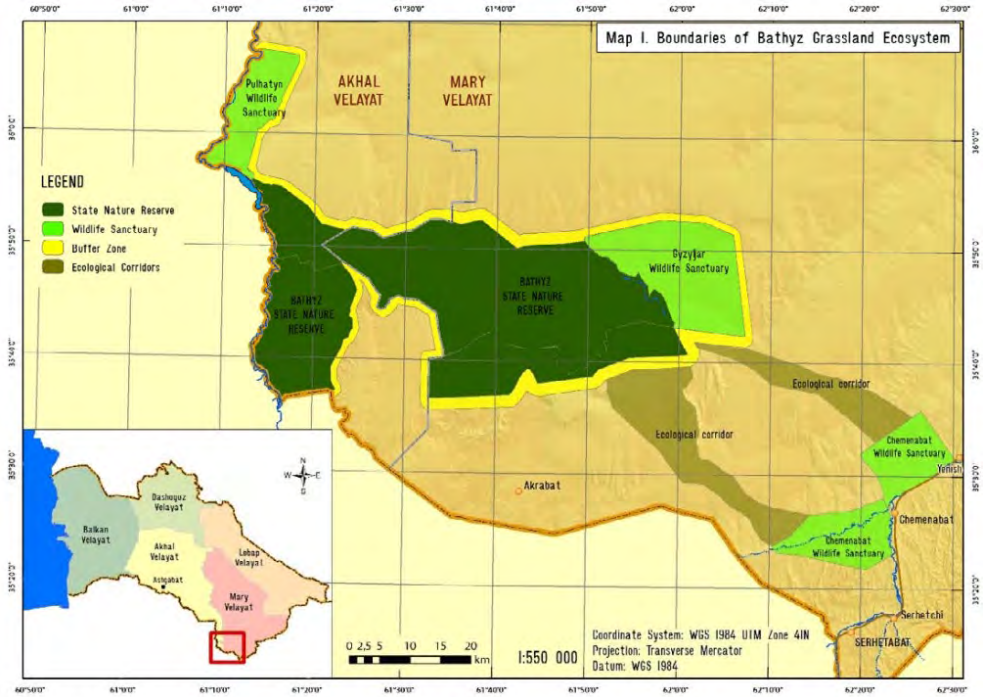


Figure 25: Map of Badkhyz SPA ("State Nature Reserve") and adjacent zakazniks and corridors ("Sanctuary"). Source: Kaczensky and Linnell (2015), based on Rustamov et al. (2015).

Barriers for migration:
There is a border fence (chain link, high) along the entire border at the Turkmenistan side, fencing off access to water for large mammals and preventing transboundary movements. Since the 1960s, this border fence runs parallel with the international borders with Iran to the west and Afghanistan to the south. This fence is located 3 to 5 km inside Turkmen territory meaning that ca. 12,000 ha (14% of the total area) of the current Badkhyz SPA, all of the 29,000 ha of the planned extension of the Badkhyz SPA to the west, and 13,100 ha (87% of the total area) of the Pulkhatyn *zakaznik*, amounting to a total area of 54,100 ha (21% of the protected area complex) are cut off by the fence (Kaczensky and Linnell, 2015). Potentially ungulates might irregularly pass the fence when broken by high water, but reportedly the fence after such events is immediately repaired. Leopards, however, seem to be able to pass the fence (Kaczensky, pers. comm. 2019).

More recently, at least in some sections, a border fence has also been erected at the Iranian side, further limiting or entirely preventing ungulate movements (Ghoddousi, pers. comm. 2019).

Other threats:
Poaching is the major threat in the area, including the Badkhyz SPA and related protected areas in Turkmenistan. The rapid decline of population sizes of Goitered Gazelle, Urial and Asiatic Wild Ass - with likely local extinction of the latter – points to intensive poaching as the main driver. Fences blocking access to water and preventing transboundary movements may have contributed to the decline, both directly by affecting habitat quality and indirectly by facilitating poaching and exacerbating its impact. Additionally, habitat quality at least in Turkmenistan is increasingly affected by overgrazing mainly with migratory livestock herds (Kaczensky and Linnell, 2015) and by transformation of areas suitable for irrigation into arable lands.

Recommendations for action:
The most important conservation actions would be the substantial improvement of control of the Badkhyz SPA and associated protected areas for effective prevention of poaching. Save access to watering points is needed for all target species. Furthermore, livestock grazing needs to be prevented inside the SPA and be regulated across the entire landscape.

Border fences need to be modified with openings to allow for migration of ungulates. This requires the involvement of border guards in the conservation activities to achieve acceptance for such proposed modifications and to prevent poaching in such critical areas.

Once key conservation requirements – prevention of poaching and suitable habitat quality, in particular access to water – are met, the possible remnants of the Kulan population should be reinforced or the species be reintroduced by release of sufficient numbers of animals from well preserved populations. By these recovery measures the site could again become a valuable conservation hotspot of all four target species.

Rustamov et al. (2015) suggested the expansion of the protected areas network in the Badkhyz region of Turkmenistan from 158,680 to 289,347 ha and the development of a transboundary protected areas network including the Badghyz in Afghanistan and the left bank of Harirod River.

Site ID: 4 **Name:** Wakhan **Countries:** Afghanistan-Pakistan-Tajikistan

Location:
Administrative:

- Afghanistan, Badakhshan Province, Wakhan district;
- Pakistan, Khyber Pakhtunkhwa, Chitral district;
- Tajikistan, Gorno-Badakhshan Autonomous Region, Ishkashim District

Geographic area:

- Wakhan upstream from Eshkashem to Sarhad-e Baroghil (Afghanistan) and Tupkhona valley (Tajikistan), upper Yarkhun (Baroghil) valley south of Baroghil Pass (Pakistan)

Coordinates: N 36.988622°, E 72.568698°

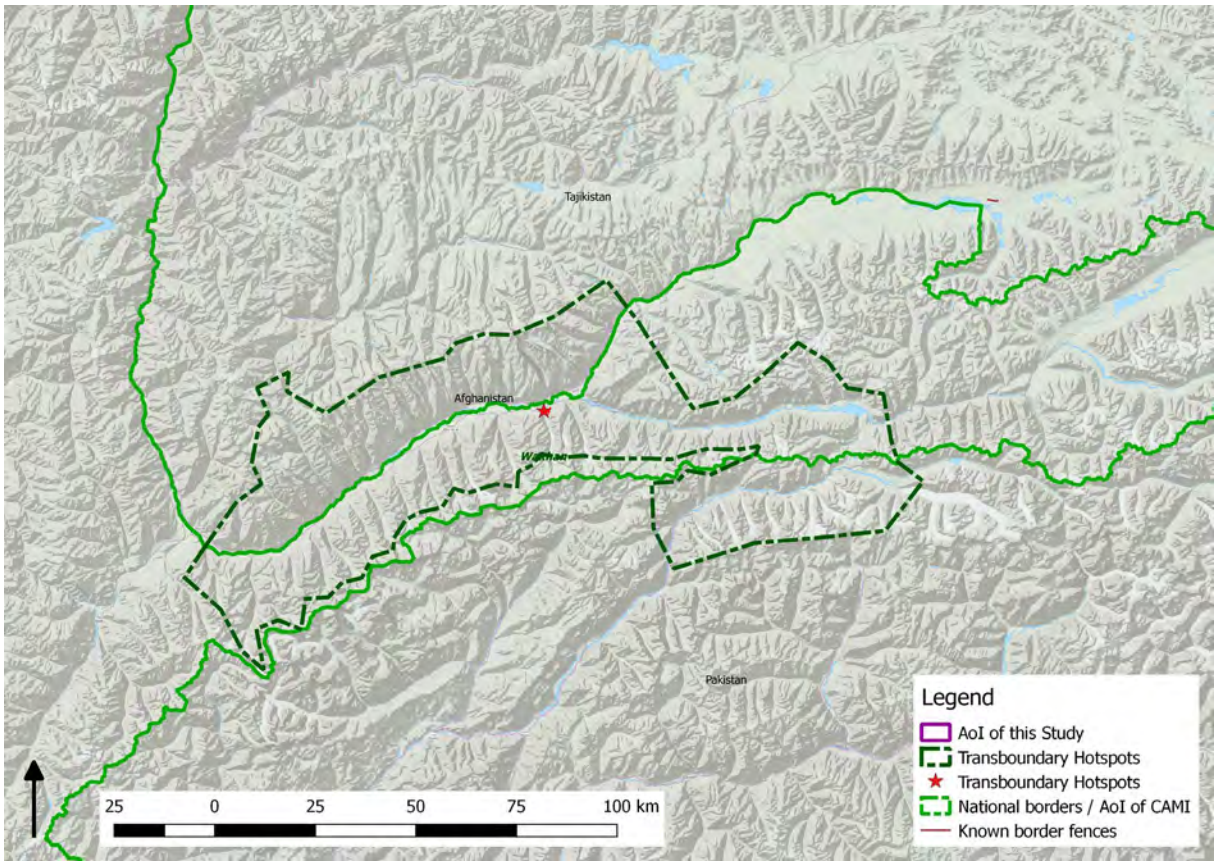


Figure 26: Location map of potential hotspot Wakhan

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir Tien-Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Karakoram-West Tibetan Plateau alpine steppe, Gissaro-Alai open woodlands;
Ecosystems/habitat types: High mountains, high mountain desert, high mountain grasslands, riparian areas, glaciers

Species:

Urial:
Population size: Approx. 400 in Afghanistan (survey WCS, 2010), irregularly in Tajikistan, there permanent population likely extirpated;
Movements: Poorly understood; according to local people in some locations, regular seasonal movements, vertical movements, locally more or less sedentary, transboundary movements: irregularly Afghanistan-Tajikistan; Documented movements between Afghanistan and Pakistan across Baroghil pass.
Importance of transboundary population: Currently population is effectively not transboundary and comparably well preserved in Afghanistan. Recolonization or reintroduction in Tajikistan would be important for restoration of range area and numbers and serve as backup population. Genetic exchange would be likely at least by males.

Snow Leopard:
Population size: Unknown, range of 50 - 100; 30 individuals identified across about 1/3 of the range in Afghanistan; probably 50-70 animals on the Afghan side (pers. comm. Ostrowski, 2019).
Movements: Given typical home range sizes and known distances of dispersal, regular transboundary movements can be expected. Males are more mobile than females. Movement of collared adult female from Afghanistan to Tajikistan and back has been documented by WCS. Hameed et al. (2020) modeled good connectivity for Snow Leopards between Afghanistan and Pakistan across the Baroghil pass.
Importance of transboundary population: The population should be considered as transboundary. Despite the river as partly barrier, this area is part of the major link between more northern and more southern range area, which is likely important for the long-term conservation of global population of the species.

Conservation significance:
The area is of high significance for the conservation of the two target species as well as for a number of other high-mountain species (e.g., Asiatic Ibex *Capra sibirica* – a key prey species of Snow Leopard) and for its ecosystem values and functions. The site covers parts of the Wakhan critical Snow Leopard landscape in Afghanistan (GSLEP Landscape “Pamir”).

Protected areas status:
Afghanistan: Wakhan National Park (covering all of Afghanistan’s part of the area);
Pakistan: Baroghil National Park;
Tajikistan: No state protected area;
Two sections – Darshaydara gorge and sections between Zong and Tupkhona are protected as conservancies by the community-based wildlife conservation NGOs “Yoquti Darshay” and “Yuz-Palang”.

Barriers for migration:
No border fence. The Panj River acts locally as natural barrier, but can be crossed by the target species at its upper reaches where there are few scattered human settlements.

Other threats:
Urial:
- Livestock (forage competition, disease transmission, habitat degradation);
- Claims of conflict with farmers caused by grazing in wheat and barley fields;
- Poaching, currently on the rise in Afghanistan due to militarization of the area (border guard deployment as a result of growing insecurity in Badakhshan Province), opportunistic poaching on Urials moving to Tajikistan may prevent recolonization.

Snow Leopard:

- Low density or decline of wild ungulate prey (mainly Tajikistan);
- Killing in human-wildlife conflict;
- Poaching for illegal trade (?).

Existing or planned transboundary activities:

- ICIMOD initiative for landscape level conservation, but so far no work on the ground (In Wakhan in Afghanistan in nearly 15 years, never anyone from ICIMOD visiting despite invitations. (pers. comm. Ostrowski, WCS, 2019)

Recommendations for action:

- "Belt and Road Initiative": Assessment of potential impact and political intervention for avoidance, mitigation and compensation of impact.
- Community-based conservation: Support models and collaboration between communities in Tajik Wakhan and those living in Wakhan National Park.
- Transboundary coordinated monitoring of Urial and Snow Leopard: Currently permanent Urial presence in Tajikistan is unlikely, but some level of coordination might be useful, in particular where areas in Afghanistan can be easily observed from Tajikistan; Snow Leopard – information exchange and in areas with likely movements comparison of camera trap pictures and/or coordinated non-invasive DNA sampling.
- Transboundary information exchange: Particularly important might be direct exchange between local wildlife conservation NGOs and other conservation actors across the borders. A barrier is the visa and border regime, which makes visits difficult to arrange and expensive (Afghanistan-Tajikistan) or impossible (Afghanistan-China) or would requires long detours (Tajikistan-China).
- Reintroduction or supported recolonization of Urial in Tajikistan: Technical feasibility of reintroduction is likely in terms of sufficiently large source population for taking the necessary number of founder animals and habitat suitability in Tajikistan, yet causes of extirpation in Tajikistan still not fully under control. Recolonization is rather unlikely as in most areas the Panj River valley forms a broad strip of unsuitable habitat, which is unlikely to be crossed by a sufficiently large numbers of colonizers, and uncontrolled poaching prevails.

Site ID: 5 **Name:** Panj River Valley-Tigrovaya Balka **Countries:** Afghanistan-Tajikistan

Location:
Administrative:

- Afghanistan, Balkh Province, Kaldar and Khulm districts, Kunduz Province, Qala-e Zal and Imam Sahib districts;
- Tajikistan, Khatlon Region, districts Chilikul, Qabodiyon and Qumsangir

Geographic area:

- Panj River valley (Afghanistan and Tajikistan), area between the Vaksh and Panj Rivers, including Tigrovaya Balka SPA (Tajikistan);
- Remarks: The range area of Bukhara Deer in this area as indicated in the CAMI Atlas (CMS Secretariat, 2009) seems to be larger than the suitable habitat visible in satellite imagery (Bing Aerial, Google Earth). The range areas of Goitered Gazelle in the CAMI Atlas appear in some sections unrealistic, with the species in some areas most likely already extinct and distribution of confirmed population much reduced by development of intensive irrigated agriculture, especially since 2017.

Coordinates: N 37.286642°, E 68.450740°; N 37.279697°, E 68.780875

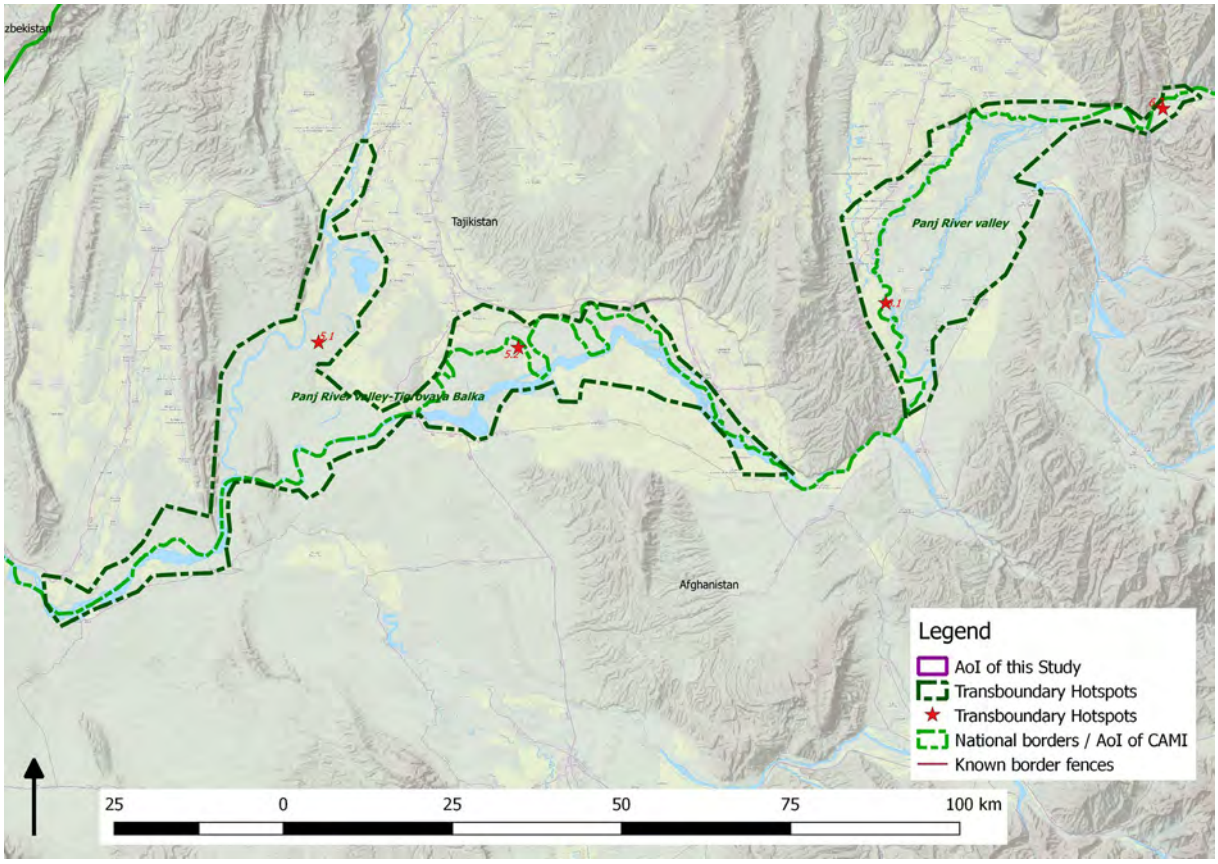


Figure 27: Location map of potential hotspot Panj River Valley andPanj River Valley-Tigrovaya Balka

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Hindukush and Pamir Tien-Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Badghyz and Karabil semi-desert, Gissaro-Alai open woodlands;
Ecosystems/habitat types: Riparian forest, riparian woodland, reeds, agricultural lands, semi-desert.

Species:

Bukhara Deer:
Population size: Tajikistan: Tigrovaya Balka SPA: population sizes reported vary between 270 (or only 130-140) (CMS, 2011b) and >350 or even 386 (CMS Secretariat, 2020), other areas unknown; Afghanistan: unknown and likely small (probably only few tens of deer).
Movements: poorly understood; major population in SPA Tigrovaya Balka probably not regularly moving outside of the protected area, possibly males more mobile, transboundary movements: at least irregularly Afghanistan-Tajikistan.
Importance of transboundary population: Currently, the population is well preserved locally in Tajikistan and likely only a small part is transboundary. Range area expansion along the Panj River would take place in both countries (national border in the river course) and occurrence further upstream (Site 5) suggests that such movements occur at least irregularly.

Goitered Gazelle:
Population size: Tajikistan: Tigrovaya Balka SPA: around 70, (pers. comm. protected area administration quoted in Weichert, 2020) or 40 or less (pers. comm. anonymous, 2021); other areas: unknown and possibly extinct.
Movements: The remaining confirmed distribution area appears surrounded by less suitable or unsuitable riparian habitats and intensively cultivated agricultural areas and thus no regular movements are expected; movements across the Panj river and thus into Afghanistan appear unlikely.
Importance of transboundary population: The population in Tigrovaya Balka SPA is small and most likely not transboundary.

Conservation significance:
The area is of high significance for the conservation of Bukhara Deer. Its population is the only large autochthonous population of the subspecies and has been (together with nearby Site 7 Aral Paygambar) the direct or indirect source population for the existing reintroduced as well as semi-wild and captive populations. For Goitered Gazelle the conservation significance is high at national level for Tajikistan and restocking attempts have been made by the government (e.g., in 2008) by releasing animals from Uzbekistan's "Ecocentre Jeyran". However, the allocation of important habitat sections for development of intensive irrigated agriculture has further reduced the already limited habitat of this confined population and its future survival is highly uncertain.

Protected areas status:
Tajikistan: Strictly Protected Area "Tigrovaya Balka".

Barriers for migration:
No border fence. The Panj River itself is not a natural barrier, but there are intensively cultivated and densely populated areas, where human presence hinders migration and causes mortality.

Other threats:
Habitat quality for Bukhara Deer in the SPA Tigrovaya Balka is affected by modified flood regime, caused by upstream large reservoirs, in particular, Nurek Reservoir and the newly built Roghun Reservoir, as well as by illegal tree cutting and livestock grazing. The population is fluctuating but seems stable although the limiting factors are poorly understood. Poaching might be a source of mortality, in particular outside of the SPA. There is potential of conflict with farmers caused by grazing in crop fields.
Available habitat for Goitered Gazelle has been reduced since 2017 by development of intensive irrigated farming, affecting important habitats where young were born and reared. This may also have contributed to conflict with farmers and likely poaching. Livestock grazing

causes forage competition and degradation of vegetation in remaining suitable habitats. (pers. comm. protected area administration quoted in Weichert, 2020)

Recommendations for action:

Transboundary coordinated monitoring of Bukhara Deer and information exchange: Currently, permanent deer presence in Afghanistan is unlikely, but some level of coordination might be useful. In particular, where areas in Afghanistan can be easily observed from Tajikistan, they should be included in any monitoring and information be provided to the agency in charge, the National Environmental Protection Agency (NEPA). If any research activities in Afghanistan were to take place, coordination with Tajikistan (Committee of Environmental Protection) would be needed, e.g., for coordinated surveys and non-invasive DNA sampling.

Barriers: Agricultural land-use severely limits the available habitat for Bukhara Deer and its movements. The deer would ecologically be able to use also agricultural lands and poplar plantations, but poaching and conflict may prevent this. The volatile security situation in Afghanistan may hamper transboundary conservation activities in the area.

Habitat conservation: All types of natural habitats suitable for Bukhara Deer and Goitered Gazelle need strict enforcement of bans on hunting and grazing and other resource use (especially in SPA), use restrictions and the prevention of further conversion into intensive agricultural lands.

Site ID: 6 **Name:** Panj River Valley **Countries:** Afghanistan-Tajikistan

Location:
Administrative:
- Afghanistan, Kunduz Province, Yangi Qaleh and Darqad districts;
- Tajikistan, Khatlon Province, districts Farkhor, Hamadoni and Shamsidin Shohin

Geographic area:
- Panj River valley (Afghanistan and Tajikistan);
- Remark: The range area of Bukhara Deer in this area indicated in the CAMI Atlas seems to be smaller than the suitable habitat visible in satellite imagery (Bing Aerial, Google Earth) and the known occurrence of the species.

Coordinates: N 37.338443°, E 69.388120°; N 37.593436°, E 69.846198°

Map: see Site 5 (figure 27)

Biogeographical region; major ecosystems/habitat types:
Udvardy 1982: Hindukush and Pamir Tien-Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Paropamisus xeric woodlands, Gissaro-Alai open woodlands;
Riparian forest, riparian woodland, reeds, agricultural lands, semi-desert

Species:

Bukhara Deer:
Population size: Tajikistan: Farkhor 20-24, Hamadoni 16-18, Shamsidin Shohin 6-7 (CMS, 2011b) or overall 50-60 (CMS Secretariat, 2020), Afghanistan unknown, Darqad district – observed several times from Tajikistan (Ikromov, pers. comm. 2008-2012) and by WCS in Afghanistan (Moheb et al., 2016);
Movements: poorly understood; possibly connection with the population in SPA Tigrovaya Balka, but likely no regular movements between that site and this area; possibly males more mobile, transboundary movements: at least irregularly Afghanistan-Tajikistan;
Importance of transboundary population: Currently this population is very small and only surviving as transboundary population. Movements along the Panj River likely take place in both countries (international border in the river course) and fragmented occurrence of small groups of individuals suggests that such movements occur at least irregularly.

Conservation significance:
The area is of significance for the conservation of Bukhara Deer. Its population is part of or connected with the only larger autochthonous population of the subspecies. It provides an opportunity for general population stabilization and range area increase as well as a possible backup in case of disease or other events in the main population in SPA Tigrovaya Balka.

Protected areas status:
Tajikistan: Reserves (*zakazniks*) “Karatau” and “Dashtijum”, Strictly Protected Area “Dashtijum” – bordering suitable habitat, but not including it in substantial areas.

Barriers for migration:
No border fence. The Panj River itself is not a natural barrier, but there are intensively cultivated and densely populated areas, where human present hinders migration and causes mortality.

Other threats:
Fragmented population and fragmented habitat in small patches. Habitat influenced by livestock, expansion of arable farming and (possibly) cutting of trees. Poaching might be the main source of mortality, in particular outside of the SPA. There is potential of conflict with farmers caused by grazing in crop fields. Changing flow dynamics in the Panj River due to climate change may impact on habitat quality, recruitment and adult mortality.

Recommendations for action:

Transboundary coordinated monitoring of Bukhara Deer and information exchange: Currently permanent deer presence in Afghanistan is unlikely, but some level of coordination might be useful. In particular, where areas in Afghanistan can be easily observed from Tajikistan, they should be included in any monitoring and information be provided to the agency in charge, the National Environmental Protection Agency (NEPA). If any research activities in Afghanistan would take place coordination with Tajikistan (Committee of Environmental Protection) would be needed, e.g. for coordinated surveys and non-invasive DNA sampling.

Barriers: Agricultural land-use severely limits the available habitat for Bukhara Deer and its movements. The deer would ecologically be able to use also agricultural lands and poplar plantations, but poaching and conflict may prevent this. The volatile security situation in Afghanistan may hamper transboundary conservation activities in the area.

Site ID: 7 **Name:** Aral Paygambar **Countries:** Afghanistan-Turkmenistan-Uzbekistan

Location:
Administrative:

- Afghanistan, Balkh Province, Shorteppa district, Khulm Province, Kaldar district, Jwazjan Province, Qarqen and Khamyab districts;
- Turkmenistan, Lebap province (extent of the site into Turkmenistan to be verified);
- Uzbekistan, Surkhandarya Province.

Geographic area:

- Riparian areas near Termez, downstream of "Friendship Bridge", inclusion of area upstream of the bridge thinkable;
- Remark: The range area of Bukhara Deer in this area as indicated in the CAMI Atlas seems to be larger than the suitable habitat visible in satellite imagery (Bing Aerial, Google Earth).

Coordinates: N 37.297403°, E 67.137200°; N 37.219264°, E 67.368819°

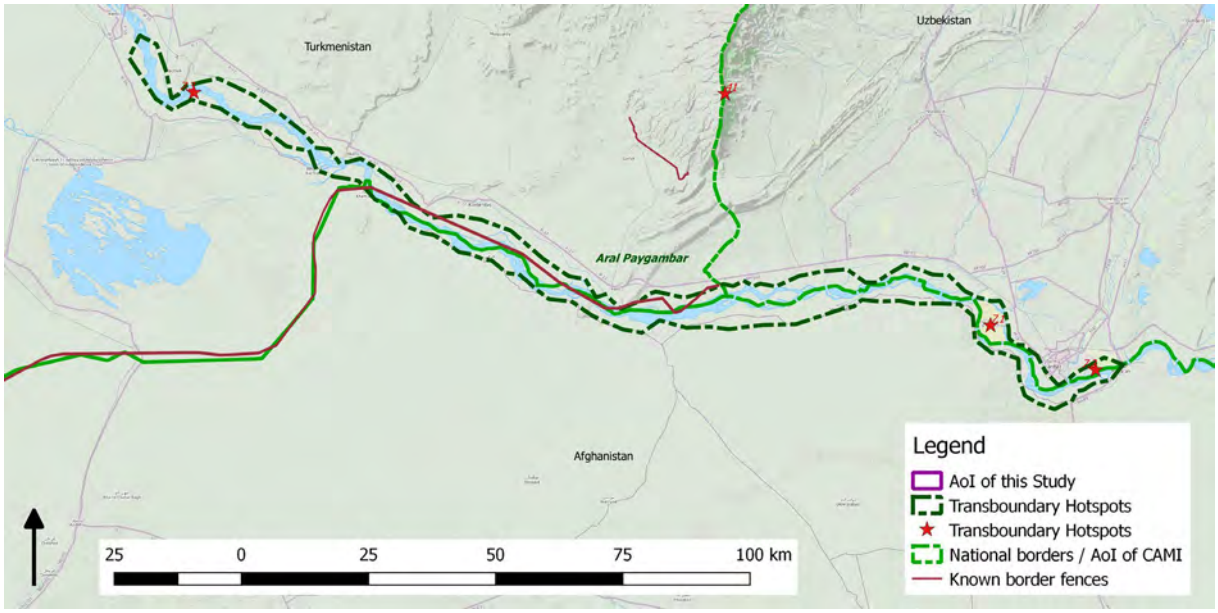


Figure 28: Location map of potential hotspot Aral Paygambar

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Hindukush Highlands, Turanian (Kazakh desert scrub-steppe);
WWF Ecoregion (Olson et al., 2001): Badghyz and Karabil semi-desert, Central Asian riparian woodlands;
Ecosystems/habitat types: Riparian forest, riparian woodland, reeds, agricultural lands, semi-desert.

Species:

Bukhara Deer:
Population size: Turkmenistan about 50 animals since 2003 at least until 2011 (Pereladova 2013); Normatov (2016) assessed the population size as about 100 animals; 130 were reported for 2019 (CMS Secretariat, 2020); Afghanistan and Uzbekistan unknown, but likely shared population with Turkmenistan.

Movements: No documented transboundary movements known, but as the national borders of Afghanistan with Turkmenistan and Uzbekistan are in the river course and the border between Turkmenistan and Uzbekistan crosses the river, such movements are highly likely, although there is a fence along the border of Turkmenistan. The population is divided by the city of Termez into an eastern and western part (Normatov, 2016).
Importance of transboundary population: Population estimates indicate a significant population. This population is particularly important as it is one of the few autochthonous populations. There is some potential that this population can become connected with the population in Sites 5 and 6, although Termez as a major city and the "Friendship" bridge may hamper migration.

Persian Leopard:
Population size: No permanent population confirmed, but occasional occurrence is possible (Marmazinskaya, 2016).
Movements: It is likely that leopards use the riparian forests of the site as linking connection between populations in the Kugitang and Babatag Ranges (Normatov, 2016).
Importance of transboundary population: The transboundary area might be an important connection between isolated population patches despite the area probably has no resident leopards.

Conservation significance:
The area includes present and past range areas of Bukhara Deer. There is potential for the presence or recovery of a transboundary population of this species, which might become linked with populations further upstream. The site might serve as a connecting link for leopards between ranges in the Kugitang or further in the west and in the Babatag in the east.

Protected areas status:
The area includes former Aral Paygambar SPA (Uzbekistan), which has been closed in the 1990s.

Barriers for migration:
Turkmenistan has a border fence (chain-link, high, not covered) along its border (CAMI Atlas referring to Kaczensky). However, it is technically unlikely that such a fence can be located in the actual riparian areas and where it crosses the river course can permanently block migration of Bukhara Deer. The city of Termez and the "Friendship" bridge are other barriers to migration (Normatov, 2016), but observations from Zarafshon National Park in Uzbekistan (Marmazinskaya, pers. comm. 2018) suggest that Bukhara Deer can live close to urban areas and may cross highways and other infrastructure.

Other threats:
- Habitat degradation caused by tree cutting, livestock grazing and changing riverflow dynamics;
- Poaching is likely, but at least from the Uzbekistan side prevented by the border zone and its protection (Normatov, 2016).

Recommendations for action:
- Transboundary communication and coordinated assessment and monitoring of population status and movements;
- Habitat conservation;
- Prevention of any poaching through law enforcement, collaboration with border police and community involvement;
- Assessment of barriers and where necessary and technically feasible mitigation to facilitate migration.

Site ID: 8 **Name:** Eastern Himalaya **Countries:** Bhutan-China-India

Location:
Administrative:

- Bhutan, Lhuntse and Trashiyangtse Districts;
- China, Tibet Autonomous Region;
- India, Arunachal Pradesh.

Geographic area:

- Eastern part of the Himalaya Range.

Coordinates: N 27.850755°, E 81.608906°

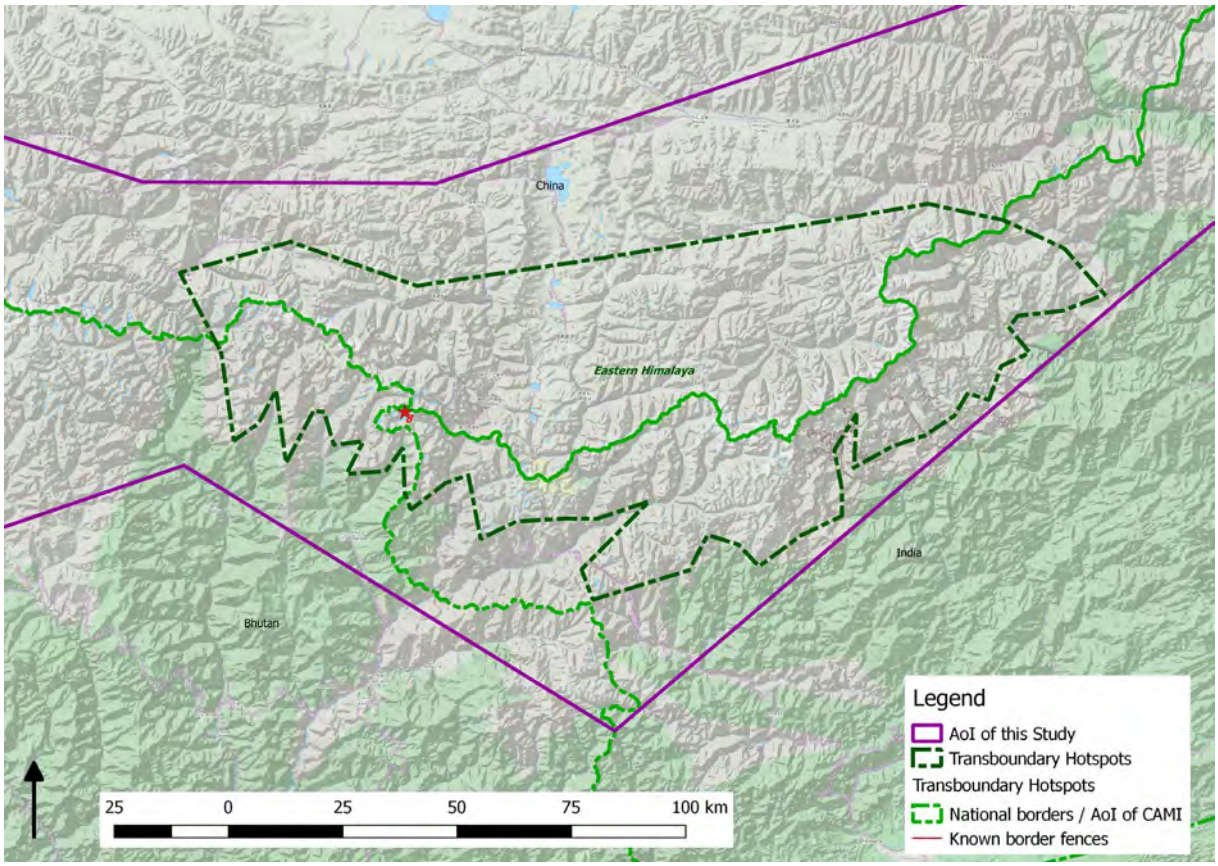


Figure 29: Location map of potential hotspot Eastern Himalaya

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Himalayan highlands, Tibetan;
WWF Ecoregion (Olson et al., 2001): Eastern Himalayan alpine shrub and meadows, Northeastern Himalayan subalpine conifer forests; rock and ice;
Ecosystems/habitat types: High mountains, mountain steppe, mountain woodlands and coniferous forests.

Species:

Argali:
Population size: The Argali range in the IUCN Red List (Reading et al., 2020) indicates "Possibly extant" for the China section of this site, only locally crossing into adjacent areas of Bhutan and India. This range might in some parts include unsuitable areas, especially in the

"possibly extant" areas in China; there are no recent records in Bhutan and in India's Arunachal Pradesh. No population figures could be obtained for the site.
Movements: No documented transboundary movements known.
Importance of transboundary population: It is uncertain if Argali exist close to the international borders at the site and thus existence of a transboundary population is uncertain.

Snow Leopard:
Population size: In Bhutan Snow Leopard is expected in the area, but not yet confirmed (Nyhus et al., 2016), while according to IUCN Red List map the species is "extant"; the parts in India are largely considered as good quality habitat, the population estimate for Arunachal Pradesh is 42 (Nyhus et al., 2016) out of which about 50% may occur on the site; in China Snow Leopard presence is confirmed for large areas of the Tibetan plateau, but not specific information is available for the site (Nyhus et al., 2016), on which in the IUCN Red List map "possibly extant" is indicated.
Movements: No documented transboundary movements are known. Given the location of the international border at the main ridges such movements are very likely.
Importance of transboundary population: The transboundary population of Snow Leopard is of importance for the conservation of the species, especially in Bhutan and Arunachal Pradesh (India).

Conservation significance:
The area is of significance for the conservation of Snow Leopard.

Protected areas status:
Bhutan: Bundeling Wildlife Sanctuary (entire site);
China: None?
India: None[4]

Barriers for migration:
No information is available on the existence or absence of human-made barriers to migration. Possibly some high mountain passes are equipped with fences, although the existence of substantial migration barriers for Snow Leopard is unlikely, but more likely for Argali if present in the area.

Other threats:
No specific threat assessment is available for this site. Threats likely occurring include:
- Habitat degradation, mainly be overgrazing;
- Poaching.

Recommendations for action:
- Assessment of range areas, habitat use, and population sizes and trends of target species;
- Determination and implementation of conservation interventions;
- Transboundary collaboration, exchange of experience and mitigation of barrier effect of border fences if existing or planned.

[4] Map of the protected areas in Arunachal Pradesh: http://arunachalforests.gov.in/protected_areas.html

Site ID: 9 **Name:** Khangchendzonga-Sikkim Plateau **Countries:** Bhutan-China-India-Nepal

Location:
Administrative:

- Bhutan,
- China, Tibet Autonomous Region;
- India, Sikkim;
- Nepal; Mechi and Koshi.

Geographic area:

- (Northern) plateau of Sikkim, Khangchendzonga region and adjacent areas in Tibet (China) and Bhutan.

Coordinates: N 28.045823°, E 88.680373°

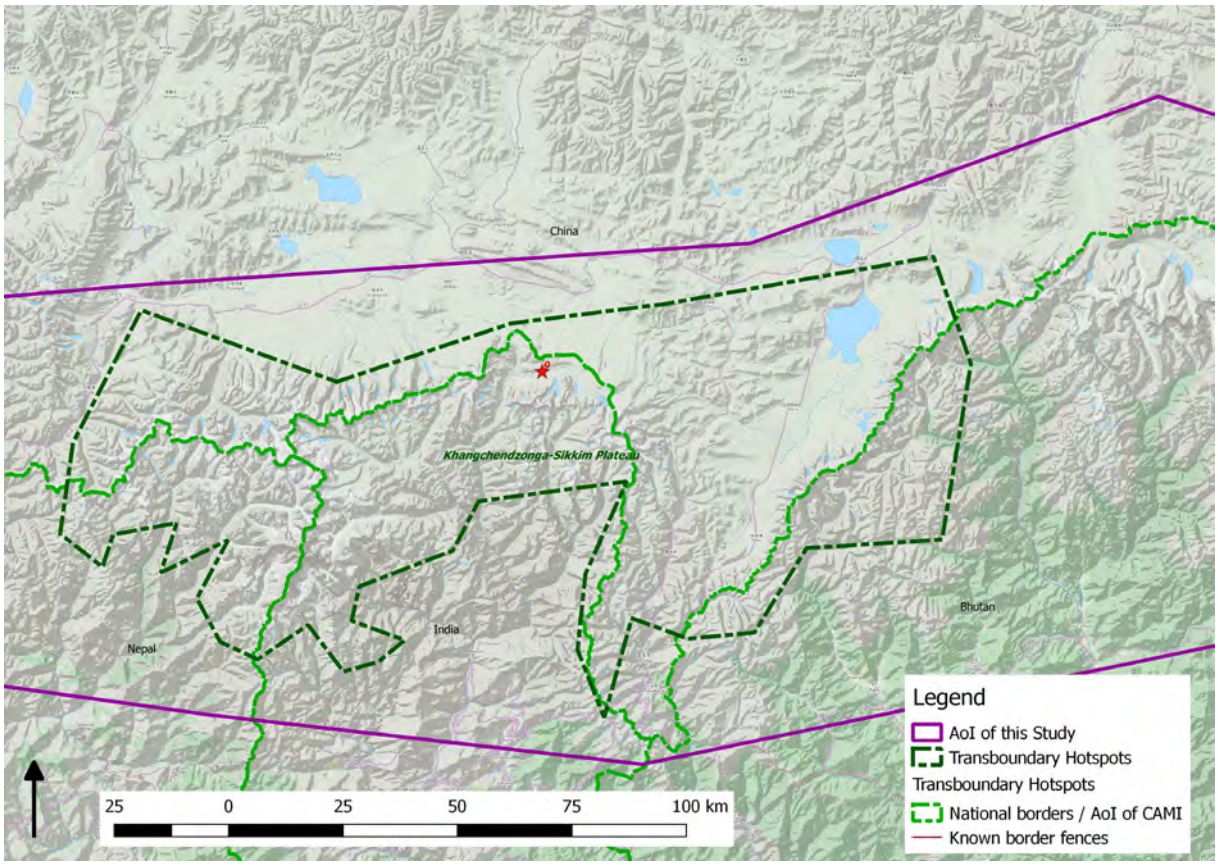


Figure 30: Location map of potential hotspot Khangchendzonga-Sikkim Plateau

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Himalayan highlands, Tibetan;
WWF Ecoregion (Olson et al., 2001): Eastern Himalayan alpine shrub and meadows, Northeastern Himalayan subalpine conifer forests; rock and ice;
Ecosystems/habitat types: High mountains, mountain steppe and semi-desert, mountain woodlands and coniferous forests.

Species:

Kiang:
Population size: The species range indicated in the IUCN Red List at this site is not much linked to obvious physical features. It might in some parts include unsuitable areas, especially too rugged and even forested areas. Presence in Sikkim (restricted to a small area in the Northern Plateau) is confirmed; in the Bhutan and Nepal parts of the site it is uncertain. Most recent intensive surveys in northern Sikkim yielded a minimum number of only 18 Kiangs (Chanchani et al., 2010). No other population figures could be obtained for the site.
Movements: No documented transboundary movements are known, but Chanchani et al. (2010) found indications of transboundary movements between Tibet (China) and Sikkim (India);
Importance of transboundary population: The area is located at the southern edge of the natural range area, which is mainly limited by natural features there. It is of importance for the conservation of the species at national and sub-national level in India (Sikkim) and possibly Bhutan and Nepal. In case of future declines of the species across its main range the area may gain importance for the conservation at the level of the subspecies Southern Kiang *E. k. polyodon*.

Argali:
Population size: The range of Argali indicated in the IUCN Red List includes all of the China part of the size as "possibly extant" and the northernmost section of Sikkim (India) as "extant". The survey by Chanchani et al. (2010) yielded a minimum population size of 177 Argali in the Sikkim parts of the site.
Movements: No transboundary movements have been documented, but movements are likely.
Importance of transboundary population: The site is one of the few range areas of Tibetan Argali *O. a. hodgsonii* outside of China and harbors one of the most important groups in India. It is thus of national conservation importance for India, but also for the conservation of the subspecies and species as such in case of further declines across its main range area.

Snow Leopard:
Population size: The IUCN Red List map considers presence as "extant" for the Bhutan, India and Nepal parts of the site and as "possibly extant" for the China part. Nyhus et al. (2016) considered the Khangchendzonga region in Sikkim (India) as moderately known, the remaining parts of Sikkim as poorly studied, but assessed the entire area as good habitat, with a total estimate of 13 individuals. Snow Leopard is confirmed from Jigme Khesar Strict Nature Reserve in Bhutan, but no figures are available. No information about occurrence and numbers are available for other parts of this site.
Movements: No documented transboundary movements known. Given the location of the national border at the main ridges such movements are very likely.
Importance of transboundary population: The transboundary population of Snow Leopard is of importance for the conservation of the species, especially in Bhutan, Sikkim (India) and Nepal.

Tibetan Gazelle:
Population size: The site is located at the southern edges of the range area indicated in the IUCN Red List. However, the boundaries of the range area appear heavily generalized and include large unsuitable areas. Chanchani et al. (2010) confirmed the presence of Tibetan Gazelle in the northern plateau of Sikkim and recorded a minimum number of 77 animals.
Movements: No documented transboundary movements known, but connectivity of the groups in Sikkim (India) with Tibet (China) is likely. Bhatnagar (pers. comm. 2021) suggested that occurrence of Tibetan Gazelle in India might be only seasonal, thus making a strong case for transboundary movements.
Importance of transboundary population: The transboundary population is very small compared to the global population estimate for the species. It is of importance for the conservation of the species at sub-national level in Sikkim and at national level in India. The importance for the overall population at the southern edges of the species' range cannot yet

be assessed due to lack of information on local distribution, potential fragmentation of the range area. Population size and trends.

Conservation significance:
The area has been proposed by Maheshwari (2020) as one of the key areas for transboundary conservation of Snow Leopard in the Himalayan region. Also Bhatnagar (pers. comm. 2021) highlighted the significance of the area from the perspective of conservation of the CAMI species in India and the potential for transboundary conservation. The conservation significance of the Khangchendzonga National Park has been recognized by its inscription in the UNESCO World Heritage Sites list, although the national park's biodiversity value is mainly determined by other species than those listed under CAMI (except Snow Leopard) and the transboundary hotspot's other CAMI species occur outside of the World Heritage Site, but in adjacent areas.

Protected areas status:
Bhutan: Jigme Khesar Strict Nature Reserve;
China: Not known;
India: Kangchenjunga National Park and Biosphere Reserve, Singhba Wildlife Sanctuary;
Nepal: Kangchenjunga Conservation Area.

Barriers for migration:
There is currently no information available about artificial barriers to migration. The high mountain relief and glaciation in the area naturally limits movements of wild mammals to some passes, and fences as well as disturbance from presence of humans (e.g. border guards) and dogs may restrict movements there.

Other threats:
Threat assessments available for this site are provided by Chanchani et al. (2010) and Sharma et al. (2020). Threats occurring include:

- Small and fragmented of populations;
- Habitat degradation, mainly be overgrazing as well as tourism;
- Competition by livestock and related disturbance as well as risk of livestock disease transmission;
- Depredation and disturbance by herders' and feral dogs;
- Some human-wildlife conflict (livestock depredation by Snow Leopards), although retaliatory is not reported;
- Poaching is very limited due to religious beliefs and assumed to occur only in China.

Existing or planned transboundary activities:

- ICIMOD initiative for landscape level conservation, focusing on Bhutan, India and Nepal (e.g., Gurung et al., 2019).

Recommendations for action:

- Assessment of range areas, habitat use, and population connectivity, sizes and trends of target species;
- Determination and implementation of conservation interventions;
- Transboundary collaboration, exchange of experience and mitigation of barrier effect of border fences and border-related disturbance.

Site ID: 10 **Name:** Western Trans-Himalaya **Countries:** China-India-Nepal

Location:
Administrative:

- China, Tibet Autonomous Province;
- India, Uttarakhand;
- Nepal, Far-Western.

Geographic area:

- Trans-Himalaya between Bandarpunch Mountain range in the west and the eastern watershed of Upper Humla in the east.

Coordinates: N 31.091263°, E 79.062512°, N 30.309320°, E 81.623352°

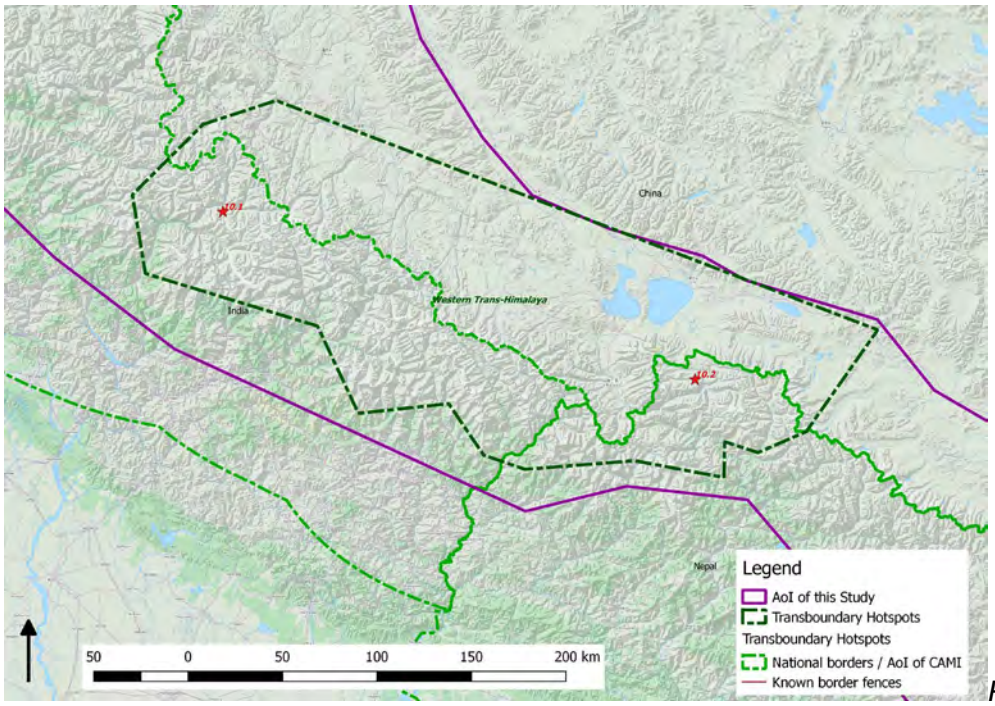


Figure 31: Location map of potential hotspot Western Trans-Himalaya

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Himalayan highlands, Tibetan;
WWF Ecoregion (Olson et al., 2001): Western Himalayan alpine shrub and meadows, rock and ice;
Ecosystems/habitat types: High mountains, mountain steppe and semi-desert, mountain woodlands.

Species:

Wild Yak:
Population size: Kusi et al. (2021) confirmed the presence of Wild Yak in Upper Humla (Nepal) with sightings of three individuals and genetic samples. The population in nearby China is not known.
Movements: No documented transboundary movements known, but occurrence close to the border with China suggests that such movements occur.
Importance of transboundary population: The wild yak population of the site belongs to a small patch of range area indicated in the map of the IUCN Red List. This population as well

as Wild Yak groups in other habitat patches outside of the species' main range might be particularly threatened and thus deserve special attention.

Kiang:
Population size: The heavily generalized range map in the IUCN Red List shows that parts of the site in all three countries belong to the range area of the species. Werhahn et al. (2015) confirmed the presence of Kiang in Upper Humla (Nepal) and recorded around 571 individuals during 2013 and an estimated 800 individuals during 2014. Shah et al. (2015) mention occurrence in Uttarakhand. No figures on population sizes and trends are available.
Movements: No documented transboundary movements known, but the location of suitable habitats at international borders suggests that such movements may occur regularly.
Importance of transboundary population: The transboundary population is likely very small compared to the overall population size, but of importance for the conservation of the species in India, in particular in Uttarakhand, and in Nepal.

Argali:
Population size: Argali presence has been confirmed from Nelang valley (Gangotri NP) in India (Pal et al., 2018) and from Upper Humla in Nepal (Werhahn et al. 2015, Kusi et al. 2017). In both areas recorded animals numbered below ten, but actual population size there and in adjacent areas of Tibet (China) is not known.
Movements: No documented transboundary movements known, but the locations of observations in India and Nepal close to the border with China suggest that recorded animals may carry out transboundary movements.
Importance of transboundary population: The so far confirmed likely transboundary occurring Argali groups are extremely small. Without transboundary migration continuing presence of the species in these parts of India and Nepal is unlikely. These groups are considered important for the conservation of the species at national level (Nepal) and sub-national level (Uttarakhand). In what extent these transboundary groups are of importance for the conservation of the species in the adjacent parts of Tibet (China) is not known.

Snow Leopard:
Population size: The majority of the range area in Uttarakhand (India) is considered good habitat, mainly within the site and total numbers are estimated with 86 individuals (Nyhus et al., 2016), in China Snow Leopard presence is confirmed (Nyhus et al., 2016), but no figures are available for this specific site. In Nepal presence has been confirmed from Humla, which is part of the species' western distribution block, numbers in the area are unknown (Nyhus et al., 2016).
Movements: No documented transboundary movements known. Given the location of the international borders across the species' habitats such movements are very likely.
Importance of transboundary population: The Snow Leopard population of the Western Trans-Himalaya is part of a continuous range area and is of importance for the conservation of the species at regional (Himalayan) and global scale.

Chiru
Population size: The range map of the IUCN Red List indicates the southern boundaries of the species distribution north of the site. In Upper Humla (Nepal) the species occurred formerly, but is now considered extinct (Werhahn et al., 2015, IUCN SSC Antelope SG, 2016a).
Movements: No documented transboundary movements known, but the historic occurrence of the species had most likely been transboundary.
Importance of transboundary population: The species is extinct in the wider area and assessing the chances of recolonization would require specific information about nearest populations in China, their trends and options and barriers for range expansion. This information is currently not available.

Tibetan Gazelle:
Population size: The range map of the IUCN Red List indicates the southern boundaries of the species distribution north of the site. However, Werhahn et al. (2015) confirmed the presence of the species in Upper Humla (Nepal) and recorded four and six individuals in 2013 and 2014 respectively. No information is available on possible occurrence in adjacent areas of Tibet (China).
Movements: No documented transboundary movements known; the existence of previously unknown small groups in Upper Humla may either represent a relic of a local resident population or a rather recent transboundary recolonization.
Importance of transboundary population: The small groups of Tibetan Gazelle observed in Nepal near the border with China suggest that local survival of the species may rely on transboundary connectivity of the population.

Conservation significance:
The area is of high significance for the conservation of Snow Leopard, but also for the local conservation of the declining ungulate species Wild Yak, Kiang, Argali, Tibetan Gazelle and potentially in the future of Chiru. In particular the eastern parts of this site are remarkable due to the existence of an almost complete specialized wild ungulate community and the absence of permanent human settlements.

Protected areas status:
China: None?
India: Gangotri National Park
Nepal: None

Barriers for migration:
No barriers to migration are known, border between China and Nepal is largely unfenced, but planned border fences may pose future barriers.

Other threats:
Reported threats include:
- Habitat degradation, mainly by overgrazing (more likely at the areas in China);
- Poaching, especially of Wild Yak for meat and illegal trade (from Nepal to China, reported by Kusi et al. (2021).

Recommendations for action:
- Assessment of range areas, habitat use, and population sizes and trends of target species;
- Regulation of pasture use;
- Prevention of illegal hunting and trade;
- Preventing fence construction;
- Monitor climate change effects, especially on water availability;
- Determination and implementation of conservation interventions;
- Transboundary collaboration, exchange of experience;
- Previous Indian-Chinese cooperation on Chiru to be continued

Site ID: 11 **Name:** Changthang, Spiti **Countries:** China-India

Location:

Administrative:

- China, Tibet Autonomous Region and Xinjiang Autonomous Region;
- India, Ladakh and Himachal Pradesh.

Geographic area:

- Changthang plateau in eastern Ladakh and Spiti valley in Himachal Pradesh with adjacent areas of northern Tibetan plateau. The delimitation towards site 21 (Eastern Karakoram-Ladakh) is difficult and both sites might be considered as continuous.
- Changthang Wildlife Santuary (Nyoma and Durbuk admin units) in Ladakh, Kibbar Wildlife Sanctuary in Spiti, India;
- Changthang Nature Reserve in Tibet, China.

Coordinates: N 34.318468°, E 79.020433°; N 32.258513°, E 78.154907°

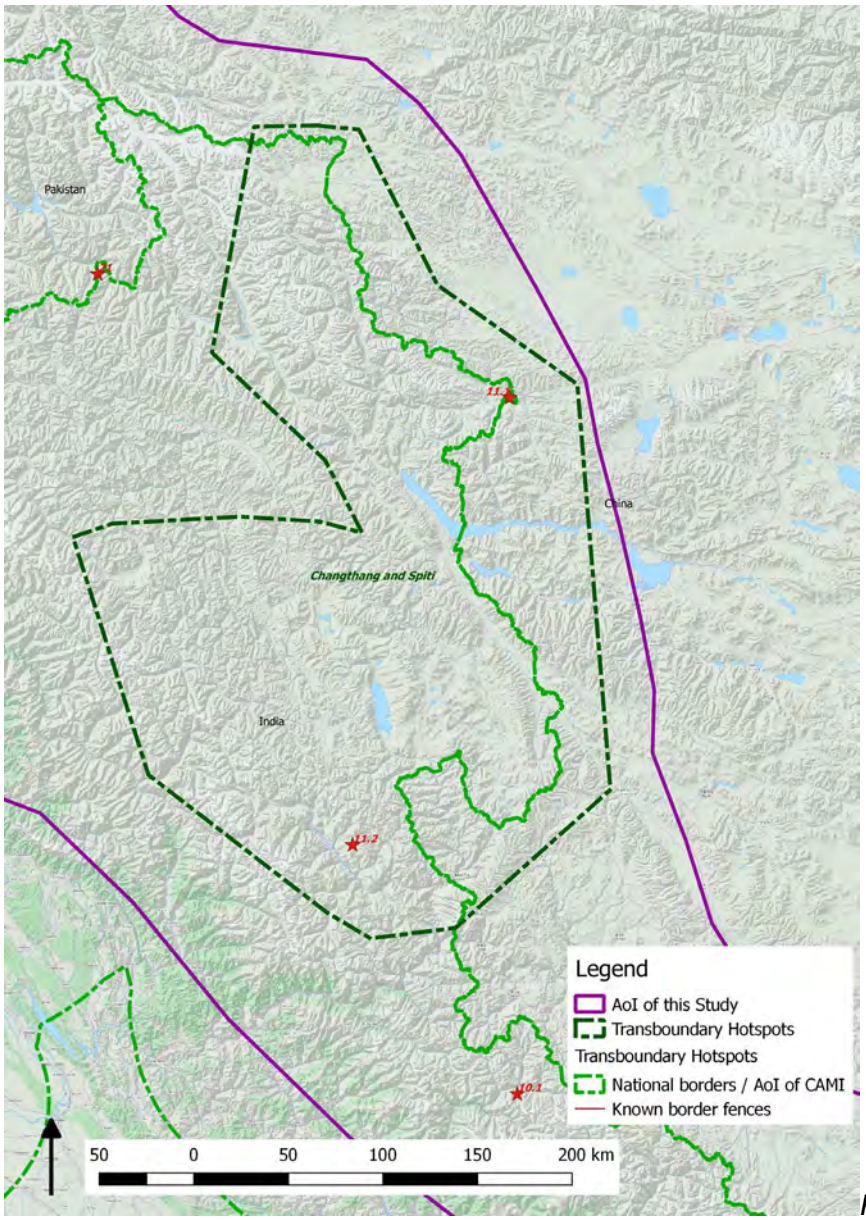


Figure 32: Location map of potential hotspot Changthang and Spiti

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Himalayan highlands, Tibetan;
WWF Ecoregion (Olson et al., 2001): Karakoram-West Tibetan Plateau alpine steppe, Central Tibetan Plateau alpine steppe, Northwestern Himalayan alpine shrubs and meadows, rock and ice;
Ecosystems/habitat types: High mountains, mountain steppe and semi-desert.

Species:

Wild Yak
Population size: Wild Yak occurs in the Changchenmo Valley in the Ladakh (India) part of the site, where Rawat and Sankar (2011) estimated the population size at 110-120 animals. Buzzard and Berger (2016) suggested that the population has been increasing compared to very few yaks previously reported. Presence of Wild Yak is further highly likely in the adjacent areas of Tibet (China).
Movements: Transboundary movements are mentioned by Buzzard and Berger (2016), and the records of Wild Yaks close to the Line of Actual Control suggest that at least some of the animals may regularly move across this border.
Importance of transboundary population: The transboundary population of Wild Yak is of high importance for the conservation of the species in India, where it constitutes the only population. With the species being vulnerable and declining and the site representing the westernmost edge of the range area, the local population is also of importance for the conservation of the species.

Kiang
Population size: The site is entirely considered as Kiang range area in the map in the IUCN Red List, but actual Kiang presence is rather patchy. Rawat and Sankar estimated 125-150 Kiang being present in the Changchenmo Valley. Shrotriya et al. (2015) provided an estimate of 4,462 animals (Standard Error 1,868). Kiang presence is also confirmed from several other parts of the site in Ladakh and northern Himachal Pradesh (India) (Shah et al., 2015). The Changtang region of Tibet (China) is the stronghold of the species, but it is unclear what population of the species occurs at this region's western edges.
Movements: No transboundary movements are documented, but the range area being continuous across the Line of Actual Control suggests that parts of the population carry out transboundary movements, especially the population in Changchenmo Valley, drawn to water points on the Indian side.

Importance of transboundary population: The local population is of importance for the conservation of the species in India. Changthang is the only area in Ladakh, where Kiang occurs regularly (Shrotriya et al., 2015). Transboundary movements are likely of some importance for genetic exchange and seasonal availability of suitable habitat. Given the overall favorable conservation status of the species, the importance of the local population of the site might be limited. It is important as one of the westernmost populations of the species and might gain further importance in case of reduction of the overall population, which might happen due to human-wildlife conflict and land-use change across the species range.

Argali:
Population size: The Indian part of the site is one of the two range areas of the species in the country (the other one being site 9), and thus of its Tibetan subspecies *O. a. hodgsonii* outside of China. The Argali occur in several scattered areas in mainly Ladakh and probably few in Spiti valley of Himachal Pradesh (Khanyari and Bhatt, 2018). Population estimates vary between around 200 (e.g., Shrotriya et al. 2015) and 480-620 (e.g., Singh, 2008) or more. Occurrence in parts of the site in China is likely, but no figures are known (Reading et al., 2020).
Movements: No transboundary movements are documented, but are possible.

Importance of transboundary population: Although its transboundary character is not documented, the population is in any case of conservation importance at the level of India.

Urial:

Population size: The range area of Urial at the site overlaps with the range area of Argali (pers. comm. Y.V. Bhatnagar, 2021). One of the range areas, the Shyok river valley, is within the site. There Khara et al. (2021) confirmed the presence of some Urial groups but did not conduct a population estimate. In a range area patch between Leh and Soka Lake only limited site use was estimated. The remaining strongholds of the Urial in Ladakh are located in Site 21.
Movements: The population of the site might be connected with Urials further to the west and there might be occasional movements over longer distances, but so far targeted research is lacking. Khara et al. (2021) found that field observations and local knowledge of herders and wildlife protection department officials suggested that Urial, while exhibiting a degree of seasonal movement, did not undertake long-distance migration.
Importance of transboundary population: The transboundary character of the Urial population at the site is not documented. As the subspecies Ladakh Urial *O.v.vignei* has generally declined in numbers and range area any remaining groups are of high conservation importance.

Snow Leopard:

Population size: The Snow Leopard occurs at the site, but its distribution and population size appear to be influenced by habitat suitability. In the Changthang of Ladakh only few presence points have been recorded by Watts et al. (2019), what based on a habitat suitability model they interpreted as impact of above optimal elevation and related factors. Nyhus et al. (2016) also show most of the site as poor habitat for Snow Leopard. No site-specific guess of population size is possible. In the part of Himachal Pradesh, where Nyhus et al. (2016) indicate good habitat, an estimated 61 Snow Leopards existed. During a state-wide survey, 9 individuals were recorded in Spiti with another 9 in adjacent Tabo landscape (Anon., 2021), while Sharma et al. (2021) estimated 0.5 mature Snow Leopards per 100 km² for 950 km² of the Spiti landscape.
Movements: No documented transboundary movements known. Given that the international border and Line of Actual Control cross suitable habitats, in particular in the southern parts of the site, such movements are very likely.
Importance of transboundary population: The transboundary population of Snow Leopards at the site, especially in its southern parts, is of importance for the conservation of the species, especially at national level in India, but also for the western Himalaya region.

Chiru:

Population size: The population of Chiru in Changthang is small and limited to few sites close to the Line of Actual Control. In the north (Daulet Beg) Chiru occur in mixed herds and numbered about 250-300 (Sarkar et al., 2008). In Changchenmo valley Rawat and Sankar (2011) estimated 20-30 animals, which might be restricted to males, while females and young ones may stay to the east or north of Changchenmo across the Line of Actual Control.
Movements: The Chiru occurring in the Indian part of the site are generally considered as seasonally migrating and crossing the Line of Actual Control.
Importance of transboundary population: The Chiru of Changthang are the only animals of this species occurring in India and they are thus of national importance. Contiguity with the populations in Chang Tang Plateau of Tibet is crucial for their long-term survival. Compared to the overall population size of the species their number is small, but given the uncertainty concerning future trends due to threats like poaching and illegal trade, land-use changes and other developments as well as past massive population fluctuations this population may become important for global population in the future, if adequately protected and supported.

Tibetan Gazelle:

Population size: The species is restricted to the small area of Hanle Valley in the south of Changthang. The reported number was around 50 animals (Bhatnagar, Wangchuk et al., 2006; Namgail et al. 2008), but seems mow to be slowly increasing; about 65-70 are seen often (Bhatnagar, pers. comm. 2021). The population size in the adjacent areas in China is not known.

Movements: The maps and information about fragmentation of suitable habitat (Bhatnagar, Namgail et al., 2006) suggest that the small population in Ladakh might be restricted to a small area and not carry out larger movements. It is thus likely be no longer connected with Tibetan Gazelles in China.

Importance of transboundary population: Transboundary movements are of low conservation relevance for the species. However, the conservation of the small population in Ladakh is of national importance for India. And given the threats that Tibetan Gazelles face across their range, the conservation of even the small population of the site deserves attention beyond a purely national perspective.

Conservation significance:

The area is of high significance for the conservation of Kiang, but also of the Ladakh subspecies of Urial. It is further of significance for Snow Leopard conservation at least regionally. Presence of small populations of Wild Yak, Tibetan Argali, Chiru and Tibetan Gazelle further adds to the conservation significance of the site.

Protected areas status:

China: Pangong Lake County-level Wetland Nature Reserve; Changthang Nature Reserve in Tibet;

India: Changthang Wildlife Sanctuary in Ladakh, Nubra Shyok Wildlife Sanctuary, Kibbar Wildlife Sanctuary in Spiti, Hemis National Park.

Barriers for migration:

No information is available about border fences and other potential barriers to migration.

Other threats:

Threats reported for the site (e.g. by Bhatnagar et al. 2006, Namgail et al., 2010, Rawat and Sankar, 2011, Shrotriya, 2015, Khara et al. 2021) include:

- Impact of livestock, mainly due to increasing numbers of Cashmere goats causing forage competition and habitat degradation;
- Depredation and disturbance by feral dogs;
- Small and fragmented populations of ungulates;
- Possible genetic contamination of Wild Yak;
- Poaching reportedly declined and is mainly associated with border guards, but can still threaten small populations.

Recommendations for action:

- Assessment of range areas, habitat use, and population sizes and trends of target species;
- Recovery and maintaining pockets of high-density wild prey populations can immensely facilitate Snow Leopard conservation in multiple-use landscapes (Sharma et al. 2021);
- Determination and implementation of conservation interventions specifically addressing identified threats;
- Transboundary collaboration, exchange of experience and potentially mitigation of barrier effect of border fences.
- Cooperation between nature protection and border security as well as military on wildlife monitoring and conservation.

Site ID: 12 **Name:** Jungarian Alatau **Countries:** China-Kazakhstan

Location:
Administrative:

- China, Xinjiang Uyghur Autonomous Region, Bortala Mongol, Changji Hui and Ili Kazakh Autonomous Prefectures;
- Kazakhstan, Almaty Province.

Geographic area:

- Jungarian Alatau (other spellings Dzhungar, Dzungar, Zhongar), entire mountain area.

Coordinates: N 44.908111°, E 79.868378°

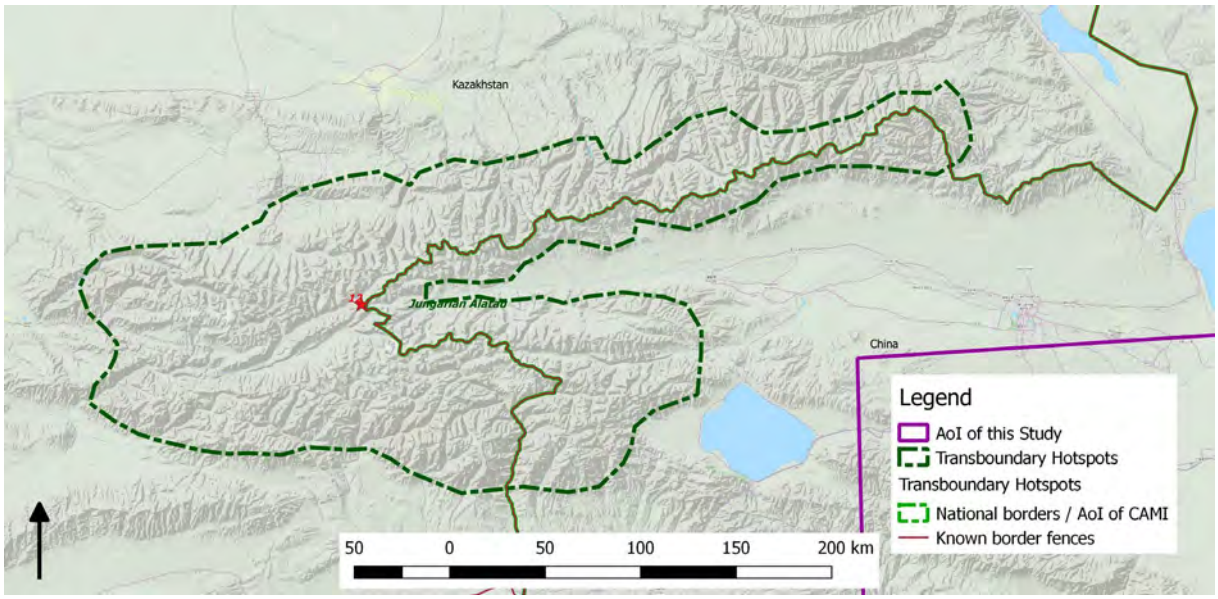


Figure 33: Location map of potential hotspot Jungarian Alatau

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan highlands;
WWF Ecoregion (Olson et al., 2001): Tian Shan montane steppe and meadows, Tian Shan foothill arid steppe;
Ecosystems/habitat types: High mountains, mountain steppe, mountain woodlands and coniferous forests.

Species:

Argali:
Population size: The Argali range indicated in the CAMI atlas for this site is not much linked to obvious physical features. It might in some parts include unsuitable areas, especially in the "possibly extant" areas in China, but also leaves out some suitable areas in Kazakhstan. No population figures could be obtained for the site.
Movements: No documented transboundary movements are known.
Importance of transboundary population: The Jungarian Alatau is considered as main range area of a specific type of Argali, the Littledale Argali, which is, however, not recognized as a separate subspecies but considered as *Ovis ammon karelini* (Damm and Franco, 2014). For the long-term conservation of this population transboundary connectivity would be important to maintain genetic integrity and diversity, to reduce extinction risk of isolated sub-populations and to allow access to seasonally varying habitat.

Snow Leopard:
Population size: Kazakhstan 45-55 (Nyhus et al., 2016), in China Snow Leopard presence is confirmed (Nyhus et al., 2016), but no figures are available for this specific site;
Movements: No documented transboundary movements known. Given the location of the national border at the main ridges such movements are very likely.
Importance of transboundary population: The Jungarian Alatau is an important and at this latitude the only link between the Snow Leopard's southern and northern range area. It is thus of key importance for the connectivity and genetic exchange across the Snow Leopard range and therefore for the global conservation of the species.

Conservation significance:
The area is of high significance for the conservation of Argali, in particular the specific Jungarian population of *Ovis ammon karelini* and as linking element of the southern and northern part of the Snow Leopard range area. The site overlaps with the GSLEP Landscape "Jungar Alatau".

Protected areas status:
China: None?
Kazakhstan: Lepsinskiy *zakaznik*, Verkhnekoksuskiy *zakaznik* and Toktinskiy *zakaznik*, Zhongar-Alatau state national nature park

Barriers for migration:
The CAMI Atlas indicates at least a partial border fence along the national border between China and Kazakhstan. The extent, completeness, exact location, technical features and barrier effect of this fence are unknown. In Soviet time, border fences have often been erected several km away from the actual border, in easier accessible area; thus an unfenced strip along the border is likely. It is unknown if Chinese border authorities have erected their own fence, which in other areas has been the case at the actual border. If this is the case there would be a high likelihood that the area is at least in substantial sections fragmented by at least one border fence.

Other threats:
No specific threat assessment is available for this site. Threats likely occurring include:
- Habitat degradation, mainly be overgrazing (more likely at the areas in China);
- Poaching.

Recommendations for action:
- Assessment of range areas, habitat use, and population sizes and trends of target species;
- Determination and implementation of conservation interventions;
- Transboundary collaboration, exchange of experience and mitigation of barrier effect of border fences.

Site ID: 13 **Name:** Tarbagatay and Saur Ranges **Countries:** China-Kazakhstan

Location:
Administrative:

- China, Xinjiang Uyghur Autonomous Region, Tacheng Prefecture;
- Kazakhstan, Eastern Kazakhstan Province, Zaysan district.

Geographic area:

- Tarbagatay and Saur (other spelling Sair) Ranges, continuous area along the China-Kazakhstan border.

Coordinates: N 47.212407°, E 83.021317°; N 47.100329°, E 85.150187°

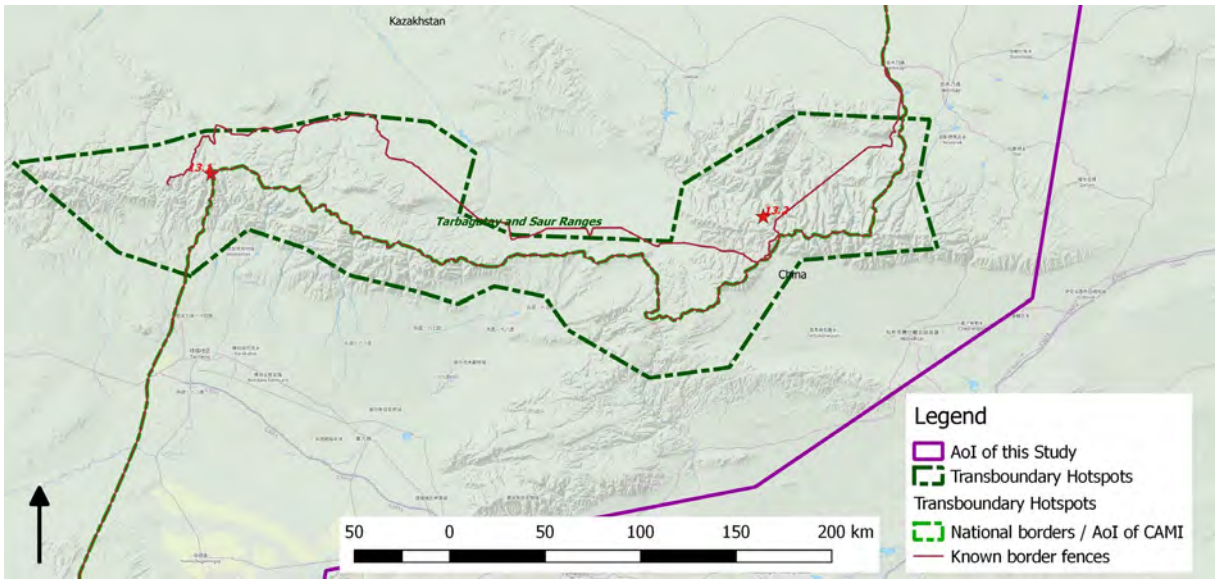


Figure 34: Location map of potential hotspot Tarbagatay and Saur Ranges

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Altai highlands, bordering the Pontian Steppe and the Mongolian-Manchurian Steppe;
WWF Ecoregion (Olson et al., 2001): Altai alpine meadows and tundra, Altai steppe and semi-desert;
Ecosystems/habitat types: Mountain steppe, mountain woodlands and coniferous forests.

Species:

Argali:
Population size: The range area of Argali in the CAMI Atlas includes large areas without Argali. Kazakhstan: Hunting management areas “Naryn” (Tarbagatay) 141 recorded on a surveyed area of 31,500 ha and “Zaysan” (Saur) 279 on an area of 25,670 ha (V. I. Vernadskiy Non-Governmental Ecological Foundation, 2018), numbers in other areas not known; China unknown.
Movements: Seasonal migrations, including spatially segregated habitat use by males and females with young, have been reported by local wildlife managers. Such migrations are heavily impeded by border fences.
Importance of transboundary population: The site is considered as the main range area of a specific type of Argali, the Sair Argali, which is, however, not recognized as a separate subspecies but considered as *Ovis ammon collium* or *O. a. karelini* (Damm and Franco 2014). For the long-term conservation of this population transboundary connectivity would be

important to maintain genetic integrity and diversity, to reduce extinction risk of isolated sub-populations and to allow access to seasonally varying habitat.

Snow Leopard:
Population size: The area is included in the range area map of the species. In Kazakhstan, records of Snow Leopard mainly occur near Muztau peak (3,723 m NN) in Saur Range, but no Snow Leopards have been recorded in Tarbagatay for many years and no information on population size is available for the site (Nyhus et al., 2016). In China, Snow Leopard presence is not mentioned from this site by Nyhus et al. (2016).
Movements: No documented transboundary movements known, but is likely despite border fences because of smaller distances between potential stepping stones in China.
Importance of transboundary population: The site is a linking element or stepping stone connecting the northern and southern range areas of Snow Leopard.

Conservation significance:
The area is of high significance for the conservation of Argali, in particular the specific "Sair" population of *Ovis ammon collium (?)* and as linking element of the southern and northern part of the Snow Leopard range area.

Protected areas status:
China: None?
Kazakhstan: Tarbagatay *zakaznik*, several game management areas, in particular "Naryn" and "Zaysan".

Barriers for migration:
Kazakhstan and China have barbed wired fences, which are barriers to the movement of Argali and other wildlife. The Chinese fence is located directly at the border, at the main watershed of the Tarbagatay range. The Kazakhstani fence, built in the 1970s in Soviet times but still maintained, is located at the bottom of the main slope of Tarbagatay range, about 20 to 25 km north of the actual border. In Kazakhstan a survey of two game management areas (V. I. Vernadskiy Non-Governmental Ecological Foundation, 2018) found most Argali within the fenced border zone, but only few groups and low numbers outside of the fenced zone. The fences seriously hamper connectivity and exchange within the population. Local wildlife managers reported that only high snowdrifts occasionally facilitate crossing of the fences by Argali. For Snow Leopard the fences might be easier to pass.



Figure 35: The border fence in Kazakhstan is an almost total barrier for any wildlife movement. Photo: Michel

Other threats:

- Poaching;
- Habitat degradation and replacement of Argali by increasing livestock numbers.

Recommendations for action:

- Establishment of incentives for Argali conservation and prevention of poaching through regulated hunting, benefiting game area holders and local people;
- Regulation of livestock grazing and involvement of local people in management and sustainable use of Argali;
- Transboundary collaboration for exchange of information, coordinated monitoring and conservation intervention;
- Enhanced permeability of the border fences for Argali and Snow Leopard.

Site ID: 14 **Name:** Khan Tengri Region **Countries:** China-Kazakhstan-Kyrgyzstan

Location:
Administrative:

- China, Xinjiang Uyghur Autonomous Region, Aksu and Ili Kazakh Autonomous Prefectures;
- Kazakhstan, Almaty Province, Raiymbek District;
- Kyrgyzstan, Issyk-Kol Region, Ak-Suu District.

Geographic area:

- Khan Tengri massif in the Tian Shan.

Coordinates: N 42.195660°, E 80.173685°

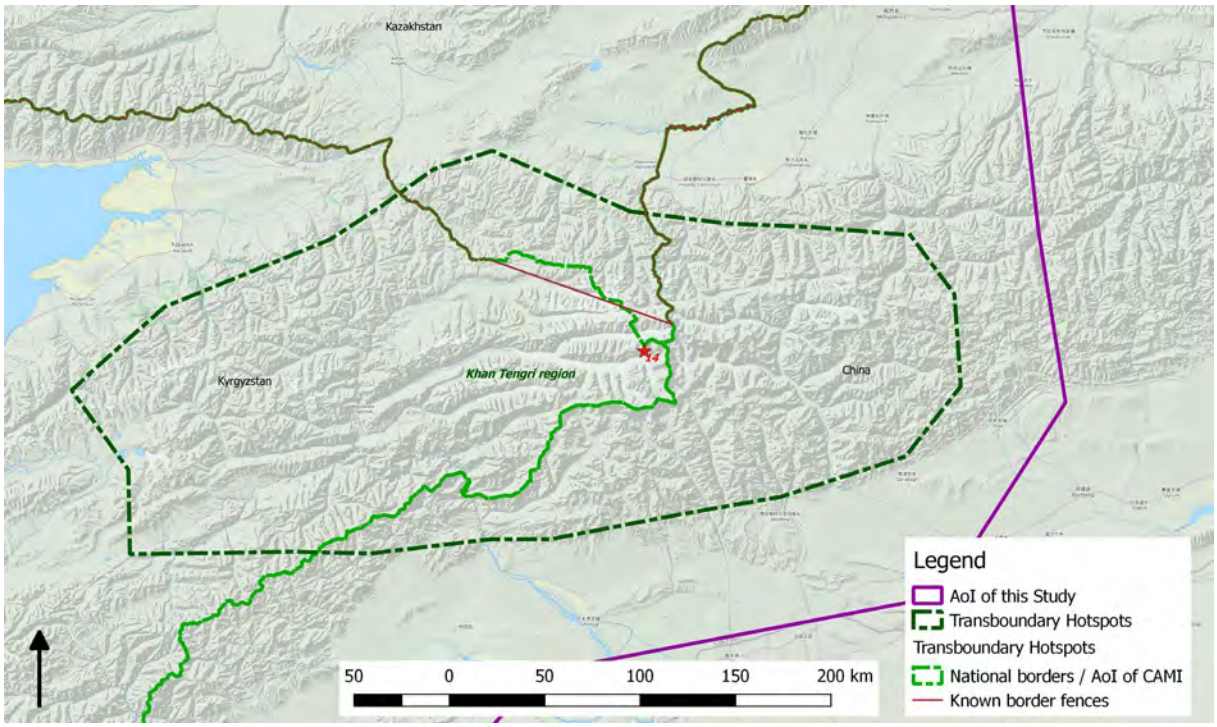


Figure 36: Location map of potential hotspot Khan Tengri region

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Tian Shan montane steppe and meadows, Tian Shan montane conifer forests;
Ecosystems/habitat types: High mountains, mountain steppe, mountain woodlands and coniferous forests.

Species:

Argali:
Population size: The site is part of the range area of *Ovis ammon karelini* and recent observations (e.g. Asykolov pers. comm. 2017, transboundary pilot survey in Kazakhstan and Kyrgyzstan by Snow Leopard Transboundary Initiative (2018)) confirm its presence. A survey in 2010 covering only one valley in the west of the site in Kyrgyzstan yielded records of 147 Argali (Davletbakov and Musaev, 2012).
Movements: Movements between Kazakhstan and Kyrgyzstan have been repeatedly observed, e.g. by Asykulov in 2017. To which extent border fences hamper these movements

is currently unclear, but reportedly (Ismailov pers. comm. 2019) larger areas are unfenced and existing fences are at least partly located at lower elevations, outside of the Argali habitat.
Importance of transboundary population: The Argali at the site are part of a larger transboundary population with China. Connectivity between Kyrgyzstan and Kazakhstan is important for the conservation of Argali in the eastern part of northern Tian Shan. Overall, the Argali population in Kyrgyzstan, Issyk-Kol and Naryn Provinces, is stable and only partly relies on transboundary habitat.

Snow Leopard:
Population size: As result of a transboundary pilot survey in Kazakhstan and Kyrgyzstan by Snow Leopard Transboundary Initiative (2018) ten Snow Leopards (incl. female with two cubs) were guessed to be present in the Kazakhstan part and at least four or five (incl. female with two sub-adults) in the Kyrgyzstan part. These results are not conclusive and likely the total number is higher, but they indicate the presence of a reproducing population.
Movements: No documented transboundary movements have been recorded, but they can be assumed given the geography of the site.
Importance of transboundary population: Similarly, as sites 12 and 13, this site represents one of the bottleneck areas of key importance for connectivity between the northern and southern range areas of the Snow Leopard. The evidence of several reproducing females underlines the importance of this transboundary population.

Conservation significance:
The area is of high conservation significance, particularly for Snow Leopard, but also for Argali. The remoteness, integrity and size of little or not transformed high mountain ecosystems contributes to this. The site overlaps with the GSLEP Landscapes “Northern Tian Shan” and “Sarychat”.

Protected areas status:
Kazakhstan: Assigned game management area (hunting ground)
Kyrgyzstan: Khan Tengri NP (planned with 275,800 ha)

Barriers for migration:
The border fence indicated in the CAMI Atlas exactly along the border of Kazakhstan seems to be inaccurate. The fence drawn as straight line at this location in the site map above is only indicative. A new border fence is reportedly planned between China and Kyrgyzstan (Rosen, pers. comm. 2019). According to Ismailov (pers. comm. 2019) border fences from China towards Kazakhstan and Kyrgyzstan have been erected, except in the highest parts of the Khan Tengri massif. The Soviet period border fence is located at about 5 – 10 km distance from the border form Kazakhstan and Kyrgyzstan (?) towards China. It is still maintained in Kazakhstan, but there dismantling has been considered. A new border fence (since about 2010) from Kazakhstan towards Kyrgyzstan seems to exist in some locations, but the exact status is unknown.

Other threats:
- Poaching in easier accessible areas;
- Potentially future expansion of grazing into currently unused areas, causing competition, habitat degradation and disturbance, in particular by herders’ dogs and if associated with poaching.

Existing or planned transboundary activities:
- Snow Leopard Transboundary Initiative (NABU, Marwell)

Recommendations for action:
- “Belt and Road Initiative”: Assessment of potential impact and political intervention for avoidance, mitigation and compensation of impact.

- Transboundary assessments and monitoring of wildlife populations and habitats;
- If necessary, mitigation of barrier effect of existing and planned border fences, work with border guards for involvement in conservation;
- Prevention of expansion of grazing areas;
- Involvement of local people in management and sustainable use of Argali where appropriate;
- Addressing potential adverse impact of tourism development.

Site ID: 15 **Name:** Altai **Countries:** China-Kazakhstan-Mongolia-Russian Federation

Location:
Administrative:

- China, Xinjiang Uyghur Autonomous Region, Altay Prefecture;
- Kazakhstan, Eastern Kazakhstan Province, Raiymbek District;
- Mongolia, Uvs and Bayan Ulgii Aimags;
- Russian Federation, Altay Republic, Kosh-Agach District, Tuva Republic, Buryatiya.

Geographic area:

- Central part and SE part of Altai Mountains, including among others Saylyugem Range, Chikhacheva, Tsagaanshuvuut;
- Specific important areas to be determined!

Coordinates: N 49.006372°, E 87.394649°; N 47.681114°, E 89.849796°; Specific locations recommended by Poyarkov (pers. comm. 2019): N 49.492°, E 88.551° (Saylyugem); N 49.740 E 89.698° (Chikhacheva); N 50.326°, E 90.021° (Tsagaanshuvuut);

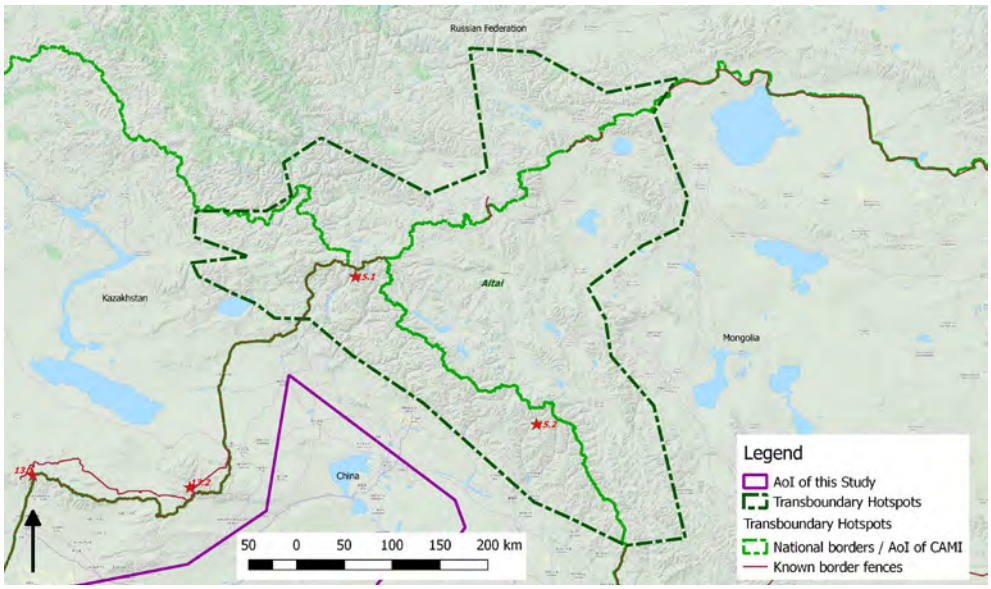


Figure 37: Location map of potential hotspot Altai

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Altai Highlands;
WWF Ecoregion (Olson et al., 2001): Altai alpine meadows and tundra, Altai montane forest and forest steppe, Sayan alpine meadows and tundra, Great lakes basin desert steppe;
Ecosystems/habitat types: High mountains, mountain steppe, mountain woodlands and coniferous forests, semi-desert.

Species:

Argali:
Population size: In Russian Federation WWF (2017) recorded 1,236 Argali, out of these 945 animals on the Sailyugem Ridge at the border with Mongolia. Harris et al. (2010) estimated in Mongolia 2,311 Argali in Khovd and 2,123 in Bayan Ulgii Aimags, most of these within the approximate boundaries of the site. In Kazakhstan numbers are very low (declining from 50-55 in 2005 to 10 in 2011-2013 (CMS, 2014). No Argali figures are known from the Chinese

part of the site. Overall numbers of Argali within the site might be in the range of 4,000-5,000 animals.
Movements: Argali move regularly between Mongolia and Russian Federation. The drivers of movement are seasonality of forage availability, driven by vegetation phenology, snow cover and livestock grazing (WWF, 2017, Paltsyn et al., 2011).
Importance of transboundary population: The main range areas of Altai Argali *Ovis ammon ammon* are located within the site. The share of the population occurring immediately close to the national border between Mongolia and Russian Federation and potentially being transboundary has been assessed in the range of 1,100-1,700 animals (Paltsyn et al., 2011). Access to habitats of seasonally varying quality across the international border is essential for the conservation of these Argali. Actual transboundary movements might be impeded by border fences in key areas (Chimmedorj et al., 2013).

Snow Leopard:
Population size (Nyhus et al., 2016): In the Kazakhstan part the number of Snow Leopard unlikely exceeds 10 individuals. In Russian Federation's Altay-Sayan region the population is likely 70-90 animals. The Mongolian Altai is considered a high-density area. From the Altai in China, Snow Leopard occurrence is also reported.
Movements: No documented transboundary movements are known, but such movements are highly likely.
Importance of transboundary population: The site and its Snow Leopard population make up a substantial part of the Snow Leopard's northern range area. As the site is shared between four countries, the entire Snow Leopard population can be considered transboundary. While permanent occurrence might be patchy, as suggested by the map provided for Mongolia in Nyhus et al. (2016), survival of the Snow Leopard in the region depends on connectivity and opportunities of dispersal and recolonization. Lukarevskiy (2015 and pers. comm.) expressed concerns that in some parts of the range area in the Russian Altai-Sayan very few or no reproducing females survived and only dispersing males occur there, thus questioning the mid-term perspectives of these range area patches without augmentation.

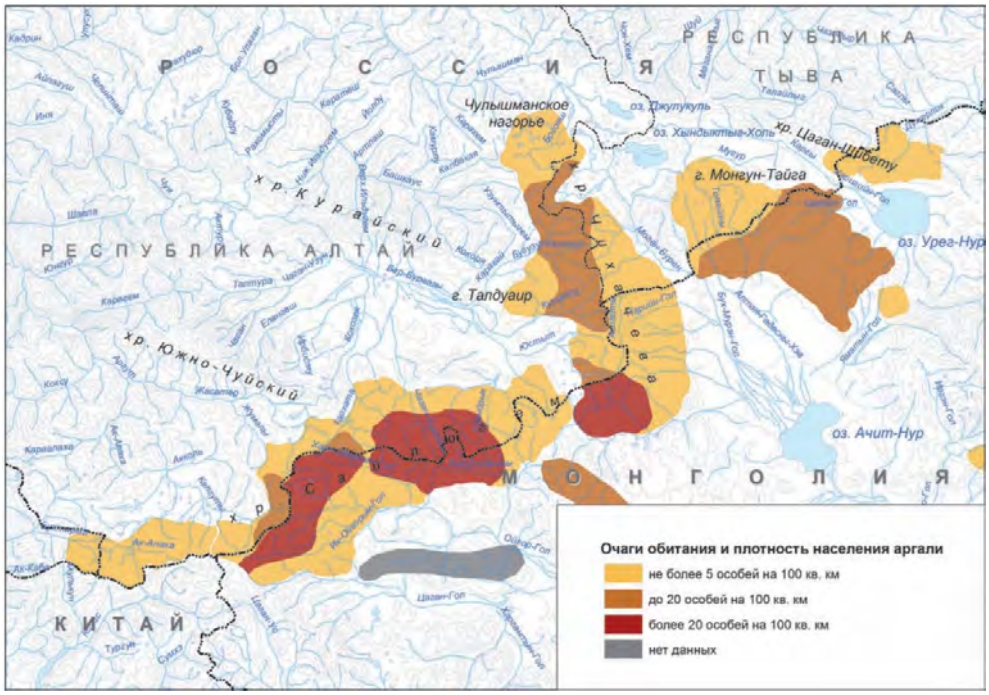


Figure 38: Density of Argali in the border region of Mongolia and Russian Federation; Source: Paltsyn et al., 2011. (Legend from top to down: no more than 5/100 km², up to 20/100 km², >20/100 km², no data)

Conservation significance:
The entire Altai-Sayan region is of high conservation significance for the two target species and in general terms of biodiversity and ecosystems. In particular, Saylyugem Range with its national park is of importance for both species, Argali and Snow Leopard (Poyarkov, pers. com. 2019). The exact areas of relevance as transboundary hotspot under CAMI have to be determined in more detail and may require expansion and modification.

Protected areas status:
China: Khanas Protected Area
Kazakhstan: Katon-Karagay State National Natural Park;
Mongolia: Tsagaan Shuvuut and Siilkhem Nuruu SPAs, Sailyugem NP, Altai-Tavyn-Bogd NP, Gulzat Local Protected Area;
Russian Federation: Saylyugem National Park, Altai SPA and section "Mongun-Tayga" of Ubsungurskaya Kotlovina SPA, Kosh-Agach, protected area "Zona Pokoya Ukok" (some of the areas recognized as UNESCO World Heritage Site "Golden Mountains of Altai")

Barriers for migration:
The area has at least in parts border fences, which negatively impact on Argali through interruption of seasonal migrations, hindering access to critical habitat, isolation and direct mortality. Poyarkov (pers. comm. 2019) mentions that border fences are currently mainly built by the Mongolian border authorities.
Most of the border fence between Altal Tovon Bogd and Uvs Lake is of unknown status. For the CAMI Atlas Paltsyn has mapped several segments, Chimeddorj et al. (2013) suggest at least partial fencing in some areas, and Badamjav has provided the coordinates of several fences. One of the impermeable border fences of about 50 km length has been erected by Mongolian border guards in 2000 along the Ak-Adyr range and the Mongun-Tayga massif. This fence seriously hinders the movement of Argali between Mongolia and Tuva and caused a decline of Argali there. Deaths of Argali, which entangled in the border fence, have been reported (Paltsyn et al., 2011).
A further barrier for migration and cause of fragmentation might become the gas pipeline from Russian Federation to China (CAMI Atlas), which is (or was) planned to cross Mongolia as well (Paltsyn et al., 2011).

Other threats:
- Poaching of Argali and Snow Leopard;
- Snow Leopard as occasional bycatch of illegal Musk Deer snaring (Poyarkov, pers, comm. 2019);
- Over-hunting of ungulates affecting Snow Leopard (Poyarkov, pers. comm. 2019);
- Increase in livestock numbers and resulting habitat degradation, forage competition with Argali and replacement of wild ungulates, human-wildlife conflict (Snow Leopard) and potentially disease transmission;
- Expansion of mining activities, potential industrial development at the Chikhacheva Range.

Existing or planned transboundary activities:
- Altai initiative between Mongolia/Russian Federation/Kazakhstan (considerations of Transboundary Biosphere Reserve).

Recommendations for action:
- Intensified transboundary collaboration;
- Implementation of the conservation measures recommended in the Strategy for the conservation of Snow Leopard in Russian Federation (Istomov et al., 2015).
- Establishment of section of SPA Ubsungurskaya Dolina at the Sangilen Range in Russian Federation (Poyarkov, pers. comm. 2019);

- Removal or mitigation of border fences in critical areas;
- Regulation of livestock grazing;
- Increase of anti-poaching efforts;
- Revision of Argali hunting systems or introducing hunting schemes, which ensure effective involvement of and direct benefits for local communities and conservation.

Site ID: 16 **Name:** Inner Tian Shan **Countries:** China-Kyrgyzstan

Location:
Administrative:

- China, Xinjiang Uyghur Autonomous Region, Aksu Prefecture, Kizilsu Kyrgyz Autonomous Prefecture;
- Kyrgyzstan, Issyk-Kol Province, Aksuu District and Naryn Province, Jeti-Oguz District.

Geographic area:

- Entire mountain range along the border between China and Kyrgyzstan.

Coordinates: N 41.092293°, E 77.839644°

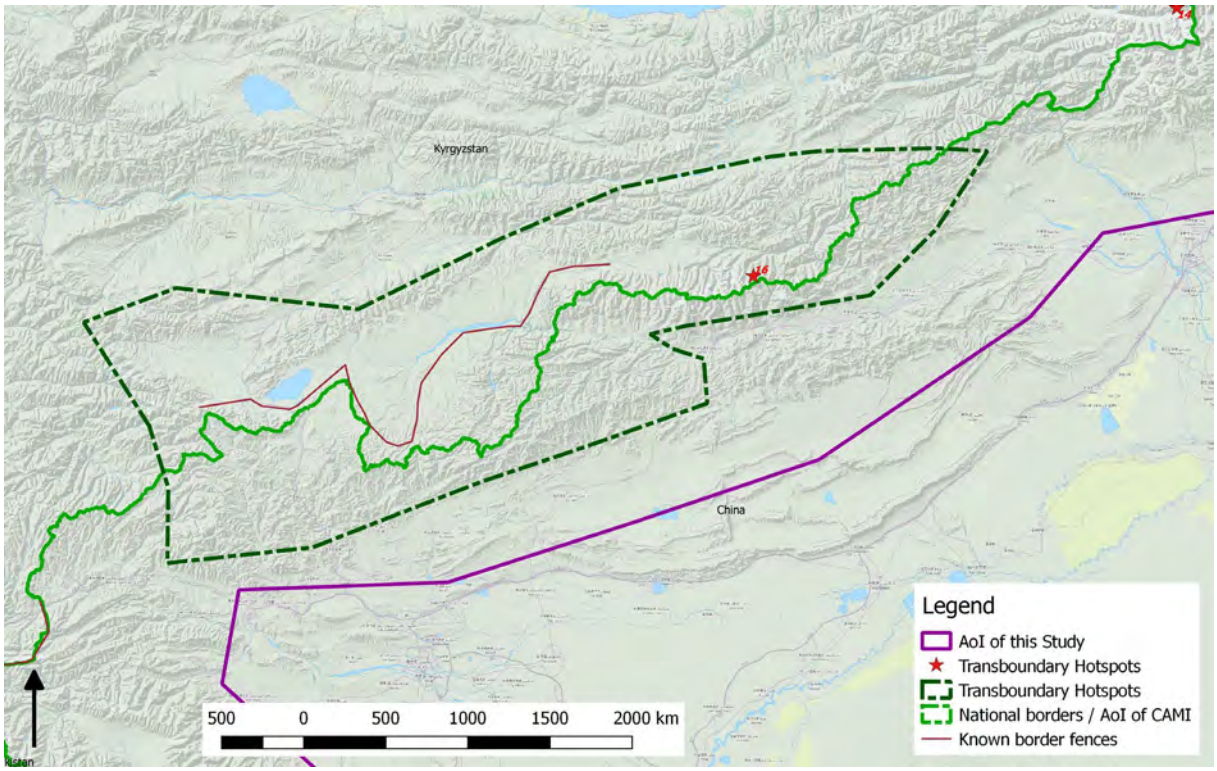


Figure 39: Location map of potential hotspot Inner Tian Shan

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Tian Shan montane steppe and meadows;
Ecosystems/habitat types: High mountains, mountain steppe, mountain woodlands and semi-desert.

Species:

Argali:
Population size: In Kyrgyzstan in fall 2010 close to 12,000 Argali have been recorded (Davletbakov and Musaev, 2012); China unknown.
Movements: Transboundary movements of Argali have been observed and occur regularly (Davletbakov, pers. comm. 2010-2016), as far as not hampered by more recently built border fences from the Chinese side.
Importance of transboundary population: In 2010 approximately 50% of the Argali recorded in the area of the site were recorded in the immediate border area. The overall sub-population in the region is one of the largest single Argali sub-populations. It has been often attributed to

Ovis ammon polii, but morphological differences and considerations of geographic barriers and linkages suggest that it might rather belong to *Ovis ammon karelini*. It would therefore be the largest compact population of this subspecies or represent an intermediate form.

Snow Leopard:
Population size: Snow Leopard occurs in the area, but no specific information on population size is available. Kachel (pers. comm. 2013) in one large hunting concession in the Kara-Say Syrte found evidence of very few Snow Leopards only, despite abundant prey species.
Movements: A study using collars has been conducted by Kachel (pers. comm. 2013-2018) outside of the site. Results are not yet published. No documented transboundary movements known as so far no collaring took place in the area. Movements are however likely.
Importance of transboundary population: The Snow Leopards of the area are part of a larger connected population in the Tian Shan. As the area has a large wild ungulate population consisting of Argali and Asiatic Ibex it provides a good prey base. Because of comparably low number of livestock herds conflict potential is rather low. Also due to the species' low density and large spatial requirements the area is of high importance.

Conservation significance:
The entire site is range area of both species and of high conservation significance for these species and for the mountain ecosystems of the Inner Tian Shan. The site partly overlaps with the GSLEP Landscape "Sarychat".

Protected areas status:
China: None?
Kyrgyzstan: Part of Issyk-Kol Biosphere Reserve, buffer zone of Sarychat-Ertash SPA, several hunting concessions.

Barriers for migration:
A Soviet times border fence exists in key sections in Kyrgyzstan. Due to its location several kilometers away from the actual border there is a comparably undisturbed border zone. However, the fence, despite having some gaps, is a barrier for Argali migrations and causes fragmentation of population and habitat. There is no information available about a potential new border fence from the Chinese side. As such fence has been built or is under construction in other areas along the border of China with former Soviet republics, there is reason for concern that such fence is planned, under construction or already built.

Other threats:
- Poaching of the target species (Kachel, pers. comm. 2013, found several leg-hold traps at sites typical for Snow Leopard presence);
- Intensive livestock grazing at the Chinese section and potentially expansion of livestock grazing and increase in livestock numbers in areas in Kyrgyzstan, which are currently unused or grazed in low intensity;
- Potentially development of mining activities.

Recommendations for action:
- "Belt and Road Initiative": Assessment of potential impact and political intervention for avoidance, mitigation and compensation of impact.
- Assessment of current state and planned development of the border fences and their impact;
- Development of removal or mitigation measures at border fences;
- Prevention of poaching, in particular through community involvement in and benefit sharing from regulated hunting of Argali and Asiatic Ibex;
- Enforcement of ban of leg-hold traps in Kyrgyzstan, which are sometimes set under the pretext of Wolf control;

- Regulation of grazing and establishment of seasonal and permanent grazing exclusion zones, control of dogs kept by herders (herd protection dogs and hunting dogs).

Site ID: 17 **Name:** South Gobi **Countries:** China-Mongolia

Location:
Administrative:

- China, Inner Mongolia Autonomous Region, Bayannur, Baotou, Ulanqab and Xilingol Prefectures;
- Mongolia, Ömnogovi and Dornogovi Aimags.

Geographic area:

- Southern edges of Gobi Desert and Yin Mountains. There might be possibly several separate sections.

Coordinates: N 42.163084°, E 106.423024°

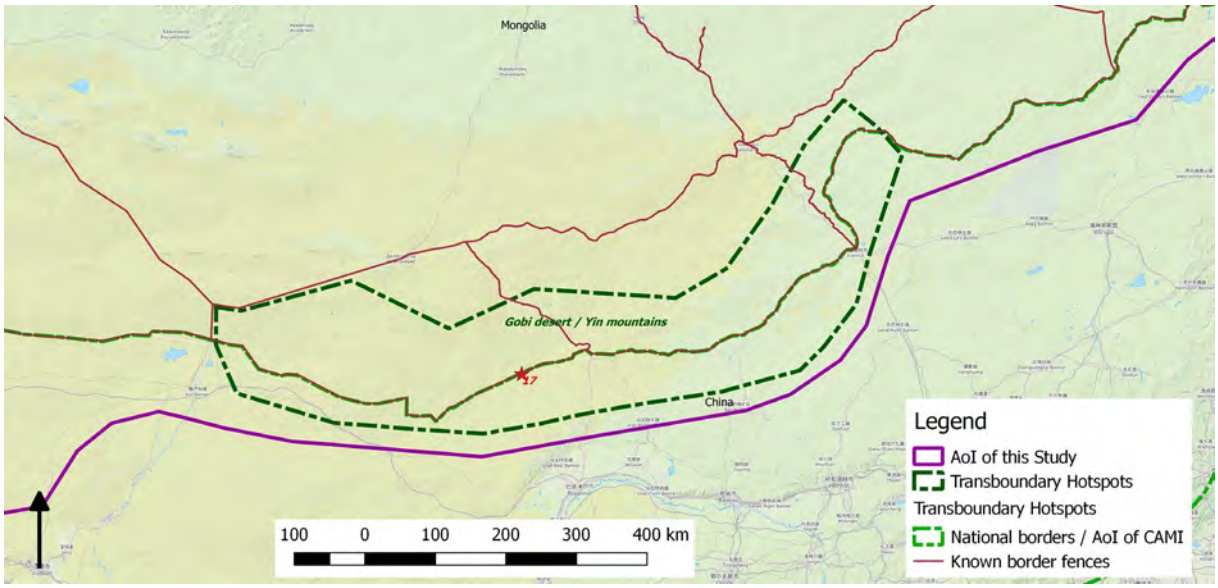


Figure 40: Location map of potential hotspot South Gobi

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Taklamakan-Gobi Desert;
WWF Ecoregion (Olson et al., 2001): Alashan plateau semi-desert, Eastern Gobi Desert steppe;
Ecosystems/habitat types: Desert, semi-desert and desert-steppe, plains, dunes and mountainous areas.

Species:

Goitered Gazelle:
Population size: The site is part of the larger range area of Goitered Gazelle in the Gobi Desert of Mongolia, which supports the world's largest population of the species with an estimate of 28,462 individuals in 2012-2015 (Buuveibataar, 2017). Presence was confirmed using camera traps by Augugliaro et al. (2019) in Small Gobi A SPA, but not in unprotected areas north of it.
Movements: No documented transboundary movements are known and they are likely hindered by border fences. China is not indicated as part of the range area of the species in the CAMI Atlas.
Importance of transboundary population: The population is currently not known as being transboundary. The CAMI Atlas shows the Mongolian part of the site as range area, but not the part in China. If the species still occurs as well at the China side, the population is likely

functionally separated. The population of the site is large and of global importance, but its conservation status is independent of the potential transboundary character.

Asiatic Wild Ass:

Population size: The site is part of the larger Range area of Khulan in the Gobi Desert of Mongolia, which supports the world's largest population of the species with an estimate of 35,899 individuals in 2012-2015, or 75% of the global population (Buuveibataar, 2017). Presence was confirmed using camera traps by Augugliaro et al. (2019) in Small Gobi A SPA, but not in unprotected areas north of it.

Movements: No documented transboundary movements are known and they are prevented by border fences. A small section in China is indicated as part of the range area of the species in the CAMI Atlas.

Importance of transboundary population: The population is currently not transboundary. If the species still occurs as well at the China side, the population is functionally separated. The population of the site is large and of global importance, but its conservation status is independent of the potential transboundary character. However, survival of the species in the China part of the site will depend on transboundary connectivity.

Argali:

Population size: The national ungulate survey in 2009 yielded an estimate of 2,913 Argali in Dornogovi Aimag and 2,400 in Ömnogovi Aimag (Harris et al., 2010), which are both partly included in the site. As of 2009, Argali within Inner Mongolia (China) appear to be restricted to extremely small populations in three areas (Harris et al., 2009). Harris et al (2019) found that Argali had disappeared from several areas and small numbers of Argali persist in the Yabrai (Yubulai) Shan range, the Hada Shan area and the Erenuo'ersumu region of Sunitezuo Banner. Presence was confirmed with camera traps by Augugliaro et al. (2019) in Small Gobi A SPA, as well as in unprotected areas north of it (lower relative abundance than in the SPA).

Movements: A border fence (Figure 41) can hamper movements, but Harris et al. (2009) found that locally, Argali were able to cross the border by jumping over the fence. Whether this is still possible, or whether the fence has been enforced since then, is unknown.

Importance of transboundary population: In Mongolia, the conservation status of Argali is secure. The future of Argali within Inner Mongolia (China) appears tenuous, most likely dependent on the ability of dispersing individuals from Mongolia to supplement existing groups or colonize new areas.



Figure 41: Seven Argali in mid-November 2008 near the border with Mongolia, behind the border fence. Signs from Argali were also found on the Inner Mongolian side of the fence. Photo: Bi Junhuai, from Harris et al. (2009).

Mongolian Gazelle (Dzeren):
Population size: The area is part of the species range area in Mongolia and the range area shown in the CAMI Atlas appears in the eastern part of the site to reach into China. No site-specific population figures are available.
Movements: Mongolian Gazelles are seasonally migrating, but movements do not appear to follow a specific pattern and do not show fidelity to any given range. Cross-border migrations in the area are interrupted by the Chinese border fence.
Importance of transboundary population: There is currently no information available on transboundary movements of any substantial parts of the population. Any population in China – if still extant – would likely depend on at least occasional immigration from Mongolia.

Snow Leopard:
Population size: Presence of the species recorded for the first time in Small Gobi A SPA in 2019(?) by camera traps (Augugliaro et al., 2019).
Movements: No information available.
Importance of transboundary population: Permanent population highly unlikely. Dispersal movements might be transboundary.

Conservation significance:
The site is of high significance for the conservation of Goitered Gazelle and Khulan, but is also important for Argali, represented by the subspecies *O.a. darwini*, and potentially for Dzeren. However, currently the fenced border with China is more or less the southern boundary of the range areas of these species and – if at all existing – remnant populations of the three species appear to be very small.

Protected areas status:
China: None (?);
Mongolia: Small Gobi A SPA (Auguglario et al., 2019), four protected areas (Buuveibataar et al., 2016), but none exclude livestock grazing.

Barriers for migration:
There are two impermeable linear infrastructures constructed in the 1950s, namely the fenced border with China, and the Trans Mongolian Railroad corridor (fenced on both sides). In the west there are two parallel paved roads that connect major mines with the Chinese border crossing (Buuveibataar et al., 2017).

Other threats:
- Forage competition with livestock, habitat degradation and potentially disease transmission caused by livestock. The Southern Gobi is the centre of the Cashmere goat industry in Mongolia (Berger et al., 2013).
- Mining and related infrastructure development.
- Poaching.

Recommendations for action:
- Fence removal proposed at the railroad crossing the site in the east as well as further to the north. Fences between Zainshand and Zamyn-Uud near the border with China should be modified or removed, and only in areas with human settlements fences should remain to prevent accidents with livestock (Olson, pers. comm. 2019).
- Avoiding or mitigating fencing along the newly built railroads Tavantolgoi -Gahuun Sukhait (fully fenced), TT-Zuunbayan, Zuunbayan-Khangi;
- Regulation of grazing, veterinary measures to prevent disease transmission and the creation, and/or expansion of livestock exclusion zones.
- Coordination of joint research and monitoring;
- Coordination of temporary opening of the border fence between China and Mongolia
- Exclution of non-military human use from the direct border zones;
- Mapping available water sources and suitable habitat for CAMI species in Mongolia and China;
- Enhjanced communication and wildlife related data sharing between China and Mongolia, starting from the border crossing points;
- Involving border guards in monitoring and law enforcement activities
- Nomination and listing of a transnational UNESCO World Heritage site (ongoing)
- Mapping and monitoring water bodies in the border area.

Site ID: 18 **Name:** Trans-Altai Gobi **Countries:** China-Mongolia

Location:
Administrative:

- China, Gansu Province, Kumul, Jiayuguan and Jiuquan Prefectures;
- Mongolia, Govi-Altai and Bayanhongor Aimags.

Geographic area:

- Mongolian Trans-Altai Gobi Desert, largely identical with Great Gobi A SPA.

Coordinates: N 42.683870°, E 96.422978°

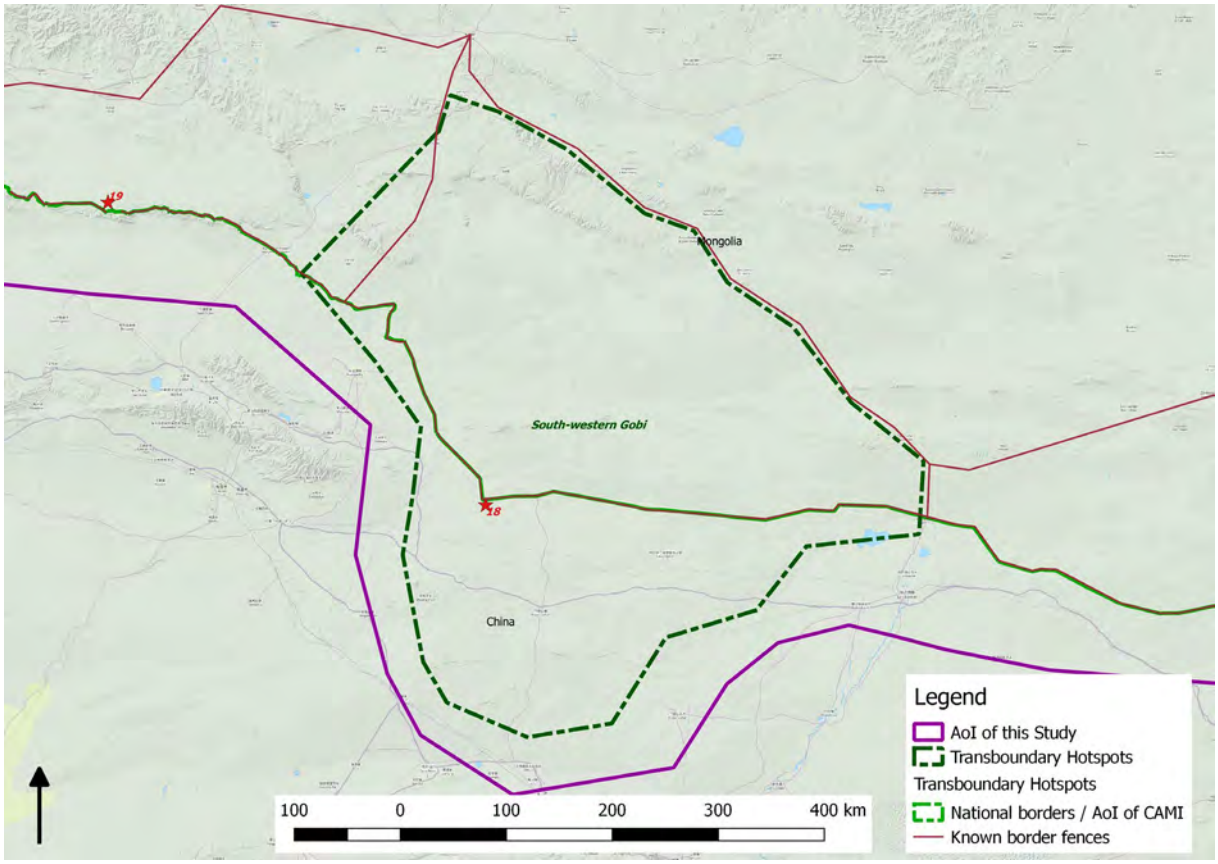


Figure 42: Location map of potential hotspot Trans-Altai Gobi

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Taklamakan-Gobi Desert;
WWF Ecoregion (Olson et al., 2001): Alashan plateau semi-desert, Jungar Basin semi-desert and Altai montane forest and forest steppe;
Ecosystems/habitat types: Desert and semi-desert, small areas with steppe and woodland.

Species:
The CAMI Atlas (CMS, 2019) shows range area overlaps between species of plain semi-desert (Wild Camel, Asiatic Wild Ass, Goitered Gazelle, Gobi Bear) and species of mountainous areas (Argali and Snow Leopard). This overlap is less real habitat sharing than an issue of the resolution of the range areas layers.

Wild Camel:
Population size: Population estimates for Wild Camels vary widely and were determined using several different methods, thus precluding direct comparisons to assess demographic trends.

Estimates for Mongolia, i.e. for this site, vary between 350 and 2,000 (Adiya, 2012). Several hundred Wild Camels may exist in China, but during one survey, Adiya and Dovchindorj (2006) observed only 10 Wild Camels in the Arjinshan Mountain and Gumuago Desert in China (Adiya, 2012).
Movements: Wild Camels are highly mobile and roam within large areas. The border fence is an obstacle to transboundary movements.
Importance of transboundary population: The population of the site hosts one of only three populations of wild camel. This is the only potentially transboundary and probably the largest population of the species.

Asiatic Wild Ass:
Population size: 1,500 in Trans-Altai Gobi of Mongolia (Kaczensky et al., 2015b). Numbers in adjacent China are not known.
Movements: Generally Wild Asses are highly mobile and regularly move long distances in search of water and forage. Kaczensky et al. (2011) found in the area individual home ranges of collared Khulan of 14,695-16,907 km². With the upgrading of the fence along the international border in the 1980s and 1990s, population exchange between Mongolia and China has likely ceased or at least became minimal. Consequently, the Chinese populations should be regarded as separate from Mongolia. (Kaczensky et al., 2015b);
Importance of transboundary population: The population is currently not transboundary. The conservation status in Mongolia is independent of the potential transboundary character. However, survival of the species in the China part of the site will depend on transboundary connectivity.

Goitered Gazelle:
Population size: The site is part of the larger range area of the species in southern Mongolia. No site-specific information is available.
Movements: No documented transboundary movements known. Regular movements are hindered by the border fence.
Importance of transboundary population: There is currently no functionally transboundary population. The conservation status in Mongolia is independent of the potential transboundary character. However, survival of the species in the China part of the site will depend on transboundary connectivity.

Argali:
Population size: The 2009 mountain ungulate survey of Mongolia yielded estimates of approximately 2,000 Argali for the two aimags (Harris et al., 2010). The site covers only a small portion of the Argali habitat of these aimags and so the Argali numbers are much lower. In China Argali range area in the site is not immediately located at the border and numbers are unknown.
Movements: No movement data are known. The border fence and distance of range area in China from the border make transboundary movements unlikely.
Importance of transboundary population: The population is currently not transboundary. The conservation status in both countries is independent of the potential transboundary character. Improved connectivity would positively influence the conservation status and improve the genetic diversity of small Argali groups and increase chances of recolonization of sites where Argali is extinct.

Snow Leopard:
Population size: The Snow Leopard occurs in the site in Mongolia and probably in an area located to the west in China. No population numbers are known.
Movements: No documented transboundary movements known. Border fences and habitat characteristics limit transboundary movements.
Importance of transboundary population: Transboundary character of the population not confirmed.

Gobi Bear:
Population size: The Gobi Bear currently occurs only in the site in Mongolia, but may irregularly occur also in China. The estimated population size is in the range of 20-40 individuals.
Movements: One transboundary movement of a GPS-collared bear was registered, but the regularity of such movements is not known. Border fences and habitat characteristics may limit transboundary movements.
Importance of transboundary population: While the transboundary character of the population is not confirmed, its location close to the border provides the potential of current or future transboundary occurrence. The population is of utmost conservation importance due to its unique ecological features. Given the small population size and its isolation from other Brown Bear populations, any transboundary occurrence would deserve special attention.

Conservation significance:
The site is of global significance, mainly because of Wild Camel and Gobi Bear. The Wild Camel survives only in one population in the Mongolian Trans-Altai Gobi Desert (this site) and in three groups in China, namely a small area of the Taklamakan Desert, the Gashun Gobi in the north of Lop Nur and Arjin Mountain. (Adiya et al., 2012) The occurrence of Gobi Bear contributes to the global significance. The site includes the only known range area of this unique Brown Bear population. The area is further important for the conservation of Wild Ass, Goitered Gazelle and Argali as well as Snow Leopard.

Protected areas status:
Mongolia: Great Gobi A SPA

Barriers for migration:
The border fence from China is the largest and most significant barrier. Highways and railways are among the more common movement barriers and became prominent in the north western China in Gansu and Xinjiang provinces. In particular, the Silk Road and later the Gansu-Xinjiang highway and the Lanzhou-Xinjiang railway have separated the Lop Nur Lake region from the Altai-Gobi Desert. In addition, a green corridor from Weili to Ruoqiang, the Tarim River and Lop Nur Lake has separated Camel populations in the Taklamakan Desert from populations in the Gashun Gobi Desert and the northern piedmont of Arjin Mountain. Accordingly, this highly endangered animal nowadays faces the disadvantaged situation of being dispersed in at least three isolated populations. A mining area in China near the border with Mongolia forms one of the biggest barriers in North-western China. (Adiya et al., 2012; Adiya, pers. comm. 2019)

Other threats:
- Livestock – The Great Gobi A SPA is normally not allowed to be grazed by livestock, but under exceptional circumstances grazing is permitted and causes forage and water competition and disturbance keeping wildlife away from essential resources;
- Hybridizing of wild and domestic camels from the buffer zone and during temporary grazing (Wild Camel bulls taking domestic females in their harems);
- Poaching by local people and border guards (reportedly effectively prevented by Great Gobi A SPA (Adiya et al., 2012));
- Illegal and legal (in China) mining;
- Drying up of water sources.

Recommendations for action:
- Continued collaboration between China and Mongolia. Perhaps the most important tasks are increasing awareness of cross-boundary issues and improving communication between agency personnel, biologists, and conservationists working on Wild Camel conservation in China and Mongolia. Additional joint meetings on camel

conservation would facilitate this process, as would joint research projects. Addressing border issues may require involving military border guards and foreign affairs officers.

- Specific measures should include:
    - Mapping and monitoring of the waterbodies in the border area;
    - Joint monitoring and observation of wildlife movement along the border in China and Mongolia, with continuous monitoring by a camera trapping study along the border in Mongolian side and, if possible, in Chinese side in the near future;
    - Establishing of a wildlife movement corridor across the border fences based on joint research study between Mongolia and Chinese researchers;
    - Stopping the operation of the mining site near border in China.
- Regulation of grazing and livestock in critical areas of the buffer zone at the boundaries of Great Gobi A SPA.
- Nomination of a transnational UNESCO World Heritage Site (ongoing).
- Exploring possibility of transboundary conservation area Great Gobi A SPA and Anxi Extreme Arid Desert ANR.

Site ID: 19 **Name:** Jungarian Gobi **Countries:** China-Mongolia

Location:
Administrative:

- China, Xinjiang Uyghur Autonomous Region, Kumul and Changji Hui Autonomous Prefecture;
- Mongolia, Khovd Aimag.

Geographic area:

- Western (Jungarian) Gobi Desert, in Mongolia largely identical with Great Gobi B SPA.

Coordinates: N 45.087319°, E 92.261473°

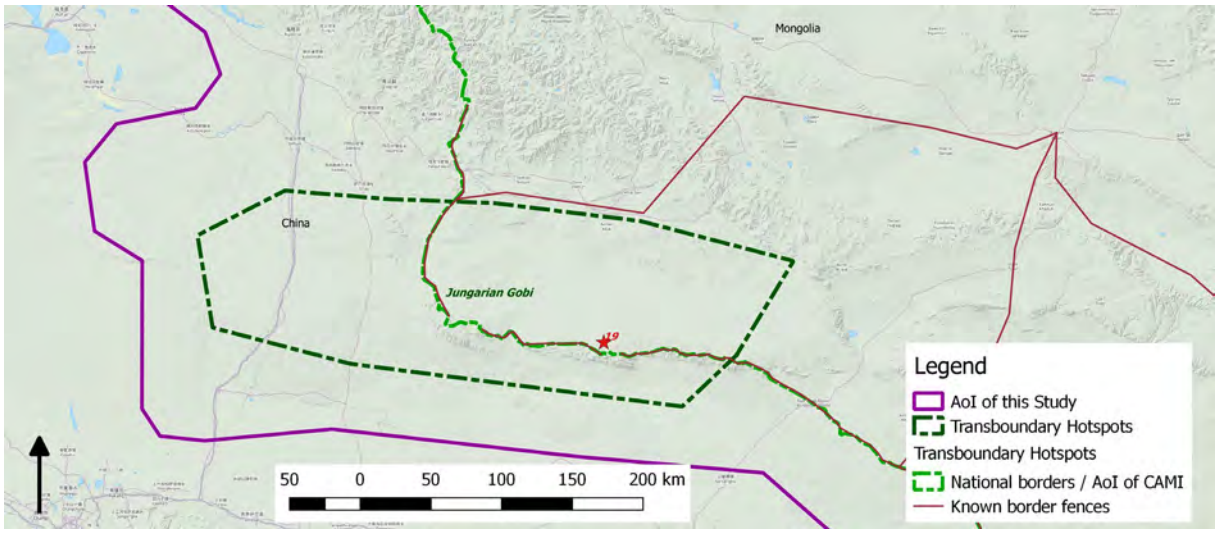


Figure 43: Location map of potential hotspot Jungarian Gobi

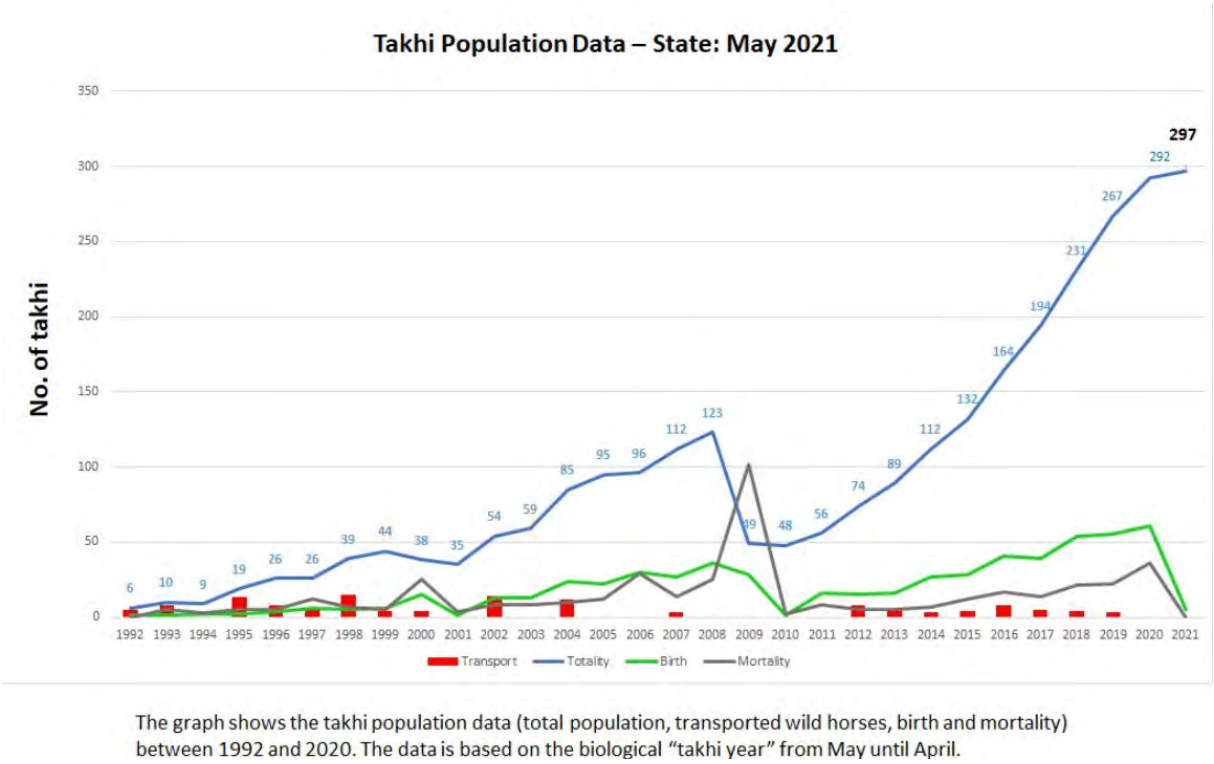
Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Taklamakan-Gobi Desert;
WWF Ecoregion (Olson et al., 2001): Jungar Basin semi-desert;
Ecosystems/habitat types: Desert and semi-desert, small areas with steppe.

Species:
The CAMI Atlas (CMS Secretariat, 2019) shows range area overlaps between species of plain semi-desert (Wild Camel, Asiatic Wild Ass, Goitered Gazelle) and species of mountainous areas (Argali and Snow Leopard). This overlap is less real habitat sharing than an issue of the resolution of the range areas layers.

Przewalski's Horse or Takhi:
Population size: The site hosts the largest free roaming population of Przewalski's Horse. End 2017 there were 200 individuals (Burnik Šturm et al., 2017). In October 2020, 320 Takhi lived in the Great Gobi B, 56 of them were foals (International Takhi Group, website[5]). Since 2001, in China, horses have been released into the nearby Kalamaili Nature Reserve (KNR), which had a population of 99 in 2012 and 121 in 2013, part of which are semiwild and are returned to the acclimatization pen during the winter (King et al., 2015).
Movements: The collared Przewalski's Horses use mainly the northern part of the reserve (GPS data available at International Takhi Group website[6]. King and Gurnell (2005) found that home ranges varied between 129 and 2,399 ha, with 80% core areas of between 61 and

[5] https://savethewildhorse.org/en/takhi/
[6] https://www.takhi.org/en/research/takhi_monitoring_en.php

1,196 ha.
Importance of transboundary population: The range area of the Mongolian population is adjacent to the border; movements into China are prevented by the border fence. The reintroduced population in Kalamaili Nature Reserve in China is located far from the border and there is currently no transboundary connectivity between these two populations.



The graph shows the takhi population data (total population, transported wild horses, birth and mortality) between 1992 and 2020. The data is based on the biological "takhi year" from May until April.

Figure 44: Population development of Przewalski's Horse since 1992. Source: International Takhi Group[7]

Asiatic Wild Ass:
Population size: Estimate of 5,671 in 2010 in the Jungarian Gobi (Kaczensky et al., 2015b) of Mongolia; about 1,500 Khulan according to International Takhi Group in Great Gobi B SPA[8]. About 5,000 believed to exist in adjacent China (Kaczensky et al., 2015b).
Movements: With the upgrading of the fence along the international border in the 1980s and 1990s, population exchange between Mongolia and China has likely ceased or at least became minimal. Consequently, the Chinese populations should be regarded as separate from Mongolia. (Kaczensky et al., 2015b);
Importance of transboundary population: The population is currently not transboundary. The conservation status in both countries is independent of the potential transboundary character.

Goitered Gazelle:
Population size: The site is part of the larger range area of the species in southern Mongolia. The CAMI Atlas indicates that the range area does not reach into China and the border is the effective range area boundary. No site-specific information is available.
Movements: No documented transboundary movements are known. Regular movements are hindered by the border fence.
Importance of transboundary population: There is currently no functionally transboundary population. The conservation status in Mongolia is independent of the potential transboundary

[7] https://savethewildhorse.org/en/takhi/
[8] https://www.takhi.org/en/research/khulan_monitoring_en.php

character. However, survival or recovery of the species in the China part of the site will depend on transboundary connectivity.

Argali:
Population size: The 2009 mountain ungulate survey in Mongolia yielded estimates of approximately 2,311 Argali for Khovd (Harris et al., 2010). The site covers only a small portion of the Argali habitat of this aimag and so its actual Argali numbers are much lower. The Argali range area in the site stretches into China but numbers are unknown.
Movements: No movement data are known. The border fence may impede transboundary movements.
Importance of transboundary population: It is not known if the population is currently tranboundary. The conservation status in Mongolia is independent of the potential transboundary character, but the Chinese part of the Argali population at the site may have little exchange with other Argali. Improved connectivity would positively influence the conservation status and improve the genetic diversity of small Argali groups and increase chances of recolonization of sites where Argali is extinct.

Snow Leopard:
Population size: The Snow Leopard occurs in the site in Mongolia and reaches into China. No population numbers are known.
Movements: No documented transboundary movements known. Border fences and habitat characteristics limit transboundary movements.
Importance of transboundary population: The patterns of the range area of Snow Leopard in this region suggest that the population is transboundary and connectivity across the national border is important for its survival.

Conservation significance:
The site includes the Przewalski's Horse reintroduction range with currently the largest free roaming population. The potential of future transboundary expansion of their range has driven the inclusion of the species into Appendix I of the CMS. Furthermore, the site is of high significance for the conservation of Khulan and has the potential of re-establishing transboundary connectivity between range areas in China and in Mongolia. The site additionally includes habitat of the target species Goitered Gazelle, Argali and Snow Leopard.

Protected areas status:
China: Kalamaili Nature Reserve
Mongolia: Great Gobi B SPA

Barriers for migration:
The border fence of China since more than 30 years prevents transboundary movements and connectivity of the target species, possibly except Snow Leopard.

Other threats:
- Livestock grazing inside and close to the reserve causing forage competition, in particular with Khulan and Przewalski's Horses;
- Livestock and herders' presence at watering points makes it difficult for Khulans to use this essential resource;
- Poaching of Khulan as competitors to domestic livestock and source of meat;
- Risk of hybridization of Przewalski's Horses with domestic horses.

Recommendations for action:
- Restriction and regulation of grazing by livestock and horses especially in the boundaries of the Great Gobi B SPA and critical areas of the buffer zone;
- Creation of transboundary wildlife corridors between Kalamaili – Trans-Altai Gobi – Dzungarian Gobi, including the border security areas on both sides in Mongolia and

China, mainly for Khulan and Przewalski's Horses but also Goitered Gazelles, Argali and Snow Leopard;

- Mapping and monitoring of water bodies in the border area;
- Coordination of joint research and monitoring, including activities to jointly monitor wildlife movement along the border in China and Mongolia, e.g via a camera trapping study along the border on the Mongolian side and, if possible, on the Chinese side;
- Initiation of communication and wildlife related data sharing between both countries, starting from the border crossing points;
- Nominating and listing a transnational UNESCO World Heritage site (ongoing);
- Mitigation of linear infrastructure impacts.

Site ID: 20 **Name:** Daurian Steppe **Countries:** China-Mongolia-Russian Federation

Location:
Administrative:

- China, Inner Mongolia, Hulun Buir Prefecture;
- Mongolia, Dornod Aimag;
- Russian Federation, Zabaykalskiy Krai.

Geographic area:

- Parts of the steppe region of Dauria extending from Eastern Mongolia to Russian Siberia and into North-Eastern China.

Coordinates: N 49.844536°, E 116.703908°

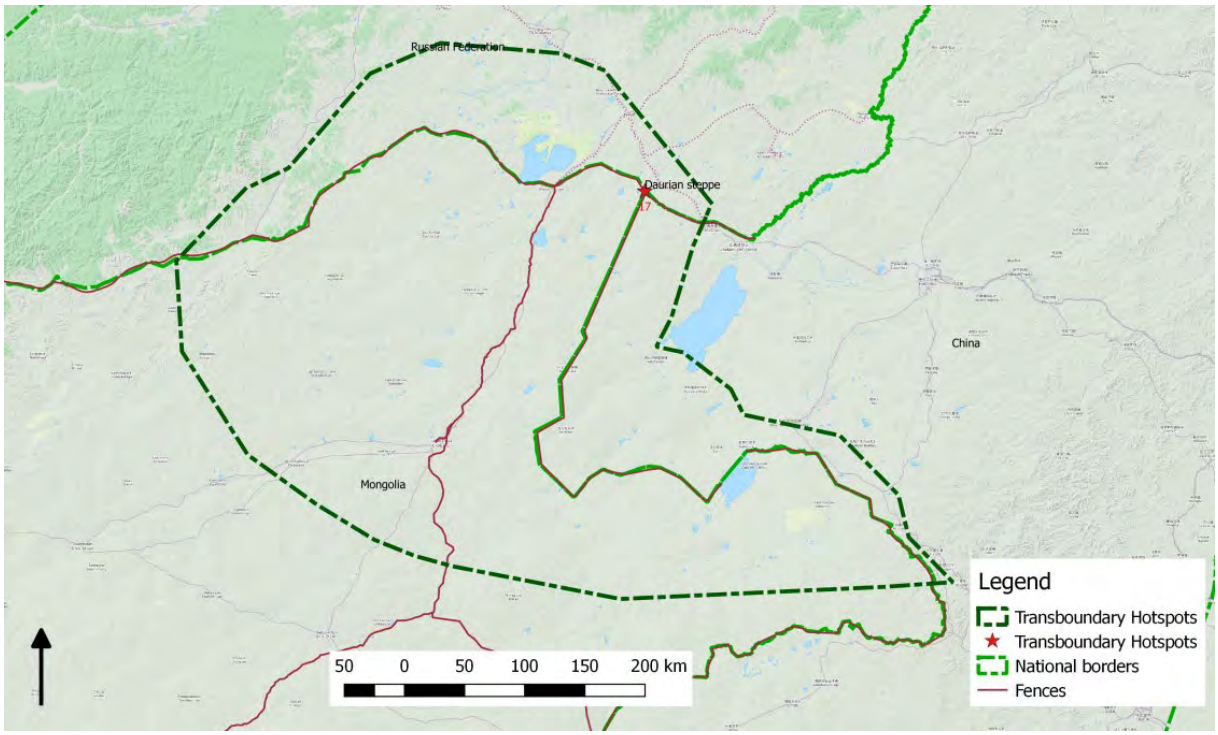


Figure 45: Location map of potential hotspot Daurian Steppe

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Mongolian-Manchurian steppe;
WWF Ecoregion (Olson et al., 2001): Jungar Basin semi-desert;
Ecosystems/habitat types: Desert and semi-desert, small areas with steppe.

Species:

Mongolian Gazelle (Dzeren):
Population size: Population migrating between Mongolia and Russian Federation: 30-50,000 to 120,000 (3-8% of the world population), much smaller Chinese population separated by border fence and much reduced in numbers (IUCN 2015); considered Critically Endangered in the national Red List (IUCN SSC Antelope Specialist Group 2016);
Movements: Mongolian Gazelles are seasonally migrating, but movements do not appear to follow a specific pattern and do not show fidelity to any given range. IUCN (2015) notes the last free passage for cross-border migrations of Dzeren between Mongolia and Russian Federation, while the CAMI Atlas shows an uninterrupted border fence in the area.;

Importance of transboundary population: Although numerically only representing a small share of the global population, this population is of importance as it inhabits a partly isolated range area. This is the only population of the species, which is transboundary and the site is the only place where this species breeds in the Russian Federation and maybe also in China (separated by border fence).

Conservation significance:
The site represents one of the best-preserved examples of Eurasian steppe, which supports the migration of the Mongolian Gazelle, which is one of the last truly mass ungulate migrations in Central Asia (IUCN 2015). In 2017, the site was inscribed in the UNESCO List of World Heritage Sites as a Natural Site.

Protected areas status:
Mongolia: Mongol Daguur SPA, Yakh Nuur Nature Reserve
Russian Federation: Daurskiy State Biosphere SPA, State natural zakaznik of Federal importance “Dolina dzerena”

Barriers for migration:
There is a border fence from Russian Federation and from the Chinese side. Between the Russian Federation and Mongolia, there is a border fence west of the Toreysk Lakes (Kirilyuk, pers. comm., 2019). The border fence entangles and kills large numbers of Mongolian Gazelles moving in search of quality forage or water sources, or to avoid deep snow. This fence is also an obstacle for those gazelles that do not become entangled, but are deprived of needed resources, and therefore their fitness is decreased. The border zone west of Erentsav (Russian Federation-Mongolia) is apparently passable by gazelles; either there is no fence or it is not a strong barrier there. At the border with China, Mongolian Gazelles fit with GPS collars appeared to make attempts to cross from the Mongolian side, but were unsuccessful. The fenced Ulaanbaatar-Beijing railway line also blocks Dzeren migration. IUCN (2015) states reports that the fenced Choibalsan-Soloveyvsk railway crossing the site does not prevent migration of Mongolian Gazelles.

Other threats:
- Wildfires, which occur more frequently (once or several times a year) than in the past, are caused by human activity, e.g. careless spring agricultural burning, and cause loss of vegetation, soil erosion and habitat degradation (IUCN, 2015);
- Poaching, by IUCN (2015) described as a major threat in the Russian Federation, but in recent years expanded to Mongolia as well. Kirilyuk (pers. comm., 2019) states that effective protection is missing in many Mongolian PAs and there is poaching causing much disturbance, while in the Russian Federation poaching is considered insignificant;
- Overgrazing, especially as the traditional nomadic lifestyle of the local people, which sustained natural steppe restoration processes, is being replaced by sedentary living with over 750,000 head of livestock on the Mongolian part (much less in Russian Federation). Overgrazing in Mongolia at the background of droughts causes the depletion of pastures (Kirilyuk, pers. comm., 2019);
- In Russian Federation the growing mass migration of Dzeren causes growing negative attitudes by local authorities and among the population (Kirilyuk, pers. comm., 2019);
- Urban development (China, particularly along border between Nomrog and Erlian);
- Expansion of mining operations.

Existing or planned transboundary activities:
- Transboundary migration of Dzeren between Mongolia and Russian Federation is partly protected by the International Russian-Mongolian SPA “Dauriya”. (Kirilyuk, pers. comm., 2019)

- It is planned to activate the communication between official Russian and Mongolian working groups about the reduction of intensity of transboundary migration of Dzeren, which is caused by the pressure on them causing their movement from Mongolia to Russian Federation. (Kirilyuk, pers. comm., 2019)

Recommendations for action:

- Regular monitoring of Dzeren population in Mongolia is required for effective conservation management.
- Maintenance and improvement of transboundary migration routes through mitigation of fences at the railway and border:
    - Modification of the fence so that gazelles are able to pass underneath while still allowing it to serve effective border and railway security;
    - Negotiations ongoing between local environmental authorities and Russian border agencies to reconstruct the fence.
- Important intervention locations:
    - along an east west axis between Erentsaav and Russian Federation/Mongolia/China border (N 49.845169°, E 116.771738° to N 49.885796°, E 115.744532°);
    - between Russian Federation/Mongolia/China border and Kherlen River in the south (N 49.845169°, E 116.771738° to N 48.152085°, E115.521671°);
    - from Kherlen River east to Buir lake (N48.102466°, E115.530399° to N 47.761164°, E 117.493768°), no recent data on gazelles on the China side;
    - from Nomrog west to border town Erlian (N 46.618233°, E 119.602377° to N 43.694958°, E 111.949712°), no recent data on gazelles.
- Wildfire control and prevention;
- Hunting ban in key Dezeren habitats (Kirilyuk, pers. comm. 2019), anti-poaching, possibly through development of community-based sustainable hunting management (?);
- Better financing of protected area and wildlife management in Mongolia, possibly international assistance is needed (Kirilyuk, pers. comm. 2019);
- Regulation of grazing in key Dzeren habitats in the border region (Mongolia, China);
- Restriction of mining activities.

Site ID: 21 **Name:** Eastern Karakoram **Countries:** India-Pakistan

Location:

Administrative:

- India, Ladakh;
- Pakistan, Gilgit-Baltistan;

Geographic area:

- Upper Indus Valley and valleys of tributaries upstream from Leh to downstream from Skardu.

Coordinates: N 34.878674°, E 76.7505049°

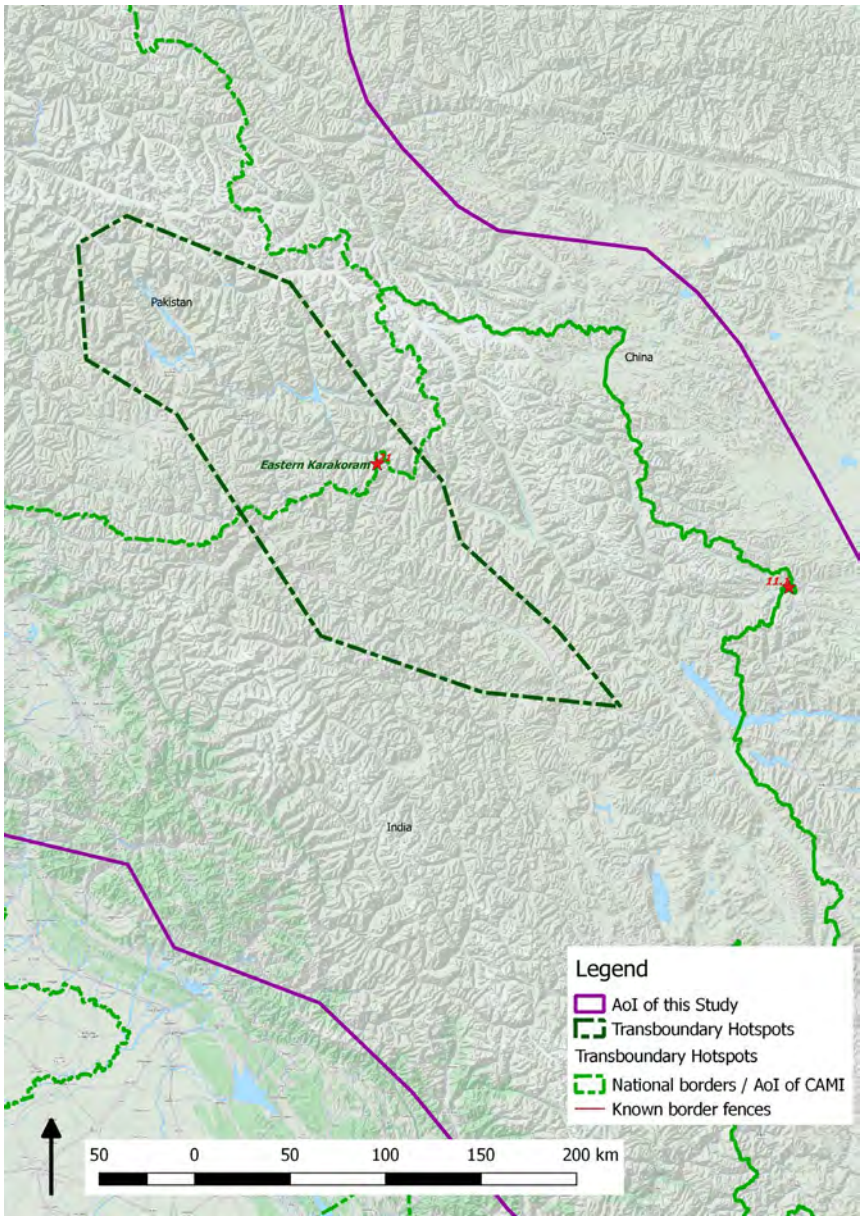


Figure 46: Location map of potential hotspot Eastern Karakoram

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Himalayan highlands;
WWF Ecoregion (Olson et al., 2001): Karakoram-West Tibetan Plateau alpine steppe, rock and ice;
Ecosystems/habitat types: High mountains, mountain steppe and semi-desert.

Species:

Urial:
Population size: In the Ladakh (India) part of the site Khara et al. (2021) estimated 686 Urials with a density of 0.96/km² across the Heniskot-Lamayuru-Takmachik and Upper Sham landscapes, which represent there the main areas of occurrence of Urial. In the Pakistan part of the site numbers are smaller, but there are further fragmented range areas to the west. Within the site, based on 22 Urials sighted in 2013 around Skardu, Siraj-ud-Din et al. (2016) estimated a population of 92 Urials to occur in this area. This estimate, however, might have been an overestimate or the population has further declined as the total population in Gilgit-Baltistan (Pakistan) likely comprises fewer than 350 individuals (pers. comm. S. Ostrowski, 2019).
Movements: Khara et al. (2021) found that field observations and local knowledge of herders and wildlife protection department officials suggested that Urial, while exhibiting a degree of seasonal movement, did not undertake long-distance migration. The populations of the site might be not regularly connected due to long distances between the fragmented range areas but occasional long-distance movements and thus connectivity between Urial populations in Ladakh (India) and around Skardu (Pakistan) are thinkable (Y. V. Bhatnhagar, pers. comm. 2021).
Importance of transboundary population: The transboundary character of the population is not evident, but given the species' general ability to move over long distances, the population might be connected across the Line of Control between India and Pakistan. The population of Urial at the site is probably the largest population of the subspecies Ladakh Urial *O.v. vignei* and therefore of high conservation importance.

Snow Leopard:
Population size: For Ladakh (India), Nyhus et al. (2016) indicated parts of the area as good habitat and a substantial share of the 285 Snow Leopards estimated for Jammu-Kashmir may occur within the site. For Pakistan, Hameed et al. (2020) confirmed Snow Leopard presence in the site north of Skardu (sampling site "Basha-Arandu") and indicated areas of high suitability there.
Movements: Transboundary movements are not known. Hameed et al. (2020) modeled weak connectivity of Snow Leopard habitat north of Skardu (Pakistan) with range areas in Ladakh (India). However, Hameed et al. (2020) acknowledge that data scarcity might have impact these modelling results and satellite imagery (Google Earth, Bing Aerial) checked by the author of this study did not show any apparent barriers for movements.
Importance of transboundary population: The Snow Leopard populations of the area are of global significance and may represent a connecting link between populations in the Himalaya and the Hindu Kush.

Conservation significance:
The area is of high conservation significance, in particular for Urial, but also for Snow Leopard. Currently there is no official cooperation between the two Range States, but Maheshwari (2020) indicated the area as one of the sites, where transboundary conservation might contribute to peace and collaboration.

Protected areas status:

India:	Hemis National Park, Nubra-Shyok Wildlife Sanctuary (both in parts only);
Pakistan:	Central Karakoram National Park.

Barriers for migration:
No border fences are documented for the site. Along the line of control at easy passable locations in valleys and at mountain passes presence of border, guards and military may cause disturbance and poaching that may negatively affect the opportunities for migration by wild mammals.

Other threats:

- Livestock grazing causes forage competition with wild ungulates, habitat degradation and conflict with Snow Leopards;
- Poaching is still a major threat in the area, in particular for Urial in Pakistan and in areas with activity of armed forces.

Recommendations for action:

- Livestock grazing regulation and enforcement of grazing bans and restrictions in protected areas;
- Prevention and persecution of poaching, including development of community-based conservation of Urial, based on cultural values and tourism related incentives (in Pakistan with options for regulated sport hunting of Urial);
- Conflict mitigation and prevention of killings in the course of conflicts through appropriate measures (e.g. prevention of livestock losses and insurance schemes).

Site ID: 22 **Name:** Kopet Dagh **Countries:** Iran-Turkmenistan

Location:
Administrative:

- Iran, Khorasan-e Shomali, Khorasan-e Razavi Provinces;
- Turkmenistan, Akhal Welayet (Province);

Geographic area:

- Mountain and hill areas in the entire border region.

Coordinates: N 38.138427°, E 56.020189°; N 37.649680°, E 58.440410°; N 37.131702°, E 59.647731°

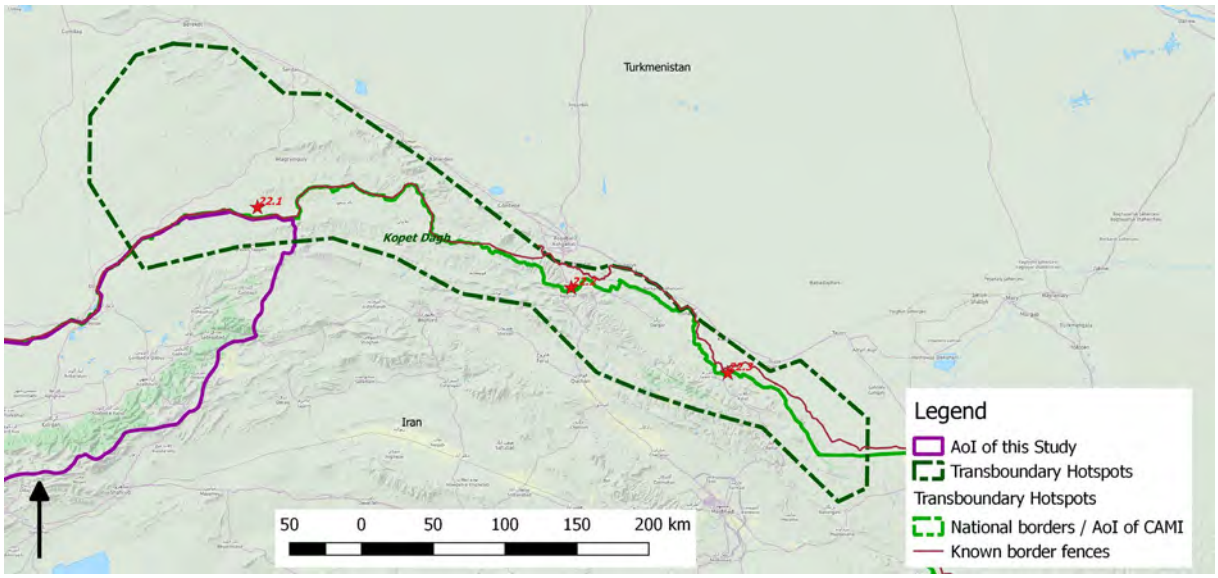


Figure 47: Location map of potential hotspot Kopet Dagh

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Caucaso-Iranian highlands;
WWF Ecoregion (Olson et al., 2001): Kopet Dagh woodlands and forest steppe, Kopet Dagh semi-desert;
Ecosystems/habitat types: Woodlands, dry steppe and semi-desert.

Species:

Asiatic Cheetah
Population size: There is no evidence that the species is present at the site. Nearest area of known occurrence is the Miandasht Wildlife Refuge in north-eastern Iran some 150 km from the border with Turkmenistan. Cheetahs are also documented from Touran Biosphere Reserve, west of Miandasht and after 40 years, in 2014, one Cheetah was spotted in Golestan National Park (Mehr, 2014). The reliability of the reported spotting of a Cheetah by a local person in the west of the Kopet Dagh Mountains in 2015 (Rosen, 2017) remains unclear.
Movements: The closest range area indicated in the CAMI Atlas is 150 km from the site.
Importance of transboundary population: The establishment of a reproducing transboundary population is extremely unlikely in any foreseeable future. Given the precarious state of the Asiatic Cheetah any individual is of importance for the conservation of the subspecies.

Asiatic Wild Ass:

Population size:

The Red Book of Turkmenistan in its editions of 1985, 1999 and 2011 mentioned five range area patches of reintroduced Kulan with a total population size of 590 individuals. Field research in 2014 -2017 revealed that only two or three patches were still inhabited, with possibly only 20 animals in total (Rustamov, pers. comm. 2018). For Iran, no reports about Asiatic Wild Ass occurrence is available from the site and the nearest range area is located at 200 km distance from the border. Populations in Iran (*Equus hemionus onager*) and in Turkmenistan (*E. h. kulan*) have been separated for long periods of time and were considered as separate subspecies (Kaczensky et al., 2018).

Movements: No information about the movements of the reintroduced populations is available.

Importance of transboundary population: There has not been a transboundary population at the site for many decades or even centuries.

Goitered Gazelle:

Population size: In Turkmenistan habitats of Goitered Gazelle exist along the piedmonts of the Kopet Dagh. In the eastern part the population indicated in the Red Book had been 1,500, but despite general confirmation of presence in the central and western Kopet Dagh, no data on population size are available (Rustamov, pers. comm. 2018). For Iran, no information is available. The nearest possible range area indicated for Iran is 45 km from the range area in Turkmenistan (CAMI Atlas), but occurrence in the Iranian part of the site is very likely (Kaczensky, pers. comm. 2019).

Movements: Between Iran and Turkmenistan border fences from both sides of the border, but Kaczensky, pers. comm. (2019) nevertheless assumes that some transboundary movements happen.

Importance of transboundary population: It is unclear if the species occurs in the site in both countries and if so, if there is connectivity. Possibly, a small transboundary population exists in the strip between the border fence of Turkmenistan and the fence of Iran. Any Goitered Gazelle population would be of high conservation importance because of the risk of local extinction in a wider area. Goitered Gazelle is a key prey species for Asiatic Cheetah, but also for Persian Leopard.

Urial:

Population size: In 2014-2017 the site had about 1,060 Urials, which would be less than half of the population size indicated in the Red Book of Turkmenistan (Rustamov, pers. comm. 2018). The range area covers also areas in Iran. There during a survey the DoE (unpublished, 2016) in protected areas recorded 3,890 (Khorasan-e Shomali) and 7, 269 Urials (Khorasan-e Razavi). What share of these have been recorded within the site is not known.

Movements: At least a part of the Urial population in this area occurs in the border zone, beyond the Turkmenistan border fence and is by all likelihood regularly moving between the countries.

Importance of transboundary population: The population of Urial in the Kopet Dagh is among the largest populations of the species and therefore of high conservation importance. Urial is a key prey species for Persian Leopard as well as for Asiatic Cheetah.

Persian Leopard:

Population size: Khorozyan (2008) presented a guesstimate of 78-90 for Turkmenistan, which might be unrealistically high. Sanei et al. (2016) recorded confirmed and possible presence across Iran's Kopet Dagh, with a trend of more confirmed presence records in the western part of the site. Farhadinia (2016) recorded 21 different leopards, including three leopard females with cubs, across the research areas in Kopet Dagh and nearby located areas.

Movements: Transboundary movements are likely despite the border fence. The documented cross-border movement of a male in 2015 was the first evidence of these movements (Farhadinia, 2016).

Importance of transboundary population: Given their regularly large home ranges and dispersal movements the Leopards of this area are part of a larger population. Dispersal of Leopards from Iran to Turkmenistan might be support the viability of the population there (Khorozyan, 2008) and transboundary connectivity is of importance for the conservation of the Persian Leopard in this part of its range area, in particular as Leopard populations and range areas in Iran become increasingly fragmented (Sanei et al., 2016).

Conservation significance:
The area is of high conservation significance, in particular for Persian Leopard, Urial and Goitered Gazelle; and it has potential for the recovery of Kulan. The Kopet Dagh represents a continuum of suitable leopard habitat with the best of protection around Ashgabat and then progressively fading (but no less important!) (Rosen, pers. comm. 2019). Of special importance for Goitered Gazelle, Urial and Persian Leopard in Turkmenistan are the large areas beyond the border fence or between the Turkmenistan and Iran fences (Kaczensky, pers. comm. 2019).

Protected areas status:

Iran:	Protected areas located within the site and at the border with Turkmenistan or relatively close to it (Darvishsefat, 2006): Tandoureh Protected Area, Tandoureh NP as well as Sarany, Ors-e Sistan, Salouk, Sarigol and Heydari Protected Areas;
Turkmenistan:	Central Kopet Dagh SPA, Sunt Hasar Dagh SPA

Barriers for migration:
The border fence is continuous along the border from Turkmenistan side, with areas of varying width between the fence and the actual border. The actual location of the border fence east of Ashghabad is indicated in the revised layer for the CAMI Atlas, while west of the capital the fence is shown schematically along the border. More recently at least in some sections a border fence has as well been erected at the Iranian side, further limiting ungulate movements (Ghoddousi, pers. comm. 2019).

Other threats:
- Poaching is the major threat in the area, less in the areas close to the capital of Turkmenistan;
- Livestock grazing causes forage competition with wild ungulates, habitat degradation and conflict with Leopards.

Recommendations for action:
- Transboundary collaboration, particularly on Leopard monitoring and conservation;
- Mitigation of border fences to create wildlife corridors and establish connectivity;
- Livestock grazing regulation and enforcement of grazing bans and restrictions in protected areas;
- Prevention and persecution of poaching;
- Conflict mitigation and prevention of killings in the course of conflicts through appropriate measures (e.g. prevention of livestock losses and insurance schemes);
- Identifying of corridors for wildlife movement, especially of Leopard, Cheetah, Urial, Goitered Gazelle and Asiatic Wild Ass.

Site ID: 23 **Name:** Western Kyrgyz Range **Countries:** Kazakhstan-Kyrgyzstan

Location:
Administrative:

- Kazakhstan, Jambyl Province;
- Kyrgyzstan, Talas Province.

Geographic area:

- Kyrgyz range of Tian Shan.

Coordinates: N 42.718098°, E 72.363159°

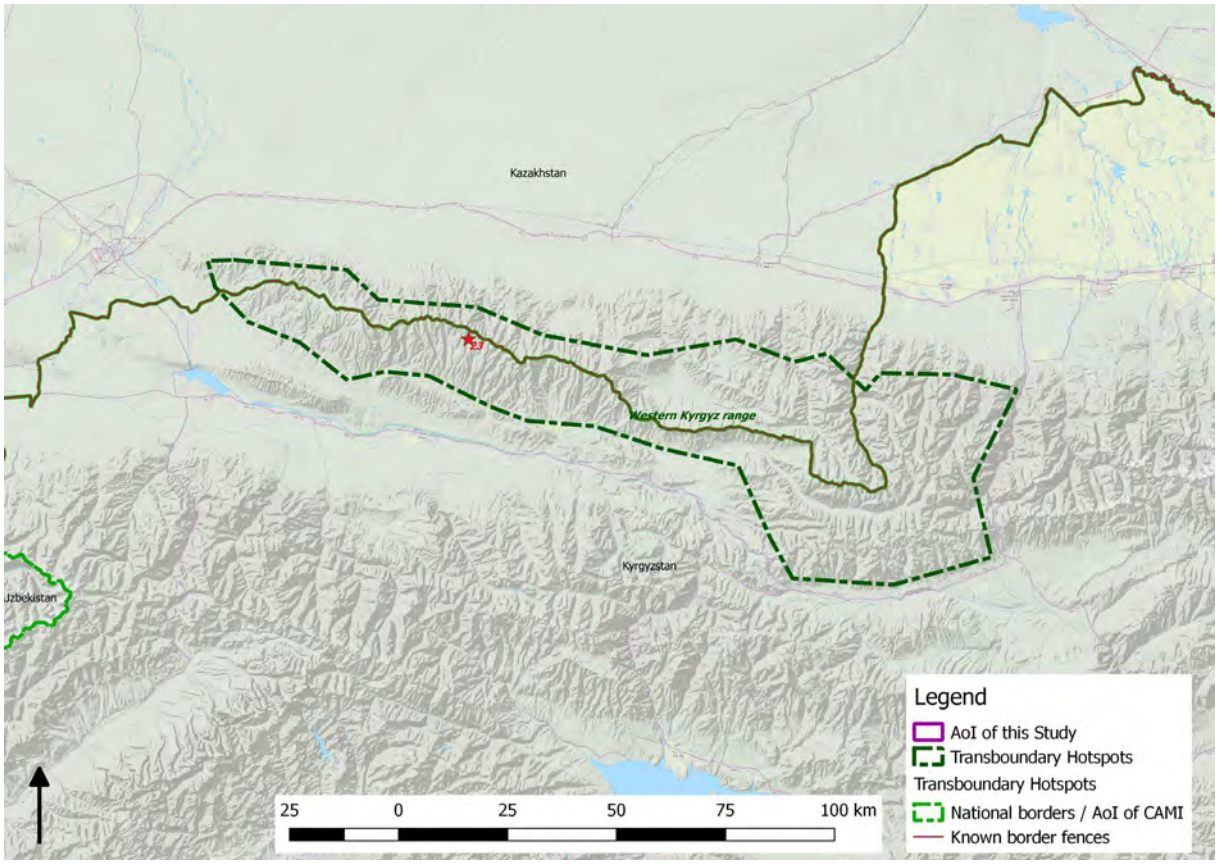


Figure 48: Location map of potential hotspot Western Kyrgyz Range

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan highlands;
WWF Ecoregion (Olson et al., 2001): Tian Shan montane conifer forests, Tian Shan foothill arid steppe;
Ecosystems/habitat types: Mountain steppe, coniferous forest, woodlands and semi-desert.

Species:

Argali:
Population size: The site is indicated as range area, but there are few documented recent records. Davletbakov and Musaev (2012) in May 2011 recorded 23 Argali in the East of the site.
Movements: No site-specific information is available.
Importance of transboundary population: The number of Argali in the border area by all knowledge is very small, but likely connected with the larger range area of *Ovis ammon karelini*.

Snow Leopard:
Population size: Only the east of the site is indicated in the CAMI Atlas as part of the larger range area of Snow Leopard in the Tian Shan.
Movements: Snow Leopards occurring in the area would move across the border.
Importance of transboundary population: The site is at the edge of the Snow Leopard range area. Only its eastern part forms a linking element or stepping stone to other Snow Leopard range areas.

Conservation significance:
The site most likely is geographically and in terms of population numbers rather marginal for the conservation of the two target species. Its importance lies more in the avoidance of reduction of overall range areas and their fragmentation, less in the conservation of sizeable populations.

Protected areas status:
None

Barriers for migration:
None

Other threats:
- Poaching of both species;
- Increase in livestock grazing intensity may affect Argali and indirectly Snow Leopard through reduction of wild prey availability and increase of conflict with herders.

Recommendations for action:
- Assessment and monitoring: For both target species actual range areas and population sizes as well as connectivity with other parts of their range areas;
- Sustainable game management: The site is used and has potential as hunting areas, the management of which has to be improved and where suitable community-based wildlife management areas might be developed;
- Regulation of livestock grazing and conflict reduction: Impact of livestock grazing and intensity of conflict need to be assessed and interventions should be developed if and as needed.

Site ID: 24 **Name:** Northern Tian Shan **Countries:** Kazakhstan-Kyrgyzstan

Location:
Administrative:
- Kazakhstan, Almaty Province;
- Kyrgyzstan, Issyk-Kol and Chuy Provinces.

Geographic area:
- Zaili-Alatoo and Kungey-Alatoo ranges of Tian Shan.

Coordinates: N 42.927080°, E 77.195160°

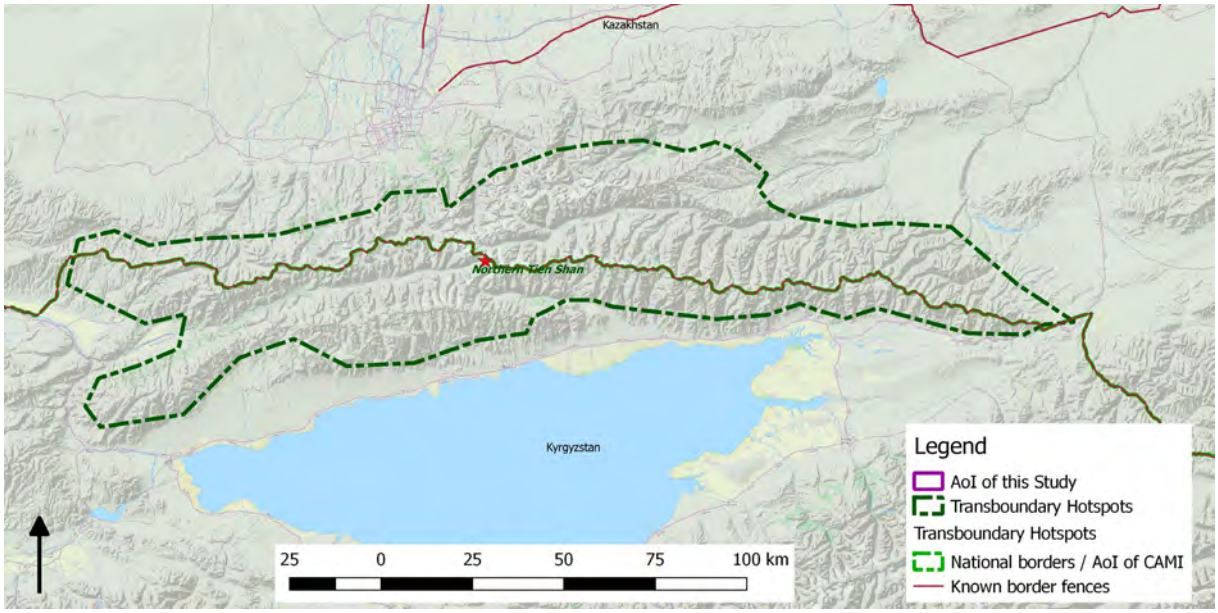


Figure 49: Location map of potential hotspot Northern Tian Shan

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan highlands;
WWF Ecoregion (Olson et al., 2001): Tian Shan montane steppe, Tian Shan montane conifer forests, Tian Shan foothill arid steppe;
Ecosystems/habitat types: Mountain steppe and meadows, coniferous forest, woodlands.

Species:

Argali:
Population size: The site is indicated as part of the range area, although there are few known observations (e.g. unpublished Michel in 2004 at eastern edge). The area of suitable habitat seems to be limited and the population size is likely small.
Movements: The author of this study observed in 2004 one female Argali moving across the undulating plateau across the state border at the eastern edge of the site.
Importance of transboundary population: Given the limited suitable habitat, any Argali population in the area can only be conserved and managed as transboundary population. The site is likely used only by a tiny portion of the overall population of Argali in the Tian Shan and is less important than the areas and population south of Issyk-Kol Lake.

Snow Leopard:
Population size: Snow Leopard presence has been repeatedly recorded in different parts of the site and in both countries, e.g. 2014-2015 two individuals in Ile-Alatau NP and six individuals in Kolsay-Kolderi NP (ACBK 2016). The site has a reproducing population. The

population size in the Zaili-Alatau range was guessed at 30-35 in the early 2000s (ACBK, 2016). Lukarevskiy and Umetbekov (2011) assumed that there were 10-15 Snow Leopards in the Kungey Alatoo at the Kyrgyzstan part of the site.
Movements: So far, no systematic study of movements has taken place, but the topography of the site makes long distance movements and regular crossing of the state border likely.
Importance of transboundary population: The range area of these Snow Leopards stretches along the state border and so the entire population in the Northern Tian Shan is transboundary.

Conservation significance:
The site is the home range of one important Snow Leopard population and covers the most significant sections of the GSLEP Landscape "Northern Tian Shan".

Protected areas status:
Kazakhstan: Almaty SPA, Ile-Alatau National Park, Kolsai-Kolderi National Park;
Kyrgyzstan: Chon-Kemin National Park

Barriers for migration:
The CAMI Atlas indicates a border fence. However, this fence may exist only in certain sections or not at all.

Other threats:
- Poaching;
- Intensive and unregulated tourism development: This includes the (now halted) development of a ski resort in the area of Ile-Alatau National Park, for which the park area had been reduced and which would have massive impact also on the remaining park area;
- Livestock: Increase of livestock numbers and poorly regulated grazing (locally).

Existing or planned transboundary activities:
- Project "Conservation of Biodiversity of the Transboundary Region of Northern Tian Shan" funded by the German government, implemented by NABU 2014-2016.

Recommendations for action:
- Improved transboundary collaboration between protected areas, scientific organizations and NGOs in monitoring, research, conservation management and regulation of transboundary development;
- Better regulation of tourism, no tourism development causing substantial transformation of landscapes and ecotourism;
- Development of community-based wildlife management to prevent poaching and incentivize wildlife over livestock;
- Expansion and consolidation of zones without livestock grazing.

Site ID: 25 **Name:** Western Tian Shan **Countries:** Kazakhstan-Kyrgyzstan-Uzbekistan

Location:
Administrative:

- Kazakhstan, Jambyl and South Kazakhstan Provinces;
- Kyrgyzstan, Talas Province;
- Uzbekistan, Tashkent Province.

Geographic area:

- Mountain ranges of western Tian Shan.

Coordinates: N 42.243700°, E 70.943811°

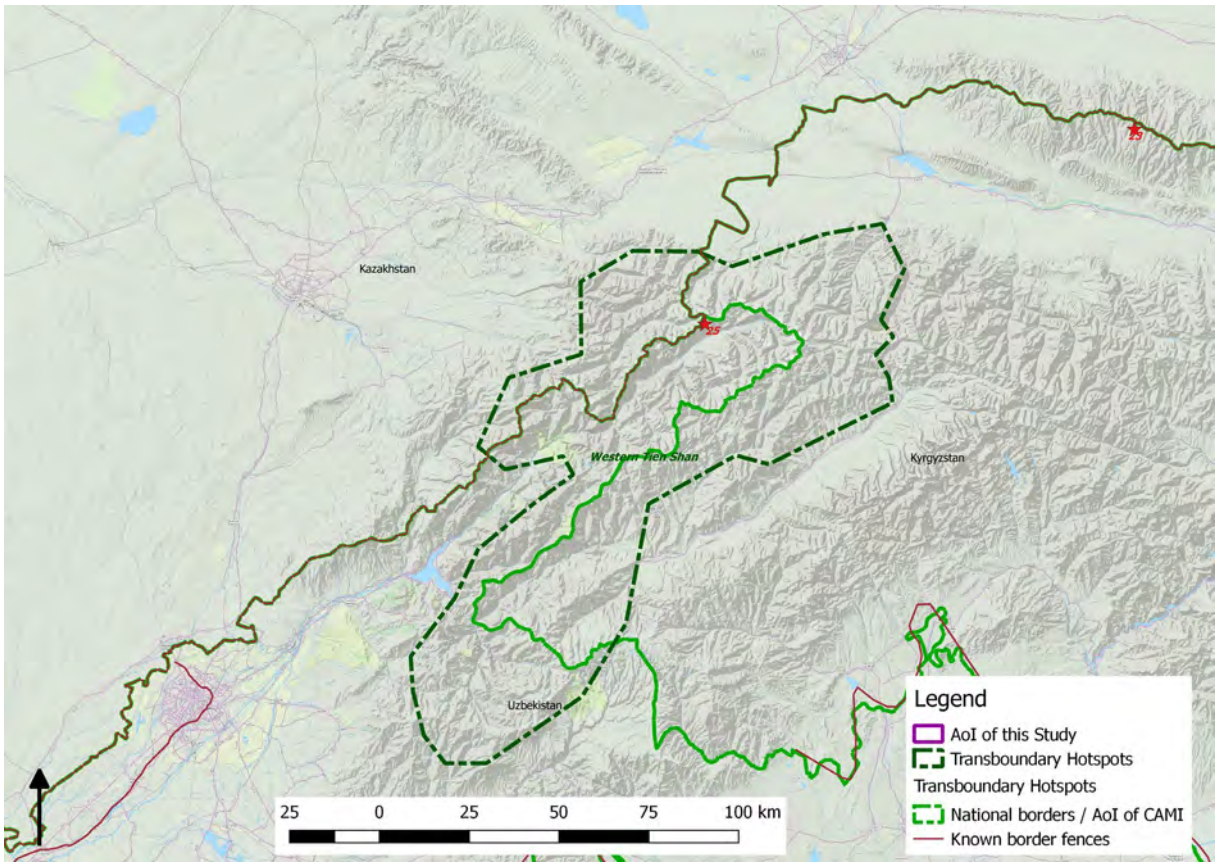


Figure 50: Location map of potential hotspot Western Tian Shan

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan highlands;
WWF Ecoregion (Olson et al., 2001): Tian Shan montane steppe, Tian Shan foothill arid steppe, Gissaro-Alai open woodlands;
Ecosystems/habitat types: Mountain steppe and meadows, deciduous and juniper forest and woodlands.

Species:

Argali:
Population size: The site is indicated as partly located within the range area. Argali numbers in Aksu-Zhabagly SPA were below 100 in the early 2000s and had declined in the decades before (Shakula, pers. comm. 2004). According to the World Heritage Site Nomination Dossier (2016) Argali occurs in the protected areas Aksu-Jabagly, Sairam-Ugam and Besh-Aral. Argali

is not confirmed from Uzbekistan for the recent decades. The area of suitable habitat seems to be limited and the population size is likely small.
Movements: There are unconfirmed reports about past or current seasonal migrations of Argali between the Western Tian Shan and its north-western spur, the Syr Darya Karatau. The population is using transboundary habitats between Kazakhstan and Kyrgyzstan.
Importance of transboundary population: The Argali population is the most north-western of *Ovis ammon karelini* and is spatially close to the rare Karatau Argali *O. a. nigrimontana*.

Snow Leopard:
Population size: Snow Leopard presence is reported from all parts of the site (Nomination Dossier, 2016). For Uzbekistan varying figures of 10–15 (or 30–40) individuals have been presented (Nyhus et al., 2016). These Snow Leopards would in any case roam beyond the borders of the country and these figures may rather represent the overall population of the site.
Movements: Due to the mountainous topography, Snow Leopards regularly move between the parts of the site belonging to the three countries.
Importance of transboundary population: This Snow Leopard population is generally transboundary and can only be preserved as one unit. It is assumed that the Snow Leopards of the site are part of a larger range area stretching into the Kyrgyz Range. This population may have limited connectivity with other Snow Leopard populations and is therefore prone to further fragmentation and decline.

Conservation significance:
The area is of significance for the conservation of the most north-western range area patches and population of Tian Shan Argali and for the Snow Leopard. Sections of the site have been inscribed on the World Heritage List of Natural Sites on the basis of criterion (X), i.e. because of its outstanding biodiversity value. Snow Leopard and Argali are explicitly mentioned in the decision about the inscription (Decision: 40 COM 8B.9 of the World Heritage Committee in 2016).

Protected areas status:
Kazakhstan: Aksu-Zhabagly SPA; Sairam-Ugam State National Natural Park
Kyrgyzstan: Besh Aral SPA;
Uzbekistan: Chatkal SPA, Ugam-Chatkal BR, Ugam-Chatkal NP.
(SPAs jointly recognized as UNESCO World Heritage Site)

Barriers for migration:
The CAMI Atlas shows a partial border fence of unknown characteristics between Kazakhstan and the other two countries. No other information about border fences is known for the site.

Other threats:
- Poaching: Differences in wildlife populations and behavior, particularly of Asiatic Ibex, between a well-managed hunting area in Uzbekistan and adjacent areas suggest that poaching is a major limiting factor for ungulates and the Snow Leopard depending on them;
- Livestock grazing: In several parts overly intensive livestock grazing is a cause of competition with wild ungulates, habitat degradation, disturbance and conflict. Livestock grazing permits are the main source of income of several forestry units, including the unit in charge Ugam-Chatkal NP;
- Tourism development: Due to its locally concentrated character, tourism development does not seem to be a major threat. Guided tourism in Aksu-Zhabagly SPA did not lead to obvious conservation issues for the target species and their ecosystems.

Existing or planned transboundary activities:
- GEF-funded UNDP projects are currently implemented in Kyrgyzstan and Uzbekistan for improved landscape level conservation.

Recommendations for action:

- Intensified monitoring of the target species;
- Collaboration across borders on monitoring, conservation activities and tourism development;
- Intensified anti-poaching in and beyond protected areas, including the development of sustainable hunting management;
- Training of protected area staff, in particular on work with the public, law enforcement and monitoring;
- Feasibility assessment of proposed Argali reintroduction in the Uzbekistan part of the site.

Site ID: 26 **Name:** Ural Steppe **Countries:** Kazakhstan-Russian Federation

Location:
Administrative:

- Kazakhstan, West Kazakhstan Province;
- Russian Federation, Astrakhan, Volgograd and Saratov Provinces.

Geographic area:

- Range area of Volga-Ural population of Saiga antelope.

Coordinates: N 49.860873°, E 47.331539°

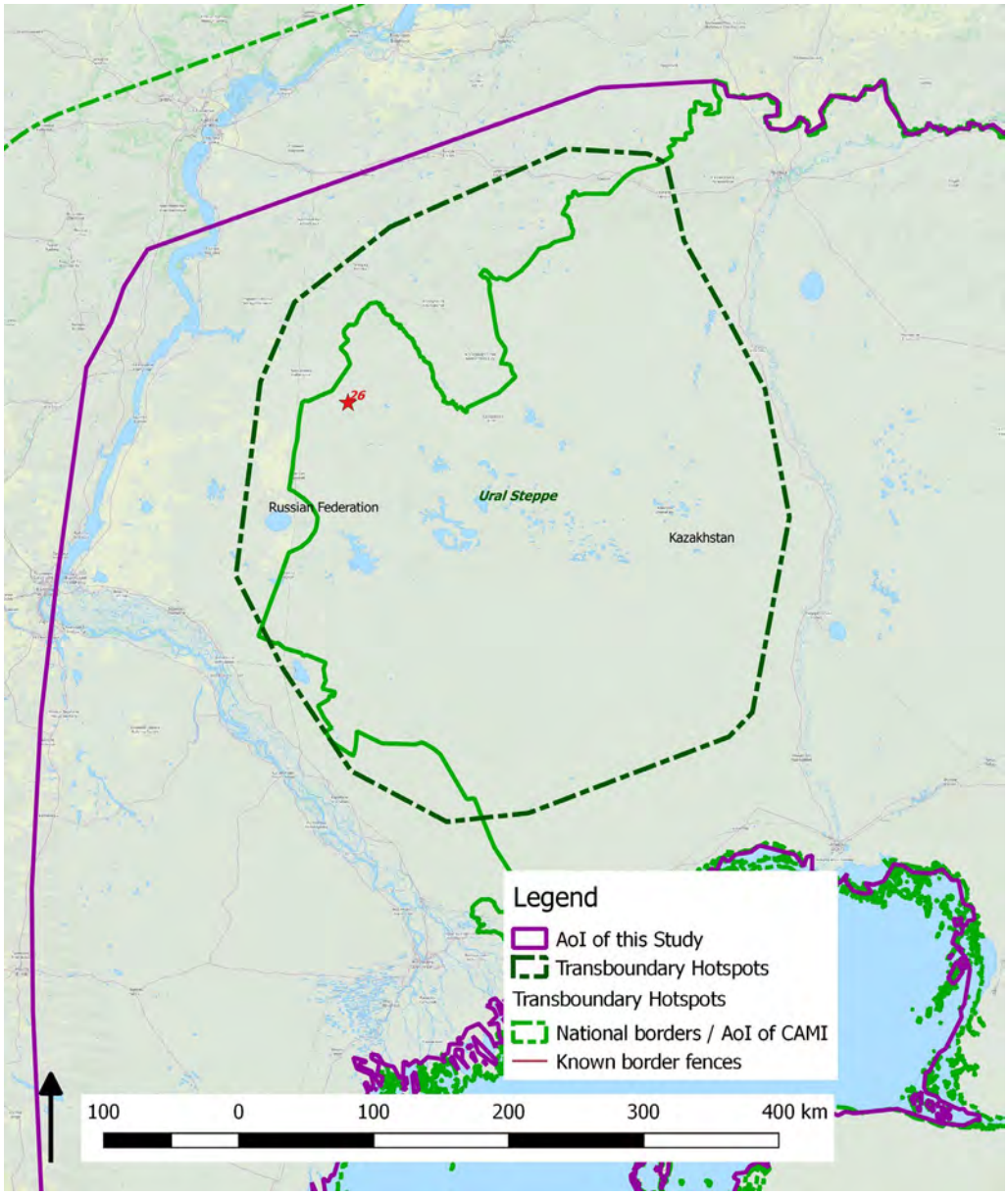


Figure 51: Location map of potential hotspot Ural Steppe

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pontian steppe, Turanian;
WWF Ecoregion (Olson et al., 2001): Pontic steppe, Caspian lowland desert;
Ecosystems/habitat types: Steppe, semi-desert, arable lands.

Species:

Saiga Antelope:
Population size: The Volga-Ural saiga population experienced massive fluctuations during the last decades. The population went down to few thousand in the early 2000s due to massive poaching and related reproductive collapse. The recovery was interrupted by a mass die-off in 2010, causing the loss of about half of the population of that time. Since then, the numbers recovered and in spring 2019, it was the largest saiga population globally, with an estimated 217,000 individuals. Most recently, the Ministry of Ecology, Geology and Natural Resources of Kazakhstan presented an estimate of 585,000 animals for pre-birth season spring 2021 for this population. The estimates for 2018, 2019 and 2021 would mean that from 2018 onwards the population had grown by more than 60 per cent annually, what appears biologically hardly possible and is much higher than reported in any previous year.
Movements: The saigas seasonally migrate within their range area, with winter habitat in the south and summer habitat further to the north. The length of the border, where saiga may potentially cross, is up to 1000 km. The recently installed border fence impedes these movements.
Importance of transboundary population: The population is in a large extent potentially transboundary. With the recovery of the population more and more saigas seasonally migrate from Kazakhstan into Russian Federation. In 2018, single saigas as well as herds of several thousand animals were observed (Mezhnev, 2019). The actual portion of the population crossing the border is not known, but transboundary migration becomes increasingly important as the population recovers.

Conservation significance:
The saiga population of the site is currently the largest population globally and continues to recover. Its conservation is thus of global significance.

Protected areas status:
Kazakhstan: None, establishment of reserves under consideration;
Russian Federation: Bogdinsko-Baskunchakskiy SPA, Bogdinsko-Baskunchakskiy *Zakaznik.*

Barriers for migration:
On a part of the length of the Russian-Kazakhstan border in the area of the Volga-Ural population (Astrakhan, Volgograd, and Saratov regions of the Russian Federation), on the initiative of the veterinary services, a barbed wire fence was installed that impede the movement of saigas. The railroad Saratov-Astrakhan along the national border presents another obstacle to saiga movements. The barriers for migration impede the access of saiga to critical seasonal habitat, in particular during times of limited access to forage caused by snow and ice (*dzhut*) conditions or drought.

Other threats:
- Poaching: focused mainly on males for selling horns for smuggling abroad;
- Conflict with farmers/herders: According to media reports (2019 - 2021, e.g., Katikov, 2019, Udovichenko, 2021), large saiga herds are perceived by local land-users as damaging pastures and attempts have been made by them to chase off the animals from their lands. As of 2021, there are considerations by government authorities, Academy of Sciences and NGOs to start culling Saiga in order to reduce their numbers as soon as the moratorium on saiga hunting is scheduled to end in 2023.

Existing or planned transboundary activities:
- Interaction of saiga conservation inspections;
- Borderline PAs of federal and regional importance (planned)

- Agreement between the Ministry of Natural Resources and Environment of the Russian Federation and the Ministry of Agriculture of the Republic of Kazakhstan on the protection, reproduction and use of the Volga-Ural saiga group.

Recommendations for action:

- Strengthening the fight against poaching;
- Creation of transboundary protected areas;
- Mapping of fences and assessment of their impact on saiga populations;
- Adaptation of the fences to make it possible for saigas to cross them;
- Sustainable use options benefiting local land users and making them responsible for saiga conservation should be explored to create local ownership, prevent the development of negative perceptions about saigas and ensure local support saiga conservation and anti-poaching in particular. In contrast, switching from total protection to culling for regulation of numbers would be counterproductive as it would further enforce the perception of saiga antelope as vermin and undermine its image as a valuable asset that can support the economic interests of local land-users.

Site ID: 27 **Name:** Northern Betpakdala **Countries:** Kazakhstan-Russian Federation

Location:
Administrative:

- Kazakhstan, Aqtobe and Kostanay Provinces;
- Russian Federation, Orenburg Province.

Geographic area:

- Northern edges of range area of Betpakdala population of saiga.

Coordinates: N 50.673074°, E 60.027631°

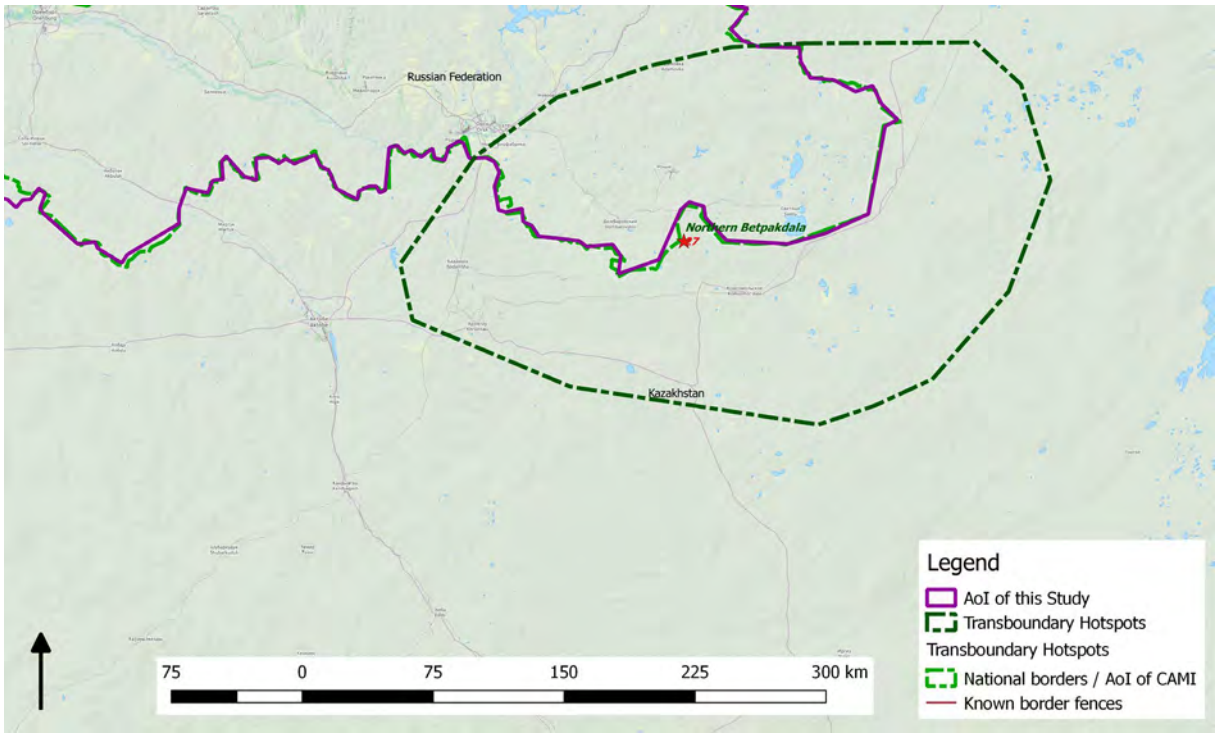


Figure 52: Location map of potential hotspot Northern Betpakdala

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pontian steppe;
WWF Ecoregion (Olson et al., 2001): Kazakh steppe, Kazakh forest steppe, Kazakh semi-desert;
Ecosystems/habitat types: Steppe, semi-desert, arable lands.

Species:

Saiga Antelope:
Population size: The site includes the northwestern edges of the range of the Betpak-Dala population and it is not clear in what extent or for what periods of the year substantial Saiga numbers occur there. This Saiga population experienced massive fluctuations during the last decades. The population went down to few thousand in the early 2000s due to massive poaching and related reproductive collapse. The recovery was interrupted by a mass die-off in 2015, causing the loss of more than 200,000 Saigas or about 85% of the population of that time. Since then, the numbers recovered and in spring 2019 with an estimated 111,500 individuals it was the second largest Saiga population globally. According to the Ministry of Ecology, Geology and Natural Resources of Kazakhstan, by the estimates for pre-birth spring

2021 the population has now reached 285,000 animals, the highest number since 1994. This would mean an annual growth by 60% since the latest estimate in 2019, which at or above biologically plausible growth rates.
Movements: The Saigas seasonally migrate within their range area, with winter habitat in the south and summer habitat further to the north. As most of the Saiga range is within Kazakhstan there are only occasional movements into Russian Federation. The recently installed border fence impedes these movements.
Importance of transboundary population: The population is only in very minor extent potentially transboundary. With the recovery of the population more saigas may seasonally try to migrate from Kazakhstan into Russian Federation. If climate change causes more arid conditions this may enforce such migrations during summer in search of better forage conditions. In 2018 only single Saigas observed in the Russian part of the site, which has been attributed to the border fence (Mezhnev, 2019).

Conservation significance:
The Saiga population of the site in the past has been the largest population globally and continues to recover. Its conservation is thus of global significance. However, the site forms only a minor part of its overall range area and the intensity of site use in terms of numbers and periods is not known. Cross-border migration is currently not essential for the conservation of this population, but it may contribute to the recovery of numbers, expansion of range area and increase the resilience of the population against various events (e.g., disease, forage shortage).

Protected areas status:
Kazakhstan: Tounsorksiy *Zakaznik*, others south of the site within the range area of the saiga population;
Russian Federation: One section of “Orenburgskiy” SPA.

Barriers for migration:
On a part of the length of the Russian-Kazakhstan border in the area of the Betpakdala population (Orenburg region of the Russian Federation), on the initiative of the veterinary services, a barbed wire fence was installed that impedes the movement of Saigas. The railroad Saratov-Astrakhan along the national border presents another obstacle to Saiga movements. The barriers for migration impede the access of Saiga to critical seasonal habitat, in particular during times of limited access to forage caused by snow and ice (*dzhut*) or drought.

Other threats:
- Poaching: focused mainly on males for selling horns for smuggling abroad;
- Conflict with farmers/herders: So far not reported from the area, but Saiga damage on arable fields had been an issue during Soviet times and was one of the drivers of Saiga culling.

Existing or planned transboundary activities:
- Interaction of Saiga conservation inspections;
- Borderline PAs of federal and regional importance (planned)
- Agreement between the Ministry of Natural Resources and Environment of the Russian Federation and the Ministry of Agriculture of the Republic of Kazakhstan on the protection, reproduction and use of the Volga-Ural Saiga group (planned to be extended to the Betpakdala population).

Recommendations for action:
- Strengthening the fight against poaching;
- Creation of transboundary protected areas;
- Mapping of fences and assessment of their impact on Saiga populations;
- Adaptation of the fences to make it possible for Saigas to cross them;

- Sustainable use options benefiting local land users and making them responsible for Saiga conservation should be explored to create local ownership, prevent the development of negative perceptions about Saigas and ensure local support Saiga conservation and anti-poaching in particular. As far as was known by the time of this report, culling is currently not considered, and should be avoided in favor of regulated sustainable use with involvement and for the benefit of local land-users to create incentive for conservation of Saiga and its habitat.

Site ID: 28 **Name:** South-western Ustyurt **Countries:** Kazakhstan-Turkmenistan-Uzbekistan

Location:
Administrative:

- Kazakhstan, Mangystau Province;
- Turkmenistan, Balkan Province;
- Uzbekistan, Karakalpakstan Autonomous Republic.

Geographic area:

- Ustyurt SPA and areas south of it (1);
- Kaplankyr Plateau south east of salt pan (*shor*) (2);
- Chink at the border, Kazakhly shor (3);
- Kaplankyr SPA s of Sarygamysh lake (4);
- Assake-Audan (5);
- Areas south of the road Barsa Kelmes – Jaslyk and between Kazakhstan-Uzbekistan border and Ustyurt SPA (6).

Coordinates: N 42.382329°, E 54.111493°(1); N 41.194460°, E 55.881960°(2); N 41.338580°, E 55.978608°(3); N 41.235781°, E 57.550095° (4?); N 42.293289°, E 56.077211°(5); N 43.634792°, E 55.961138° (6)

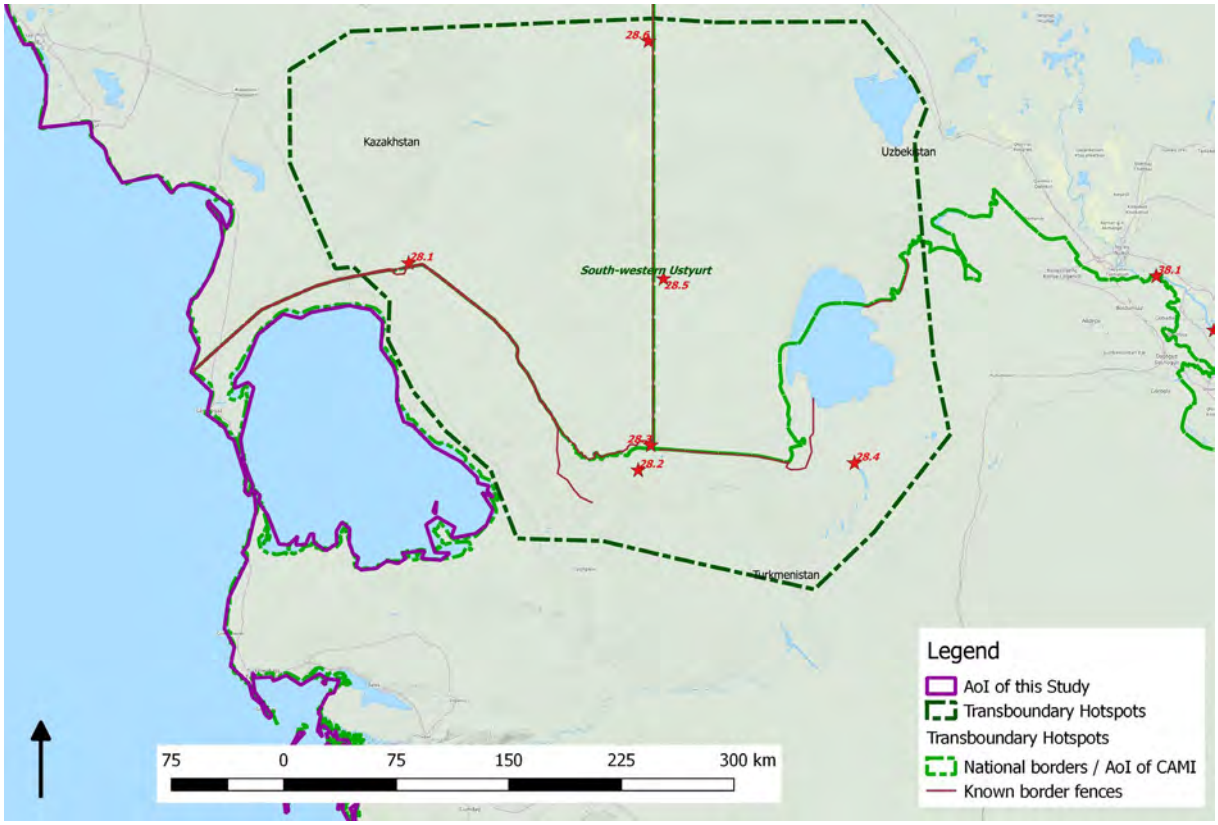


Figure 53: Location map of potential hotspot South-western Ustyurt

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Turanian;
WWF Ecoregion (Olson et al., 2001): Central Asian northern desert, Central Asian southern desert;
Ecosystems/habitat types: Steppe, semi-desert, arable lands.

Species:

Asiatic Wild Ass:

Population size: Kazakhstan: Kulan is considered extinct in Mangystau since the late 19th/early 20th century (Heptner et al., 1961/1988). There had been attempts of reintroducing the species twice, which both failed, apparently because of poaching. One Kulan was observed by ACBK researchers near the border with Uzbekistan, close to the site Assake-Audan (5) in April 2019 (Pestov et al., 2019). This is the first confirmed Kulan in Mangystau Province for many years. Turkmenistan: The Wild Ass population of the site has been reintroduced in the 1980s and may have reached more than 200 individuals in the early 2000s (Rustamov et al., 2015). But expeditions in 2014-2017 revealed a massive decline and loss of range area with a maximum number of 80 individuals remaining (Rustamov, pers. comm. 2018). In Uzbekistan Kulan has been recorded between Sarykamysh Lake and the borders with Turkmenistan and Kazakhstan, in the Assake Audan depression and at the Kazakhly Shor cliff (*chink*), as well as in the north and west of Sarykamysh (Marmazinskaya et al., 2013).
Movements: Kulan are highly mobile and move long distances, in particular to access water. At the site, movements are massively hampered by border fences. Areas without border fences mostly are salt swamps or have steep terrain, thuslimiting movements to dry seasons or few locations.
Importance of transboundary population: Despite the massive movement restrictions and the limited range area, the Asiatic Wild Ass population of the site has to be considered entirely transboundary. Given the precarious state of Asiatic Wild Ass outside of Mongolia and of this subspecies in particular, any population is of high conservation significance. Transboundary mobility and connectivity of habitats are essential for the survival of this population.

Goitered Gazelle:

Population size: In the Kazakhstan part of the site Goitered Gazelle is widespread and has a stronghold in Ustyurt SPA and adjacent areas. In Turkmenistan the Red Book previously stated a population of 1,700 gazelles for the area, but expeditions in 2014-2017 confirmed only about 300 animals (Rustamov, pers. comm. 2018). In Uzbekistan expeditions under the CADI project confirmed presence of Goitered Gazelle from the entire area between Sarykamysh Lake and the borders with Turkmenistan and Kazakhstan, as well as further to the north (Wunderlich, pers. comm. 2019, Marmazinskaya et al., 2012). There, Goitered Gazelle occurs in low density, with in total maybe 150 animals only (Marmazinskaya, pers. comm. 2019), although this statement may refer to parts of the site only.
Movements: Goitered Gazelles are very mobile. Their migrations are affected by the border fences, which also are a reason of direct mortality.
Importance of transboundary population: The population is currently only partly transboundary as the border fences have caused an effective fragmentation. Transboundary connectivity is essential for the maintenance of genetic diversity, sufficient effective population size to preserve a viable population and for access to habitats of seasonally varying suitability.

Urial:

Population size: Urial occurs in Kazakhstan in Ustyurt SPA as well as in other areas with suitable relief. Ismailov (pers. comm. 2019) assessed the overall population of the site in Kazakhstan with 700-750 and assumed a 50% decline since the early 2000s. In Turkmenistan Rustamov (pers. comm. 2018) found a decline to 250 animals during expeditions 2014-2017, compared to up to 1,600 animals indicated for the 1990s in editions of the Red Book. In Uzbekistan CADI expeditions (2012-2014, Wunderlich, pers. comm. 2019) recorded Urial observations, tracks and skulls north of Kazakhly Shor (3), northwest of Kaplankyr SPA (near 4), along the western shore of Sarykamysh Lake and northwest of it. There overall numbers are apparently very low (Marmazinskaya et al., 2012).
Movements: Urials move between sites with suitable relief and can cross plain areas of several tens of kilometers. Pestov (pers. comm., 2019) mentioned that Urial in contrast to other ungulates are able to pass the barbed-wire border fences established from Kazakhstan without

obvious difficulties or harm. The Turkmenistan border fence of covered chain-link cannot be crossed by Urials, but there might still be areas where Urials can bypass the fence.
Importance of transboundary population: The patchy distribution of suitable habitats, the small size and carrying capacity of many of these habitat patches and low overall numbers make the Urial population's long-term survival highly dependent on transboundary connectivity.

Persian Leopard:
Population size: The site is so far not considered as permanent range area of the Leopard in any of the countries. During the last two decades three Leopards have been recorded in Mangystau Province, in the Kazakhstan part of the site or close to it. Since fall and winter 2018 a Leopard was repeatedly recorded on camera traps in Ustyurt SPA in Kazakhstan. Its remains were found in June 2021 near Beyneu, about 250 km straight line from the protected area. The closest known occurrence has been in the Great Balkhan in Turkmenistan, where tracks and remains of dead Leopards were found in 2017 (about 370 km). The distance from Ustyurt SPA to the western Kopet Dagh in southern Turkmenistan, where the Leopard lives at present, is at least 600 km. Two more Leopards were killed in Mangystau region in 2007 and 2015. (Pestov et al., 2019) Marmazinskaya (pers. comm. 2018) reported that she had observed possible Leopard tracks in the Uzbekistan part of the site.
Movements: Dispersing Leopards, mainly males, can cover distances of several hundred kilometers in search of new home ranges. Whether these individuals can establish new population nuclei depends on the dispersal of females, which are much less mobile, into such areas.
Importance of transboundary population: So far, the occurrence of single dispersing males does not yet form a transboundary population. These Leopards are nevertheless important as they can indicate the habitat suitability for the species and may in the long run become the colonizers of new areas if reproducing females reach such places naturally or assisted.

Saiga Antelope:
Population size: The site was, in the past, part of the range area of the Ustyurt population and still, in winter 1993-1994, 25,000 Saigas migrated to the Turkmenistan part of the site. With the rapid decline of this population, only single Saiga observations were recorded in the area since that time, in Turkmenistan latest in winter 2008-2009. CADI expeditions in 2012-2014 recorded saiga skulls in the Uzbekistan part of the site, west of Sarykamysh Lake (Marmazinskaya et al, 2012, Murzakhanov, pers. comm. 2019).
Movements: In the past the site has been the winter range for a part of the Ustyurt population and Saigas depending on the weather conditions migrated southwards beyond the border of Turkmenistan.
Importance of transboundary population: Currently the range area of the remaining Ustyurt population is too far away to make Saiga migration to the site likely. If the recovery of this population will also allow for the recolonization of range areas south-west of the Beyneu-Nukus road and railway cannot yet be predicted.

Conservation significance:
The site is of high significance for the conservation of at least three target species – Asiatic Wild Ass (Kulan), Goitered Gazelle and Urial. The latter two species have declining but still substantial population sizes. The status of Kulan appears highly critical, but compared with several other populations in Turkmenistan at the brink of extinction there is still a comparably high chance of survival of the species in the site. For Leopard and Saiga Antelope the area may become important under the most optimistic assumptions.

Protected areas status:
Kazakhstan: Ustyurt SPA; Kenderli Kayasanskaya Protected Zone;
Turkmenistan: Kaplankyr SPA, Sarykamysh Zakaznik, Shasenem Zakaznik;
Uzbekistan: Planned Southern Ustyurt SPA.

Barriers for migration:
Border fences: There is a border fence from Kazakhstan (chain-link) along the entire border of the country. At the section towards Turkmenistan, several openings exist. From the Turkmenistan side, the border fence is made from chain-link and covered by several lines of barbed wire, but there are still areas at Sarykamysh Lake without border fences, where animals can cross at least seasonally. There is no fence from the side of Uzbekistan. The fences cannot be crossed by Goitered Gazelle and Kulan; Urials can reportedly pass the Kazakhstan fence, but not the Turkmenistan fence (Pestov, pers. comm. 2019). Border guards reported that they had observed gazelles, which got injured and died as results of crossing attempts (Pestov, pers. comm. 2019). Furthermore, openings in the border fence from Kazakhstan to facilitate wildlife migration and the open section of the border fence from the Turkmenistan side reportedly allow gazelles and possibly Kulan to move into the area between the fences. In most sections the fences are only few hundred meters or less apart. Wildlife within this strip cannot escape to either side in the case of motorized border patrols and might be chased or jump into the fences, causing death or injuries.

Karashor lake (Altyn asyr): This planned artificial lake (N 40.826509° E 56.705714°) might become another barrier for wildlife movements and may have indirect negative impact. However, currently, not enough water is available to flood the area.

Other threats:
- Poaching: Despite low human population poaching is a serious threat to all target species across the site. Cross-border poaching takes place. Turkmenistan border guards poaching with search lights have been observed in Uzbekistan in the mid 2010-s (anonymous source, pers. comm. 2018). The rapid declines of Kulan, Goitered Gazelles and Urial in Turkmenistan can mainly be explained by poaching (Rustamov et al., 2015).
- Fishery: At Sarykamysh lake fishes are intensively harvested, which causes disturbance.
- Oil and gas industries: Exploration and extraction are a threat to the target species through disturbance, habitat degradation and direct persecution by staff of the companies. Exploration of gas fields adjacent to Ustyurt Zapovednik in 2015/2016 reportedly caused an immediate (temporary?) decline of Goitered Gazelle and Urial numbers due to disturbance (Pestov, SPA staff, pers. comm. 2016). In 2019 the state-owned gas company KazMunayGaz stated that the gas field will not be exploited.
- Climate change impact: The area is naturally already highly arid and Kazakhstan-wide observations and projections both suggest a further increase in aridity (GERICS, 2018). A drought throughout spring and summer 2021 brought almost all vegetation growth on hold and depleted forage and water sources for wild and domestic animals (Dieterich and Kozybakov, pers. comm. 2021).

Recommendations for action:
- Cross-border collaboration at expert and political level: Coordinated assessments and monitoring, exchange of information, lobbying of border security authorities and their collaboration;
- Modification of border fence in Kazakhstan: Based on the experience from Eastern Ustyurt the responsible border authority shall be lobbied to modify the border fence with sufficiently large openings and underpasses. Along the border with Turkmenistan such modifications need to be sufficiently frequent to allow animals escape from the strip between the fences of the two countries.
- Lobbying with Government of Turkmenistan and border authorities: The government should be further encouraged to implement measures for mitigation of the border fence. Focus should be (Rustamov et al., 2015) on the junction of the borders of the three countries and the Sarykamysh depression as well as Kazakhly Shor, Kara Shor and the area Kulantakyr, located in between.

- Anti-poaching: Enforcement of wildlife protection is difficult in this remote area and requires an increase in staff, involvement of local people, and work with border police in the three countries. Approaches of involvement of hunters interested in sustainable hunting opportunities and assignment of hunting grounds should be explored.
- Supporting of the planned Southern Ustyurt cluster protected area in Kazakhstan
- Supporting of Southern Ustyurt National Park in Uzbekistan

Site ID: 29 **Name:** Eastern Ustyurt **Countries:** Kazakhstan-Uzbekistan

Location:
Administrative:

- Kazakhstan, Mangystau, Atyrau (?) and Aqtobe Provinces;
- Uzbekistan, Karakalpakstan Autonomous Republic.

Geographic area:

- Range area of Ustyurt population of saiga
- Ustyurt between Atyrau-Nukus road and Aral Sea shore.

Coordinates: N 45.207123°, E 57.217359°

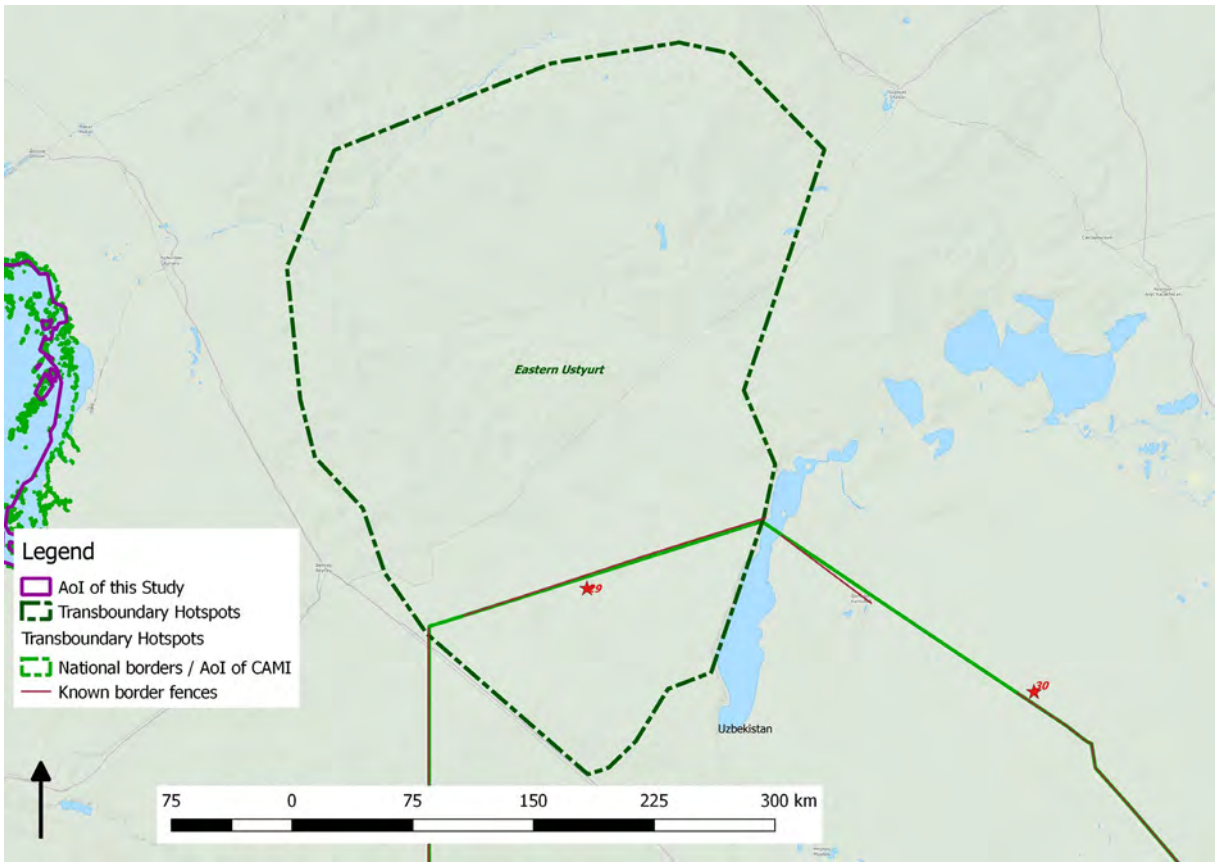


Figure 54: Location map of potential hotspot Eastern Ustyurt

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Turanian;
WWF Ecoregion (Olson et al., 2001): Central Asian northern desert;
Ecosystems/habitat types: Semi-desert, desert, steppe, mud and salt pans (*takyr* and *shor*).

Species:

Goitered Gazelle:
Population size: In the Kazakhstan part of the site according to various reports by local people the Goitered Gazelle is extinct since a cold and snowy winter around 1993 and did not recolonize the area (various statements to Kozybakov and Michel 2015-2019). Occurrence of Goitered Gazelles in the Uzbekistan part needs to be verified.
Movements: Despite the high mobility of the species no movements into Kazakhstan are known for the last decades.

Importance of transboundary population: There is currently no known transboundary population in the site.

Saiga Antelope:
Population size: The Ustyurt Saiga population experienced a continuous and massive decline during the last decades. The population went down from about 254.000 in the early 1990s to an estimated 1,270 in 2015 due to massive poaching and possibly the impact of new barriers to migration. Since then the numbers seem to recover. In spring 2019 with an estimated 5,900 individuals it still belonged to the smallest Saiga populations globally. According to the Ministry of Ecology, Geology and Natural Resources of Kazakhstan, by the estimates for pre-birth spring 2021 the population has now reached 12,000 animals. In the Uzbekistan part of the range area of the Ustyurt population Saiga observations declined since the erection of the border fence and almost ceased since the construction of the new railway, i.e. since 2013.
Movements: The Saigas seasonally migrate within their range area, with winter habitat in the south and summer habitat further to the north. After the construction of the border fence still movements of Saiga into Uzbekistan were recorded. Currently most of the Saiga range is within Kazakhstan north of the railway and so far, no crossings of this barrier have been documented (Zuther and Salemgareyev, pers. comm. 2019). During Saiga transects census survey in Uzbekistan in December 2017 were recorded only Saiga tracks, in comparison with the same period of 2016, when Saigas were seen on the same transects. In February 2019, Saigas and even their tracks in the snow were not found. (Zuther, Salemgareyev, Bykova pers. comm. 2019) Only recently small groups of Saiga Antelopes have been again observed in Uzbekistan, and in spring 2020 the first lambing was recorded (Gritsina et al., 2020, Mardonova et al., 2020). It is not clear how far these animals migrate and if they are connected with the population north of the railway.
Importance of transboundary population: The population had always been transboundary with substantial parts of the winter range and parts of the lambing sites being located in Uzbekistan. Currently these migrations ceased, which can be attributed to the combined impact of the new railway and low Saiga numbers. However, the transboundary migrations are essential for the long-term viability of the population. In the case of severe winters high losses are possible if Saiga cannot access southern winter ranges. For the recovery of the population a recolonization of the transboundary range areas will also likely be of importance.

Urial:
Population size: Occurring in low numbers in the chinks of the Kazakhstan part of the area in Mangystau and Atyrau Provinces.
Movements: Mobility in suitable habitats along relief structures.
Importance of transboundary population: There is currently no known transboundary population in the site.

Conservation significance:
The Saiga population of the site had in the past been globally significant due to its large size. It is currently in a critical stage but seems to recover. As one out of four populations of *Saiga tatarica* its conservation is of global significance. Cross-border migration does currently not happen, but is likely essential for the conservation of this population. The area is at the northeastern edge of the range area of Urial and has historically been part of the range are of Asiatic Wild Ass.

Protected areas status:
Kazakhstan: Section of Kyzylsay Provincial Natural Park;
Uzbekistan: Saigachy Landscape Reserve (*Zakaznik*)

Barriers for migration:
- Border fence from the side of Kazakhstan (erected 2011). In 2015, the design of the fence was modified based on the recommendations by K. Olson (2013) – migration

passages were opened in 125 sections of the 150 km border fence. Up to now, no data exists on the effectiveness of such passages, especially in a period with high levels of snow.

- New railway Shalkar-Beyneu (built 2012-2014, used since 2015) became a serious barrier for the movements of Saiga to the south during migration. According to ground and aerial monitoring, since 2016 no Saigas have been observed south of the railway (Zuther, Salemgareyev, Bykova pers. comm. 2019). The railway is currently avoided by Saiga Antelopes, but by its constructive features possible to be passed, while the functioning of special overpasses remains doubtful.

Other threats:

- Poaching: mainly opportunistically for meat, less focused on males for selling horns.

Existing or planned transboundary activities:

- Agreement between Kazakhstan and Uzbekistan since 2010, but dormant.

Recommendations for action:

- Strengthening bilateral cooperation between Kazakhstan and Uzbekistan within the framework of the cooperation agreement signed in 2010;
- Strengthening the fight against poaching;
- Continuous monitoring of Saiga population trends, movements and impact of railway and border fence and evaluate existing mitigation measures (at both railway and fence) and continue/expand Saiga satellite tracking;
- If necessary, adaptation of railway overpasses, temporary traffic stops for the railway (at nighttime) and turning off light along the railway and further modification of the fences to ease crossing by Saigas;
- Lobbying for the creation of a migration corridor or other protected area in Kazakhstan, addressing as well safe crossings of the railway and the border fence.
- Development of community-based Saiga conservation across the population's range area with the perspective of sustainable use options benefiting local land users and making them responsible for Saiga conservation.
- Strengthening the effectiveness of the Saigachiy wildlife reserve (e.g. organizing well-protected watering places, installing additional street signs indicating borders of the reserve, working with local people, interacting with law enforcement agencies, cross-border cooperation).
- Organizing a transboundary rangers meeting, invoving also community rangers;
- Continuation of Asiatic Wild Ass (Kulan) reintroduction with improved methodology, such as the use of adaptation enclosure;
- Improving monitoring after the reintroduction including satellite tracking;
- Raising awareness of local communities regarding wildlife monitoring;
- Establishment of a working group on Ustyurt based on the experience of the bilateral working group on Syrdarya between Kazakhstan and Uzbekistan;
- Support of the Memorandum for Cooperation on Wildlife Conservation on Plateau Ustyurt with fundraising efforts, capacity building and expert advise to develop and implement conservation activities;
- Establishment of an Ustyurt Working Group, similar to the existing Syrdarya Workding Group.

Site ID: 30 **Name:** Aral Sea / Western Kyzylkum Desert **Countries:** Kazakhstan-Uzbekistan

Location:
Administrative:

- Kazakhstan, Kyzylorda Province;
- Uzbekistan, Karakalpakstan Autonomous Republic.

Geographic area:

- Western part of Kyzylkum desert, eastern part of dry Aral Sea bottom, incl. former islands Barsa Kelmes and Vozrozhdenie.

Coordinates: N 44.642783°, E 60.664708°

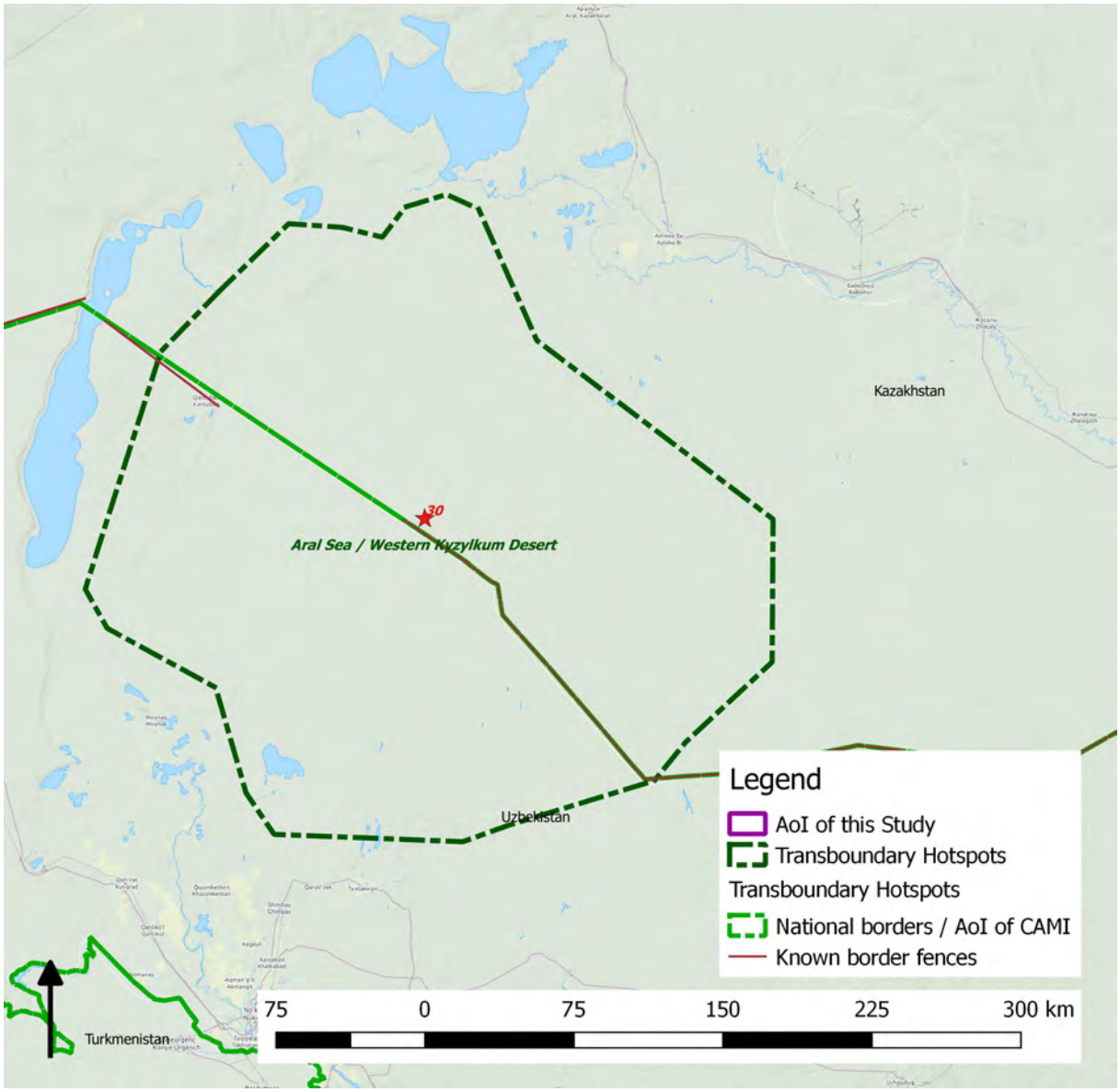


Figure 55: Location map of potential hotspot Aral Sea/Western Kyzylkum Desert

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Turanian, Aral Sea;
WWF Ecoregion (Olson et al., 2001): Central Asian northern desert;
Ecosystems/habitat types: Semi-desert, desert, mud and salt pans (*takyr* and *shor*), wetlands.

Species:

Asiatic Wild Ass:
Population size: Kulan had been introduced from Badkhyz to the island Barsa Kelmes between 1953 and 1963 (Kaczensky and Salemgareyev, 2019). Around 2000, the island became connected with the mainland and the Kulan spread over parts of the dry sea ground and former island KaskaKulan at the eastern shore. In 2005 the population size was 179[9]. Currently the Kulan population along the former Aral Sea shore is estimated at around 500, but systematic surveys have not been possible (Kaczensky, pers. comm. 2019).
Movements: The Wild Asses rely on water and visit artesian wells in the range area, in particular at KaskaKulan, but roam in a large area, including the former island Barsa Kelmes. In April 2019 three female Kulan were captured and equipped with satellite GPS collars. Locations of the first ten days showed movements within an area of about 2,500 km² (Kaczensky and Salemgareyev, 2019).
Importance of transboundary population: So far there is no evidence that the Kulan cross into Uzbekistan. Such movements may have happened undetected or may happen in the future and lead to the establishment of a transboundary population. The current population in and around Barsa Kelmes SPA is the second largest population of the subspecies.

Goitered Gazelle:
Population size: Goitered Gazelle numbers are not known for the larger area. About 50 gazelles had been present at the former island Barsa Kelmes in 2005[10]. On the mainland further to the east Pestov et al. (pers. comm. 2019) in 2019 observed only one single Goitered Gazelle despite intensive search and assumed that the population density must be extremely low. T. Dieterich (pers. comm. 2021) during an expedition in the frame oif CADI in May 2021 along the entire border observed <10 gazelles, but found tracks at several locations.
Movements: Goitered Gazelles have been known to be mobile over large areas of the Kyzylkum Desert. Low population density makes it currently difficult to assess movements. The border fence between Kazakhstan and Uzbekistan likely hinders transboundary movements, possibly much restricting these to the unfenced part of the dry sea ground.
Importance of transboundary population: The existence of a transboundary population was confirmed by tracks detected by T. Dieterich (pers. comm. 2021) crossing the border at several locations. Long-term conservation of Goitered Gazelle in the Kyzylkum would require connectivity of the population across the national border.

Saiga Antelope:
Population size: The site is the range area of two introduced Saiga populations at the former islands Barse Kelmes and Vozrozhdenie. After Barsa Kelmes became connected with the mainland the Saiga left it. 155 Saigas were recorded at the peninsula Barsa Kelmes in 2005[11]. There are still Saigas near the former Aral Sea shore, but the population size and trends are not known. In Uzbekistan Saigas had been introduced to Vozrozhdenie Island. During 2007-2010 at least 100-150 Saigas occurred there, fresh tracks have been confirmed at the island and adjacent sea ground in 2015 and 2017 (Sherimbetov, presentation 2019). More recently in February 2020 about 100 Saigas had been observed on the peninsula and during winter 2019-2020 several groups of 15-20 animals were seen in the saxaul plantations on the dry sea bottom (Gritsina et al., 2020).
Movements: The introduced Saiga populations appear rather sedentary. The population at former island Vozrozhdenie and its surroundings is transboundary between Kazakhstan and Uzbekistan. Movements of the population at the eastern Aral Sea shore from Kazakhstan into Uzbekistan are not known.

[9] https://geosfera.org/aziya/kazaxstan/2167-barsakelmesskiy-zapovednik.html
[10] https://geosfera.org/aziya/kazaxstan/2167-barsakelmesskiy-zapovednik.html
[11] https://geosfera.org/aziya/kazaxstan/2167-barsakelmesskiy-zapovednik.html

Importance of transboundary population: Both populations of Saiga are small and of rather scientific interest than of importance for the conservation of the species. It would be of particular interest to study the trends of these populations, limiting factors, and – if growth can be achieved – if such introduced populations become migratory once they grow above a certain number.

Conservation significance:
The area is of highest significance for the conservation of Kulan, due to its population size, the potential of the population to be used as source populations for introduction and the available habitat for further population growth. It is also important for the conservation of Goitered Gazelle in the Kyzylkum desert although current population density is apparently low and limiting factors are poorly understood. The conservation significance of the two very small introduced saiga populations is rather low. The Severtzov's Argali *Ovis ammon severtzovi* occurs in the Kyzylkum of Uzbekistan, but the range area is far from the border and there are no areas with potential for transboundary conservation of this species.

Protected areas status:
Kazakhstan: Barsa-Kelmes SPA with three sections – former island Barsa Kelmes, former island KaskaKulan and surrounding areas, peninsula at Northern Aral Sea, recognized as UNESCO Biosphere Reserve in 2016;
Uzbekistan: Section of Sudochye-Akpetki Reserve (*zakaznik*).

Barriers for migration:
- A border fence from Kazakhstan forms a barrier across the entire Kyzylkum Desert;
- At the eastern part of the Aral Sea ground with former islands Barsa-Kelmes and Vozrozhdenie no artificial physical barriers exist. However, there are unconfirmed rumors about the construction of a fence on Vozrozhdenie by Kazakhstan. This need to be checked, but it is still impossible to navigate well on the land of a former bottom of Aral Sea.
- Larger sections of the former sea bottom may form barriers for movements of ungulates, at least in wet periods.

Other threats:
- Poaching is an issue at least at Vozrozhdenie (Bykova and Esipov, pers. comm., 2019; Sherimbetov, presentation 2019), but it likely occurs across the entire site, although Barsa Kelmes SPA has at least managed to control poaching of Kulan at a level that permits population growth;
- Livestock grazing might locally cause competition for water and forage and habitat degradation;
- Commercial harvest of *Artemia salina* in the Aral Sea may cause some localized disturbance;
- Afforestation (saxaul forest) at the former bank of Aral Sea;
- Expansion of the network of canals at the former Aral Sea (Kazakhstan);
- Human, infrastructure and industrial development.

Existing or planned transboundary activities:
- Development of transboundary projects in the area of eastern Aral Sea with former islands Barsa-Kelmes and Vozrozhdenie, possibly across the entire Kyzylkum east to Lake Aydar. (It is not clear if there is already any specific planned or ongoing initiative.)

Recommendations for action:
- Continuation of Kulan research in and around Barsa-Kelmes SPA;
- Continuation of research on the status of the gazelle and Saiga population near Aral Sea with Barsa-Kelmes / Resurrection Island and impact of current development on these;

- Continuation of monitoring of the border fence with camera traps from the Kazakh side and launch monitoring from the Uzbek side Conduct research on the state of Goitered Gazelle in the Kyzylkum;
- Evaluation of possibilities for creating further protected areas or expanding Barsa Kelmes SPA and supporting the conservation measures in this SPA;
- Evaluation of posisblity of establishing new PAs from Kazakh side, bordering with Uzbek PAs in Navoi province (Central Kyzylkum NP, Tamdy-Aktau SPA)
- Joint Kazakh-Uzbek research expedition in Central Kyzylkum;
- Evaluation of posisblities of reintroductions of Kulans in the newly established Uzbek PAs.

Site ID: 31 **Name:** Eastern Turkestan Range **Countries:** Kyrgyzstan-Tajikistan-Uzbekistan

Location:
Administrative:

- Kyrgyzstan, Batken Province;
- Tajikistan, Sughd Province;
- Uzbekistan, Fergana Province.

Geographic area:

- Hissaro-Alai system (eastern Turkestan and Zarafshon ranges, including northern piedmonts).

Coordinates: N 39.596297°, E 70.542251°

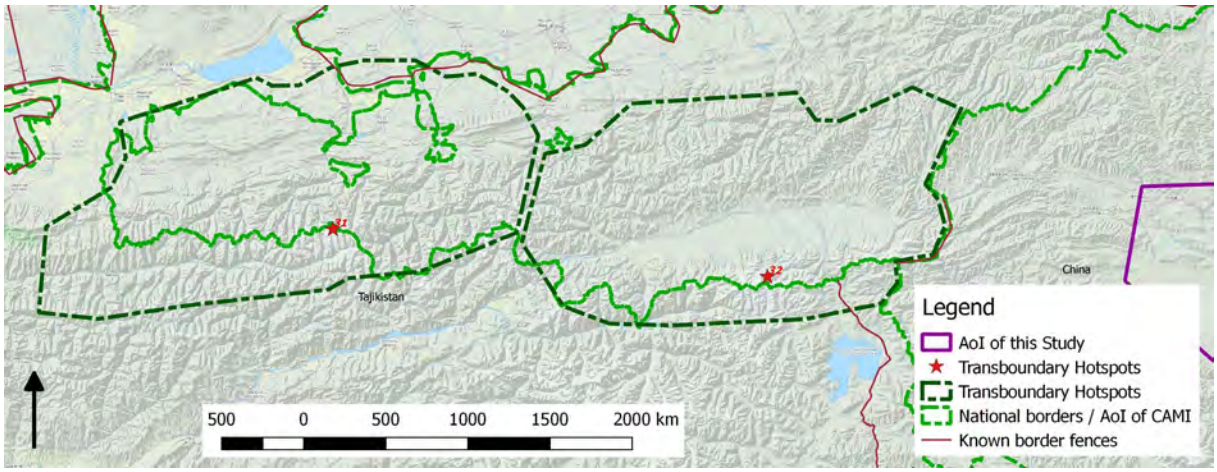


Figure 56: Location map of potential hotspots Eastern Turkestan Range and Pamir-Alay

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan highlands;
WWF Ecoregion (Olson et al., 2001): Pamir alpine desert and tundra, Gissaro-Alai open woodland;
Ecosystems/habitat types: High mountains, mountain grassland, juniper woodland, deciduous woodland, dry steppe, arable lands.

Species:

Argali (Severtzov's sheep)
Population size: The range area of Severtzov's Argali *Ovis ammon severtzovii* in these mountain ranges had not been reconfirmed until 2010. In May 2011 Davletbakov and Musaev (2012) recorded six groups of Argali, consisting of 37 animals in the foothills of Zarafshon range. One of these groups was recorded at the border with the Uzbekistan enclave Sokh. In Tajikistan local people in the upper Zarafshon valley in 2011 talked to experts from the NGO NBCUT about Argali occurrence and presented old skulls. In 2014 there one female with two lambs was observed (data by NBCUT and Tajikistan Mountain Ungulates Project). Further search in 2018 and 2019 did not yield any records and possibly Argali is extinct there now.
Movements: Local people at the site talk about seasonal vertical movements of the Argali, but no specific information is available.
Importance of transboundary population: The Argali in the northern foothills use transboundary habitat, given the mosaic of national borders in this area. But border fences may impede these movements. If the Argali observed in Tajikistan belonged to a transboundary population is not clear as the border between Kyrgyzstan and Tajikistan is formed by the high ridge of the

Zarafshon Range, which in this area may be a natural barrier. The population of Severtzov's Argali is likely extremely small, compared to the core population in Uzbekistan's Nuratau SPA, which is estimated consisting of around 1,500 animals (Beshko, pers. comm. 2016). The population at the site is important as isolated population of this subspecies and in the case of extinction natural recolonization is highly unlikely. Except the core population in the Nuratau SPA only five other small and isolated populations of this very distinctive Argali subspecies are known.

Snow Leopard:
Population size: The population size in the site is not known and the site is indicated in the CAMI Atlas as "possibly extant". Camera trap research in 2018 (Karimov et al., 2018) confirmed the presence of at least three individual Snow Leopards at the northern slope of Zarafshon Range at a rather limited research area of 13 camera traps.
Movements: Given the location of the national border between Kyrgyzstan and Tajikistan movements across this border may occur regularly.
Importance of transboundary population: The population is likely entirely transboundary between Kyrgyzstan and Tajikistan. It might not be significant in terms of numbers, but as important link between the populations of the western Hissaro-Alai system and the Pamirs.

Conservation significance:
Despite comparably low animal numbers the site is of conservation significance – as remote and isolated habitat of a small population of Severtzov Argali and as linking element of Snow Leopard populations and range areas. The site covers sections of the GSLEP Landscape "Alay-Hissar".

Protected areas status:
None

Barriers for migration:
There might be at least partly border fences at the enclaves of Tajikistan and Uzbekistan in the lower parts of the mountains. The main ridge of Turkestan Range may form a natural barrier for Argali.

Other threats:
- Livestock grazing: The site, in particular in Tajikistan and in the northern piedmonts is intensively grazed by livestock. Locations at lower elevation and close to villages are year-round or winter grazing sites, at higher elevations summer pastures are used by large herds of livestock from other regions. Grazing takes place up to the highest ridges and has adverse impact on the target species through forage competition, habitat degradation, disturbance by people and dogs and conflict between herders and carnivores.
- Poaching: Ungulate densities appear below carrying capacities despite intensive grazing. This and the shyness of ungulates indicate substantial poaching. The decline and possible local extinction of Severtzov's Argali can likely be attributed to poaching.

Existing or planned transboundary activities:
- The site is part of the GSLEP Snow Leopard Conservation Landscape Landscape "Alay-Hissar" and is planned to be included in transboundary monitoring and conservation activities under GSLEP.

Recommendations for action:
- Intensified and coordinated monitoring of the target species;
- Anti-poaching efforts, in particular through the development of community-based wildlife management (currently one such local NGO active in the upper Zarafshon Valley in the Turkestan and Zarafshon Ranges);

- Measures for addressing herder carnivore conflict;
- Regulation of grazing is desirable but would be very hard to achieve.

Site ID: 32 **Name:** Pamir-Alai **Countries:** Kyrgyzstan-Tajikistan

Location:
Administrative:
- Kyrgyzstan, Osh Province;
- Tajikistan, Gorno-Badakhshan Autonomous Province;

Geographic area:
- Transalai and Alai ranges, Alai valley.

Coordinates: N 39.396534°, E 72.938290°

Map: *see Site 31(Figure 56)*

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan highlands;
WWF Ecoregion (Olson et al., 2001): Pamir alpine desert and tundra, Gissaro-Alai open woodland;
Ecosystems/habitat types: High mountains, mountain grassland, juniper woodland, deciduous woodland, dry steppe.

Species:

Argali
Population Size: In the Pamirs of Tajikistan Argali is abundant with 23,700 Argali recorded in several sections of the entire area in 2009, and at least around 5,000 animals Marco Polo present in the areas close to the border with Kyrgyzstan. At the northern slope of the Transalai Range in Kyrgyzstan hardly any Argali occur, likely due to poaching until recently. In the south-west of the site few hundred or less Argali exist in a hunting concession according to local sources. No recent Argali occurrence is known from the northern part of the site, the Alai Range.
Movements: Argali are migrating on the high Pamirs, but rarely move through lower elevations with more dense human population and intensive livestock grazing. The Alai Valley seems to be a rarely crossed barrier for Argali movements and may represent the boundary between Marco Polo sheep *Ovis ammon polii* and Tian Shan Argali *O. a. karelini* (Davletbakov, pers. comm. 2011). Local hunters report irregular movements of Argali from Tajikistan into Kyrgyzstan at the northern slope of the Transalai range.
Importance of transboundary population: The population is only in a limited extent transboundary and the border between Kyrgyzstan and Tajikistan is located at or close to a natural geographic and related land-use boundary, which might also form the range area boundary of Argali.

Snow Leopard:
Population size: The Tajikistan part of the site belongs to the larger Snow Leopard range area in the Pamirs. Only few Snow Leopards were recorded by camera traps in the site, all in the northern slope of Transalai Range in the South of the site. The northern part, the Alai Range is also indicated as probable Snow Leopard range area in the CAMI Atlas and Taubmann et al. (2015) based on interviews modelled there a high probability of site use in 2010 by Snow Leopard.
Movements: No information about regular movements is available for the site.
Importance of transboundary population: The population is likely entirely transboundary between Kyrgyzstan and Tajikistan. It might not be significant in terms of numbers, but forms an important link between the Snow Leopards in the western Hissaro-Alai system and the Pamirs.

Conservation significance:
The site has currently very limited significance for Argali conservation, as it has only low numbers of the species, but is located in the vicinity of one of the most numerous populations of the species. T. Rosen (pers. comm., 2019) stated that the site is not a hotspot for Snow Leopard. Despite comparably low individual numbers the site is of conservation significance as linking element of Snow Leopard populations and range areas. The site covers sections of the GSLEP Landscapes “Alay-Hissar” and “Pamir”.

Protected areas status:
Kyrgyzstan: Three community-based wildlife management areas;
Tajikistan: Tajik National Park, recognized as natural World Heritage Site by UNESCO

Barriers for migration:
There are no border fences in the site, except towards China. The ridges and peaks of the Transalai Range are natural barriers.

Other threats:
- Poaching: Ungulate densities are below the carrying capacity and poaching incidents, including trapping of Snow Leopards, have been reported by community members. With the development of three community-based conservancies in the Kyrgyzstan part of the site poaching was much reduced, as indicated by increasing ungulate populations, but has not entirely ceased within the conservancy areas and is still an issue outside of these;
- Trophy hunting: One area in the west of the site is assigned as hunting concession to a commercial company. While the protection efforts and performance of the company cannot be assessed with the available information, it seems that hunters from the local communities feel alienated by this commercial operation of outsiders and may thus feel legitimized to poach (Community members in Sarytash, pers. comm. 2016).
- Livestock grazing: The intensity of grazing only locally may cause forage competition and habitat degradation.
- Mining: In at least two locations mining operations (coal, gold) are active. Local people in Chak village resisted gold mining due to environmental and safety concerns, but since 2018 mining has started, and so far, adverse impact seems limited if any (Community members of Chak, pers. comm. 2018).

Existing or planned transboundary activities:
- The area is considered as part of the GSLEP Snow Leopard Conservation Landscapes “Alay-Hissar” and “Pamir” and is planned to be included in transboundary monitoring and conservation activities under GSLEP;
- With assistance from international NGOs, the Kyrgyz customs service has been trained and provided with sniffer dogs to detect illegally traded wildlife products (e.g., from Argali, Asiatic Ibex, and Snow Leopard). In 2017, customs detected a party of illegally hunted and exported trophies of Argali and Asiatic Ibex from Tajikistan.

Recommendations for action:
- Community-based wildlife conservation: Step up anti-poaching efforts, in particular through the further development of community-based wildlife management. This requires that for the areas currently protected by local community-based NGOs and assigned to these in 2020 as game management areas hunting quotas for Asiatic Ibex are allocated in accordance to the population size;
- Livestock grazing: In the current intensity livestock grazing seems to have no substantial negative impact. Grazing intensity, seasonal and spatial patterns should be monitored and regulated if necessary. In case of conflict with carnivores, avoidance and mitigation activities should be implemented.

Site ID: 33 **Name:** Eastern Sayan **Countries:** Mongolia-Russian Federation

Location:

Administrative:

- Mongolia, Khovsgol Aimag;
- Russian Federation, Tuva Republic, Tere-Khol District and Buryatia Republic, Okinsk District.

Geographic area:

- Eastern Sayan Mountains, incl. Khovsgol area.
- Bolshoy Sayan, Munku Sardyk, Khovsgol;
- Specific important areas to be determined!

Coordinates: N 52.040283°, E 98.815337°; Specifically recommended by Poyarkov (pers. comm. 2019): N 52.000°, E 99.225° (Bolshoy Sayan); N 51.730°, E 100.581° (Munku Sardyk)

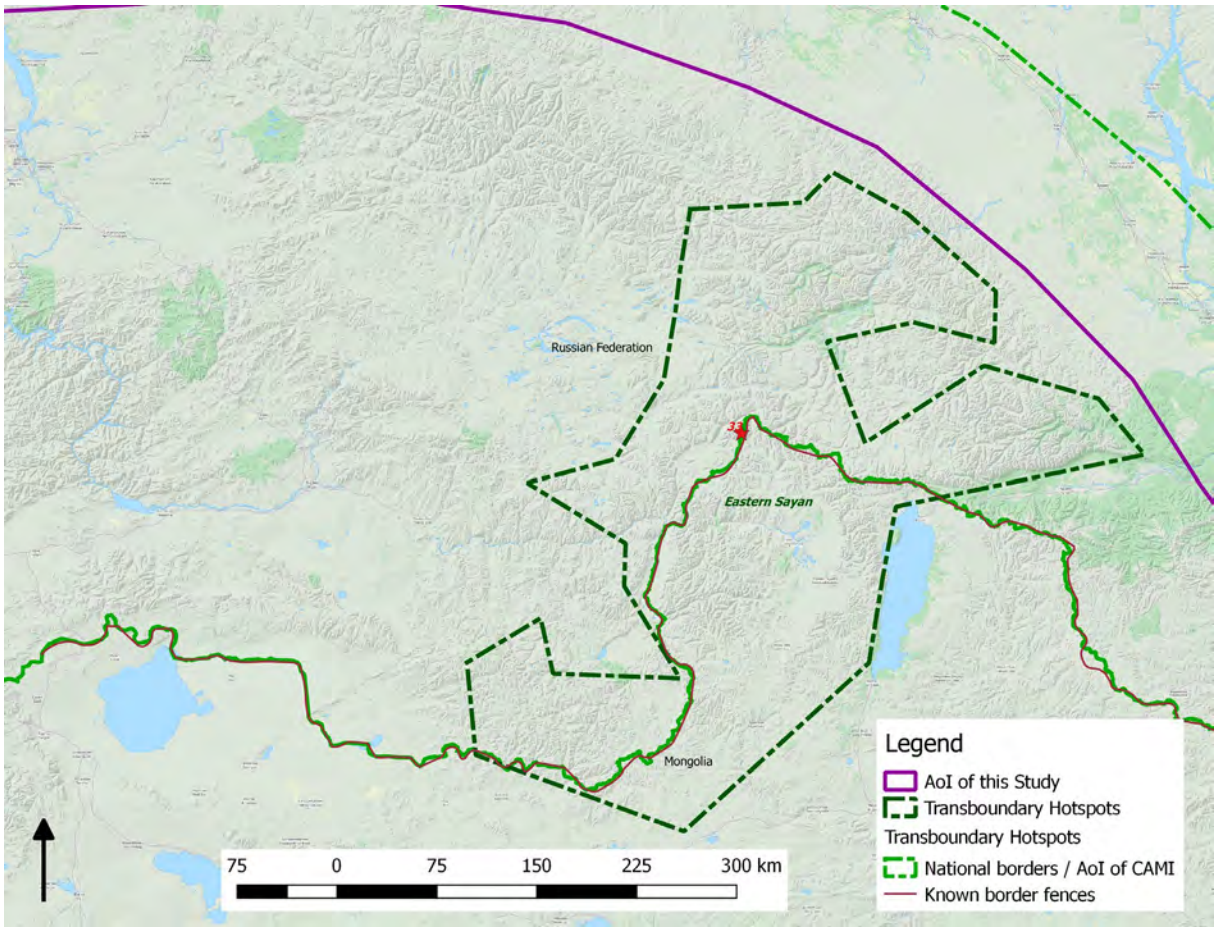


Figure 57: Location map of potential hotspot Eastern Sayan



Figure 58: Map of Snow Leopard occurrence in the site (Source Nyhus et al., 2015)

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Altai Highlands;
WWF Ecoregion (Olson et al., 2001): Sayan alpine meadows and tundra, Sayan montane conifer forests, sayan intermontane steppe, Selenge-orkhon forest steppe;
Ecosystems/habitat types: Alpine meadows, mountain tundra, mountain steppe, mountain woodlands and coniferous forests.

Species:

Argali
The range area of the species as indicated in the CAMI Atlas includes the site. The website of Tunkinskiy National Park[12] in Russian Federation also mentions the species, despite there is no overlap between the mapped range area and the park boundaries. The WWF (2017) Argali survey states that Argali nowadays occur only in other parts of the Altay-Sayan Ecoregion. The National Mountain Ungulate Survey 2009 in Mongolia (Harris et al., 2010) did not provide figures for Argali in Khovsgol Aimag and did not show any Argali distribution units there, but mentioned the species for Khoridol-Saridag SPA within the site.
Movements: The Argali are likely connected with groups in range area patches of the Altai to the west and the Tarvagatai to the south. The CAMI Atlas indicates a border fence between Mongolia and Russian Federation. So transboundary movements of Argali might be limited.

[12] http://www.tunkapark.ru/fauna/

Importance of transboundary population: The population is likely small and possibly currently not transboundary. Given the small range area patches, it is possible that Argali presence is only maintained by immigrating animals from other range areas.

Snow Leopard:
Population size: The Snow Leopard is indicated for the site in the CAMI Atlas, mainly as "probably extant". It is further mentioned in the website of Tunkinskiy NP[13] and on several websites about Azas SPA[14]. Nyhus et al. (2016) indicate most of the site as "Potential Snow Leopard Habitat" and the immediate border region between the southwestern part of Burytia and Khovsgol Aimag as "Optimal Habitat (Known Snow Leopard Populations)". Another such habitat patch is indicated in the southeast of Tuva, near the border with Mongolia. No population figures are available.
Movements: The Snow Leopards in the area must be connected with Snow Leopards in other range area patches. The range area indicated in Nyhus (2016) shows that transboundary movements are certainly assumed.
Importance of transboundary population: The conservation of Snow Leopard populations in the site is only possible if the transboundary connectivity with other Snow Leopard range areas is maintained.

Conservation significance:
The site has likely only small populations of the two occurring target species. It is of conservation significance as marginal range area.

Protected areas status:
Mongolia: Khoridol-Saridag SPA, Ulaantaiga SPA
Russian Federation: Azas SPA, Tunkinskiy NP

Barriers for migration:
The CAMI Atlas indicates the existence of a border fence. Poyarkov (pers. comm., 2019) mentions that border fences are currently erected mainly by the Mongolian side.

Other threats:
- Poaching of Argali and Snow Leopard (Poyarkov, pers. comm. 2019);
- Snow Leopard as occasional bycatch of illegal musk deer snaring (Poyarkov, pers. comm. 2019);
- Over-hunting of ungulates causes prey depletion for Snow Leopard (Poyarkov, pers. comm. 2019);
- Increase in livestock numbers and resulting habitat degradation, forage competition with Argali and replacement of wild ungulates, human-wildlife conflict (Snow Leopard) and potentially disease transmission (Poyarkov, pers. comm. 2019);
- Fragmentation of range areas and populations make local extinctions highly likely, while recolonization is hampered by border fences and remoteness from potential source populations.

Recommendations for action:
- Intensified transboundary collaboration;
- Status assessment of the target species with determination of conservation potential, threats and options to address these;
- Implementation of the conservation measures recommended in the Strategy for the conservation of Snow Leopard in Russian Federation (Istomov et al., 2015).

[13] http://www.tunkapark.ru/fauna/
[14] http://www.ecotravel.ru/regions/reserves/1/17/116/;
http://oopt.aari.ru/oopt/%D0%90%D0%B7%D0%B0%D1%81

- Establishment of protected area in the Eastern Sayan of Russian Federation, in Mongolia in Khovsgol region protected areas are functional (Poyarkov, pers. comm. 2019);
- Regulation of livestock grazing;
- Increase of anti-poaching efforts;
- Removal or mitigation of border fences in critical areas.

Site ID: 34 **Name:** Western Hissar Mountains **Countries:** Tajikistan-Uzbekistan

Location:
Administrative:

- Tajikistan, Sughd Province and Districts of Republican Subordination;
- Uzbekistan, Kashkadarya and Surkhandarya Provinces.

Geographic area:

- Western section of the Hissaro-Alai mountain range.

Coordinates: N 38.995356°, E 68.027545°

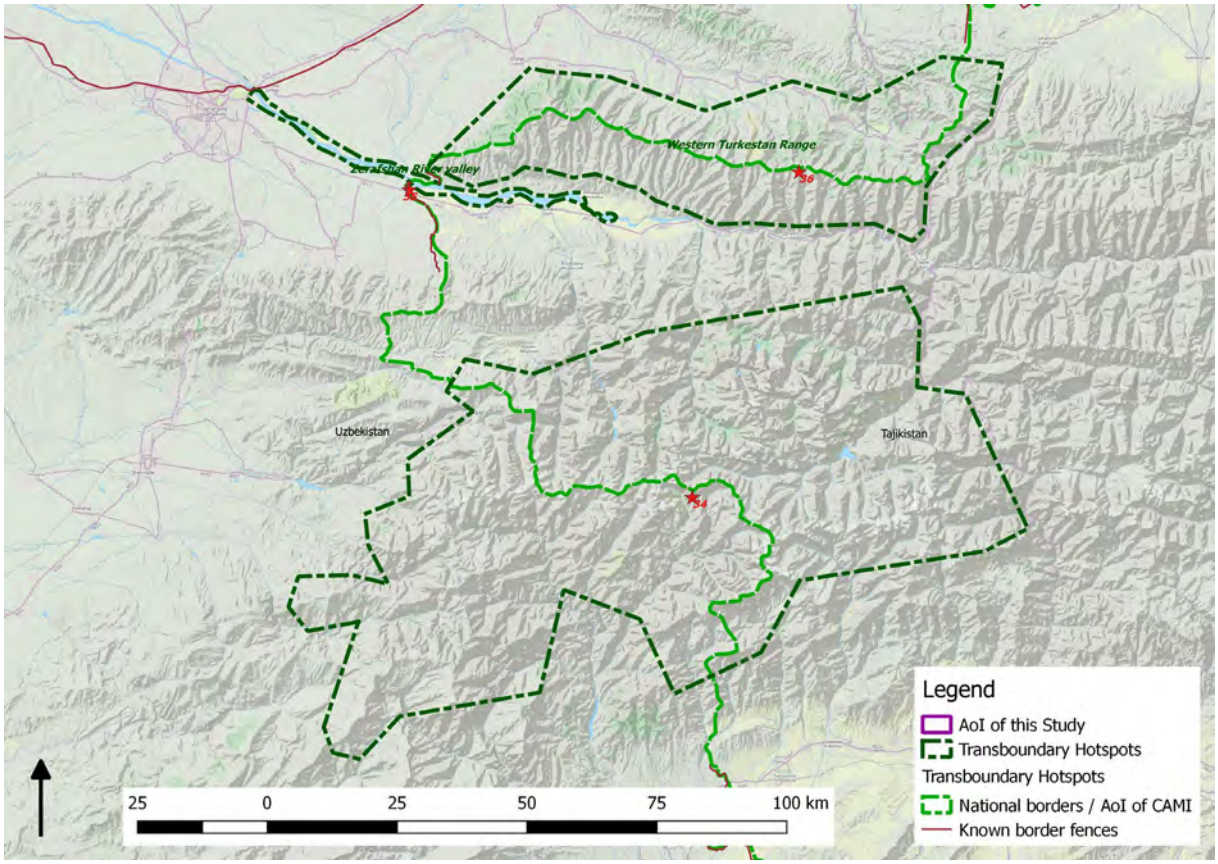


Figure 59: Location map of potential hotspots Western Hissar Mountains, Zarafshon River Valley and Western Turkestan Range

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Gissaro-Alai open woodlands, Pamir alpine desert and trundra;
Ecosystems/habitat types: Alpine meadows, mountain dry steppe, sparse xerophytic shrubs, woodlands.

Species:

Snow Leopard:
Population size: Snow Leopard has been confirmed from the Tajikistan part (three camera trap pictures and more scats in different areas; Amirov and Karimov, 2014) and from Uzbekistan's Hissar SPA (camera trap records of at least two individuals in six events in 2013 and 2014, Nyhus et al., 2016). In Nyhus et al. (2016) guesstimates of 23-25 Snow Leopards for the Hissar

SPA are presented, which might be an overestimate, even if assuming that these figures refer to the entire transboundary population. Fourteen visual encounters with cubs were recorded between 1981 and 2014 (Nyhus et al., 2016). In 2018, rangers of Hissar SPA detected two cubs without mother and took them into custody of Tashkent Zoo. These cubs were the most recent evidence of a reproducing population at the site (UNDP project staff, pers. comm. 2018).
Movements: The site represents an edge of the Snow Leopard range area and their current presence relies on movements and exchange across a larger range area.
Importance of transboundary population: The population is certainly transboundary and can only survive in the mid and long term if connectivity with the larger range area of Snow Leopard is maintained.

Conservation significance:
Only one target species is present. The site represents an edge of the Snow Leopard range and population size is likely small, but reproduction is confirmed. As extinction often starts at the periphery of range areas, its conservation is of significance for Snow Leopard conservation in general. The site covers parts of the GSLEP Landscape "Alay-Hissar".

Protected areas status:
Tajikistan: Shirkent National Park, *Almosi Zakaznik*;
Uzbekistan: Hissar SPA.

Barriers for migration:
The border fences along the border between Tajikistan and Uzbekistan are limited to lowland areas and do not affect the site. There are currently no known barriers at the site.

Other threats:
- Poaching: The major limiting factors for Snow Leopards are direct persecution and low populations of prey species. Poaching of the main prey species at the site, the Asiatic Ibex impacts the prey availability.
- Livestock grazing: The site, including the protected areas, is almost entirely used for livestock grazing, locally by large flocks of sheep and goats moved on high altitude pastures during summer season as well as intensive year-round grazing closer to villages. Degradation of vegetation is noticeable in several areas, forage competition with wild ungulates and herder-Snow Leopard conflicts are issues across the site.

Existing or planned transboundary activities:
- The area in parts overlaps of the GSLEP Snow Leopard Conservation Landscape "Alay-Hissar" and is planned to be included in transboundary monitoring and conservation activities under GSLEP.

Recommendations for action:
- The establishment of a National Park with large core zones and wilderness zones without livestock grazing should be pursued in the areas with low human density and less intensive land use between Hissar SPA and the border with Tajikistan, incl. Tupalang Valley.
- Community-based conservation initiatives and wildlife management may reduce poaching of Ibex and develop local capacity for addressing conflict.
- Livestock grazing needs to be better regulated and grazing restrictions in protected areas have to be effectively enforced.
- Address herder-Snow Leopard conflict by preventive and mitigation measures.
- Transboundary collaboration between scientists, protected areas, communities and tourism managers in the spheres of wildlife monitoring, coordinated conservation activities and law enforcement as well as conservation-friendly tourism development.

Site ID: 35 **Name:** Zarafshon river valley **Countries:** Tajikistan-Uzbekistan

Location:
Administrative:

- Tajikistan, Sughd Province;
- Uzbekistan, Samarkand Province.

Geographic area:

- Zarafshon river valley between Jomboy and Husar.

Coordinates: N 39.520217°, E 67.404043°

Map: see Site 34 (Figure 59)

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Alai-Western Tian Shan steppe, Gissaro-Alai open woodlands;
Ecosystems/habitat types: Riparian forests, woodlands and reeds, poplar plantations, orchards, irrigated arable lands.

Species:

Bukhara Deer:
Population size: The Bukhara Deer population is introduced and has two sources of origin. In the 1980s an enclosure had been established in Tajikistan and during the civil war the deer were intentionally or unintentionally released from there and established a small transboundary population. In Uzbekistan, close to the headquarters of Zarafshon Strict Nature Resere an enclosure had been erected in the late 1990s for breeding and further reintroduction. The founder population had been 2 stags from Kyzylkum Strict Nature Reserve and 4 females from Baday-Tugay Strict Nature Reserve. Later, several more deer from Kyzylkum Strict Nature Reserve were added. The herd was not actively managed and inbreeding is highly likely. Deer were released from this enclosure in 2005 and 2007. The natural park administration guesses the size of the wild population at around one hundred animals, but this number is not based on robust estimates and the real population size might be lower (Michel, 2018). In 2018, within one morning, Michel observed up to ten Bukhara Deer in Tajikistan close to the border with Uzbekistan and recorded tracks more than 10 km upstream. Official sources stated the size of the Tajikistan/transboundary subpopulation with 12 to 20, which seems to be much below the real population size (Michel, 2018). CMS Secretariat (2020) reported 100 Bukhara Deer in the western part and another 60-150 further to the east, transboundary between Uzbekistan and Tajikistan as well as 24 in pens in Uzbekistan.
Movements: At the site the deer move across the entire riparian area and also visit orchards and arable lands for grazing. Large areas in Zarafshon Natural Park without any signs of Bukhara Deer presence indicate an overall small and possibly functionally fragmented deer population with two core areas – one in the downstream part in the western section, and a second one in the upstream areas of the eastern part, probably mostly using habitat outside of the natural park (tree plantation right of Pravoberezhniy canal) and in Tajikistan (Michel, 2018). The two subpopulations are divided by larger less suitable open gravel areas with few shrubs, which are rarely crossed (Marmazinskaya, pers. comm. 2018).
Importance of transboundary population: The Bukhara Deer using the riparian habitats in Tajikistan and close to the border in Uzbekistan regularly cross the border and rely on transboundary habitat. Given the small overall size of the site, the limited available suitable habitat and the limited number of founders the Bukhara Deer population of the site should be managed as one transboundary population.

Conservation significance:
The site represents an isolated Bukhara Deer population and unique riparian ecosystem. Conservation of Bukhara Deer at the site requires transboundary collaboration and the positive development of bilateral relations between the two countries allow for such collaboration.

Protected areas status:
Tajikistan: Zarafshon Zakaznik
Uzbekistan: Zarafshon NP

Barriers for migration:
The border fences between Uzbekistan and Tajikistan are located outside of the riparian areas and do not impact on Bukhara Deer migration. The diversion weir at the border between Uzbekistan and Tajikistan and larger irrigation canals form potential local barriers, but are bypassed (weir) or crossed (canal). Larger sections of the river valley with open gravel areas or narrow sections without riparian plains form natural barriers, which may in some extent hinder movements and reduce habitat connectivity.

Other threats:
- Forest degradation: Illegal cutting of trees as well as regular forestry activities have caused changes in structure and composition of riparian forests. Some areas have been transformed into poplar plantations, which are also used by the deer.
- Livestock grazing: Almost the entire site is used for grazing of cattle. While in some extent cattle and deer can coexist, but there is forage competition and both species impact on forest regeneration.
- Dykes: Building of dykes changes the river course and impacts the flood dynamics in the riparian forests and thus the vegetation growth and composition. Changes of the morphological dynamics of the river cause massive lateral erosion and losses of riparian forests and high-quality deer habitat, in particular near Panjakent.
- Land conversion: Large areas of the riparian plain have in the past been converted into arable lands. Conversion of riparian areas into arable lands is accompanied by dyke construction and has caused habitat loss much beyond the reclaimed lands.
- Development of tourism infrastructure in Zarafshon NP has during the recent past affected important sections of prime Bukhara Deer habitat, including clear cutting of forest sections for erection of tourist facilities (Marmazinskaya, pers. comm. 2021).
- Poaching is likely an issue, but additionally to the protected areas staff also be prevented by the border police in Uzbekistan (Marmazinskaya, pers. comm. 2018).

Existing or planned transboundary activities:
- A GIZ scoping mission 2018 for identifying the potential for developing a regional small-scale project financed by the German government related to “Cross-border integrated protected area management of Zarafshon National Natural Park (Uzbekistan) and Zarafshon Reserve (Tajikistan)”. The project is not yet confirmed, but still under consideration (Haller, pers. comm., May 2019).

Recommendations for action:
- Cross-border collaboration between national level institutions and at the level of the local protected areas and scientific institutions in research, monitoring and conservation activities;
- Elaboration of a transboundary conservation management plan for Bukhara Deer, including management of the captive herd in Uzbekistan;
- Maintenance of natural riparian hydrological and geomorphological dynamics;
- Integration of protected area management with forest management under minimum intervention in vegetation dynamics
- Clear determination of permitted, restricted and illegal activities, prevention of the proliferation of illegal use, prevention of conversion of riparian areas into arable lands;

- Consideration of the inclusion of additional areas with high biodiversity and ecosystem conservation potential and of areas potentially suitable for the development of tourism and recreation.

Site ID: 36 **Name:** Western Turkestan Range **Countries:** Tajikistan-Uzbekistan

Location:
Administrative:
- Tajikistan, Sughd Province;
- Uzbekistan, Jizzakh Province.

Geographic area:
- Turkestan Range west of Shahristan.

Coordinates: N 39.550563°, E 68.262615°

Map: see Site 34 (Figure 59)

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Gissaro-Alai open woodlands, Alai-Western Tian Shan steppe;
Ecosystems/habitat types: Alpine meadows, mountain dry steppe, sparse xerophytic shrubs, woodlands.

Species:
Argali (Severtzov's sheep)
Population size: Occurrence of Severtzov's Argali *Ovis ammon severtzovii* had been reported for the western sections of Turkestan Range in the past from Uzbekistan. Due to the location in the border zone and low capacity of Zaamin SPA no systematic research took place during the last three decades. Musaev et al. (2016) referring to reports by border guards assessed the population there with 30-40 animals. In Tajikistan in 2014 a group of one male, three female and two yearlings were recorded (data by Nature and Biodiversity Conservation Union of Tajikistan and Tajikistan Mountain Ungulates Project) close to the border with Uzbekistan in 2014. According to a ranger from Zarafshon NP in fall 2015 a male Argali had been captured by local people near Mugal village in Uzbekistan, close to the border with Tajikistan.
Movements: No specific information is available.
Importance of transboundary population: The Argali in the site is certainly transboundary, given the proximity of recent observations to the border and the fact that the Turkestan Range is not a barrier for movements. The population of Severtzov's Argali is likely extremely small, compared to the core population in Uzbekistan's Nuratau SPA and its vicinity, which is estimated consisting of around 1,500 animals (Beshko, pers. comm. 2016). The population at the site is important as isolated population of this subspecies and in the case of extinction natural recolonization is highly unlikely. Except the core population in the Nuratau SPA only five other small and isolated populations of this very distinctive Argali subspecies are known.

Snow Leopard:
Population size: The population size in the site is not known and parts of the site are indicated in the CAMI Atlas as "possibly extant". In Uzbekistan in recent years, the Zaamin Reserve has not conducted research. The small staff of the protected areas lacked the ability to conduct regular monitoring. If a population exists, it is likely small, perhaps just 2–3 individuals (Nyhus et al., 2016). Rosen (pers. comm. 2019) assumed there are no Snow Leopards in the site. There are very few Asiatic Ibex in the area (Nyhus et al., 2016: 35-40 in Zaamin SPA), so that prey availability may limit the suitability of the site for Snow Leopard.
Movements: Given the location of the international border between Uzbekistan and Tajikistan movements across this border may occur in the case of Snow Leopard presence.
Importance of transboundary population: Snow Leopard occurrence in the area is not recently confirmed and any presence would likely be temporarily only. The area is neither a stepping stone nor corridor connecting other Snow Leopard range areas.

Conservation significance:
The site is of some conservation significance – as remote and isolated habitat of a small population of Severtzov's Argali. It is less important for Snow Leopard conservation but covers sections of the GSLEP Landscape "Alay-Hissar".

Protected areas status:
Uzbekistan: Zaamin SPA and Zaamin National Park

Barriers for migration:
There border fences between Uzbekistan and Tajikistan in the lowest parts of the mountains, but not in high mountains, thus causing little negative impact on the target species.

Other threats:
- Livestock grazing: The site, in particular in Tajikistan is intensively grazed by livestock. Grazing takes place up to the highest ridges and has adverse impact on the target species through forage competition, habitat degradation, disturbance by people and dogs and conflict between herders and carnivores.
- Poaching: Ungulate densities appear below carrying capacities indicating substantial poaching. According to the Forestry Enterprise Panjakent in Tajikistan (pers. comm. 2018) at the southern slope of Turkestan Range a hunting concession has been assigned to a private company few years before. Already in June 2017 pictures of a trophy hunted Severtzov's Argali, allegedly from Tajikistan, had appeared in the internet. By all available information the population is too small to allow for sustainable trophy hunting and no allocation of quotas for Severtzov's Argali, which is legally protected, by the Government of Tajikistan are known.

Existing or planned transboundary activities:
- Under GSLEP the area is considered as part of the Snow Leopard Conservation Landscape "GSLEP Landscape "Alay-Hissar" and is planned to be included in transboundary monitoring and conservation activities.

Recommendations for action:
- Intensified and coordinated monitoring of the target species;
- Expand Zaamin SPA and Zaamin National Park by annexing the adjacent north-facing slopes of the Turkestan Range;
- Prevention of trophy hunting on Argali until the population has reached sufficient size for sustainable use and suitable management and benefit sharing are in place;
- Community-based wildlife management for the conservation of Severtzov's Argali;
- Regulation of grazing is desirable but would be very hard to achieve.

Site ID: 37 **Name:** Babatag **Countries:** Tajikistan-Uzbekistan

Location:
Administrative:

- Tajikistan, Khatlon Province;
- Uzbekistan, Surkhandarya Province.

Geographic area:

- Babatag range and adjacent mountain ranges.

Coordinates: N 37.877689°, E 68.114596°

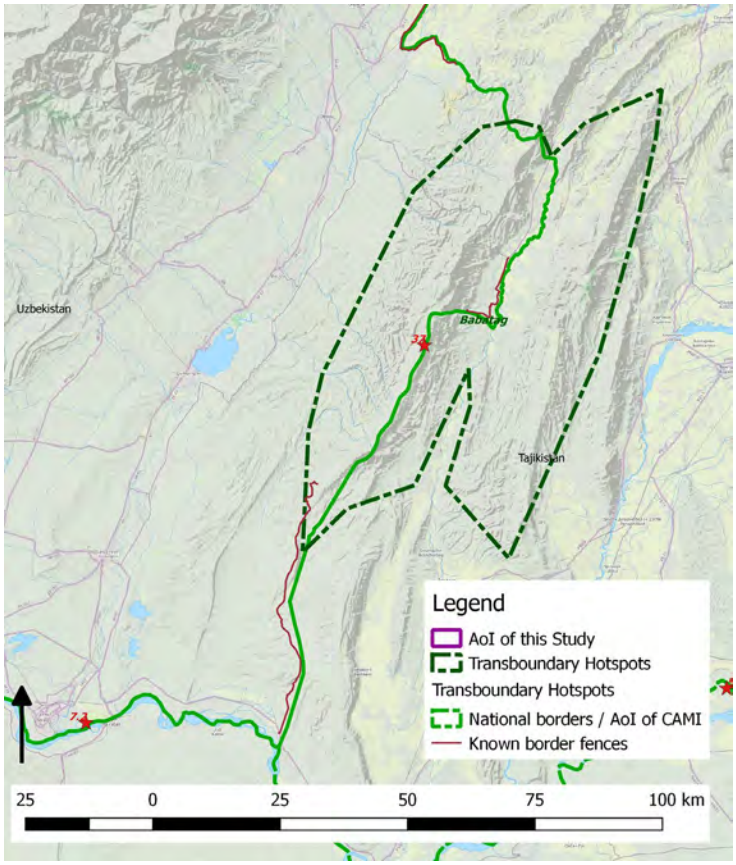


Figure 60: Location map of potential hotspot Babatag

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Gissaro-Alai open woodlands, Badghyz and Karabil semi-desert;
Ecosystems/habitat types: Semi-desert, dry steppe, sparse xerophytic shrubs, woodlands (e.g. pistachio).

Species:

(Goitered Gazelle)

Population size: According to Normatov (2016), in the mid-1980s Goitered Gazelle was exterminated in the *adyrs* (piedmonts) of Babatag in Uzbekistan. From Tajikistan no information about past and recent observations in the site are available. As the area due to its

poor accessibility and the restrictions of the border zone is not well researched, there is a minor chance that a small population might still exist.
Movements: No information is available. In the lower parts of the site movements are restricted by a border fence from Uzbekistan.
Importance of transboundary population: Currently population is extinct or extremely small. Potentially suitable habitat would be transboundary.

Urial
Population size: In the early 2000s about 40 Urials were assumed to exist in the Uzbekistan part of the site (Musaev et al., 2016). Normatov (2016) mentioned that locals until around 2012 annually caught about 10 Urial lambs as pets, but since then such information is missing, possibly indicating a massive decline in the population numbers. In Tajikistan Urial is known from the nearby located Aktau range, which hosts a population of likely more than 100 Urials (Michel, various local reports, own observations 2018).
Movements: Urials seasonally migrate over distances of several ten kilometers. The Babatag and adjacent areas are likely used by one connected population.
Importance of transboundary population: The Bukhara Urial *O. v. bocharensis* is one of the rarest and probably fastest decreasing Urial subspecies. The site provides habitat to a population of high importance of the conservation of the subspecies.

Persian Leopard:
Population size: The Persian Leopard in the past existed in this site, but since the 1960s confirmed records are missing (Marmazinskaya, 2016). Ustyan (pers. comm. 2009) still in the 1970s observed two animals (probably female with cub) in this area. Some zoologists report about rumors that Leopards are still present in the area (Muratov, pers. comm. 2009; Marmazinskaya, 2016 & pers. comm. 2018. Normatov (2016) quotes reports of local hunters having observed Leopards in 2003, 2006 and 2008 in the central and southern parts of the mountain range.
Movements: Leopards are highly mobile and can appear many tens and even hundreds of kilometers away from their core range areas.
Importance of transboundary population: If any Leopards exist in the area, they could only survive as transboundary population.

Conservation significance:
The area is of significance for the conservation of one target species – Urial, and in particular its subspecies *O. v. bocharensis*. Leopard presence is considered possible and there is a minor chance of Goitered Gazelle being extant. In addition to the target species, Striped Hyena *Hyaena hyaena* has a reproducing population there (Normatov, 2016). This species is rare and declining across Central Asia.

Protected areas status:

No protected areas existing.

Barriers for migration:
A border fence seems to exist only in lower sections; it would potentially impact Goitered Gazelle if at all present in the site.

Other threats:
- Poaching: Normatov (2016) reported about past and recent poaching of Urial, Goitered Gazelles and Hyenas. Poaching is most likely the key threat.
- Livestock grazing: The extent and intensity of grazing is currently not known, but given current grazing pressure in similar areas in both countries it likely has impact.

Recommendations for action:

- Cross-border assessment of occurrence of target species, habitat conditions, migrations and limiting factors;
- Determination of approaches to reduce poaching and if necessary regulate grazing.

Site ID: 38 **Name:** Lower Amu Darya **Countries:** Turkmenistan-Uzbekistan

Location:
Administrative:

- Turkmenistan, Dashoguz Province;
- Uzbekistan, Karakalpakstan Autonomous Republic, Khorezm Province.

Geographic area:

- Riparian areas of the lower Amu Darya river valley between Nukus (Uzbekistan) and Seydi (Turkmenistan).
- Amu Darya s of "Kungrad"/Imeni Telmana, incl. Nazarkhan and Begbay core zone (1);
- Amu Darya near Lebap between Khorezm and Kyzylkum SPA (at Turkmenistan side) (2);
- Amu Darya SPA (Turkmenistan) and Kyzylkum SPA (Uzbekistan) (3);
- Baday-Tugay (4).

Coordinates: N 42.307920°, E 59.877521° (1); N 41.124536°, E 61.821193° (2); N 40.612679°, E 62.112579° (3); N 41.998413°, E 60.322092° (4)

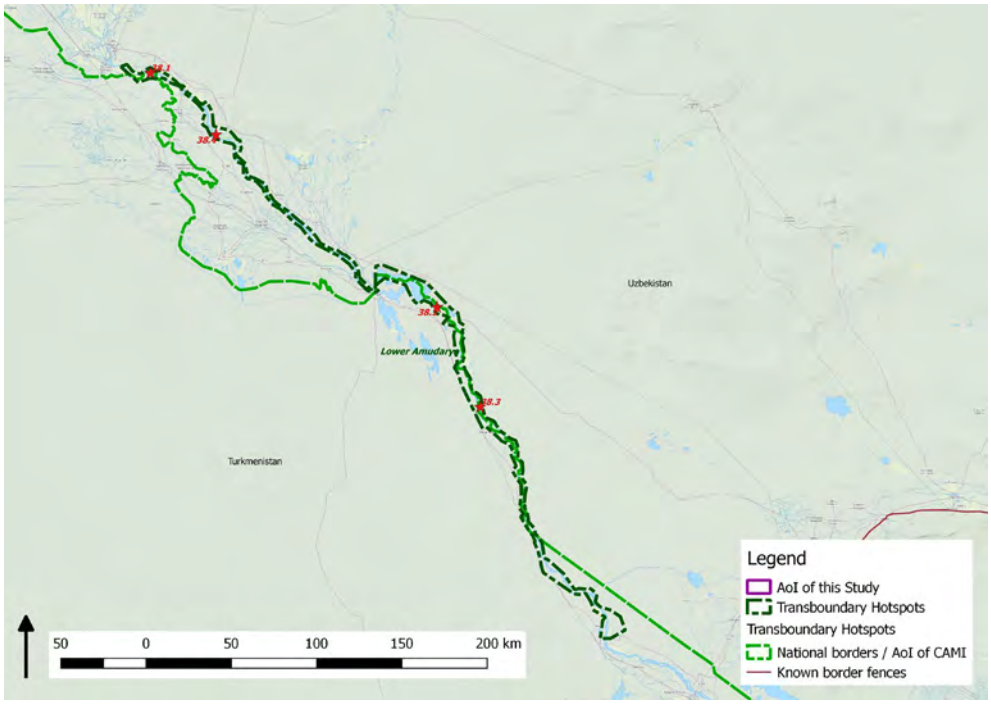


Figure 61: Location map of potential hotspot Lower Amu Darya

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Turanian;
WWF Ecoregion (Olson et al., 2001): Central Asian riparian woodlands, Central Asian southern desert;
Ecosystems/habitat types: Riparian areas with *tugai* forest, riparian woodlands and shrubs, reeds, semi-desert, irrigated arable lands.

Species:

Bukhara Deer
Population size: The overall population of Lower Amu Darya Biosphere Reserve in 2019 was estimated by Cornelis et al. (2020) with 2,112 [1,320 – 3,344, 95% CI]. The official National

Report to CMS (CMS Secretariat, 2020) reported figures of 1,500 -1,857. The largest population exists in the section Baday-Tugay SPA (4) on which the survey by Cornelis et al. 2020 concentrated. Mambetullaeva et al. (2016) refrain from providing a recent population estimate in their article about Bukhara Deer in Lower Amu Darya Biosphere Reserve. At Nazarkhan core zone (1) currently no or very few deer are present. Here, a reintroduction enclosure has been established under a UNDP-GEF project. In Kyzylkum SPA (3) the population in 2011 was about 130 (Pereladova, 2015) and according Musaev et al. (2016) and CMS Secretariat (2020) fluctuates between 120 and 150. In Turkmenistan the population in 2011 was 50-70 (Pereladova, 2015) and has grown to 120 (National Report, quoted by CMS Secretariat, 2020) but these animals may use in some extent transboundary habitats.
Movements: Bukhara Deer migrate along the river course, but also seasonally move from the riparian areas into the desert to forage there during the short vegetation season.
Importance of transboundary population: The largest number of Bukhara Deer currently exists in Baday-Tugay (Uzbekistan), which is not immediately at the border. Despite currently connectivity and natural exchange between different groups of Bukhara Deer might be limited, the entire population of the site should be considered as one transboundary population. The site includes habitat patches at the border or in its immediate vicinity, like Nazarkhan core zone (Uzbekistan) and SPAs Kyzylkum (Uzbekistan) and Amu Darya (Turkmenistan). Between the latter areas already currently regular transboundary movements are likely.

Conservation significance:
The site is of high significance for the conservation of Bukhara Deer. It includes areas with high density of deer as well as suitable habitat without or with very few deer. Furthermore, the site represents important examples of riparian ecosystems and their biodiversity. Small and fragmented patches of riparian ecosystems are potential links or stepping stones between other, larger range areas.

Protected areas status:

Turkmenistan:	Amu Darya SPA
Uzbekistan:	Lower Amu Darya BR incl. Nazarkhan and Baday-Tugay core zones, Kyzylkum SPA

Barriers for migration:
Border fences may exist outside of the immediate riparian areas and are thus of low impact for Bukhara Deer. The major barriers are areas with dense human populations, where riparian habitats are entirely transformed into arable lands and towns. The fragmentation of the riparian deer habitat limits carrying capacity of the ecosystem, contributes to human-wildlife conflict and hampers genetic exchange between subpopulations.

Other threats:
- Transformation of riparian areas into farmlands and urbanized areas;
- Poaching;
- Habitat degradation, caused by changed river dynamics, livestock and local deer populations exceeding carrying capacity.

Recommendations for action:
- Transboundary assessment of distribution, population size and structure, habitat use and migration of Bukhara Deer;
- Elaboration and implementation of transboundary concept for conservation, management and sustainable use of Bukhara Deer and its habitat, including addressing of balance between population size and habitat carrying capacity, coexistence of deer and agriculture and management of human-wildlife conflict;

- Prevention of further transformation of riparian ecosystem into farmlands and establishment of habitat corridors to facilitate connectivity between patches of deer habitat.

Site ID: 39 **Name:** Kugitang/Koytendag **Countries:** Turkmenistan-Uzbekistan

Location:
Administrative:

- Turkmenistan, Lebap Province;
- Uzbekistan, Surkhandarya Province.

Geographic area:

- Kugitang/Koytendagh range.

Coordinates: N 37.701902°, E 66.552273°

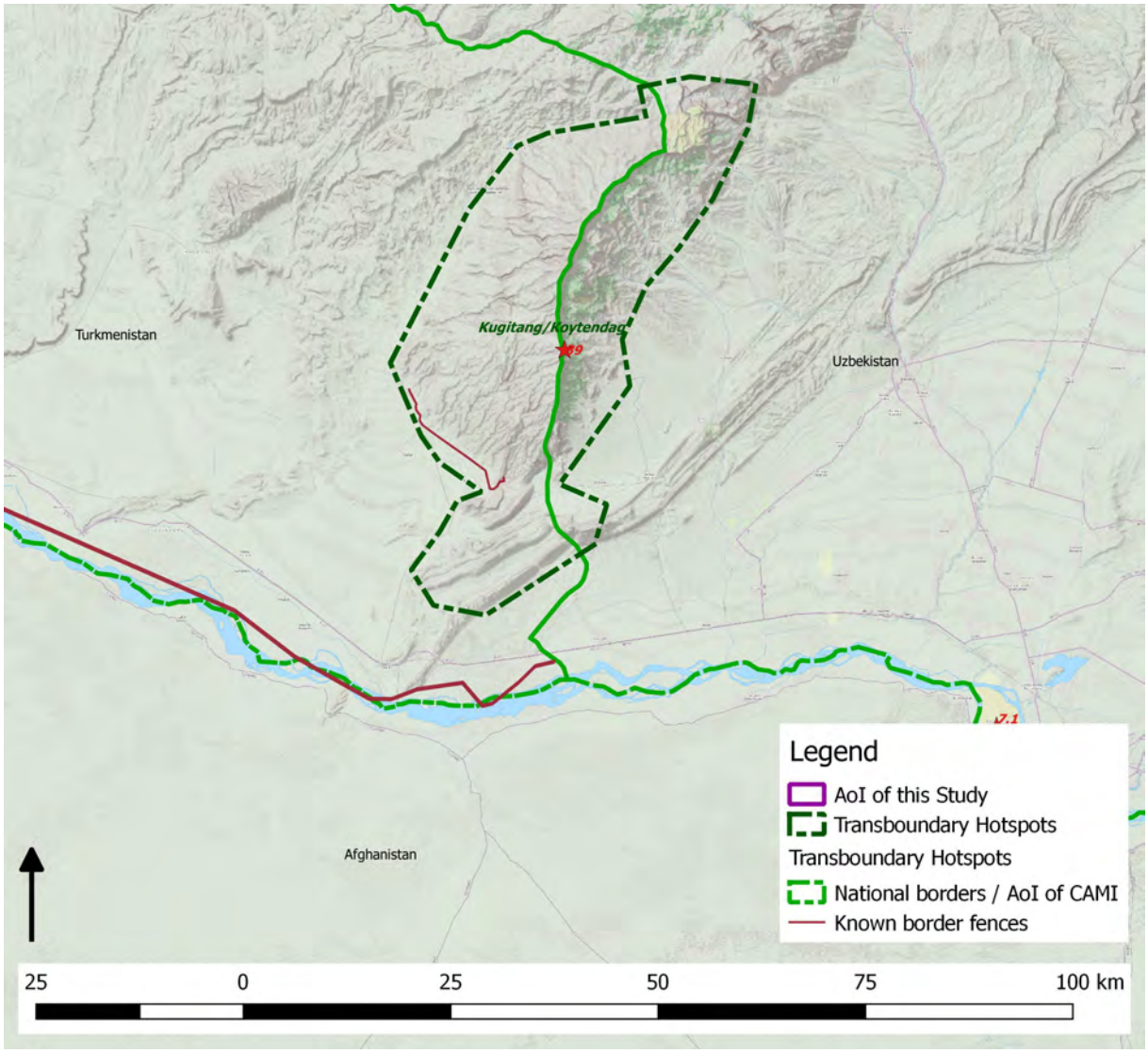


Figure 62: Location map of potential hotspot Kugitang/Koytendag

Biogeographical region; major ecosystems/habitat types:
Biogeographical region by Udvardy (1982): Pamir-Tian Shan Highlands;
WWF Ecoregion (Olson et al., 2001): Badghyz and Karabil semi-desert;
Ecosystems/habitat types: Woodlands (juniper, pistachio), xerophytic shrubs, dry steppe, semi-desert.

Species:

Goitered Gazelle

Population size: According to Normatov (2016) Goitered Gazelle has in the past been a common and numerous species, but has been exterminated in most areas in the 1970s. A small population still exists in the piedmonts of Kugitang in Uzbekistan. The CAMI Atlas indicated the piedmonts in both countries as range area of the species.
Movements: No information is available.
Importance of transboundary population: According to the CAMI Atlas and the available literature there is currently no transboundary population. Potentially suitable habitat would be tranboundary.

Urial
Population size: Kholikov (pers. comm., 2014) in 2013 recorded 45 Urials in Surkhan SPA in Uzbekistan. Rustamov (pers. comm. 2018) assumes that about 250 Urials exist at the Turkmenistan part of the site.
Movements: Urials reportedly migrate over some ten kilometers and the site has no barriers for their movement. Data provided by Kholikov (pers. comm., 2014) show some continued presence in certain areas.
Importance of transboundary population: The population should be considered as transboundary.

Persian Leopard
Population size: In the Kugitang in Uzbekistan Leopards have repeatedly been recorded in the 1990s. One Leopard has been killed by poachers in 2010 (Marmazinskaya, 2016).
Movements: Normatov (2016) reports a Leopard observation by border guards in the riparian area east of Termez and concludes that Leopards in Kugitang and nearby Susyztau are connected with the range area in Babatag (Site 37) via the riparian areas of the Amu Darya.
Importance of transboundary population: The population of the site is transboundary and via the border areas with Afghanistan further connected with other parts of the range area. Connectivity of possibly still existing small Leopard groups is important for the conservation of the Persian Leopard in its fragmented range area.

Conservation significance:
The Site is of high significance for the conservation of one target species – Urial, and in particular its subspecies *O. v. bocharensis*. Leopard presence is possible and there is a minor chance of Goitered Gazelle being extant. In addition to the target species, another ungulate subspecies of conservation importance, the Tajik markhor *Capra falconeri heptneri* (Near Threatened) is present with a large population of about 300 in Uzbekistan (Kholikov, pers. comm. 2014), and similar numbers likely occur in Turkmenistan.

Protected areas status:
Turkmenistan: Koytendag SPA
Uzbekistan: Surkhan SPA

Barriers for migration:
In the lower parts of the Site movements are at least in parts restricted by a border fence from Turkmenistan.

Other threats:
- Poaching;
- Livestock grazing: in SPA illegal grazing, outside poorly regulated and overly intensive grazing;
- Cutting of trees and shrubs.

Recommendations for action:

- Transboundary collaboration between the SPAs in research, monitoring and conservation activities;
- Improvement of law enforcement;
- Regulation of grazing;
- In Uzbekistan follow-up on UNDP-GEF supported buffer zone management plan implementation.

5. Priority Ranking and Recommendations

5.1 Priority ranking

The ranking of the assessed sites in accordance to the approach described in section 2.3 is presented in the matrix below (Table 6).

Total scores assigned are in the range between 7 (Sites 2 Afghanistan-Iran Border Region, 6 Panj Valley, 8 Eastern Himalaya, 34 Western Hissar Mountains, 31 Eastern Turkestan Range and 36 Western Turkestan Range) and 18 (Site 15 Trans-Altai Gobi). The 21 areas with a total score >10 (see Table 4) can be preliminarily considered as priority sites for transboundary conservation in the frame of CMS and CAMI.

Table 4: List of sites with a total score >10, preliminarily consideres as priority sites

Priority rank	Total score	Sites ID and name
1	18	18 Trans-Altai Gobi
2	17	28 South-western Ustyurt
3	16	17 South Gobi 10 Western Trans-Himalaya 11 Changthang and Spiti 22 Kopet Dagh
4	15	14 Khan Tengri Region
5	14	15 Altai 19 Jungarian Gobi 26 Ural Steppe
6	13	3 Badghyz
7	12	1 High Pamirs 4 Wakhan 9 Khangchendzonga-Sikkim Plateau 16 Inner Tian Shan 30 Aral Sea/Western Kyzylkum Desert
8	11	12 Jungarian Alatau 13 Tarbagatay/ Saur Ranges 20 Daurian steppe 21 Eastern Karakoram 38 Lower Amu Darya

But consideration of specific aspects may justify diverging determination of priorities.

These sites also represent different types of ecosystems and can be assigned to the different sub-regions mentioned in the previous CAMI programme of work 2014-2020[15] (Table 5).

[15] The current PoW 2021-2026 (UNEP/CMS/COP13/Doc.26.3.5/Annex 2) does not make references to sub-regions anymore.

Table 5: Representation of ecosystems/sub-regions

Ecosystems/ sub-region	**Species**	**Sites ID, name**	**Total score**
Mountain ecosystems	Snow Leopard, Argali, Urial, Wild Yak, Kiang, Chiru, Tibetan Gazelle	10 Western Trans-Himalaya 11 Changthang and Spiti	16
		14 Khan Tengri Region	15
		15 Altai	14
		1 High Pamirs 4 Wakhan 9 Khangchendzonga-Sikkim Plateau 16 Inner Tian Shan	12
		12 Jungarian Alatau 13 Tarbagatay/ Saur Ranges 21 Eastern Karakoram	11
Gobi-Desert – Eastern Steppes ecosystems	Wild Ass, Wild Camel, Mongolian Gazelle, Goitered Gazelle, Przewalski's Horse, Gobi Bear	18 Trans-Altai Gobi	18
		17 South Gobi	16
		19 Jungarian Gobi	14
		20 Daurian Steppe	11
South-west sub-region (plus Central region)	Cheetah, Goitered Gazelle, Chinkara, Wild Ass [Kulan/Onager], Persian Leopard, Urial Saiga	28 South-western Ustyurt	17
		22 Kopet Dagh	16
		26 Ural Steppe	14
		3 Badghyz	13
		30 Aral Sea/Western Kyzylkum Desert	12
Tugai forests	Bukhara Deer	38 Lower Amu Darya	11

Table 6: Matrix for ranking of the sites (Scores: Species numbers: score = total number of confirmed target species; Population status: occurrence irregularly or previously = 1, regularly = 2, substantial numbers = 3; other criteria not = 0, low = 1, medium = 2, high = 3)

Site	**Name**	**Importance** by Species number (absolute number)	**Importance** by Population status	**Potential of conservation success**	**Problems** to be addressed in a transboundary context	**Urgency**	**Feasibility** from a political and/or economic perspective	**Total score**	***Priority rank***
1	High Pamirs	2	3	3	2	1	1	**12**	***7***
2	Afghanistan-Iran Border Region	3	1	1	1	1	0	**7**	***12***
3	Badghyz	4	1	1	3	3	1	**13**	***6***
4	Wakhan	2	3	3	1	2	1	**12**	***7***
5	Panj River valley-Tigrovaya Balka	2	3	2	1	1	1	**10**	***9***
6	Panj River valley	1	1	2	1	1	1	**7**	***12***
7	Aral Paygambar	1	1	2	2	1	1	**8**	***11***
8	Eastern Himalaya	1	1	2	1	1	1	**7**	***12***
9	Khangchendzonga-Sikkim Plateau	4	2	2	1	1	2	**12**	***7***
10	Western Trans-Himalaya	5	2	3	2	2	2	**16**	***3***
11	Changthang and Spiti	7	2	3	1	2	1	**16**	***3***
12	Jungarian Alatau	2	2	2	2	2	1	**11**	***8***
13	Tarbagatay and Saur Ranges	2	2	2	2	2	1	**11**	***8***
14	Khan Tengri region	2	3	3	3	2	2	**15**	***4***
15	Altai	2	2	2	3	3	2	**14**	***5***
16	Inner Tian Shan	2	3	3	1	2	1	**12**	***7***
17	South Gobi	4	3	3	2	2	2	**16**	***3***
18	Trans-Altai Gobi	6	3	3	2	2	2	**18**	***1***
19	Jungarian Gobi	5	2	2	1	2	2	**14**	***5***
20	Daurian steppe	1	2	3	2	1	2	**11**	***8***
21	Eastern Karakoram	2	3	2	1	1	2	**11**	***8***
22	Kopet Dagh	4	3	2	3	3	1	**16**	***3***

Site	**Name**	**Importance** by Species number (absolute number)	**Importance** by Population status	**Potential of conservation success**	**Problems** to be addressed in a transboundary context	**Urgency**	**Feasibility** from a political and/or economic perspective	**Total score**	***Priority rank***
23	Western Kyrgyz range	2	1	2	1	1	2	**9**	***10***
24	Northern Tian Shan	2	2	2	1	1	2	**10**	***9***
25	Western Tian Shan	2	1	1	1	1	2	**8**	***11***
26	Ural Steppe	1	3	3	2	2	3	**14**	***5***
27	Northern Betpakdala	1	1	2	2	1	3	**10**	***9***
28	South-western Ustyurt	5	2	2	3	3	2	**17**	***2***
29	Eastern Ustyurt	3	1	1	2	1	1	**9**	***10***
30	Aral Sea / Western Kyzylkum Desert	2	3	2	1	2	2	**12**	***7***
31	Eastern Turkestan Range	2	1	1	1	1	1	**7**	***12***
32	Pamir-Alai	2	1	2	1	1	2	**9**	***10***
33	Eastern Sayan	2	1	1	1	1	2	**8**	***11***
34	Western Hissar Mountains	1	1	1	1	1	2	**7**	***12***
35	Zarafshon River Valley	1	2	2	1	1	2	**9**	***10***
36	Western Turkestan Range	2	1	1	1	1	1	**7**	***12***
37	Babatag	3	1	1	1	1	1	**8**	***11***
38	Lower Amu Darya	1	3	2	2	2	1	**11**	***8***
39	Kugitang/ Koytendag	3	1	2	1	1	1	**9**	***10***

5.2 Recommendations

Preliminary recommendations for conservation action were listed in section 4.2 for each of the individual areas. These actions were subject for discussion at the CAMI Range States Meeting in Ulaanbaatar, Mongolia 23-28 September 2019 and were revised in consultation with the different stakeholders. In addition to the site-specific recommendations, this chapter attempts to draw some general conclusions and develop recommendations about how to enhance transboundary conservation in the context of CAMI.

The purpose of trying to prioritize the TAs was to help focusing limited resources to areas that are important, need action most, and where interventions are feasible and likely to bear fruit. However, while this prioritizing is a rather political necessity, it is important to note that also those areas with low scores under the numerical assessment above still play important roles for the conservation of the target species and are therefore all worth of implementing specific activities or including them into broader programs.

Across the region transboundary collaboration at various levels in most areas is rather weak. To strengthen it, as a first step, the exchange of information should be developed and institutionalized, starting at the national level. Government authorities in charge of nature conservation, wildlife and protected areas need to communicate across the borders. The communication should involve experts, protected area managers and others involved in the specific sites from the very beginning. Direct local exchange should be set up allowing for immediate communication between organizations and people working on the ground in the transboundary areas. Information about populations and migrations of the target species, about observed barriers to migration and about conservation action considered, needs to be shared across the borders.

There are certainly differences between the preliminarily identified priority sites in terms of knowledge and data availability about the populations of the target species in those areas. However, in all areas, intensified research and continuous monitoring are required for better understanding the status of the migratory mammals, the threats to their survival and the actions needed for their conservation. Research and monitoring activities should at least be coordinated and results be shared in a format, which allows for practical use. Joint transboundary research and monitoring can be particularly useful for understanding population dynamics, spatial and temporal patterns of transboundary migrations and ecological and land-use factors impacting on the target species.

Border-related conservation issues

Information on border area characteristics and in particular on border infrastructure is typically considered highly sensitive and unauthorized exploration of the situation and sharing of information with foreign organizations and individuals is often difficult. Therefore, consultation with and involvement of governmental authorities in charge of border security and customs control is crucial at any stage. The development of cross-border collaboration between these organs with involvement of conservation authorities and practitioners is desirable, but most likely possible only under very favorite circumstances, where neighboring states are joined in a customs union already or other bi- or multilateral agreements facilitate such direct collaboration in potentially sensitive sectors.

Border fences are an important problem for transboundary conservation of the target species in at least 14 out of the 21 sites listed in Section 5.1 with priorities 1-8. In addition, in several of the 17 sites of lower priority, border fences form barriers to the animals' movements. In critical areas the prevention of new border fence construction and the mitigation or even removal of existing fences is the most important need for maintaining the transboundary

character of the populations of the target species, allowing them to migrate to critical habitats, to maintain genetic connectivity and allow for recolonization of areas where a species locally disappeared. A special focus on fences is therefore important in many areas, although also other conservation activities can be meaningful for improving the status of target populations, where border fences currently cannot be addressed.

The purposes of border fences can vary and it is important to understand these purposes to be able to provide justified and targeted solutions, which as much as possible satisfy these purposes. Some border fences may have the purpose of restricting movements of humans (pedestrians as well as motorized transportation). These are hard to modify, but in remote areas gaps in fences, equipped with modern surveillance, can be an option. Fences for preventing only the crossing of motorized transport are easier to modify to become passable for wildlife while still fulfilling its purpose. In some areas, fences have been erected for the prevention of livestock movements in the first place. Here, modifications of the height and type of the lower wires can be useful. Detailed recommendations on the mitigation of border fences are provided by Olson (2013). Any attempts regarding border fences require the development of trust and commitment of the border security and customs control authorities and typically high-level political support. In countries that are Parties to CMS, the Convention can become a vehicle for facilitating such processes.

Poaching

Poaching or illegal hunting is an issue that should be addressed with highest priority and is a key problem in most, if not all, identified areass. Beyond the immediate effect of increased mortality, illegal hunting is a disturbance that can cause target animals to avoid large areas of otherwise suitable habitat. This avoidance can affect their overall condition, survival and recruitment. Prevention or at least reduction of poaching is therefore a precondition for the success of other conservation actions. Which means are suitable for achieving this success depends on specific conditions regarding the target species, their population characteristics, drivers of illegal take, legal and institutional frameworks, enforcement capacities and attitudes of stakeholders. Potential approaches, which often can be and need to be combined, include improved enforcement by government rangers through increase in staff numbers; better equipment and rewards; improved protected areas in terms of area size, staff, financial and technical basis; community-based and other systems of sustainable legal use in assigned areas; training and equipment of customs services to intercept illegal trade; and other approaches. All these approaches can benefit from transboundary collaboration. Moreover, even though border guards particularly in remote areas can sometimes be involved in poaching, their inclusion in approaches is crucial in successful transboundary prevention of poaching.

Livestock grazing

Overgrazing and livestock with its effects of competing with wild species for forage, habitat degradation, displacement and disease transmission are significant threats in nearly all priority areas with very few exceptions. The CAMI PoW 2021-2026 provides a set of activities to address livestock related issues. These activities should be applied as needed and adapted to the site-specific conditions. Of particular importance are the development of approaches facilitating and incentivizing the coexistence of wildlife and other land-uses, including livestock grazing, and the establishment of permanent or temporary grazing-free areas. Traditionally in many transboundary areas, grazing took place across current national borders. Looking into grazing systems from a transboundary perspective may show opportunities for landscape level grazing management in a way that also benefits wildlife. Such approaches can only be implemented where veterinary and other regulations permit for this.

Extractive industries and infrastructure

Industry, mining and infrastructure development are relevant threats in several of the priority areas, e.g., in the context of China's Belt and Road Initiative, or through the expansion of extractive industries. Transboundary impacts should be considered in the context of the Environmental Impact Assessments. Avoidance, mitigation and compensation of adverse impacts on migratory mammals require the consideration of transboundary aspects.

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