#1

Central Asia

Snow leopard. All three big cats in the region – Persian leopard, Asiatic cheetah and snow leopard – are threatened by illegal hunting. Hunting of the cats' natural prey also causes starvation and increases the likelihood of attacks on domestic animals.

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List of abbreviations and acronyms

ACBK	Association for the Conservation of Biodiversity of Kazakhstan
CAMI	Central Asia Mammals Initiative
CBD	Convention on Biological Diversity
CCPP	contagious caprine pleuropneumonia
CDV	canine distemper virus
CEPF	Critical Ecosystem Partnership Fund
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CSO	civil society organisation
CSR	corporate social responsibility
DAC	Development Assistance Committee of the OECD
EBRD	European Bank for Reconstruction and Development
EIA	environmental impact assessment
EU	European Union
EUR	euro
FAO	Food and Agriculture Organisation of the UN
FFI	Fauna & Flora International
G200	Global 200 Ecoregions
GEF	Global Environment Facility
GDP	gross domestic product
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German Technical Assistance Agency)
GNI	gross national income
GSLEP	Global Snow Leopard and Ecosystem Protection programme
GWh	gigawatt hour
IBA	important bird area
ICIMOD	International Centre for Integrated Mountain Development
IUCN	International Union for Conservation of Nature
JICA	Japanese International Cooperation Agency
KBA	key biodiversity area
KLC	key landscape for conservation
MAB	Man and the Biosphere Convention
MAIL	Ministry of Agriculture, Irrigation and Livestock, Afghanistan
METT	Management Effectiveness Tracking Tool
MoU	Memorandum of Understanding
MSRI	Mountain Societies Research Institute of the University of Central Asia
NABU	Naturschutzbund Deutschland (Nature and Biodiversity Conservation Union)
NBSAP	National Biodiversity Strategy and Action Plan
NEST	National Environmental Security Task Force
NGO	non-governmental organisation
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
PA	protected area
PPR	peste des petits ruminants
PRC	priority region for conservation
SEA	strategic environmental assessment
SLAWEN	Snow Leopard and Wildlife Enforcement Network
SLCU	Snow Leopard Conservation Units
SMART	Spatial Monitoring and Reporting Tool
tCO_2e	tons of carbon dioxide equivalent
UK	United Kingdom
UN//UNDP/UNEP	United Nations/Development Programme/Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNODC	United Nations Office on Drugs and Crime
USA	United States of America
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WCS	Wildlife Conservation Society
WDPA	World Database on Protected Areas
WHS	World Heritage Site
WWF	World Wide Fund for Nature

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Executive summary

Grassland, forest and mountain ecosystems in Kazakhstan and Kyrgyzstan. Central Asia (as well as East Asia) has large areas of remote, natural ecosystems with sparse human populations. This creates opportunities and challenges for conservation and social development in the region.

0 _ Executive summary

This chapter covers the Central Asian countries of Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, and the central and eastern portion of Iran. It is a region dominated by some of the world's largest remaining areas of steppe and desert, but also with important wetlands and high mountain ecosystems. While forest cover is limited, there is a large diversity of forest types, including the wild ancestors of several of the fruit and nut species that are now widely domesticated. Located at the junction of three of the world's bio-geographic realms, the region has species typical of the Palearctic (e.g. wolf, brown bear), Indo-Malayan realm (e.g. palm civet, leopard cat) and Afrotropics (e.g. cheetah, caracal). In addition, the steppe and deserts support large herds of migratory ungulates including saiga antelope, goitered gazelle and Asiatic wild ass. The charismatic fauna of the mountains includes snow leopard, mountain sheep (urial, argali) and goats (ibex, markhor).

The human population density over much of the region is very low – less than 10 people/km² over 65 % of the area. Nevertheless, the impact of human activity is significant because natural ecosystems in this region of climatic extremes and water stress are very sensitive to over-exploitation and may be slow to recover from damage.

The countries of the region have experienced dramatic political change in the last 30 years, with the end of the Soviet Union, the revolution in Iran and the on-going conflict in Afghanistan. These transitions have shaped the institutions and mechanisms that are responsible for managing the region's natural resources. All the governments have taken some action on the environment, including the creation of protected areas and the implementation of laws on wildlife trade and resource use. Across the region, however, government presence in the remote regions that are most important for biodiversity is typically weak and poorly resourced. As a result, local communities are often the main decision-makers and resource managers, and some of the most interesting conservation success stories show how the involvement of local people can lead to improved protection and management of the resources they depend on – including community-based hunting concessions, the management of rangelands and anti-poaching patrols in national parks.

The main threats to biodiversity in the region are uncontrolled: illegal hunting and harvesting, logging and over-exploitation of forests, drainage of wetlands and the degradation and conversion of grasslands for livestock, agriculture or mining. Biodiversity is threatened because individual animals and plants are killed and collected, and also because habitats are fragmented, leaving small, isolated populations unable to recover from shocks and vulnerable to other pressures. The expansion of road, rail and pipeline networks presents an obstacle to the movement of herds of large mammals, which rely on their ability to migrate to avoid extreme weather and find pasture. This threatens their survival, through direct mortality and through isolating populations, leaving them vulnerable to disease or poaching. Interaction between wildlife and domestic livestock heightens the risk of disease transmission and may result in killing by herders. Many of these threats will be intensified by the impacts of climate change, which is expected to have a severe impact on large areas of this dry region through changes to the intensity and regularity of rainfall.

Underlying these threats are the growing pressure from population growth, especially where this is linked to rural poverty; economies which are highly dependent on oil, gas and minerals; inadequate policy frameworks and weak capacity of government agencies, and, in some places, on-going insecurity and conflict.

An estimated 497 protected areas (PAs) cover about 5.6 % of the land surface of the region. This figure is well below international targets and the global average. More importantly, given that some of the most vulnerable species range over large areas or occur at low densities, these relatively small protected areas do not effectively protect viable populations of the region's threatened species. In addition, most protected areas are poorly resourced, with limited staff and minimal facilities. In some cases, their legal status is also weak, with inadequate powers to control damaging hunting or grazing, or to protect them from development pressures.

The large-scale nature of ecosystems and the challenges faced by protected areas mean that landscape-scale approaches are essential to biodiversity conservation in the region. Furthermore, the absence of effective government control means that it is often local communities, and in some cases private sector landowners, who are in a position to lead on landscape initiatives. With the support of civil society organisations and the approval (sometimes support) of governments, communities have been instrumental in the creation of Afghanistan's first two national parks, sustainable resource management initiatives in the Tien Shan Mountains of Kazakhstan and Kyrgyzstan, monitoring and protecting mountain goats and sheep in Tajikistan, managed community-controlled conservancies in Kyrgyzstan, and undertaking income-generating activities related to the conservation of cheetah in Iran.

Nomadic herders' tents and yaks, Afghanistan. Sustainable management of the region's vast, fragile dry grasslands is vital for conservation of wild species as well as for rural livelihoods.

Another consequence of the large scale of ecosystems and wildlife movements in the region is that international cooperation and transboundary conservation are especially important. Transboundary initiatives exist for areas of high species diversity including the Tien Shan Mountains (Kazakhstan, Kyrgyzstan and Uzbekistan, also China), the Pamir-Alai region (Kyrgyzstan and Tajikistan) and Altai-Sayan (Kazakhstan, with Russia and Mongolia). International cooperation has also focused on species, with specific Memoranda of Understanding (MoUs) under the Convention on Migratory Species for Bukhara deer, saiga antelope and Siberian crane, and a broader programme under the Central Asia Mammals Initiative (CAMI).

There are several examples of corporate support to conservation of species and sites. However, moves towards a green economy (greening of business practice and the introduction of sustainable technologies) are in their infancy in the region. Planning for sustainability, environmental safeguards, and assessment and monitoring of the environmental impacts of individual economic development projects all need to be strengthened.

There are important opportunities to complement and build on the efforts already underway for improved management of biodiversity and ecosystems in the region. The most important of these strategic approaches are summarised below.

- Support the strengthening of protected areas, with targeted research and monitoring, introduction of more efficient management approaches such as the Spatial Monitoring and Reporting Tool (SMART), and capacity building for personnel and decision-makers, including the exchange of lessons and experiences between countries and outside the region.
- Continue and broaden work to monitor and respond to the threat of disease transmission between wildlife and domestic animals.
- Reinforce action against the illegal wildlife trade, closing loopholes in the legal framework, improving the effectiveness and resourcing of enforcement, and encouraging international cooperation and the implementation of obligations under international conventions and agreements.
- Encourage the development and further engagement of civil society in conservation action, and in science and monitoring related to priority conservation issues.
- Encourage the expansion of nascent private sector moves towards greening business practices and supporting conservation.

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Background

Issyk-Kul, Kyrgyzstan, was a stopover on the Silk Road and the site of a major civilisation over 2 500 years ago. The lake has an endemic fish fauna, and has been listed under the Ramsar and Man and the Biosphere conventions because of its biodiversity importance.

1 _ Background

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Almaty is one of the largest cities in the region, and is the old capital and still the commercial hub of Kazakhstan. The area around the city is famous for its diversity of apples, one of several globally consumed fruit and nut species that originate in Central Asia.

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The total population of the Central Asia countries is around 175 million, nearly half of whom live in urban centres. In 65 % of the region, however, population density is below 10 people per km². Despite this, unsustainable use of resources threatens biodiversity and rural livelihoods.

1.1 Socio-economic setting

1.1.1 Political and administrative context

The region covered by this chapter comprises Afghanistan, part of Iran, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

Historically, the region was a zone of economic and cultural convergence in a strategic position on the Silk Road, with an abundance of commercial centres. It had both sedentary and nomadic societies with a mosaic of cultures, languages and governments, and was a major contributor to the arts, sciences, medicine, politics and trade[1]. In recent history, the area which is now Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan was part of the Soviet Union, and this added to the cultural and linguistic diversity, and shaped the political and social environment of the post-Soviet period. The region's position has also exposed it to repeated war and conquest, including the continuing conflict in Afghanistan.

Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan retain strong, centrally organised governance, but all have established multi-party democratic systems, albeit with varying degrees of political freedom. They were founder members of the Commonwealth of Independent States (CIS), formed at the breakup of the Soviet Union in 1991. Turkmenistan has since changed its status to 'associate'.[2] The CIS plays a role in co-ordinating efforts related to trade, finance, law making, security and cross-border crime prevention. The CIS Free Trade Area has 9 members, including the 4 Central Asian republics[3]. It expressly allows for national regulations to implement international agreements on the protection of plants and animals[4]. Kazakhstan and Kyrgyzstan also belong to the Eurasian Economic Union, which has implications for CITES implementation and controls over illegal wildlife trade.

Afghanistan and Iran do not share the history of the CIS states. Afghanistan is an Islamic Republic that has experienced decades of war and on-going conflict. Afghanistan's current administration is still trying to establish effective governance outside the main urban areas, and the 2014 elections resulted in the creation of a shared power arrangement between the top two candidates.

Iran's recent political history is defined by the 1979 revolution that resulted in the removal of the Shah as absolute monarch and the creation of the Islamic Republic of Iran, a modern and authoritarian theocracy led by the supreme leader. Its political system combines a network of elected and unelected institutions.

A feature of all these countries is the difficulty the states have in governing the remote mountain, steppe and desert landscapes that make up a large proportion of their land areas. In some cases, local tribal and clan structures are the only real functional governance systems. This is true even in Uzbekistan and Turkmenistan, which have strong, centralised governments, and Kazakhstan and Iran, which have amongst the most effective governments in the region. In Kyrgyzstan, a major geographical split runs north to south through the country, dividing significant centres of political power. Afghanistan is highly fragmented, with strong divisions defined by ethnicity and tribal affiliations. Tajikistan also faces political divisions, particularly with the Gorno-Badakhshan Autonomous Region in the east and several areas in the central part of the country. In Kazakhstan and Iran, ethnic division are less visible in political discourse. The weak presence of the state in remote areas is significant for conservation, as many of the most important sites and species are found here. As a result, the involvement of local communities is central to conservation efforts in the region.

1.1.2 Population and livelihoods

Central Asia's diversity is partly a result of its long history as a crossroads between east and west, the mix of sedentary and nomadic peoples, and the isolation imposed on parts of the region by high mountains. The region's pre-Islamic and early Islamic periods were dominated by the sedentary populations of eastern Iranian-speaking peoples known as the Bactrians, Sogdians and Chorasmians, and later by the semi-nomadic Scythians and Parthians. The region was later home to a variety of Turkic peoples including Kazakhs, Uzbeks, Turkmen, Kyrgyz, Uyghurs and other nations. From the mid-19th to the end of the 20th century, the Soviet period saw the movement of many ethnic Russians into the area, but also added as many as 3.3 million people from other countries relocated under Stalin's forced deportations. The region is still home to more than 5 million Russians, close to 500 000 Ukrainians and a significant population of Koreans.

Today, the total population of these seven countries is roughly 175 million people, with almost half of them, 80 million, in Iran. Populations are increasing at an average of 2 % per annum, ranging from 1.4 % to as much as 3 %, but in all cases higher than the global average of 1.18 % per annum. Population density is low. None of the countries average more than 71 people

(1) Starr F. (2009). Rediscovering Central Asia. Wilson Quarterly, Summer 2009.
(2) Turkmenistan has not ratified the CIS charter and changed its status to associate member in 2005. See: https://www.rferl.org/a/1061002.html, accessed 27 April 2018.
(3) Turkmenistan has not signed the agreement.
(4) Commonwealth of Independent States Free Trade Agreement, Article 13.

Table 1.1 Remittances from expatriates for countries where this income source is >5% of GDP

Country	% of population living abroad	Value of remittances (2015) (EUR billion)	Remittances as % of GDP
Uzbekistan	6.2	2.5	5
Tajikistan	6.5	2.1	35
Kyrgyzstan	11.4	1.3	25

Source: Trading economics.[5,6]

per km², the regional average being 37 to 40 people/km².[7] This is substantially lower than population densities in neighbouring South-East Asia (for example, Vietnam has 274 people/km²).

Population is not distributed evenly, however. Across the mountain, desert and steppe regions, climatic and resource conditions discourage human settlement. There are less than 10 people/km² over 65 % of the area, while along the mountainous international borders that comprise snow leopard habitats, the average is closer to 8 people/km². These are the regions where the most significant populations of wildlife occur. If the distribution of snow leopard were a single country, it would be one of the five least populated countries in the world[8]. On average, urban population centres make up close to 43 % of the total population found across Central Asia. The low human population densities in rural areas are key considerations when designing conservation strategies for the region, presenting both opportunities and challenges.

Despite low population levels, all of these areas suffer from rapid population growth, overuse of resources and associated cycles of poverty. The percentage of the population living below the poverty line as defined by national governments averages 22 %, with Afghanistan (35.8 %) and Tajikistan (32 %) the highest (2011 and 2014 estimates, respectively). Kazakhstan has the lowest official poverty incidence at 2.8 % (2014 estimates)[9]. Iran states that its poverty rate is at 0 %, but the World Bank estimates it at 9 %[10]. There is no data available for Turkmenistan. The overall proportion of undernourished people has dropped from 20.2 % (2001) to 12.7 % (2012), although it remains high in some countries – with Tajikistan reporting that more than 33 % of the population is undernourished[11].

Similarly, all countries in the region have seen an increase in their Human Development Index, going from a combined average of 0.56 in 1990 to 0.675 in 2015[12]. Nonetheless, poverty remains pervasive in many areas, particularly in the remote rural areas where much of the wildlife is still found. Extreme poverty in areas that coincide with wildlife and protected areas, and the reliance on primary resources by such communities, make it important to work with local communities to develop livelihood strategies compatible with conservation efforts.

Poverty, environmental degradation and conflict drive population movements, including migration from the region, as people seek safety and better living conditions. The additional impacts of climate change are expected to increase these pressures. There were roughly 4 million Afghan refugees outside the country between 1977 and 2003, and many more millions of internally displaced people.[13] There is also emigration from middle-income countries, seeking opportunities in rich countries including in Europe.[14] Tajikistan, Kyrgyzstan and Uzbekistan all have significant expatriate populations and rely heavily on remittances to shore up relatively weak economies (Table 1.1). Remittances from expatriates are less important in Kazakhstan, Iran and Turkmenistan, although the actual level of remittances in all countries is likely to be higher than official figures[15]. Historically, Russia was the main destination for these migrants, but economic disparities and demand for workers has made Europe (especially Germany, France and the United Kingdom) an increasingly important source of employment opportunities and remittances[16,17,18].

Ministry of Gas and Oil building, Astana, Kazakhstan. Several of the countries in the region have significant reserves of oil, gas or minerals, as well as hydropower potential. Iran has the world's fourth largest reserves of oil. Nevertheless, agriculture and livestock herding remain important for rural livelihoods.

1.1.3 Economy

The Organisation for Economic Cooperation and Development's (OECD) Development Assistance Committee (DAC)[19] defines Afghanistan as a least developed country, Kyrgyzstan, Tajikistan and Uzbekistan as lower middle-income countries, and Iran, Kazakhstan and Turkmenistan as upper middle-income countries. Gas and oil reserves, and strategic location, play an important role in some economies in the region. Kazakhstan, for example, has significant oil reserves[20] and is strategically located to control oil and gas flows from Central Asia going east to China and west to Russia and Europe. Uzbekistan is also rich in petroleum resources, with just under 600 million barrels of proven crude oil reserves (as estimated in 2014) and another 1.8 trillion cubic metres of natural gas reserves (estimated in 2013)[21]. Iran has an estimated 150 billion barrels of proven oil reserves (roughly 10 % of the world's total), making it the fourth largest in the world. Turkmenistan has natural gas reserves estimated at 17.5 trillion cubic metres, as well as another 600 million barrels of proven crude oil reserves[22]. Afghanistan, although one of the poorest countries in the world, sits on what has been estimated at more than EUR 770 billion in untapped mineral resources. Tajikistan ranks eighth in the world for hydropower potential.[23] This natural resource wealth and strategic location combined with rapid economic expansion in China, Russia, and South and South-East Asia presents these countries with a largely unrealised opportunity to be significant energy and minerals providers for the entire region. These economic opportunities face significant transportation, infrastructure, market access and now climate change challenges. They also pose the threat of important environmental costs (see sections 2.1.6 and 2.1.7).

Even though the region's economic future may be tied to oil, gas and extractives, the economies are presently predominantly agricultural. Excluding the major oil producing countries of Iran, Turkmenistan and Kazakhstan, agriculture contributes 20 % to 25 % to the gross domestic product (GDP) of these countries[24]. Within agriculture, livestock production is a major subsector, contributing 14 % to 20 % to the agricultural GDP in Afghanistan, Kyrgyzstan and Uzbekistan. The Central Asia region has vast rangelands (260 million ha in the five CIS countries), but in the semi-arid climate, much of these rangelands can only be used briefly by domestic herbivores. This favours migratory pastoralism and semi-nomadic land-use systems, and has led to the development of a rich heritage of transhumant or nomadic stock rearing by pastoralist cultures[25] where meat and

(5) Source: Trading Economics. See http://www.tradingeconomics.com/kyrgyzstan/gdp
(6) Kyrgyzstan's GDP in 2015 was EUR 5.19 billion. Source: Trading Economics. Ibid.
(7) Uzbekistan: 62 people/km²; Tajikistan: 60 people/km²; Afghanistan: 46 people/km²; Kyrgyzstan: 26 people/km²; Kazakhstan: 6.5 people/km².
(8) Zahler P. and R. Paley (2016). Building Community Governance Structures and Institutions for Snow Leopard Conservation. In: McCarthy T. and D. Mallon (Eds.). Snow leopards. Elsevier Publishing, NY.
(9) Figures cited here are based on the World Bank's poverty headcount ratio at national poverty lines (% of population), using the latest estimate available for the country. Available at: http://data.worldbank.org/indicator/SI.POV.NAHC/countries. Last visited 15 June 2016.
(10) Estimate from 2013 based on a USD 5.5/day value.
(11) Max R. and H. Ritchie (2018). Hunger and Undernourishment. Published online at OurWorldInData.org. Retrieved from: https://ourworldindata.org/hunger-and-undernourishment/ [online resource].
(12) UNDP (2016). Human Development Report 2016. UNDP, New York. Available at: http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf, accessed 22 March 2018.
(13) UNEP (2003). Afghanistan – Post Conflict Environmental Assessment.
(14) Connor P., D. Cohn and A. Gonzalez-Barrera (2013). Changing Patterns of Global Migration and Remittances, More Migrants in U.S. and Other Wealthy Countries; More Money to Middle-Income Countries. Pew Research Center. Article available at: http://www.pewsocialtrends.org/2013/12/17/changing-patterns-of-global-migration-and-remittances
(15) Newland K. (2003). Migration as a Factor in Development and Poverty Reduction, Washington DC: Migration Policy Institute. Online article available at: http://www.migrationpolicy.org/article/migration-factor-development-and-poverty-reduction
(16) World Bank (2013). Migration and Remittances in Europe and Central Asia. The World Bank, Washington DC.
(17) World Bank (2013). Ibid.
(18) International Organization for Migration, Europe and Central Asia report. Available at: http://www.iom.int/europe-and-central-asia
(19) DAC list of ODA recipients effective for reporting on 2018, 2019 and 2020 flows. Available at: http://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/DAC_List_ODA_Recipients2018to2020_flows_En.pdf
(20) Kazakhstan is estimated to have around 30 billion barrels (4.8×109 m3) of crude oil reserves, which place it 11th in the world. Central Asia's Energy Risks. Asia Report No 133. International Crisis Group, 24 May 2007.
(21) Oil and Gas Journal, as reported by Uzbekistan Energy Report. Available at http://www.endofcrudeoil.com/2012/02/uzbekistan-energy-report.html
(22) 2014 BP Statistical Review of World Energy.
(23) International Hydropower Association (2016). Hydropower Status Report, accessed online at http://www.hydropower.org/country-profiles/tajikistan on 27 June 2016.
(24) FAO (2007). Subregional report on animal genetic resources: Central Asia. Annex to the State of the World's Animal Genetic Resources for Food and Agriculture. Rome. Available at: http://www.fao.org/ag/againfo/programmes/en/genetics/documents/Interlaken/CentralAsia.pdf
(25) FAO (2003). Transhumant grazing systems in temperate Asia, edited by J.M. Suttie and S.G. Reynolds. FAO Plant Production and Protection Series No 31. Rome. Available at: http://www.fao.org/docrep/006/y4856e/y4856e00.HTM

Harvesting hay, Kyrgyzstan. There were dramatic changes in land tenure as a result of the revolution in Iran, the independence of the CIS states from the Soviet Union and the conflict in Afghanistan. Despite moves to formalise land ownership, local norms prevail in many remote regions.

wool play a major role in food security and income generation. In the ex-Soviet republics, the complex transition from centrally planned to market-oriented economic systems in the 1990s[26] resulted in a 50 % drop in livestock numbers[27], caused primarily by the elimination of government subsidies. Without subsidies, producers were unable to sustain output levels, consumer prices rose and demand fell[28]. Afghanistan experienced a similar drop in livestock numbers, but the causes were civil war and drought. The economic recovery experienced in these countries since 1999 has seen a concomitant growth in livestock production[29].

1.1.4 Resource ownership and governance

As noted in section 1.1.2, large areas of Central Asia are beyond effective state control and are managed by local stakeholders. Nonetheless, there have been significant efforts at formalising land tenure over the past two decades in all of the countries. The status of these efforts is important for planning conservation in the region. In very general terms, there are three systems operating in the region: the post-Soviet systems found in Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan and Turkmenistan; a predominantly customary land-use system practised in Afghanistan; and a highly formalised system in Iran.

For the post-Soviet countries, land tenure has been defined by the relatively sudden, massive transformation of the agriculture sector, including land, from state to private ownership. For the most part, this was accomplished by dissolving state-owned enterprises and converting agricultural land to private lease holdings. The rates at which this was done and the degree of success has been different for each of these countries, but the change has made land management and conservation more complicated.

In Afghanistan, more than 30 years of conflict has caused an almost complete loss of land-titling records, undermined local land-tenure systems and left a vacuum with little clarity on formal land tenure. The government has sought to remedy this gap through the Land Management Law[30], drawing upon Sharia law, local customary practices, and creating a specific category for grazing lands (the land use most likely to overlap with the habitat of threatened species). Disputes are common, stemming from internal inconsistencies in the law and from the difficulty of implementing a new land registration system for the entire country while faced with returning refugees and displaced people[31].

(26) Kerven C., J. Channon and R. Behnke (1996). Planning and policies on extensive livestock development in Central Asia. Overseas Development Institute, Working Paper 91, London.
(27) FAO (2007). Op. cit.
(28) USDA (2004). Russia changes global market for livestock products. Amber waves: the economics of food, farming, natural resources, and rural America, February 2004. Available at: https://www.ers.usda.gov/amber-waves/2004/february/russia-changes-global-market-for-livestock-products/
(29) FAO (2007). Op. cit.
(30) In 2007, Afghanistan's Cabinet of Ministers approved the new land policy drafted by the Ministry of Urban Development, MAIL and Ministry of Justice with the support of the United States Agency for International Development (USAID). In 2008, this land policy was converted to legislative form and approved as the Land Management Law.
(31) USAID (2010). USAID Country Profile: Property Rights and Resource Governance. Afghanistan.

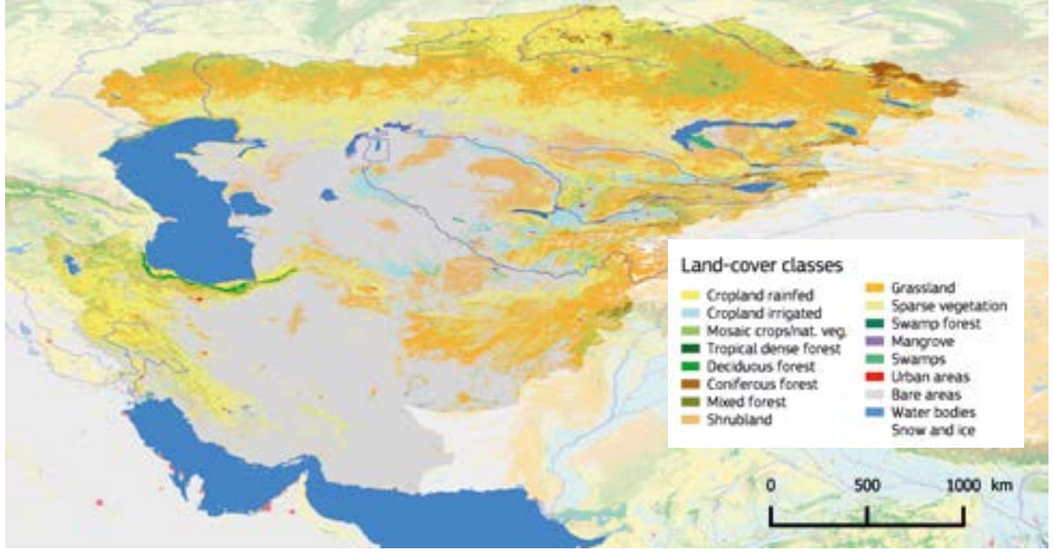
1.2 Key biodiversity features

In Iran, land tenure has changed since significant reforms were instituted in the early 1960s. Despite some conflict between agricultural workers and landowners that persisted into the 1980s, Iran's land tenure system has clear distinctions between tenure types, and management systems that cover both public and private lands. Of note for conservation are unique, conservation-oriented lease opportunities created in 2016. A private entity may request the use of large-scale areas of land on a medium-term (5 to 10-year) lease basis, including for conservation purposes. This is the tenure system used for five private, sustainable hunting reserves, which are managed privately but supervised by the government's Department of Environment.

1.2.1 Geography and climate

The region stretches from the Irano-Turanian drylands in the west to the Pamir-Karakoram-Tien Shan mountain complex in the east, and from the Kazakh steppes in the north to the Registan Desert in the south. Its northern extent (reaching the southern edge of the boreal taiga conifer forests) and continental location brings cold winters and hot, dry summers. This combination of topography and climatic conditions results in a varied mosaic of ecosystems, including temperate woodlands, including some of the last remaining stands of wild fruit and nut trees, tugai forests along lowland and mid-altitude river courses, open grassland steppe, desert and high-altitude ecosystems including glaciers, lakes, alpine meadows, montane conifer forests and shrublands (Fig. 1.1).

Figure 1.1 Land cover map of the Central Asia region



Steppe grassland and the Tien Shan mountains, Kyrgyzstan. The grasslands, which stretch from western Central Asia to Mongolia and China in the east, are the largest remaining temperate grasslands on earth.

The Karakum desert occupies 70 % of Turkmenistan and is the world's 12th largest desert. Four of the world's 8 cold-winter deserts are in Central Asia.

1.2.2 Habitats and ecosystems

Mountains

The mountain ranges of Central Asia are one of its principal geographical features, defining the water regime and the flora and fauna. The mountains support diverse vegetation communities, with more than 5 000 species of vascular plants, almost one quarter of which is endemic to the region. In the east, the Tien Shan, Pamir and Hindu Kush mountains in Afghanistan, Tajikistan and Kyrgyzstan comprise a sizable portion of snow leopard range and are home to its major prey species, the wild mountain goats and sheep.

Forests

The Central Asian region is one of the least forested regions in the world. Forests cover just 4.6 % of the land and are generally restricted to zones of higher precipitation in the north, and the lower slopes of mountain regions. Four countries have less than 4 % forest cover (Kazakhstan, 1.2 %; Afghanistan, 2.1 %; Tajikistan, 2.9 %; Kyrgyzstan, 3.3 %), 3 have more, but still less than 10 % (Iran, 6.6 %; Uzbekistan, 7.6 %; Turkmenistan, 8.8 %). Despite the low level of coverage, these forests are critical habitat for biodiversity.

The main forest types in the region are (i) the mountain conifer forests found in the northern regions and mountains of Kazakhstan related to the northern Siberian taiga system, (ii) the dry conifer forests of eastern Afghanistan, (iii) the fruit and nut forests of Tajikistan and Kyrgyzstan, and to a limited extent in Uzbekistan, and (iv) the Hyrcanian temperate broadleaf and mixed forests on the northern slopes of the Alborz Mountains of Iran. Other forest types of note include (v) the tugai forests – riparian (riverine) scrub forests with mostly willow, oleaster and poplar species; (vi) the Paropamisus xeric woodlands endemic to Afghanistan that stretch across most of the north of the country; and (vii) the saxaul 'forests', mainly in southern Kazakhstan, Uzbekistan and Turkmenistan. Saxaul is a genus of 5 m-tall woody shrubs, typical of Central Asian desert ecosystems.

The high-elevation conifer forests are found at altitudes up to 3 700 m above sea level in the western Himalayas. The juniper trees that make up the forest grow extremely slowly, with some specimens estimated to be more than 1 000 years old. The forests form one of the Global 200 Ecoregions.

Ancient forests of fruit and nut trees, which include wild walnut, apple, plum, pistachio, cherry, hawthorn and almond, have been important for local livelihoods for many centuries. They are the ancestors of many domestic varieties of fruits and nuts and preserve genetic diversity, which might be important in enabling modern varieties to adapt to climate change. About 90 % of these forests have been lost in the last half century, as a result of intensive agricultural practices, commercial over-harvesting and firewood collection.

The eastern Safed Koh mountain range of Afghanistan supports the deodar cedar, a high-value species prized for its aromatic properties that are used in incense and oils. Although logging is prohibited, there is illegal logging to supply the growing in-country and cross-border timber trade.

The Hyrcanian temperate broadleaf and mixed forests support a diverse plant community but are threatened by conversion to tea and other crops, unsustainable logging and poaching.

The Tugai (riverine) forests found in the river valleys of arid landscapes are also valuable for soil protection, as grazing lands and for biodiversity, including wild boar and Bukhara deer.

The 12 million ha of saxaul woodland in the arid parts of southern Kazakhstan, Uzbekistan and Turkmenistan are important for protecting soil against erosion, preventing sand invading oases and covering roads. They are diminishing because they are targeted for firewood.

Steppe

Despite their size (once covering over 8 % of earth's surface), steppe or temperate grasslands are today considered one of the most altered and endangered ecosystems on the planet.[32] They occur in areas where moisture regimes are insufficient to support forests, but not so dry that they become deserts. They act as carbon sinks, prevent erosion and are habitat for many of the world's migratory terrestrial fauna, as well as numerous small animals.

In Central Asia, despite substantial losses, steppes remain a dominant part of the landscape and form the largest area of temperate grasslands remaining on earth. They stretch from Ukraine in the west, dominate the landscape in Kazakhstan, Turkmenistan and Uzbekistan[33], and are interrupted only by the Altai and Tien Shan Mountains before continuing east through Mongolia to China. The World Wide Fund for Nature (WWF) divides the entire Central Asian steppe, including the sections that occur in Mongolia and China, into 14 ecoregions with distinct communities of fauna and flora. Seven of these ecoregions are within Central Asian countries: (1) Alai-Western Tien Shan (Kazakhstan, Tajikistan and Uzbekistan); (2) the Kazakh upland, (3) the Altai steppe and semi-desert (Kazakhstan); (4) the Emin Valley steppe (Kazakhstan and China), (5) the Kazakh steppe, (6) the Kazakh forest steppe, both representing the northern reaches of the grasslands as they move from Kazakhstan into Russia; and (7) the Tien Shan foothill arid steppe (Kazakhstan, Kyrgyzstan and China).

Deserts

Central Asia is a part of the Afro-Asian belt of deserts, which begins in the Cape Verde islands below the Tropic of Cancer and extends over 12 000 km to the north and east into Mongolia and eastern China. Owing in part to its northern latitudes and high plateaus, the region has 4 of the world's 8 major cold winter deserts in addition to some of largest desert areas in the world. Among them are the Kara-Kum Desert in Turkmenistan (12th largest), the Kyzl Kum Desert (15th largest) located in Kazakhstan, Turkmenistan and Uzbekistan, the Dasht-e Margo (19th largest) and Registan (20th largest) deserts in south-western Afghanistan, and the Dasht-e Kavir (25th largest in the world) and Dasht-e Lut (26th largest)[34] deserts in Iran.

These deserts receive less than 125 mm of precipitation per year and support a range of habitat types. The vegetation generally consists of xeric shrubs including Artemisia, Haloxylon (saxaul), and Salsola, and the fauna includes wild ass, goitered gazelle, caracal, saiga and sand cat. Each region has particular, often unique, flora and fauna communities, depending partly on soil type (salt, clay, sand or rock). Much of these deserts are unprotected.

([32]) Based on 2010 data published by WCMC and the IUCN Temperate Grasslands Conservation Initiative.
([33]) For an up-to-date review of definitions and geographical distribution see: Wesche K., D. Ambarli, J. Kamp, P. Török, J. Treiber and J. Dengler (2016). The Palaearctic steppe biome: a new synthesis. Biodiversity and Conservation 25(12), pp. 2197-2231; and Dengler J., M. Janišová, P. Török and C. Wellstein (2014). Biodiversity of Palaearctic grasslands: a synthesis. Agriculture, Ecosystems & Environment 182, pp. 1-14.
([34]) Dasht-e Lut is a UNESCO World Heritage Site and one of the driest places in the world.

Big Almaty lake, Kazakhstan. Despite being almost land-locked, Central Asia has globally important wetlands that support endemic species as well as millions of migratory waterfowl on their journey to and from Arctic breeding grounds. The wetlands play a vital role in local economies.

Goitered gazelle, Badkhyz Reserve, Turkmenistan. As with many of the region's steppe and semi-desert ungulates, the gazelle's population has declined as a result of hunting, habitat degradation and competition for grazing with domestic livestock.

Wetlands

A combination of climatic and geographic features makes Central Asia a globally significant region for wetland conservation. In a region that is predominantly landlocked and dry, bordered to the south and east by mountain ranges, the relatively few drainage systems and associated wetlands hold the highest diversity of birds, reptiles, amphibians, fish and invertebrates in the region. The 64 Ramsar sites[35] in Central Asia extend over approximately 7.7 million hectares of wetlands and contribute to the conservation of regional and global biodiversity by, for example, supporting breeding populations of Dalmatian pelican and white-headed duck in Kazakhstan. In favourable years, they also provide habitat for several million migrating waterfowl and waders, especially in Kazakhstan, Turkmenistan and Iran.

The Caspian 'Sea' is the world's largest lake, covering 371 000 km^2. It is home to the endangered Caspian seal, which is threatened by pollution, disease and hunting. Its waters also hold many sturgeon species, now critically endangered by overfishing for the caviar trade. Surrounding the Caspian Sea, an extensive complex of rivers and lakes play a critical role in regional hydrological processes. They are also breeding areas for rare and endemic freshwater fish and are particularly important for migratory and wintering water birds. They include the Issyk-Kul Lake in eastern Kyrgyzstan and numerous wetlands (9 of them listed as Ramsar sites); the 4 major transboundary rivers of Central Asia (the Amu Darya, Syr Dara, Ili and Helmand rivers); and the Sistan wetland, a series of shallow lakes in south-west Afghanistan and eastern Iran.

Wetlands also provide vital ecosystem services that are crucial for the sustainable development, human security and well-being of millions of people. Despite these benefits, wetlands are being degraded throughout Central Asia, with negative consequences for biodiversity and human livelihoods. Examples include the wetlands of the Sistan basin in south-west Afghanistan and eastern Iran (including the Hāmūn-e Helmand wetland in Iran), which are seasonal lakes formed by snowmelt. From the late 1990s onwards, a combination of drought and a rapid expansion of irrigation systems led to the deterioration of the wetlands. The wetlands have now mostly dried up, and the wildlife, people (many of whom were refugees from conflict), fisheries and agriculture that once surrounded the area have largely disappeared.

Ecosystem services

These habitats not only provide a home for unique assemblages of wildlife, but also a vital array of ecological services that support the human population of the region. For example, high mountains contribute to climate regulation and weather formation. Their glaciers and lakes store water and supply many major rivers such as the Amu Darya and Syr Darya rivers and their tributaries, which together provide water for drinking and cultivation for tens of millions of people. These benefits are felt outside the region – it has been estimated that nearly one-third of the world's human population benefits from power, irrigation, industrial waters and fisheries from rivers that originate in the highlands of Asia[36]. Meadows, grasslands and scrublands provide grazing for livestock, which is the primary source of food and income for some of the poorest and most marginalised rural communities in Asia. In addition to fuel and construction materials, forests provide high-value non-timber products, such as pine seeds, nuts and mushrooms, and a critical genetic legacy as the ancestral home to many kinds of domestic trees and other crops. The region's outstanding natural beauty, diversity of habitats and unique flora and fauna is also generating livelihoods by attracting an increasing number of tourists from around the world. Central Asia also makes a major positive contribution to efforts to mitigate global climate change, through the role that drylands play as a carbon sink.

1.2.3 Species diversity, endemicity and extinction risk

The Central Asia region is located on a biological crossroads, with species representative of 3 of the world's biogeographic realms: the Palearctic (e.g. wolf, brown bear), Indo-Malayan (e.g. palm civet, leopard cat) and Afrotropic (e.g. cheetah, caracal). This, combined with the diverse range of habitats, has resulted in a rich assemblage of flora and fauna with a high level of endemism. Iconic wildlife species include the snow leopard, mountain sheep (urial, argali) and goats (ibex, markhor) (collectively referred to as the 'mountain monarchs'), and the critically endangered Asiatic cheetah. The steppes are home to herds of migratory ungulates such as the saiga antelope, goitered gazelle and Asiatic wild ass. The region's wetlands hold endemic fish species and are vital for migratory birds. The plant biodiversity of the region includes more than half of the world's tulip species, and over 300 wild ancestors of domestic species.

Five of the Central Asian countries (Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan) support snow leopards. Together with the associated mountain ecosystem of northern Pakistan, they contain about 10 % (or 294 300 km^2) of the snow leopard's current global range (estimated at 2.8 million km^2)[37].

In the western part of the region, the Kopetdagh Mountains, which run along the border of Turkmenistan and Iran and the western Alborz Mountains along the south of the Caspian Sea in Iran, have a high level of plant, invertebrate, reptile and amphibian endemicity. These mountain regions hold about two-thirds of Turkmenistan's biodiversity and a rare assemblage of large mammal species, including the Persian leopard and the brown bear.

There are large numbers of endemic invertebrate species in the upper and middle altitudinal belts of all mountain systems of Central Asia. Some insect groups (especially butterflies, beetles and orthopterans) include many local genera and species with small populations and limited ranges. In addition, several endemic grasshopper genera (Ferganacris, Mizonocara) are associated with the lower altitudes of the central part of the Central Asian mountains.

The eastern Safed Koh mountain range of Afghanistan is made up of a mosaic of habitats, which includes some of the last contiguous patches of arid conifer forests (pine, spruce, fir and deodar cedar) in the Himalayas, and supports an extensive biological diversity that includes threatened species such as Asiatic black bear, musk deer, leopard cat and yellow-throated marten.

(35) The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. A key commitment of Ramsar Contracting Parties is to identify and place suitable wetlands onto the List of Wetlands of International Importance, also known as the Ramsar List. See https://www.ramsar.org

(36) Snow Leopard Working Secretariat (2013). Global Snow Leopard and Ecosystem Protection Program Bishkek, Kyrgyz Republic.

(37) McCarthy T. and D. Mallon (2016). Snow leopards. Elsevier Publishing, NY.

Wild tulips, Aksu-Zhabagly natural reserve, Kazakhstan. Central Asia's diversity of habitats and location, at the meeting point of the Palaearctic, Indomalayan and Afrotropical biogeographic realms, have contributed to the richness of the region's flora.

This region of Afghanistan is also home to endemic bird species, notably the white-cheeked tit and Kashmir nuthatch.

Within the region, 155 species have been assessed as being threatened with global extinction (Tables 1.2 and 1.3). The large number of mammals and birds on this list reflects the importance of the region's steppe and mountain habitats, but also results from the greater attention given to these groups. The large number of freshwater fish reflects the diverse and specialised nature of the freshwater fauna, and the focus on and threat to the economically important sturgeons, which accounts for 8 of the threatened freshwater fish, all of them critically endangered. Many species have yet to be assessed.

1.2.4 Geographic priorities for conservation

Priority regions for conservation

A number of global analyses have used standardised approaches to identify biodiversity priorities globally. These are summarised in this section, and for the purposes of this study, any area which falls within at least one of the priority areas is included to form a single 'priority region for conservation' (PRC).

Hotspots and key biodiversity areas

The Mountains of Central Asia hotspot includes all of Kyrgyzstan and Tajikistan, eastern Kazakhstan, the extreme east of Uzbekistan and Turkmenistan, and the Wakhan-Pamir valley in Afghanistan. In the west of the region covered by this chapter, the Caucasus hotspot includes a small part of the Iranian coast of the Caspian Sea, and the Irano-Anatolian hotspot covers a limited area of central and western Iran, and neighbouring parts of Turkmenistan.

Key biodiversity areas (KBAs)[38] have been identified in the Mountains of Central Asia hotspot (Table 1.4). The analysis takes into account earlier priority setting analyses, including important bird areas (IBAs) (BirdLife International) and Alliance for Zero Extinction sites.

Global 200 Ecoregions

Central Asia has 5 G200 Ecoregions (Fig.1.2). The Central Asia Deserts ecoregion covers large areas of Kazakhstan, while the Middle Asian Montane Woodlands and Steppe ecoregion covers the eastern part of the region. The Caucasus-Anatolian-Hyrcanian temperate forests ecoregion is in Iran, along the southern coast of the Caspian Sea. The Altai-Sayan Montane forests ecoregion is in eastern Kazakhstan (also Mongolia and China), and small parts of the Tibetan Plateau Steppe are found in Afghanistan.

([38]) Key biodiversity areas are identified on the basis of the presence of globally threatened species or important species communities and ecological processes. Full information is at http://www.keybiodiversityareas.org/what-are-kbas

Table 1.2 Numbers of terrestrial and freshwater threatened species by major taxonomic group and country

Taxonomic group	Afghanistan	Iran	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan	Whole region
Mammals	10	12	15	5	6	8	9	22
Birds	17	24	26	16	15	20	20	29
Reptiles	1	10	1	2	2	2	0	12
Amphibians	1	4	1	0	0	0	0	6
Freshwater fish	5	18	5	3	5	11	7	24
Invertebrates	2	8	7	4	3	7	0	17
Plants	5	3	16	14	12	4	17	45
Total	41	79	71	44	43	52	53	155

Source: IUCN Red List (June 2017).

Table 1.3 Number of terrestrial and freshwater threatened species in the countries of the region, by threat category

Threat category	Afghanistan	Iran	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan	Whole region
Critically endangered	5	15	17	7	8	10	11	41
Endangered	11	16	19	13	10	9	16	38
Vulnerable	25	48	35	24	25	33	26	76
Total	41	79	71	44	43	52	53	155

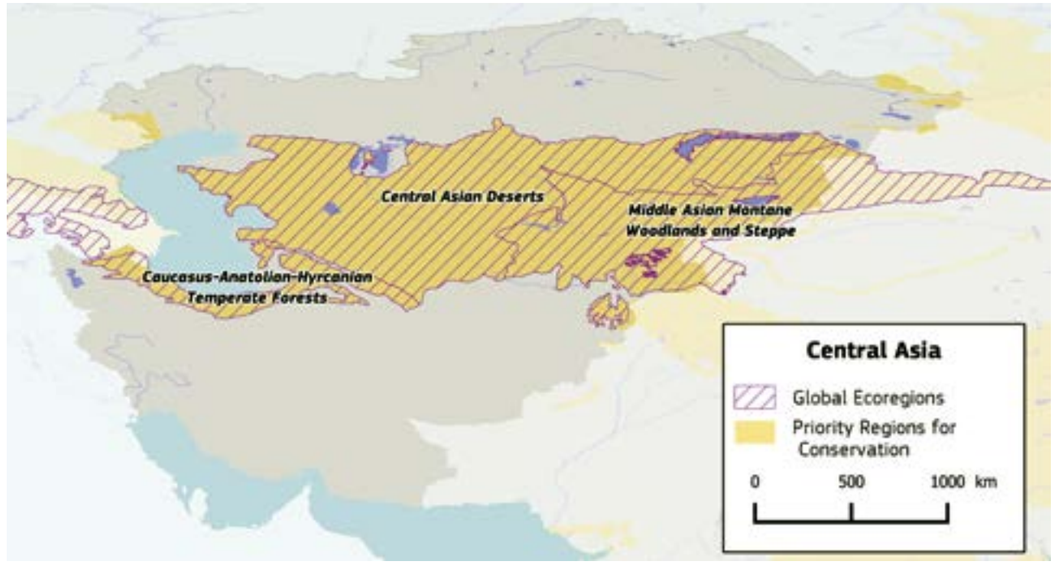
Source: IUCN Red List (June 2017).

Table 1.4 Key biodiversity areas in the Mountains of Central Asia hotspot

Country	# KBAs within the hotspot in the country (confirmed)	Area of confirmed KBAs (km²)	# KBAs within the hot-spot in the country (not yet confirmed)
Afghanistan	1	10 000	1
Iran	not in the hotspot	n/a	n/a
Kazakhstan	25	25 407	3
Kyrgyzstan	31	23 015	2
Tajikistan	35	38 950	11
Turkmenistan	3	2 960	0
Uzbekistan	36	26 774	7
Total	131	127 106	24

Source: Draft Ecosystem Profile for the Mountains of Central Asia hotspot[39].

Figure 1.2 Priority regions for conservation and Global 200 Ecoregions in Central Asia



Not all G200 Ecoregions are labelled. See Annex 1 for a full list.

(39) Provided by Zoi Environment Network on 24 January 2017.

Madyan valley, Tajikistan. Large parts of the region are included in Global 200 ecoregions, while other conservation priorities are determined on the basis of the presence of key species, for example through identification of snow leopard conservation units.

The only **endemic bird area** in the region is a small part of the Western Himalayas, which is found in Afghanistan.

Two priority-setting exercises have focused on the **snow leopard**.

Snow Leopard Conservation Units (SLCUs) are areas of importance to the animal's long-term conservation, identified by experts in 2008. There are 69 SLCUs with a combined area of about 1.2 million km² across 11 of the 12 countries where the species occurs.

The **Global Snow Leopard and Ecosystem Protection programme** (GSLEP) has identified 23 snow leopard landscapes that could be secured by 2020[40]. These landscapes are defined as those that (i) contain at least 100 breeding-age snow leopards conserved with the involvement of local communities, (ii) support adequate and secure prey populations, and (iii) have functional connectivity to other snow leopard landscapes[41].

(40) Bishkek Declaration; Snow Leopard Working Secretariat (2013).
(41) Sanderson E., D. Mallon, T. McCarthy, P. Zahler, and K. Fisher (2016) Global strategies for snow leopard conservation: A synthesis. In: McCarthy T. and D. Mallon (Eds.) (2016). Snow leopards. Elsevier Publishing, NY.

2

Conservation challenges

Saiga antelope. Until the late 20th century, huge migratory herds of saiga lived on the steppe of Central Asia, Russia and Mongolia. By 2010, hunting, disease, habitat degradation and disruption of migration routes by roads and railways had reduced the population by 90 %. Protection has allowed some populations to slowly recover, but the species remains critically endangered. (Photo taken in Russia)

2 _ Conservation challenges

2.1 Key direct threats

The Central Asia region, its habitats, wildlife and the services they deliver are all under increasing threat from a variety of sources. Over-harvesting of natural resources (e.g. illegal hunting and wildlife trade, overgrazing, deforestation, water extraction), agricultural and other human encroachment on natural landscapes, expansion of extractive industries, infrastructure (especially linear infrastructure) development and desertification are all leading to habitat fragmentation and loss, resulting in reduced and isolated wildlife populations. The region is expected to be facing some of the greatest impacts from climate change in the world.[42] The impact of the degradation of ecosystems and loss of species is an obstacle to social development and poverty alleviation, and thus contributes to long-term conflicts, political instability, out-migration and weak governance.

2.1.1 Illegal and unsustainable wildlife hunting and trade

For all of the countries in this strategy, poaching, unsustainable hunting and illegal wildlife trade are significant and continuing problems. In addition to direct killing, hunting has indirect impacts such as disturbance and increasing stress to wildlife, resulting in a reduction of habitat size. This leads to fragmentation of populations into small islands where the remaining subpopulations are even more vulnerable to a variety of impacts.

For the CIS countries, a considerable part of the problem stems from the difficulties faced after the collapse of the Soviet Union. During the Soviet era, each country had some system in place to manage hunting and trade, including licensing, hunting seasons and areas, quotas, protected species and relatively strong enforcement. Since that period, however, the collapse of enforcement mechanisms and a widespread lack of funds have resulted in a substantial decrease in active management, which has in turn led to poaching. There have also been efforts to promote trophy hunting or setting high quotas, despite unknown or decreasing populations[43]. By the mid-1990s, studies were already showing 50 % to 75 % decreases of many economically important species in the region, with some populations having disappeared altogether[44]. Iran and Afghanistan were similarly impacted by political change and conflict from 1978 to 1979.

There is concern that the new Silk Road project, or China's One Belt, One Road initiative, will increase access and further facilitate illicit wildlife trade for the region as a whole.

The following paragraphs detail key information about hunting and trade, in the context of other threats, for several iconic species in the region.

Migratory steppe ungulates

Central Asia's migratory steppe ungulates (particularly saiga antelope, goitered gazelle and Asiatic wild ass) have always been a target for hunters because of their large numbers and the accessibility of herds. Traditionally they were hunted for local subsistence, but increasingly became the target of commercial-scale poaching and legal hunting operations. For all the species, the hunting pressure has become so severe that populations are only a fraction of what they were two decades ago, and some species have disappeared from parts of their original home range.

Saiga is a migratory species found primarily on the southern steppes of Kazakhstan, Uzbekistan, Mongolia and Russia[45]. There are three distinct populations found in Kazakhstan – the Ural, Ustyurt and Betpak-dala – and some of the herds migrate during the winter into Turkmenistan and Uzbekistan. The global Saiga population numbered around 1 million in the early 1990s[46], but was reduced to about 50 000 animals by 2010 as a result of poaching, disease (see section 2.1.10) and habitat loss (although their population has since increased to roughly 150 000). This catastrophic decline has resulted in the species being listed as critically endangered by the International Union for the Conservation of Nature (IUCN). Saiga has long been a

(42) Kreft S., D. Eckstein, L. Junghans, C. Kerestan and U. Hagen (2015). Global Climate Risk Index 2015. Germanwatch: Berlin. Available at: https://germanwatch.org/en/download/10333.pdf. The publication lists Afghanistan as 15th in the world.
(43) Morgera E., J. Wingard and A. Fodella (2009). Developing Sustainable Wildlife Management Laws in Western and Central Asia. Joint publication of FAO and CIC. Budapest. 180 pp.
(44) Jowkar H., S. Ostrowski, M. Tahbaz and P. Zahler (2015). The Conservation of Biodiversity in Iran: Threats, Challenges and Hopes; and Wingard J. R. and P. Zahler (2006). Silent Steppe: The Illegal Wildlife Trade Crisis in Mongolia. Mongolia Discussion Papers, East Asia and Pacific Environment and Social Development Department, Washington DC: World Bank
(45) Milner-Gulland E. J., M.V. Kholodova, A. Bekenov, O.M. Bukreeva, A. Iu. A. Grachev, L. Amgalan and A.A. Lushchekina (2001). Dramatic declines in saiga antelope populations. Oryx Vol. 35 No 4. Available at: https://www.iccs.org.uk/wp-content/papers/Milner-Gulland2001Oryx.pdf
(46) Milner-Gulland et al (2001) Ibid.

Saiga skulls with the horns removed around a poachers' hut, Betpak-Dala, Kazakhstan, 2004. Saiga are hunted for their meat, hide and horns, the last of which are prized in Chinese traditional medicine.

game animal for locals who use the meat, with records of hunting from China going back at least 2 000 years. However, the species is now targeted for its horn, which is in demand for Chinese traditional medicine and is worth or EUR 34 230 per kilo[47], over 40 times the value of ivory. Demand for saiga horns fuels a lucrative, illicit market that is the primary driver behind high levels of poaching.

Goitered gazelle was also widespread and abundant in Central Asia, including northern and eastern Iran, southern Afghanistan, Uzbekistan, Turkmenistan, Tajikistan and Kyrgyzstan.[48] Despite legal protection against hunting in all countries (except Iran), this species has been subject to extreme illegal hunting pressure for trophy hunting, local meat consumption, hides[49,50], and more recently for their horns, which now sell on the traditional medicine markets in China. In the mid-1990s the population in the Soviet Union alone was an estimated to be 1 million, but by 2001 the global population had dwindled to as little as 120 000 to 140 000 animals.[51] The populations in Turkmenistan, Tajikistan and Kyrgyzstan have almost disappeared, and those in Kazakhstan have been drastically reduced. Most populations are small and isolated, leaving them vulnerable to habitat loss, disease and other threats.

The majority of Asiatic wild ass is now found in Mongolia and northern China, a small portion of its former range. In Central Asia, isolated populations survive in the Badkhyz Preserve in Turkmenistan and the Touran National Park and Bahramgor Protected Area in Iran[52]. Populations have been re-established in another 10 areas – in Kazakhstan on the Barsa-Khelmes Island (Aral Sea), Aktay-Buzachinskiy Reserve; Andasayskiy Reserve, Kapchagayskoye; in Uzbekistan in the Ecocentre 'Djeiran' near Bukhara; in Turkmenistan in Meana-Chaacha, Kaakha, Kopet Dag, Sumbar Valley, Sarakamish Lake. In recent field surveys it has been found that the Kaplankyr population in Turkmenistan has been extended to southern Ustyurt in Uzbekistan[53]. The Badkhyz population in Turkmenistan is threatened with imminent extinction. Poaching for meat and hides, and in some areas for use in traditional medicine, as well as habitat loss and fragmentation caused by human settlements and linear infrastructure development are the greatest threats to the species.

Mountain monarchs

The mountain goats and sheep of the region, collectively referred to as mountain monarchs, are threatened by overhunting for meat and other products, including trophies (the large horns of males).

(47) Horgos Customs uncovered antelope horn smuggling, http://news.163.com/14/0623/12/9VE3HSUC00014AEF.html (in Chinese). Chinese customs uncovers shipment of 2 351 horns that it estimates are worth Yuan 70.53 million (or EUR 8.08 million).
(48) WCS (undated). Goitered gazelle. Available at: https://mongolia.wcs.org/Wildlife/Goitered-Gazelle.aspx
(49) Hunts have been advertised online for Mongolian goitered gazelle. The Hunting Report, available at: http://www.huntingreport.com/
(50) Considered high quality and processed into chamois and box calf leather.
(51) IUCN Red List of Threatened Species, http://www.iucnredlist.org/details/8976/0
(52) Feh C., S. Munkhtuya, S. Enkhbold and T. Sukhbaatar. September 2001. Ecology and social structure of the Gobi khulan, Equus hemionus, subsp. in the Gobi B National Park, Mongolia. Biological Conservation 101(1), pp. 51-61.
(53) Marmazinskaya N., M. Gritsina, M. Mitropolskiy, R. Murzakhanov and J. Wunderlich (2016). Rare ungulates in the south of the Ustyurt Plateau and the north of the Sarykamysh depression: current conditions. Proceedings: Current problems of conservation of rare, endangered and little-studied animals of Uzbekistan, Academy of Science of Uzbekistan, pp. 118-127 (in Russian).

The Asiatic sub-species of cheetah is now found only in Iran, where less than 110 survive. In the past, cheetah were captured to be trained to hunt gazelles, but they are currently threatened by lack of prey, loss of habitat, road kill and competition with domestic livestock. Photo of a captive animal.

Markhor is a wild goat that occurs in north-eastern Afghanistan, southern Tajikistan, and southern Uzbekistan (with most of the remaining global population in northern Pakistan).[54] Although their inaccessible mountain habitat offers some protection, markhor are prized for meat and for their long, spiral horns, making them a target for local poachers. Surveys are difficult because of on-going conflicts across its range and harsh terrain, but data suggests that the species is declining or has disappeared across much of its range.

Urial is a wild sheep that is widely distributed across the region, including populations in north-eastern Iran, Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan and Afghanistan.[55] All subspecies are listed on CITES Appendix I or II, but most range states permit limited hunting. Trophy hunting of 'Afghan urial' or 'Transcaspian urial' is offered online for Tajikistan, Iran and Turkmenistan (along with hunts for Persian goitered gazelle and Asiatic wild ass). Occupying rolling hills in lowlands and lower mountains where people also graze livestock, the urial faces threats, including habitat loss and modification, competition from livestock and transmission of diseases, as well as high levels of hunting, all of which have led to substantial declines in populations.[56]

The world's largest sheep, argali, are found at much higher elevations than urial, and includes the Marco Polo subspecies that has a horn spread of up to 2 m. They are threatened throughout their range as a result of hunting and overgrazing of habitats by domestic livestock. They are targeted by illegal subsistence hunters for their meat but are also prized hunting trophies for their long, curled horns, with guided hunting packages costing more than EUR 77 000[57]. In some cases, this high value has incentivised their protection in hunting concessions, but in others it has led to unsustainable and sometimes illegal trophy hunting.[58] Argali are partially migratory, and linear infrastructure such as border fences, can stop them moving to find new pastures or avoid extreme weather.

(54) IUCN Red List of Threatened Species, http://www.iucnredlist.org/details/3787/0
(55) IUCN Red List of Threatened Species, http://www.iucnredlist.org/details/15739/0, Nowak, R.M. (1999). Walker's Mammals of the World. 6th ed. The Johns Hopkins Press, Baltimore
(56) owak, R.M. (1999). Op. cit.
(57) Advertised hunting trips for argali and ibex in Mongolia, available at: http://www.ameri-cana.com/international-hunting/mongolia/. Last visited 27 October 2016.
(58) Michele S. and T. Rosen. (2016). Hunting of Prey Species: A Review of Lessons, Successes, and Pitfalls – Experiences from Kyrgyzstan and Tajikistan. In: McCarthy T. and D. Mallon (Eds.). Snow leopards. Elsevier Publishing, NY.

Siberian ibex inhabits the highest mountain ranges of Central Asia, including in Afghanistan, eastern Kazakhstan, Kyrgyzstan, north-eastern Uzbekistan (west Tien Shan) and Tajikistan, and is considered relatively common.[59] There are, however, no rigorously derived population estimates for ibex in any range state. Ibex is hunted for subsistence purposes throughout its range, and is a traditional and important supplement in local diets. Trophy hunting is common with hunts offered online in all of the Central Asia countries, at prices ranging up to EUR 6 400[60]. As with all other mountain ungulates, ibex also face threats due to competition with livestock for food and habitat, and conflicts with nomadic populations. This combination of threats has resulted in population declines, some significant, especially in areas near human settlements.

Big cats

There are 3 big cats in Central Asia: Asiatic cheetah, Persian leopard and snow leopard. All 3 have experienced dramatic population reductions caused by hunting, scarcity of prey and habitat loss and degradation. Of the 3, the Asiatic cheetah has suffered the greatest losses and is the most threatened.

Asiatic cheetah was once common across the Indian subcontinent and south-west and central Asia, but currently less than 110 survive, restricted to the central Dasht-e Kavir desert region of Iran[61,62]. Hunting caused the subspecies' extinction in Afghanistan (in the 1950s) and Turkmenistan (in 1984). In India, Pakistan and Iran its decline was due to lack of prey, caused by hunting and competition with domestic livestock, and habitat fragmentation. Death on roads is the main threat to the remaining population in Iran, responsible for about 40 % of documented cheetah deaths.[63]

Persian leopards survive in scattered remnant populations in Iran, Uzbekistan and Afghanistan. Leopard populations have been dramatically reduced by persecution[64], habitat fragmentation, increased illegal wildlife trade[65], excessive harvesting for ceremonial use of skins, prey-base declines[66] and poorly managed trophy hunting.

Snow leopards are threatened by poaching for their pelts, loss of prey species because of over-hunting and retaliatory killing by shepherds in response to livestock losses (which may increase as wild prey declines). Traded parts include bones, teeth and claws, the first of which may be an alternative or substitute for medicinal trade in tiger bones[67]. The population is thought to be dwindling across parts of its range, despite international and national protected status banning hunting and trade. None of the countries have any official trade under the Convention on International Trade in Endangered Species (CITES), but poaching was noted in all of the SLCUs.[68] In 2017 a review of available population data led to a revision of the snow leopard status on the IUCN red list from 'endangered' to 'vulnerable', based on a review of evidence which suggests that the species' decline is not fast enough to meet the criteria for 'endangered'. IUCN note the large uncertainty and difficulty of estimating snow leopard populations, however.[69]

Other mammals

Several other mammals found in Central Asia are similarly targeted for local consumption and by wildlife traders. Species of concern include the Kashmir musk deer, wolf, Asiatic black bear, corsac fox, marmot, lynx and various small cats (e.g. sand cat, jungle cat, Pallas' cat and caracal)[70]. Many of these species are prized for their fur and sometimes their meat and medicinal properties (while musk deer are highly coveted for their musk glands[71]). Some, in particular carnivores, are also hunted because they are considered nuisance or conflict animals.

Birds and other species

Central Asia is at the core of the central Asian flyway, which includes parts of 30 countries. The flyway encompasses the migration routes of some 182 species of water birds, 29 of which are globally threatened or near threatened. These birds pass through central Asia on their journey to and from their arctic breeding grounds, and also spend parts of the non-breeding season in the region. Unregulated hunting is a threat to many of the water bird species that use the flyway. Recognising the region's importance to the continuing survival of so many species, a range of regional and international efforts and

(59) IUCN Red List of Threatened Species, http://www.iucnredlist.org/details/42398/0
(60) Global Sporting Safaris, Inc. advertises this rate on its website http://www.gssafaris.com/hunting/kyrgyzstan-ibex-hunting/. Accessed 18 January 2017.
(61) UNDP (2015). UNDP Iran releases Asiatic Cheetah PSA. UNDP Press release dated 15 June 2015. Available at: http://www.ir.undp.org/content/iran/en/home/presscenter/articles/2015/06/15/undp-iran-releases-asiatic-cheetah-psa-/, accessed 26 March 2018.
(62) International Society for Endangered Cats, Asiatic Cheetah http://www.wildcatconservation.org/wild-cats/eurasia/asiatic-cheetah/
(63) Mohammadi A. and M. Kaboli (2016). Evaluating wildlife-vehicle collision hotspots using kernel-based estimation: a focus on the endangered Asiatic cheetah in central Iran. Human-Wildlife Interactions 10(1), pp. 103-109.
(64) Selvan K.M., S. Lyngdoh, B. Habib and G.V. Gopi (2014). Population density and abundance of sympatric large carnivores in the lowland tropical evergreen forest of Indian Eastern Himalayas. Mammalian Biology 79(4), pp. 254-258.
(65) Datta A., M.O. Anand and R. Naniwadekar (2008). Empty forests: Large carnivore and prey abundance in Namdapha National Park, north-east India. Biological Conservation 141(5), pp. 1429-1435.
(66) du Toit J.T., B.H. Walker and B.M. Campbell (2004). Conserving tropical nature: current challenges for ecologists. Trends in Ecology and Evolution 19(1), pp. 12-17; Datta et al. (2008). Ibid; Selvan et al. (2014). Op. cit.
(67) Nowell K. and L. Xu (2007). Taming the tiger trade: China's markets for wild and captive tiger products since the 1993 domestic trade ban. TRAFFIC East Asia.
(68) McCarthy T., D.P. Mallon, E.W. Sanderson and K. Fisher (2016). What is a Snow Leopard? Biogeography and Status Overview. In McCarthy T. and D. Mallon (Eds.). Snow Leopards. Biodiversity of the World: Conservation from Genes to Landscapes. Elsevier. DOI:10.1016/B978-0-12-802213-9.00003-1
(69) McCarthy T., D. Mallon, R. Jackson, P. Zahler and K. McCarthy (2017). Panthera uncia. The IUCN Red List of Threatened Species 2017: e.T22732A50664030. http://dx.doi.org/10.2305/IUCN.UK.2017-2.RLTS.T22732A50664030.en. Downloaded 26 March 2018.
(70) Kretser H.E., M.F. Johnson, L.M. Hickey, P. Zahler and E.L. Bennett (2012). Wildlife trade products available to US military personnel serving abroad. Biodiversity and Conservation 21(4), pp. 967-980.
(71) Ostrowski S., H. Rahmani, J.M. Ali, R. Ali and P. Zahler (2016). Musk deer Moschus cupreus persist in the eastern forests of Afghanistan. Oryx 52, pp. 323-328.

Saker falcons are used for hunting large grassland birds, especially bustards. The wild population of the species has declined across the region as a result of capture for hunting, with many exported to the Middle East.

Dog guarding livestock, Turkmenistan. Hunting of the region's predators – big cats, wolf, bear and others – is in part fuelled by the fear of attacks on livestock. The presence of people and dogs drives wildlife away from the best grazing lands onto more marginal land.

agreements has been instituted for their protection. Among these are the Central Asian Waterbirds Flyway Action Plan and the Agreement on the Conservation of African-Eurasian Migratory Waterbirds.

The Asian houbara bustard occurs in at least 24 countries, but more than half of its global population is in southern Kazakhstan. The species is the traditional target of falconers from Middle Eastern countries. Over-hunting has extirpated it from much of its range in the Middle East, and hunters now travel to Central Asia, where the species has suffered from significant over-exploitation, resulting in dramatic declines throughout its range. The conservation impact of breeding programmes underway in Central Asia to rear birds to be released for hunting is uncertain. Bustard hunting also creates demand for falcons, and has led to unsustainable harvesting of saker falcons, which have declined across Central Asia.

The hunting of smaller birds, fish (including the critically endangered sturgeon) and other species is in many cases illegal but carried out openly and in large volume.

2.1.2 Logging

Although lacking extensive forests with the high timber volumes of the tropics (see 1.2.2), Central Asian forests are of great importance for conservation. All are under pressure from logging, harvest for firewood and livestock grazing (which prevents natural regeneration). The extreme conditions where these forests grow make them particularly vulnerable to disturbance and make rehabilitation and regeneration particularly difficult and costly. Forest loss impacts on livelihoods and water supplies as well as biodiversity.

2.1.3 Non-timber forest products

This region is home to wild tree species that are the origin of domestic species, and still serve as a source of food and income for local communities (section 1.2.2). Some of these resources are exploited commercially, but there is little data on the harvested volumes or the impact on the species. In addition, the forests of the mountain regions are an important source of medicinal plants, which still play an important role locally. Collection of some species (e.g. the flowering plant Ferula foetida and related species) for international markets has caused local extinction.

2.1.4 Livestock competition, disturbance and conflict

While extensive, grassland-based livestock production is suitable for these arid and semi-arid regions, the over-stocking of sheep and goats on seasonal pastures contributes to overgrazing, erosion and loss of plant biodiversity[72,73]. The reduction in the carrying capacity of land causes food shortages for domestic and wild livestock, and lack of control and absentee livestock owners make it difficult to address the issue.

As well as competing with wild ungulates for food[74], the presence of livestock, guard dogs and people drives wild species away from grazing grounds[75] and into more remote areas, often at higher elevations, where food may be of poorer quality[76]. Disease transmission, for example of peste des petits ruminants (PPR), from livestock can decimate wild populations (see 2.1.10).

For predators such as snow leopards and cheetahs, the abundance and location of their prey base is critical to their survival[77]. While snow leopards and cheetahs sometimes kill livestock, research suggests that wild prey species are preferred where they are available. However, as noted above, high livestock numbers typically result in the loss of wild prey, and this leads to an increase in predation of livestock, and preventative or retaliatory killings of predators by local herders.

2.1.5 Agricultural expansion and intensification

Despite their vast size, the steppes of Central Asia are today considered one of the most altered and endangered ecosystems on the planet. Only 3.66 % is formally protected[78], and more than half of this habitat has already been lost worldwide. Loss of wild steppe is caused by conversion of grasslands to farmland, exclusion of wildlife and overstocking of livestock, and the introduction of linear infrastructure (roads, rail lines, fences and power grids). The resulting habitat loss and fragmentation has an especially severe impact on large mammals that move over large distances to find food, water and breeding sites, or to avoid severe weather[79]. Climate change is expected to exacerbate these problems.

Similar threats affect the region's desert ecosystems, with overuse of water, soil contamination from pesticides and fertilisers, poaching and overuse of plants for firewood adding to the pressure. A combination of these threats has resulted in a portion of these deserts, known as the Central Persian Desert Basins ecoregion (located in Iran and extending into north-west Afghanistan) being described as vulnerable[80].

2.1.6 Oil and gas production and mining

Mining, oil and gas development already make an important contribution to the economy in most of the countries covered in this chapter[81], and all plan to intensify production (see section 1.1.3). These projects all require large-scale investments in infrastructure, including transportation networks, pipelines and power lines (see 2.1.7). Without adequate safeguards and a legal basis for the identification and avoidance or mitigation of negative impacts, best practice may not be followed, and such developments are likely to be highly damaging[82].

(72) Upton M. (2004) The role of livestock in economic development and poverty reduction, FAO Pro-Poor Livestock Policy Initiative Working Paper No 10. FAO, Rome.
(73) See Bedunah D.J. (2008). Rangeland assessment of the Wakhan corridor study area. Result report. Wildlife Conservation Society, Kabul, Afghanistan.
(74) However, undergrazing is also identified as a threat, as grasslands have evolved with grazers. See Kamp J., M.A. Koshkin, T.M. Bragina, T.E. Katzner, E.J. Milner-Gulland, D. Schreiber, R. Sheldon, A. Shmalenko, I. Smelansky, J. Terraube and R. Urazaliev (2016). Persistent and novel threats to the biodiversity of Kazakhstan's steppes and semi-deserts. Biodiversity and Conservation 25(12), pp. 2521-2541.

(75) Young J.K., K.A. Olson, R.P. Reading, S. Amgalanbaatar and J. Berger (2011). Is wildlife going to the dogs? Impacts of feral and free-ranging dogs on wildlife populations. BioScience 61, pp. 125-132.
(76) amgail T., J.L. Fox and Y.V. Bhatnager (2007). Habitat shift and time budget of the Tibetan argali: the influence of livestock grazing. Ecological Research 22, pp. 25-31.
(77) Suryawanshi K.R., Y.V. Bhatnagar, S. Redpath and C. Mishra (2013). People, predators and perceptions: patterns of livestock depredation by snow leopards and wolves. Journal of Applied Ecology 50, pp. 550-560.
(78) Based on 2010 data published by WCMC and the IUCN Temperate Grasslands Conservation Initiative.
(79) IUCN Temperate Grasslands Conservation Initiative.
(80) WWF Ecoregions – Desert and Xeric Shrublands. See http://www.worldwildlife.org/ecoregions/pa1313
(81) International Crisis Group (2007). Central Asia's Energy Risks. Asia Report No 133. ICG, Brussels and Bishkek. Available at: https://d2071andvip0wj.cloudfront.net/133-central-asia-s-energy-risks.pdf, accessed 26 March 2018.
(82) Wingard J., P. Zahler, R. Victurine, O. Bayasgalan, B. Buuveibaatar (2014). Guidelines for Addressing the Impact of Linear Infrastructure on Large Migratory Mammals in Central Asia. UNEP/CMS. Available at: http://www.cms.int/sites/default/files/publication/cms-cami_pub_linear-infrastructure_wcs_e.pdf, accessed 26 March 2018.

Train tracks, Uzbekistan. Economic development requires investment in linear infrastructure – roads, railways, pipelines and power lines. These open up access to previously remote areas, and can damage the population of large mammals through accidental killing and by disrupting migration routes.

Fishing boats stranded by the shrinkage of the Aral Sea in Uzbekistan. Once the 4th largest lake in the world, the Aral Sea has shrunk by 90 % since the 1960s, a consequence of diversion of water from the rivers feeding the lake for irrigation projects.

2.1.7 Transport and infrastructure

Central Asia is seeing a rapid expansion of major economic development projects, including China's One Belt, One Road initiative. Many of these projects will require linear infrastructure. Tajikistan has a strong interest in the continued development of hydropower (see 2.1.8), which will bring with it roads and power lines. Afghanistan, with its mineral wealth, is keen to improve the transportation network that would bring its minerals to market. The planned (already partially built) road link between Afghanistan and China, if fully realised, might traverse the entire length of the Wakhan District (now also Wakhan National Park) and will disrupt wildlife migration routes, as there are no known plans to mitigate impact through the use of specialised construction techniques. Uzbekistan, Turkmenistan, Iran and Kazakhstan are all developing mineral, oil and gas resources, and anticipate expansion of pipelines, road and rail networks.

Linear infrastructure is a barrier to wildlife movement and causes direct mortality. It fragments populations into smaller sub-groups, each more vulnerable to disease or hunting. In at least 4 of the 7 countries there are inadequate legal instruments available to ensure that these risks are identified and mitigated[83]. Specific recent linear infrastructure threats to saiga antelope include the border fence between Kazakhstan and Uzbekistan, and the construction of a rail corridor. Both cut across saiga migration routes. Mitigation measures have been used, but their effectiveness has not yet been systematically assessed. Border fences are also a concern for other species. It has been estimated that up to a third of the snow leopard's known or potential range is located less than 100 km from the international borders of the 12 range countries[84]. This is no surprise, as snow leopards live on high mountain ridges, which often form convenient physical boundaries between countries.

Linear infrastructure does not have to be a complete physical barrier (e.g. a fence) to impede movement[85]. Many species tend to avoid human activities, including vehicle traffic, due to disturbance, hunting pressure and harassment. Depending on the type of infrastructure and level of associated human activities, partial barriers to movement such as roads or rail lines can become complete barriers.

2.1.8 Dam building and water abstraction

Hydropower development is a key economic goal across Central Asia, especially the well-glaciated, high-mountain region. Numerous projects have been identified, and interested investors in hydropower development have included Iran, Russia and the European Bank for Reconstruction and Development (EBRD)[86]. The threat from these projects is usually indirect, affecting wildlife movements and bringing in large numbers of people to remote regions, especially during construction. In some cases, dams may displace local people into key wildlife habitat, increasing deforestation, poaching and other resource impacts.

The greatest potential for hydropower development in this region is in Tajikistan, with roughly 4 % of the world's hydropower potential, but more than 50 % of Central Asia's potential. The country has long-standing plans for the construction of four hydropower facilities. At least one neighbouring country, Uzbekistan, has objected to the proposed projects, citing the harm to the environment and negative impacts to people that are dependent on the water resources. However, Uzbekistan has its own plans to develop hydropower, including the construction of as many as 250 large and medium-sized power stations, and many more small installations.[87] Kyrgyzstan has similarly identified hydropower projects but has not yet secured funding[88].

Central Asia's wetlands have received comparatively little attention given their biodiversity importance. Because of the dry climate, they are seriously threatened by the combined impacts of upstream infrastructures (mainly dams), over-utilisation of water by agriculture, and climate change. The Aral Sea and surrounding areas, as well as the deltas of the Amu Darya, Syr Darya, Murgab, Zarafshan, Ili and Helmand rivers (Sistan Basin) have all experienced dramatic reduction in wetland area caused by water abstraction and intensive irrigation projects[89]. These declines have caused the loss of a host of species that are water dependent (ducks, wading birds). A similar risk exists in the Ili-Balkhash Basin in Kazakhstan, due to increasing offtake from the Ili River for irrigated agriculture development in China. The effective management of water resources and related wetlands in inland and transboundary basins requires complex holistic approaches at basin scale.

2.1.9 Invasive species

Although invasive alien species are considered a global threat to biodiversity, little is known about their effect in the Central Asian region. The arid, cold-temperate climate is likely to lessen the chances that some of the more pervasive and damaging invasive species from other biomes (e.g. the tropics) will successfully expand into the region. While various efforts have been made to identify invasive species (the international database on invasive species documents more than 300 of them in the region, predominantly plants), the overall lack of biodiversity monitoring in the region means that there is little information about the level of threat or impact these invasive species may have on native species.

Invasive species have had a significant negative impact in aquatic systems. Many lakes, rivers and especially high-elevation streams in the region have unique assemblages of fish species, with a number of endemic species and often comparatively low overall diversity. In an attempt to increase the productivity of these systems, the Soviets and others introduced fish including carp, trout, zander (a large predatory perch), tench, bream and whitefish. Despite signs that this was having significant impacts on the systems and devastating effects on local species (e.g. in Lake Issyk Kul in Kyrgyzstan), introductions have continued. Today, many lakes and rivers have more of the invasive species than the native ones, and in some cases, native fish have been driven to local or global extinction from competition or predation by these introduced species.

(83) Wingard J. et al. (2014). Ibid.
(84) R. Jackson, unpublished data. In Rosen T. and P. Zahler (2016). Snow leopards and transboundary conservation. In: McCarthy T. and D. Mallon (Eds.). Snow leopards. Elsevier Publishing, NY.
(85) Wingard, J. et al. (2014). Op. cit.
(86) Sherwin L. (2014). EBRD invests in hydropower in Tajikistan. EBRD website briefing dated 2 September 2014. Available at: http://www.ebrd.com/news/2014/ebrd-invests-in-hydropower-in-tajikistan.html, accessed 26 March 2018.
(87) Khamrakulova R. (2010). Development of renewable power sector in Uzbekistan. UNECE report.
(88) News report on the website of Radio Free Europe, 20 January 2016: Kyrgyzstan Revokes Hydropower Deal With Russia. Available at: http://www.rferl.org/content/qishloq-ovozi-kyrgyzstan-energy-dreams/27499926.html, accessed 26 March 2018.
(89) For example, the Hamoun wetlands on the border of Afghanistan and Iran used to inundate between 2 000 and 4 000 km² during the flood of the Helmand river, and have been a significant economic resource for 5 000 years. Large-scale irrigation began in the area in the 1970s. The impacts of irrigation combined with drought after 2000 have reduced the entire wetland to a few areas of swamp. Agricultural and fishery livelihoods have disappeared and large numbers of people have been forced to abandon the area. See Weier J. (2002). From Wetland to Wasteland: the Destruction of the Hamoun Oasis. NASA Earth Observatory. https://earthobservatory.nasa.gov/Features/hamoun/, accessed 26 March 2018.

Around 200 000 saiga – about half the global population – died in Kazakhstan in 2015. The deaths were caused by a bacterial disease, which may have been associated with fluctuations in climate. In other cases, disease transmission between domestic stock and wild animals is a particular threat for the region's ungulates and big cats.

Oil wells, Kazakhstan. Although the region's contribution to global greenhouse gas emissions is relatively small, the per capita emissions of the oil-rich economies of Kazakhstan, Turkmenistan and Iran are well above the global average.

2.1.10 Disease

Disease is an especially pernicious issue for larger ungulates, which are at risk of transmission from the growing domestic livestock population across the region. Disease surveillance and veterinary care services for domestic stock are limited, making baseline assessments, trends (prevalence, new diseases) and early identification of outbreaks difficult, and allowing minimal delivery of prophylactics. The recent spread of diseases that cause mass mortality in livestock and wildlife, such as PPR and contagious caprine pleuropneumonia (CCPP), now threaten livelihoods and economies across much of Central Asia. The economic losses from PPR are estimated at up to EUR 1.7 billion annually. The FAO and others have identified the spread of these diseases as a global health threat priority, and a programme to deal with them is aligned with the European Union's (EU) One Health Asia Programme global initiative.

One of the most dramatic examples of disease impacting a wild species is the saiga antelope. Outbreaks of infectious diseases among saiga have been reported since 1955, including regular epidemics of foot-and-mouth disease. Large disease outbreaks also occurred in 1981, 1984 (over 100 000 dead) and 1988 (270 000 dead). Most recently, in May 2015, approximately 200 000 saiga (well over half the global population at that point) died in only a few weeks, probably from disease caused by Pasteurella bacteria.

The transmission of contagious diseases from domestic to wild caprids (argali, ibex, markhor, urial) has been widely reported during the last 25 years[90]. During the last decade, sarcoptic mange, PPR and respiratory mycoplasmosis have infected ibex and markhor, causing mass die-off (e.g. approximately 20 % of one of Tajikistan's markhor sub populations died from respiratory mycoplasmosis in 2010). The decline of prey populations is expected to have an impact on snow leopards[91].

Diseases that are known to affect big cats, especially rabies and canine distemper virus (CDV)[92], pose a threat to Asiatic cheetah and snow leopard. Epidemics of the CDV can cause high mortality in cats[93], and snow leopard are frequently in contact with sheepdogs and red foxes, two species known as primary propagators of these diseases across Asia.

2.1.11 Climate change

Climate change is expected to bring more frequent and intense fluctuations in rainfall and temperature in the region. Tajikistan has been identified by the World Bank as the country likely to experience the greatest impacts from climate change in the whole of Europe and Central Asia[94]; Afghanistan is ranked 15th in the Global Climate Risk Index 2015[95].

Environmental consequences of climate change are reduced water provision to the region's major river systems, increased aridity and expansion of desert areas. This will cause changes in species composition, with an increased risk of extinction of vulnerable species. The steppes and deserts of the region are particularly susceptible to changes in the amount and timing of rainfall, with subtle changes having a marked effect on the plant and animal communities that depend upon them shifting in response. The small wetlands that dot the steppe are critical habitat for cranes, waterfowl and other species, and essential water sources for wide-ranging mammals and birds, as well as for pastoralists and their livestock. They are disappearing at an unprecedented rate. Forest ecosystems may shift to higher altitudes and be exposed to accelerated degradation due to reduced runoff.

Although no studies have yet focused on climate change and wildlife in the western Asian mountains, studies in the eastern Himalayas, e.g. Nepal, have noted significant increases in annual temperature and decreases in rainfall, with resultant changes in vegetation and associated food chains. One impact has been that blue sheep, and therefore snow leopards, move to lower altitudes, bringing both species into greater contact with people and livestock[96].

Human land-use patterns are also changing in response to the warming, bringing new risks of pressure on natural ecosystems.

There is a near complete lack of baselines on temperatures, weather patterns, glacial retreat, seasonal water dynamics and vegetation community structure across the region. Given the likely impacts of climate change in the Central Asia region, there is a clear need to build long-term monitoring systems in order to design conservation responses.

In absolute terms, the Central Asia region is a comparatively small producer of greenhouse gases (GHGs). Central Asian grasslands are important for carbon sequestration, which is largely lost when these lands are converted to agricultural production.[97] Some countries are major oil producing countries, however, and have carbon intensive economies that translate into significant emissions on a per capita basis. The highest is Kazakhstan, at 14.4 tonnes CO_2e per person, which is more than twice the average for Europe and Central Asia and ranks 15th in the world[98]. Turkmenistan is also high, at 12.5 tCO_2e per person. Afghanistan (0.3 CO_2e /person), Kyrgyzstan (1.6 tCO_2e/person) and Tajikistan (0.6 tCO_2e/person) are among the low emitters globally, both in absolute terms and on a per capita basis.

The same countries that are low per capita emitters of GHGs are high renewables-based electricity producers, although this is almost entirely from hydropower – a resource that is already experiencing problems due to water shortages and likely to be adversely impacted by climate change. In 2012, Afghanistan produced 710 gigawatt hours (GWh) from renewable energy sources, all of it from hydropower, which equalled an estimated 80 % of its total energy production. Kyrgyzstan produced 14 037 GWh entirely from hydropower, which was 100 % of its energy production. Tajikistan produced 16 731 GWh from hydropower to make up >95 % of its energy production. The remaining four countries are larger producers of renewable energy, (almost entirely hydropower), but are principally producers and users of fossil fuels.

(90) Dagleish M.P., A. Qurban, R.K. Powell, D. Butz and M.H. Woodford (2007). Fatal Sarcoptes scabiei infection of blue sheep (Pseudois nayaur) in Pakistan. Journal of Wildlife Diseases 43, pp. 512-517.

(91) Bao J., Z. Wang, L. Li, X. Wu, P. Sang, G. Wu, G. Ding, L. Suo, C. Liu, J. Wang, W. Zhao, J. Li and L. Qi, (2011). Detection and genetic characterization of peste des petits ruminants virus in free-living bharals (Pseudois nayaur) in Tibet, China. Research in Veterinary Science 90, pp. 238-240; Ostrowski S., F. Thiaucourt, M. Amirbekov, A. Mahmadshoev, L. Manso-Silván, V. Dupuy, D. Vahobov, O. Ziyoev and S. Michel (2011). Fatal outbreak of Mycoplasma capricolum pneumonia in endangered markhor. Emerging Infectious Diseases 17, pp. 2338-2341; Dagleish et al. (2007). Op. cit.

(92) Gruzdev K.N. (2008). The rabies situation in Central Asia. Dev. Biol. 131, pp. 37-42.

(93) Roelke-Parker M.E., L. Munson, C. Packer, R. Kock, S. Cleaveland, M. Carpenter, S.J. O'Brien, A. Pospischil, R. Hofmann-Lehmann, H. Lutz, L.M. Mwamengele, M.N. Mgasa, G.A. Machange, B.A. Summers and M.J.G Appel (1996). A canine distemper virus epidemic in Serengeti lions (Panthera leo). Nature 379, pp. 441-445; Seimon T.A., D.G. Miquelle, T.Y. Chang, A.L. Newton, I. Korotkova, G. Ivanchuk, E. Lyubchenko, A. Tupikov, E. Slabe and D. McAloose (2013). Canine Distemper Virus: an emerging disease in wild endangered Amur tigers (Panthera tigris altaica). mBio 4, e00410-13.

(94) World Bank (2009). Adapting to Climate Change in Europe and Central Asia. [Afghanistan was not part of the study.]

(95) There are alternative rankings, but in each instance Afghanistan is listed among the most vulnerable. The Maplecroft Report (2016), for example, ranks Afghanistan as the 3rd most vulnerable country to climate change.

(96) Aryal A., D. Brunton, W. Ji and D. Raubenheimer (2014). Blue sheep in the Annapurna Conservation Area, Nepal: habitat use, population biomass and their contribution to the carrying capacity of snow leopards. Integrative Zoology 9(1), pp. 34-45. Available at: https://doi.org/10.1111/1749-4877.12004

(97) Romanovskaya A.A., V.N. Korotkov, N.S. Smirnov and A.A. Trunov (2014). Land use contribution to the anthropogenic emission of greenhouse gases in Russia in 2000-2011. Russian Meteorology and Hydrology 39(3), pp. 137-145; Kurganova I., V.L. de Gerenyu and Y. Kuzyakov (2015). Large-scale carbon sequestration in post-agrogenic ecosystems in Russia and Kazakhstan. Catena 133, pp. 461-466.

(98) World Bank, CO2 Emissions (metric tons per capita), data from 2013. Available at: http://data.worldbank.org/indicator/EN.ATM.CO2E.PC?year_high_desc=true, accessed 10 October 2016.

The Kumtor gold mine, Kyrgyzstan. Several Central Asian countries have large oil, gas and mineral deposits, and all have plans to expand production. Environmental impacts include use of groundwater, pollution and the impacts of associated roads, rail and pipelines.

2.2 Drivers of threats

2.2.1 Poverty and population pressure on resources

Central Asia is one of the least populated areas in the world (see 1.1.2). However, the fragility of the resources, their vulnerability to even comparatively low-level pressure and the concentration of human impacts in limited areas is a significant driver of degradation. Areas of particular concern are (i) the conversion and use of grasslands and forests for agriculture, (ii) the associated high levels of irrigation that have dramatically reduced the groundwater table, and the size and health of globally important wetlands; (iii) increasing unsustainable hunting from residents of urban areas and human-wildlife conflicts as people continue to move into key wildlife areas; (iv) unsustainable harvest of timber (e.g. fir and cedar forests) and firewood (e.g. juniper, saxaul and tugai forests); and (v) current and planned linear infrastructure.

Parts of the region, including the remote regions that are of greatest importance for wildlife, have high incidence of poverty. Where communities depend directly upon already fragile natural resources, population growth, climate change and lack of alternatives leads to a cycle of over-exploitation and degradation. Common problems are increasing demand for woody biomass for fuel and increasing livestock numbers, leading to overgrazing and rangeland deterioration.

2.2.2 Dependence on extractive industries

For the 7 countries in this chapter, access to oil, natural gas, hydropower and minerals is a central part of their economies and economic development plans. As described in section 1.1.3, 4 of the 7 countries (Kazakhstan, Uzbekistan, Turkmenistan and Iran) have significant oil and natural gas reserves, and all have continuing plans to exploit these resources. Two countries, Tajikistan and Kyrgyzstan, have relatively abundant water resources with some capacity for hydropower. Both countries have exported power to neighbouring countries as part of the Central Asia Power System, and plan to increase hydropower capacity for domestic consumption and exports[99]. Iran, Afghanistan and Kazakhstan have among the largest zinc, copper, iron and lithium deposits in Asia, and are currently targeting these economic opportunities. The Muruntau mine in Uzbekistan is one of the largest open pit gold mines in the world, and in Kyrgyzstan, the Kumtor gold mine accounts for roughly 8 % of GDP. Afghanistan has yet to engage in major development.

All of these economies have high levels of extractive and resource dependency. Four of them rank among the 58 countries in the world most dependent on extractive industries, as identified by the Natural Resource Governance Institute. These are: Iran (petroleum is 74 % of exports, 50 % of government revenue and 32 % GDP); Kazakhstan (petroleum is 82 % exports, 39 % of government revenue and 33 % GDP), and Turkmenistan (44 % of GDP); Afghanistan (minerals, currently undeveloped, but valued at EUR 0.75 to 2.3 trillion)[100].

Exploitation of these resources carries heavy environmental costs, especially due to the extensive use of groundwater and linear infrastructure. Many impacts could be mitigated or avoided if they were adequately considered during planning and development, but experience and a review of impact assessment legislation indicates that development is likely to take precedence over conservation efforts.

2.2.3 Weak governance

Globally, the natural resource sector is particularly prone to rent seeking, corruption and misuse of power. These problems are particularly pronounced in the region. The Natural Resource Governance Institute ranks countries classified as 'extractive industry dependent' on four components specific to the management of their resources – institutional and legal setting; reporting practices; safeguards and quality controls; and enabling environment. Of the 4 Central Asian countries assessed, none have a satisfactory rating, and only Kazakhstan has a 'partially acceptable' rating, with Afghanistan, Iran and Turkmenistan rated as 'failing'. Similarly, all 7 of the countries in this chapter are ranked among the bottom third of all countries in the Transparency International's Corruption Perceptions Index. [101]

Multiple underlying factors play a role in the character, scale and prevalence of corruption in the region. For most countries, low salaries and a lack of job security create incentives for officials to accept bribes and monetise access to public services[102]. This undermines the validity of mechanisms such as allocation of hunting areas and licenses, environmental impact assessments and concessions for extractives. However, even when salaries are sufficient, the prevailing culture may be so strongly impacted by corruption, and anti-corruption measures either missing or so weakly enforced that few decisions or actions escape its influence[103]. All the countries in this assessment have been cited for deficiencies either in their anti-corruption laws or in the enforcement of them.[104]

2.2.4 Civil unrest, conflict and insurgency

Central Asia has suffered significant civil unrest, open war and insurgency over the last three decades. Almost all of Afghanistan has experienced violence. Tajikistan's transition from Soviet rule led to a violent conflict that left up to 100 000 people dead and displaced over 1 million people. As a whole, this ethnically and politically complex region is characterised by cross-border tensions and inter-related layers of conflict that are difficult to address in isolation from each other. Four types of conflict have been identified:

- Internal indigenous civil society conflicts (e.g. Uzbek community vs. Kyrgyz community in Kyrgyzstan);
- Transboundary indigenous civil society tensions (e.g. border communities of Tajikistan and Afghanistan);
- Indigenous civil society conflicts with the central government (e.g. Tajikistan's Gorno-Badakshan region, and widespread in Afghanistan);
- Conflicts between governments (e.g. Uzbekistan and Tajikistan).

In many instances, effective environmental governance has been absent or severely curtailed as a result of conflict or resistance to imposition of central state regulations.

2.2.5 Inadequate policies and laws

The ex-Soviet countries of the region inherited at least some of their law from the former Soviet Union and continue to approach the development and implementation of laws in a manner that reflects that heritage. Wildlife and other natural resources tend to be regulated with the objective of managing extraction and using it for the benefit of the national economy. The practical implication is that policies and laws focus on (i) listing species according to their status, and (ii) prohibiting or restricting hunting/harvest and trade. In the absence of population monitoring, scientific input to assess trends and enforcing laws, these approaches are probably ineffective.[105] Laws are even less effective because management responsibilities tend to be divided across agencies and devolved to local areas, such that no single agency holds all the powers (e.g. to arrest, search, confiscate, collect evidence) necessary to enforce legislation. The difficultly of coordination was worsened by the lack of formal information-sharing channels, although the creation of the Snow Leopard and Wildlife Enforcement Network (SLAWEN) has helped to address this. Finally, impact assessment requirements tend not to fully cover wildlife (particularly for linear infrastructure projects), public participation is restricted, and the legal requirements for and results of actual assessments are rarely known.

(99) Hashimova U. (2016). Kyrgyzstan Determined to Pursue Its Hydropower Plans With or Without Russia, Eurasia Daily Monitor 13(10); Fields D., A. Kochnakyan, G. Stuggins and J. Besant-Jones (2012). Tajikistan's Winter Energy Crisis: Electricity Supply and Demand Alternatives, World Bank, Europe and Central Asia Region Report.

(100) NRGI Resource Governance Index. Available at: http://www.resourcegovernance.org/resource-governance-index/report

(101) Transparency International, 2015 Corruption Perceptions Index. Available at: http://www.transparency.org/cpi2015

(102) de Haan J., E. Dietzenbacher and V. Hà Le (2013). Higher government wages may reduce corruption. VOX, CEPRs Policy Portal. Available at: https://voxeu.org/article/higher-government-wages-may-reduce-corruption, accessed 26 March 2018; Armantier O. and A. Boly (2011). A Controlled Field Experiment on Corruption. European Economic Review 55, pp. 1072-1082; Van Veldhuizen R. (2013). The Influence of Wages on Public Officials' Corruptibility: A Laboratory Investigation. Journal of Economic Psychology 39, pp. 341-356.

(103) Foltz J. and K. Opoku-Agyemang (2014). Do Higher Salaries Lower Petty Corruption? A Policy Experiment on West Africa's Highways. 'Results here suggest that merely raising salaries without changing the context and incentives within which the civil servants operate may not have the desired or hypothesized effects on corruption.'

(104) OECD reports from the Anti-Corruption Network for Eastern Europe And Central Asia; GAN Business Anti-Corruption Portal. Available at: http://www.business-anti-corruption.com/country-profiles

(105) Rosen, T. (2012). Analyzing gaps and options for enhancing argali conservation in Central Asia within the context of the convention on the conservation of migratory species of wild animals. Report prepared for The Convention on the Conservation of Migratory Species of Wild Animals (CMS), Bonn, Germany and the GIZ Regional Program on Sustainable Use of Natural Resources in Central Asia

3

Ongoing conservation efforts

The Naryn river originates in the glaciers of the Tien Shan mountains of Kyrgyzstan and flows into Uzbekistan and then Kazakhstan, eventually entering the Aral Sea. The river has been dammed in several places and its water irrigates large agricultural areas as well as powering hydroelectric plants.

3 _ Ongoing conservation efforts

Despite its significant ecosystem service and biodiversity values, Central Asia has been largely overlooked in terms of conservation funding and action. There are a number of programmes implemented by national governments and international and local non-governmental organisations (NGOs) focusing on sustainable natural resource management as well as species protection, but their impact is constrained by a lack of resources, a low number of qualified professionals, and the lack of coherent long-term or landscape-level strategic approaches. After 70+ years of Soviet isolation and more than 20 years of international sanctions for Iran, much of the region is still catching up with advances in science and conservation. Opportunities for training, especially international training in biodiversity conservation, are lacking. As a result, the number of people with the interest and capacity to engage in these efforts is much smaller than in most other parts of Asia.

3.1 Government

3.1.1 Institutions for conservation

All of the countries in the region have government institutions mandated to manage protected areas and enforce conservation legislation (Table 3.1), but these institutions often suffer from a lack of resources, lack of national planning frameworks for land-use and development, and low levels of political support. These problems are exacerbated by overlapping or unclear divisions of roles and authority between agencies, leading to duplication of effort, competition over resources and authority, and confusion among partners as to which agencies should be involved or should have the lead.

Kazakh hunters traditionally use golden eagles to hunt. Customary norms and institutions can play an important role in natural resource management, especially in remote areas. Harmonising customary and formal rules is often key to successful conservation management.

Table 3.1 Summary of the division of responsibility for conservation tasks between government agencies

Country/agency	Mandate
Afghanistan	
National Environmental Protection Agency	Has overall regulatory power on environmental issues in Afghanistan; regulates, coordinates, monitors and enforces environmental laws. Exercises oversight of the management of conservation landscapes and protected areas. Makes national environmental policies.
General Directorate of Natural Resource Management, Ministry of Agriculture, Irrigation & Livestock	Tasked with all aspects of natural resource management. Three departments oversee protected areas, forestry and rangelands. The PAs department is responsible for the day-to-day administration and management of PAs.
Ministry of Rural Rehabilitation and Development	Dealing primarily with 'brown' and 'grey' issues and management of ecologically critical areas in the environment sector.
Ministry of Energy and Water	Responsible for the planning and management of water resources, as well as facilitating water governance at the river basin level. Responsible for renewable energy development, including solar, wind, geothermal, bio-energy and hydropower.
Ministry of Interior Affairs	Responsible for all internal security agencies (including the national and border police) and an important stakeholder in efforts to control hunting and the illegal trade of wildlife.
Kazakhstan	
Ministry of Energy	Recently created. Responsible not only for environmental protection, but also extractive industries, energy supply and demand, renewable energy and energy effectiveness. Includes the Department on Transition to Green Economy.
Information and Analysis Centre for Environmental Protection, Ministry of Energy	Responsible for managing environmental records and the state cadastre of natural resources. Expected to provide information and analytical support in planning and implementing actions for environmental protection.
Republican State Enterprise 'Kazhydromet'	State enterprise within the Ministry of Energy (RGP 'Kazhydromet') responsible for environmental, meteorological and hydrological monitoring.
Ohotzooprom	State enterprise responsible for ensuring the conservation of wildlife, their habitat and biological diversity, and the sustainable use and reproduction of wildlife, as well as implementing a set of measures to prevent and combat crimes in the area of conservation, reproduction and use of wildlife.
Ministry of Agriculture	Includes separate committees for water resources and for forestry, fishing and hunting.
Committee for Water Resources, Kazakh Ministry of Agriculture	Responsible for water resource use and protection, through coordinating implementation of the national water management policy. Regional agencies under this committee are responsible for local implementation in specific basins.
Committee for Forestry, Fishing and Hunting, Kazakh Ministry of Agriculture	Responsible for implementation and control in the areas of forestry, fishing and hunting.
Kyrgyzstan	
Ministry for Agriculture, Food Security and Land Reclamation	Central executive authority that implements the national policy on agriculture, land and water resources, irrigation and land reclamation infrastructure, and the processing industry.
Department for Water Resources and Land Reclamation, Ministry of Agriculture	Ensures management, monitoring, and regulation of water resources and their use, including irrigation and drainage infrastructure; performs executive and coordinating functions for implementation of the common public water policy.
State Agency for Environmental Protection and Forests	Responsible for policy implementation and regulation in the area of environmental conservation, environmental security and nature use.
Hydrometeorological Agency at the Ministry of Emergencies	Monitors the natural environment to protect the population from hydrometeorological disasters and prevention or mitigation of damage.
State Committee for Industry, Energy and Mining	Central executive body responsible for development and implementation of policy in industry, excluding the food industry, the fuel and energy sector, and mining.
State Inspection for Environmental and Technical Safety	Supervises and controls in the area of environmental and technical safety, including the environmental, water, energy, and biological safety of products and sites as well as related operations.
Iran	
Forests, Range and Watershed Management Organization	Responsible for protecting, conserving, reclaiming, developing and utilising forests, rangelands and coastal lands. Also responsible for watershed management and soil conservation throughout the country, combating deforestation and desertification (in cooperation with the provincial natural resource administrations).
Department of Environment	Responsible for safeguarding the environment and managing all protected areas in Iran (through provincial Department of Environment offices and operations). Under the direct supervision of the president.

Table 3.1 (continued)

Country/agency	Mandate
Tajikistan	
Ministry of Energy and Water Resources	Policy development and regulation of fuel, energy and water resources. Includes the service for state supervision over hydraulic structure safety, responsible for direct supervision of dams and hydropower installations.
Agency for Land Reclamation and Irrigation	Responsible for land reclamation and irrigation activities, including policy development, and the conservation and regulation of water resources.
State Committee for Land Management and Geodesy	Responsible for policy concerning state land management, land cadastre, land surveying, mapping and state control over land use and conservation.
State Committee for Environmental Protection	Implementation of public policy in the area of environmental conservation, hydrometeorology and the rational use of nature, and manages the state control over environmental protection and nature use.
Turkmenistan	
State Committee for Environmental Protection and Land Resources	Implements the national policy for nature protection and use, including the land fund. Departments include 1) environmental protection, 2) flora and fauna protection, and 3) land resources. The Committee also supervises 5 provincial (velayat) branches, the ecological monitoring service, 9 national nature reserves, the national desert, Flora and Fauna Institute, Forestry Administration, forestry seed production and natural park protection service.
Ministry of Agriculture and Water Resources	Responsible for the management of the national agricultural sector, including enhancing its efficiency.
Ministry of Energy	Responsible for governance in the energy sector, including the modernisation and construction of additional generating capacities, as well as the energy exports.
State Concern 'Turkmengeology'	Responsible for monitoring groundwater quantity and quality, maintains 4 hydrogeological field offices.
State Commission on Compliance with Turkmenistan's Obligations Emanating from UN Environmental Conventions and Programs	Implements national policy on environmental conservation and sustainable nature use, coordinates activities concerning compliance with international obligations including the CBD, UNFCCC, UN Convention to Combat Desertification and other environmental conventions and programmes.
National Committee for Hydrometeorology ('Turkmengidromet')	Responsible for the national hydrometeorology policy, including informing economic sectors, defence agencies and the population about actual and predicted changes in hydrometeorological conditions and impacts.
National Council (Halk Maslahati)	Highest representative organ of popular power; comprises the president of Turkmenistan; the deputies of the National Assembly; members of the Supreme Court, the Cabinet of Ministers, and the Supreme Economic Court; 60 elected people's representatives; officials from scientific and cultural organisations.
Council of Elders	According to the constitution, the president is bound to consult with this body prior to making decisions on both domestic and foreign affairs. The Council of Elders is also assigned the task of selecting presidential candidates. Its chairman is the president of Turkmenistan.
Uzbekistan	
Ministry of Agriculture and Water Resources (MAWR)	The Ministry coordinates agricultural, water and forestry sectors directly or through its subordinate bodies. This includes a Central Water Resources Administration and 11 Basin Irrigation System Administrations.
State Committee for Nature Conservation ('Goskompriroda')	Responsible for governance in the areas of 1) environmental security, 2) conservation, use and restoration, and 3) enforcement of the law on the use and protection of land, minerals, water, forests, flora, fauna and atmosphere. Includes Glavzemvodkontrol, responsible for supervising the protection and use of land, water, and common minerals and waste management. Administers 1 of the 8 state nature reserves of Uzbekistan.
Gosbiokontrol	An entity under Goskompriroda, in charge of controlling the use of flora and fauna and the management of some protected areas.
State Committee on Forestry	Responsible for the management of the majority of state nature reserves. Recently separated from the MAWR.
Centre of Hydrometeorological Service at Cabinet of Ministers of the Republic of Uzbekistan (Uzhydromet)	Responsible for hydrometeorology, including the development and improvement of the state system of hydrometeorological observations, hydrometeorological information for economic sectors, scientific research, improvement of short-term and long-term weather forecasts, water availability of rivers and climate change.
Ministry of Emergency Situations	Oversees emergency services, which include natural disasters, and the coordination of other ministries and departments in such events.
Ministry of Internal Affairs	Oversees the national police, including organising the funding of police action for wildlife and environmental crimes. Regulates the possession and use of firearms, which is critical for managing the wildlife trade.

The Gissar Reserve, in Uzbekistan, was established to protect juniper forests and a wide range of mountain ecosystems. It is on the country's tentative list of World Heritage Sites.

3.1.2 Protected areas

One of the most important steps for biodiversity conservation taken by the governments of the region has been the declaration of protected areas (PAs). However, the effectiveness of PAs in conserving biodiversity is dependent on their size, their coverage of key habitats and ecosystems, and effective management.

Coverage

Each country in the region has been actively developing its protected areas system, but discrepancies in the data make accurate description of protected area coverage difficult. In one example, the World Database of Protected Areas (WDPA) lists 13 protected areas for Afghanistan[106]; however, according to local sources and a communication between Afghanistan's National Environmental Protection Agency and the Secretariat for Convention on Biological Diversity (CBD) in 2015, there are only three: Band-e Amir National Park, Wakhan National Park (incorporating the proposed Big Pamir and Teggermansu Wildlife Reserves), and Shah Foladi. Many more have been identified over the years, but never officially designated. There are less extreme discrepancies in the records for Iran, Uzbekistan, Kyrgyzstan and Tajikistan.

Table 3.2 shows the total number of terrestrial protected areas (corrected for known discrepancies in the data), the estimated size in km², and the percentage of the country's land area covered. Overall, 5.6 % of the land area is protected, less than half the world average (14.8 %) or the average for low-income countries (15.2 %). There is considerable variation within the region: 4 countries (Afghanistan, Kazakhstan, Turkmenistan and Uzbekistan) have less than 3.5 % of their land area protected, while 1 (Tajikistan) exceeds the local and world average with 22 %.

The protected area systems in Central Asia began in part as smaller efforts to protect hunting areas, watersheds and forests, with the creation of a formal protected area system based on an assessment of biodiversity values and protection needs coming much later, and in some instances (e.g. Afghanistan) only within the past few years. The CIS countries have developed relatively similar PA designations and mechanisms. In Afghanistan, their establishment has suffered major disruptions with many areas being proposed but never formally adopted.

Protected areas are generally too small to maintain viable populations of the wide-ranging or migratory mammal species that are one of the main conservation priorities of the region, especially in the steppe[107]. Of more than 60 protected areas that overlap with snow leopard ranges, for example, only a few are big enough to hold viable populations of the species (including Wakhan National Park, Afghanistan and Pamir National Park, Tajikistan)[108]. The remaining protected areas provide only partial coverage. The same is true for wide-ranging species such as the Asiatic cheetah, Asiatic wild ass, saiga antelope and goitered gazelle. This problem was addressed by the Econet of Central Asia project (2006), which identified a suite of potential protected areas that would increase coverage in the region to 31 %, taking into account the buffer zones. This important work has yet to be fully implemented.

(106) The WDPA lists 13 protected areas for Afghanistan; another site lists as many as 15. However, according to Afghanistan's National Environmental Protection Agency 2015 report to the CBD, there are only 3 officially recognised protected areas in the country.
(107) Henwood W. D. (2010). Toward a strategy for the conservation and protection of the world's temperate grasslands. Great Plains Research 20 (Spring 2010), pp. 121-134; Wesche et al. (2016). Op. cit.
(108) Johansson O., G.R. Rauset, G. Samelius, T. McCarthy, H. Andren, L. Tumursukh and C. Mishra (2016). Land sharing is essential for snow leopard conservation. Biological Conservation 203, pp. 1-7.

Table 3.2 Protected area coverage per country in the Central Asia region

Country	Land area (km²)	No terrestrial PA	Area terrestrial PA (km²)	% of total land area within PAs
Afghanistan	642 899	3	18 556	2.9
Iran	1 627 857	277	169 061	10.4
Kazakhstan	2 719 828	108	89 295	3.3
Kyrgyzstan	199 957	34	13 026	6.5
Tajikistan	142 244	26	31 690	22.3
Turkmenistan	472 138	32	15 336	3.2
Uzbekistan	450 363	17	15 200	3.4
Regional Total	6 255 286	497	352 164	5.6

Source: WCS 2016 (corrections for Afghanistan), World Database on Protected Areas (http://www.protectedplanet.net).

Compounding the small size of most protected areas, many also permit uses that diminish their value for biodiversity conservation. Of the 21 protected areas in Kazakhstan that overlap with snow leopard ranges, only 3 are equivalent to IUCN Category I protected areas where hunting, grazing and other potentially incompatible uses are prohibited. The remaining 18 are multi-use oriented.

Protected area management effectiveness

Protected areas across Central Asia tend to be underfunded, underequipped and understaffed. It is common for a single ranger to be responsible for patrolling, on foot, hundreds or thousands of square kilometres of highly inaccessible terrain. In Afghanistan, for example, 66 government and community rangers cover an area of 11 000 km² (166 km² per ranger). In the Naybandan Wildlife Refuge in Iran, there are 13 game guards to cover 15 170 km² of critical Asiatic cheetah habitat by motorcycle or car, equivalent to almost 1 200 km² per ranger. The global average is 157 km² per ranger.[109]

As a result, reports point to a low level of management effectiveness for protected areas in the region. The most widely used standard, the Management Effectiveness Tracking Tool (METT), has been used to carry out 200 assessments covering about 40 % of the protected areas across the seven countries. No PA scored higher than 65 % against the 36 indicators included in the tool. Although these assessments do not cover all areas and are not intended as a substitute for fuller analyses, they are nonetheless a strong indication of management deficits. The World Heritage Outlook has been introduced by IUCN as the first global assessment of all natural World Heritage Sites and the action needed to achieve excellence in their conservation[110]. The current database suggests a mixed picture of threats and concerns for the World Heritage Sites in Central Asia.

Countries have responded to the problems in their PAs. In Afghanistan, the SMART patrol system is being introduced to Wakhan National Park with international NGO support.

3.1.3 Transboundary initiatives

The very large scale of the key ecosystems in Central Asia and the fact that many of the best examples survive close to international boundaries means that transboundary cooperation is important for reducing threats to species and ecosystems. The concept of transboundary cooperation is enshrined in the 2013 GSLEP Bishkek Declaration, which contains a commitment to increase bilateral and regional cooperation for snow leopard conservation in transboundary landscapes, a clear set of actions and earmarked resources. This pledge was scaled down to work together to identify and secure at least 20 snow leopard landscapes across the cat's range by 2020[111].

(109) Based on information from the World Database of Protected Areas (2014) recording 209 429 terrestrial protected areas covering 32.86 million km². This is an average of approximately 157 km² per protected area.
(110) Map of World Heritage sites classified according to 2017 Conservation Outlook. http://www.worldheritageoutlook.iucn.org/#, accessed 26 March 2018.
(111) The Bishkek Declaration on the Conservation of Snow Leopards, 23 October 2013, Kyrgyz Republic.

The Panj river in Afghanistan's Wakhan corridor. The corridor links Afghanistan to China and forms a narrow buffer between Tajikistan and Pakistan. The Wakhan National Park holds important populations of snow leopard and argali sheep.

A number of transboundary protected area initiatives have been started in the region, but they tend to have short (project-based) timeframes, and this has limited their success in bringing together stakeholders and establishing sustainable cross-border mechanisms. One of the first, started in 2006, was the Pamirs Transboundary Initiative between Tajikistan, Afghanistan, Pakistan and China. The initiative achieved agreement between the four countries on a suite of recommended actions and a draft map for a transboundary protected area but was not able to follow up on this progress.

More recent transboundary initiatives are described below.

- A transboundary World Heritage Site, Western Tien Shan, is composed of 13 areas that are parts of seven protected areas in Kazakhstan, Kyrgyzstan and Uzbekistan. This was supported by the Global Environment Facility/World Bank Western Tien Shan project, which aimed to improve and increase cooperation among several protected areas (with support from EU/Technical Aid to the Commonwealth of Independent States), and the Tien Shan Ecosystem Development Project, also funded by the Global Environment Facility (GEF), which was launched in 2009 to support management of protected areas and sustainable development in the border areas of Kazakhstan and Kyrgyzstan.
- The Pamir-Alai Transboundary Conservation Area project was funded by the EU and examined the option of creating a transboundary protected area across the border between Kyrgyzstan and Tajikistan (2007-2008). A biological database was assembled but no further action was taken, although proposals to establish a protected area still exist.
- The governments of Russia, Mongolia and Kazakhstan prepared and signed agreements to establish the Uvs-Nuur and Altai Transboundary Nature Reserves in 2011-2012, via the UNDP-GEF project Biodiversity Conservation in Altai-Sayan Ecoregion.
- The Mountains of Northern Tien Shan project was developed for the period 2013-2016 with the assistance of the German Agency for International Cooperation (GIZ) and the Nature and Biodiversity Conservation Union (NABU). Within this project, a transboundary protected area was planned, encompassing three existing protected areas in Kyrgyzstan and Kazakhstan.
- A project to strengthen conservation in the Central and Inner Tien-Shan of Kyrgyzstan is supported by the United Nations Development Programme (UNDP) and the State Agency on Environmental Protection and Forestry. The project aims to establish a protected area that will border the Republic of Kazakhstan and link Sarychat-Ertash Reserve in Kyrgyzstan with Tomur Reserve in Xinjiang, China.
- A transboundary project for the conservation and sustainable use of cold winter (temperate) deserts in Kazakhstan, Turkmenistan and Uzbekistan, the Central Asian Desert Initiative, started in 2016. It is implemented by national governments, the Michael Succow Foundation and the Food and Agriculture Organisation of the UN (FAO), under the coordination of the University of Greifswald. The project is part of the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety.
- A transboundary project for the conservation of tugai forests at the lower Amu Darya in Turkmenistan and Uzbekistan is implemented by the Michael Succow

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Siberian ibex, hunted as a trophy, Tien Shan mountains, Kyrgyzstan. Preventing poaching and policing legal hunting is challenging in this remote region. Efforts to improve regional cooperation for the protection of key species include the Central Asian Mammals Initiative and Snow Leopard and Wildlife Enforcement Network.

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Hunting concession, Tajikistan. In some cases conservation policy focuses on regulating hunting, rather than protection, even when the population of target species is declining. Sustainable hunting requires adequate population data and the ability to enforce bag limits.

Foundation jointly with the NGO KRASS in Uzbekistan and the National Institute of Deserts, Flora and Fauna in Turkmenistan (2015-2017). The project is financed by the German Federal Ministry for Economic Cooperation and Development

- There have also been transboundary efforts focused on disease risks to wildlife. A transboundary collaborative study on livestock-wildlife disease surveillance in the Pamirs of Pakistan, Afghanistan and Tajikistan was implemented in 2011, focusing on the level of exposure of livestock to brucellosis and caprine contagious pleuropneumonia. The project involved the Wildlife Conservation Society (WCS), the staff from the Central Veterinary Diagnostic and Research Laboratory in Kabul, Afghanistan, the Diagnostic Laboratory of the University of Veterinary and Animal Science in Lahore, Pakistan, and the Central Veterinary Laboratory in Dushanbe, Tajikistan.

3.1.4 Wildlife law enforcement

Threatened species are frequently found outside protected areas, where resources for wildlife law enforcement are minimal and there are few specialised personnel. As a result, enforcement of laws on the illegal wildlife trade is weak outside protected areas, and threatened species are effectively unprotected in large areas of their habitat. The problem is especially acute in border areas, where border guards not only fail to be a deterrent but can be a poaching threat.[112] Some countries have made efforts to increase awareness of wildlife crime among law enforcement agencies – Afghanistan has announced educational programmes for the Afghan National Police, the Afghan Border Police, the National Directorate of Security and the Customs Department of the Ministry of Finance, for example.

Good wildlife law enforcement requires safeguards to prevent conflicts of interest and corruption. In reality, much of the regulation of commercial hunting in the region is strongly influenced by the commercial hunting lobby, which sometimes has links with decision-makers and politicians. As a result, the quota setting process is flawed, and there is corruption in the issuing of concessions. In some cases, it appears that hunting agencies operate inside protected area boundaries, for example Sarychat-Ertash State Nature Reserve in Kyrgyzstan, which was set up to protect snow leopard and its prey species.

In September 2015, the first regional workshop focused on combating illegal wildlife trade in Central Asia was held in Bishkek. It gathered representatives of environmental and law enforcement agencies and international conservation organisations from across the region. A key outcome of the workshop was agreement among all agencies to implement a Regional Enforcement Strategy to Combat Illegal Wildlife Trade in Central Asia and establish the SLAWEN. One of the key objectives is to establish National Environmental Security Task Forces (NESTs) to work as a multi-agency communication tool.

(112) Bhatnager Y.V., R. Ahmad, S.S. Kyarong, M.K. Ranjitsinh, C.M. Seth, I.A. Lone, P.S. Easa, R. Kaul and R. Raghunath (2009). Endangered markhor Capra falconeri in India: through war and insurgency, Oryx 43(3), pp. 407-411; Ali Madad Rajabi, WCS, pers. comm. (2015).

3.1.5 National and local policies

All the countries of the region have laws and policies on wildlife protection, environmental planning and safeguards. While there have been efforts to improve the legal foundations in the region, there are multiple areas of law and policy that require attention at the national and local level. Apart from an assessment in 2009[113], no detailed assessments of the national legal frameworks and court rulings are available to help identify gaps, overlaps and inconsistencies in law and policy[114]. Until assessments are updated and the inadequacies in the legal framework addressed, efforts to protect biodiversity and combat illegal wildlife trade will continue to be hampered.

One area where shortcomings in policy and law have been recognised is for snow leopard. Six of the 12 snow leopard range states report that the lack of effective policy is a high threat to snow leopard[115] and are beginning to address the problem. All five range states covered by this chapter now have a National Snow Leopard Ecosystem Protection Programme (as part of GSLEP). In addition, Kyrgyzstan has a 2013-2023 National Strategy and Action Plan for Conservation of the Snow Leopard[116], Uzbekistan had a National Strategy and Action Plan up to 2010, and Afghanistan's National Biodiversity Strategy and Action Plan, which is currently being updated, and its National Protected Area System Plan address snow leopard conservation. Snow leopards, and some of their prey species, have also received stronger legal protection in recent years. In Afghanistan a Presidential Decree was issued that expressly prohibits trafficking, trapping, and disturbing the habitat and illegal trade of wildlife, including snow leopards and other protected species[117]. In 2013, Kyrgyzstan increased the fine for killing or illegal capture of a snow leopard to KGS 500 000 (EUR 6 700), and Kazakhstan has also substantially increased its penalties (EUR 17 480 for poaching a snow leopard and EUR 13 110 for poaching any of the five subspecies of argali). A total ban on hunting in Kazakhstan has led to a decrease in poaching of snow leopards and other rare species[118].

The principle of **sustainable utilisation** of wildlife underpins some legislation, even where it may no longer be appropriate. In some cases, species that are now highly threatened are treated in law as high-value hunting targets, with legislation focused on the creation of special licences and pricing systems, rather than on conservation. This creates inconsistencies within legislative frameworks. Argali, for example, are listed as

(113) Morgera, E. et al. (2009) Op. cit.
(114) See Rosen T. (2012). Op. cit.
(115) GSLEP Secretariat (2015). Regional Enforcement Strategy to Combat Illegal Wildlife Trade in Central Asia, 2015-2018. Available at: https://www.interpol.int/content/download/30074/392861/version/2/file/Regional%20Enforcement%20Strategy%20to%20Combat%20Illegal%20Wildlife%20Trade%20in%20Central%20Asia%202015%20-%202018.pdf, accessed 26 March 2018
(116) Mallon D. and M. Kulikov (2015). Aspects of Trans-Boundary Snow Leopard Conservation in Central Asia. Report of the FFI/CMS Workshop, Bishkek, Kyrgyzstan, 1 to 2 December 2014.
(117) Snow Leopard Working Secretariat (2013). National Snow Leopard Protection Priorities (NSLEP): Afghanistan, 2014-2020. Global Snow Leopard and Ecosystem Protection Programme. Available at: http://www.globalsnowleopard.org/wp-content/uploads/2016/05/Afghanistan_NSLEP.pdf, accessed 26 March 2018.
(118) Snow Leopard Working Secretariat. 2013. Global Snow Leopard and Ecosystem Protection Program Bishkek, Kyrgyz Republic.

Road and rail crossing on the Kazakhstan steppe. Analysis using the guidelines developed under the CMS shows that strategic environmental assessment regulations in the CIS countries have yet to recognise the specific threats posed by linear infrastructure to the region's unique wildlife.

'endangered' in the national Red Lists of all the countries in Central Asia, and yet can still be legally hunted in many of them. An exception is Afghanistan, where a presidential ban on all hunting, including argali, was introduced in 2006[119]. The focus on sustainable utilisation has led to the development of private argali hunting concessions in Tajikistan and Uzbekistan, with mixed success. Some concessions are clearly working effectively to protect wildlife, with burgeoning populations of argali, but others appear to be poorly managed, with little oversight, monitoring or conservation activities. There are positive examples of success with this approach from Pakistan, where well-managed, community-based markhor trophy hunting programmes in Torghar, Chitral and Gilgit-Baltistan are considered a major success. Through this programme, four markhor trophies are sold to international hunters for between EUR 38 000 and EUR 77 000 each, in each province, with 80 % of proceeds invested directly in communities in the conservancy area and the remaining 20 % going to the wildlife department for conservation-related expenses and management. The direct community benefit has played a key role in changing attitudes toward wildlife, creating a real sense of a vested interest in protecting the resource.

Saiga is another species that was harvested in very large numbers before the 1990s. Kazakhstan banned hunting in 1997 as the population declined, but the government has shown interest in reinstating the trade given recent apparent increases in population. A sustainable harvest of saiga would be challenging, however, given the difficulty of (i) establishing sustainable harvesting rates which allow for natural fluctuations in the population, (ii) monitoring compliance with quotas over an area the size of France, (iii) preventing illegally hunted meat and horn entering the legal trade chain, and (iv) anticipating the impact on the population of new threats such as climate change, infrastructure development and fragmentation.

In terms of policies to encourage the shift to **green economic development**, Kazakhstan is leading the region with a national plan to transition to a greener economy and voluntary pledges to reduce GHG emissions. In general, however, the countries do not have the necessary legal and institutional frameworks in place, nor sufficient site-specific data to support investment[120].

The impacts of development of linear infrastructure are of specific concern for the threatened species of the region (section 2.1.7). The potential to identify, avoid and mitigate these impacts is partly dependent on the quality of planning processes and environmental impact assessment studies. The Linear Infrastructure Guidelines developed for the international Convention on Migratory Species (CMS)[121] analysed the legal frameworks in five countries (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan). The analysis noted that the legal frameworks do not specifically identify any type of linear infrastructure as a priority for strategic impact assessment. At the project level, the laws of each country varied substantially, with Kazakhstan having the most complete approach, specifically identifying migratory species and requiring their consideration for linear infrastructure projects. The other four countries had no relevant regulations in place, or had significant gaps, emphasising the need to improve and harmonise laws, especially with respect to transboundary impacts on migratory species.

(119) Mallon D., N. Singh and C. Rottger (2014). International Single Species Action Plan for the Conservation of the Argali Ovis ammon. CMS Technical Series No XX. Bonn, Germany. The other four range countries, however, continue to legally permit either trophy hunting or hunting for scientific purposes. Kazakhstan lists argali as endangered (Category I); hunting permits may be issued by governmental decree following a special procedure. According to Mallon et al. (2014), there have been no legal hunts since 2003, but there has also been no change in the law. Kyrgyzstan lists all three argali subspecies that occur there as endangered (Category 1); 70 permits for trophy hunting and scientific purposes are issued each year. Uzbekistan lists argali in its Red Book and also among its hunting species, although permits are not regularly issued. Tajikistan similarly includes argali (O. a. polii) in its Red Book; hunting is legally permitted only for 'scientific purposes', but in reality about 80 trophy hunting permits are issued each year.

(120) An example of high-level data for renewables can be found in the Global Atlas for Renewable Energy (http://irena.masdar.ac.ae/#) maintained by the International Renewable Energy.

(121) Wingard J. et al. (2014). Op. cit.

Table 3.3 Number of sites designated under the international agreements operating at site level

Country	Ramsar	MAB	WHS (natural)
Afghanistan	0	0	0
Iran	24	12	1
Kazakhstan	10	8	2[i]
Kyrgyzstan	3	2	1[i]
Tajikistan	5	0	1
Turkmenistan	1	1	0
Uzbekistan	2	1	1[i]
Regional total by treaty	45	24	4[i]

(i) One WHS, Western Tien-Shan, is shared by Kazakhstan, Kyrgyzstan and Uzbekistan.

Key: Ramsar: wetlands of international importance for biodiversity; MAB: Man and Biosphere Convention: sites of international importance for biodiversity; WHS: natural World Heritage Sites managed to preserve a unique feature of global value.

Table 3.4 International agreements operating at species/groups level and national level

Country	CBD	UNFCCC	CITES	CMS	CMS Saiga	CMS Bukhara	CMS Siberian crane	CAMI range state
Afghanistan	Party (2002)	Party (2002)	Party (1986)	Party (2015)	n/a	Range state (not signed)	Signed (2006)	Range state
Iran	Party (1996)	Party (1996)	Party (1976)	Party (2008)	n/a	n/a	Signed (1998)	Range state
Kazakhstan	Party (1994)	Party (1995)	Party (2000)	Party (2006)	Signed (2006)	Signed (2002)	Signed (1998)	Range state
Kyrgyzstan	Party (1996)	Party (2000)	Party (2007)	Party (2014)	n/a	n/a	n/a	Range state
Tajikistan	Party (1998)	Party (1998)	Party (2016)	Party (2001)	n/a	Signed (2002)	n/a	Range state
Turkmenistan	Party (1996)	Party (1995)	Non-Party	Non-Party	Signed (2005)	Signed (2002)	Signed (1998)	Range state
Uzbekistan	Party (1995)	Party (1994)	Party (1997)	Party (1998)	Signed (2006)	Signed (2002)	Signed (1998)	Range state

Key: CITES: trade in endangered species; CMS: Convention on Migratory Species, protection of migratory animals – including Saiga antelope MoU, Bukhara deer MoU, and Siberian crane MoU; CBD: protection of biological diversity, Aichi targets for protected areas, benefit sharing; UNFCCC: United Nations Framework Convention on Climate Change; and CAMI: Central Asia Mammals initiative under the CMS.

Bukhara deer is a sub-species of red deer (which may be a distinct species) found only in Central Asia. International cooperation for the deer's conservation is coordinated through the Bukhara Deer MoU, under the auspices of the CMS. The population is increasing as a result of conservation efforts.

Members of a community governance institution in Wakhan Pamir, Afghanistan. Community institutions representing 42 settled and 14 semi-nomadic communities were involved in the creation of the Wakhan National Park in 2014. The park is managed collaboratively with the communities.

3.1.6 International agreements

International biodiversity conventions can be divided into those that operate at the site level and those focused on particular species or groups or which commit a country to a series of policy and programmatic actions.

Of the site-based agreements (Table 3.3), Ramsar is by far the most actively applied, with 45 designated sites in six of the seven countries in the region, three-quarters of them in Iran and Kazakhstan. Five countries have declared sites under the Man and Biosphere Convention (MAB) Programme (24 sites) and the World Heritage Convention (4 sites). Iran is the most active in its use of international conventions aimed at site protection, followed by Kazakhstan. Only Afghanistan has no designated sites under any of the agreements.

Not all of the Central Asian countries are signatories of the international agreements aimed at species conservation and other programmatic efforts (Table 3.4). Turkmenistan has not yet signed either CITES or CMS. It has, however, joined all three of the CMS MoUs for species for which it is a range state (saiga, Bukhara deer and Siberian crane). Afghanistan is an eligible range state for Bukhara deer, but has yet to sign the CMS MoU.

Six of the seven countries in this study are parties to CITES. Implementation of the treaty has been slow, however. As an example, Afghanistan joined CITES in 1986, but did not list the snow leopard as 'protected' until 2009, and only stopped international trade in 2014, after the CITES Secretariat recommended a suspension of all trade from the country[122]. In an effort to support national governments to improve their policies and legislation, CITES conducts reviews of national legal frameworks through its National Legislation Project, categorising countries according to their level of compliance. The results of the most recent assessment concluded that none of the Central Asian countries is in Category I (national laws meet all 4 requirements for effective implementation). Kazakhstan, Kyrgyzstan and Uzbekistan are Category II countries (legislation generally believed to meet 1 to 3 of the 4 requirements for CITES implementation); and Afghanistan is a Category III country (legislation generally believed not to meet any of the 4 requirements for CITES implementation). Tajikistan has not yet been allocated to a category as it is a recent (2016) signatory 'pending submission of legislation to the secretariat'.[123]

The World Heritage Convention maintains a list of sites considered 'in danger.' None of the 4 natural sites currently registered are on this list.

The CBD's requirement to produce National Biodiversity Strategy and Action Plans (NBSAPs) is an important exercise that can provide critical baseline information on the status and needs of a country's protected areas, endangered species, national conservation goals and other conservation efforts. The most thorough NBSAP in the region has been produced by Kazakhstan. NBSAP processes in other countries have been valuable, but generally suffered from significant data gaps, restricted consultation processes and limited review, political support and financing of relevant activities.

Under the UNFCCC, all countries submitted notification of intended nationally determined contributions, and four countries (Afghanistan, Kazakhstan, Tajikistan and Turkmenistan) have submitted Nationally Determined Contributions documents.

(122) CITES (2013). Notification to the Parties, No 2013/018, Geneva, 17 May 2013, Concerning Afghanistan: recommendation to suspend trade for non-submission of annual reports. Available at: https://www.cites.org/sites/default/files/eng/notif/2013/E-Notif-2013-018.pdf, accessed 26 March 2018.

(123) CITES National Legislation Project: Status of Legislative Progress for Implementing CITES (updated December 2017). Available at: https://cites.org/sites/default/files/eng/prog/Legislation/CITES_national_legislative_status_table.pdf, accessed 26 March 2018.

3.2 Community-based conservation

Historically, Central Asian populations were a mix of nomadic, semi-nomadic and sedentary societies with strong traditional relationships to the natural environment and local resources. In many instances, however, these traditional systems and relationships were marginalised or substantially altered as part of modernisation efforts. More recently, the need for local, community-based forms of management has been recognised once again. Initiatives to strengthen community management include the following:

In Afghanistan, two community-based organisations were created over the last decade with the support of the Government of Afghanistan, WCS and USAID: one in Bamyan District (including 14 communities around Band-e-Amir) and one in Wakhan District (covering 42 communities and 14 semi-nomadic communities). These organisations helped create the country's first two protected areas – Band-e-Amir National Park in 2009 and Wakhan National Park in 2014. Both parks are developing co-management systems so that communities and government can work together to manage and gain direct benefits from the parks[124].

In Kazakhstan and Kyrgyzstan, there have been efforts to integrate the needs of the local population into the management of the north Tien Shan, supported by NABU through a GEF project. Activities have included assisting in the development and improvement of governance mechanisms; developing a sustainable pasture management system; promoting ecotourism and community-based tourism in the border region; and management planning.

In 2008, a project was started entitled Community-Based Conservation and Mountain Ungulates in Tajikistan, focused on assessing population status and supporting conservation activities for markhor and urial in southern Tajikistan and for ibex and argali in the Pamirs. The project is primarily funded by GIZ, Zoological Society for the Conservation of Species and Populations and various other NGOs. It focuses on building community institutions to manage the target species in game management areas, with the goal of creating local ownership, incentives and sustainable financing of conservation and community development through nature tourism and trophy hunting. With assistance from GIZ and Panthera, the approach has been replicated in Kyrgyzstan and currently five local community-based NGOs manage conservancies with a total area of close to 400 000 ha.

3.3 Civil society

3.3.1 CSOs in Central Asia

Strong networks of kinship, and a recent history of authoritarian regimes in the CIS countries and Afghanistan, mean that civil society as understood in western countries has been slow to emerge in the region. However, the environment for civil society organisations (CSOs) in the region is generally becoming more favourable, and the number and effectiveness of CSOs is growing.

In Afghanistan, where community-based approaches are fundamental components of political and institutional structures (e.g. Community Development Councils), and are enshrined in environmental legislation and policy[125], CSOs are seen as key partners in all types of development and conservation

(124) Zahler P. and R. Paley (2016). Op. cit.

(125) Islamic Republic of Afghanistan (2007). Environment Law. Official Gazette No 912, dated 25 January 2007. Unofficial English translation. Available at: http://www.afghan-web.com/environment/afghan_environ_law.pdf, and Islamic Republic of Afghanistan (undated). National Biodiversity Strategy and Action Plan. Framework for Implementation: 2014-2017. Available at: https://www.cbd.int/doc/world/af/af-nbsap-01-en.pdf, accessed 26 March 2018.

strategies. As a result, there are many CSOs active throughout the region, working on a variety of conservation issues in concert with international NGOs and government.

In Iran and Kazakhstan, CSO development is encouraged by the relative freedom of expression on environmental matters, the rapid increase of connected societies in urban areas, fertile communication networks, and the on-the-ground success of several high-profile NGOs and CSOs. In Iran the vast majority of CSOs are community-based social service organisations. Their freedom of operation has varied with changes in national politics. In 2004 there were 6 914 NGOs in Iran, according to the country's Statistical Centre, and the number increased after 2013 when the government eased registration procedures. Although CSOs are technically protected by the constitution, their remit is limited by what the authorities deem 'appropriate'.

In Kazakhstan, more than 400 CSOs were established in the early 1990s, most of them involved with human rights protection. In 1994, a new Civil Code recognised public associations and public foundations as non-profit organisations, leading to a growth in the diversity and quality of CSO activity. Since 2001, CSOs have enjoyed greater recognition from state bodies, and benefited from formal arrangements for civil society.[126]

In Kyrgyzstan, the role played by the non-governmental sector has been recognised by the state since the mid-1990s, and civil society organisations are active and heavily involved in campaigns for political reform. They have had an impact on local and national debates, with examples of successful collaboration between NGOs and local government on urban environmental issues, and national laws on domestic violence and gender equality adopted in response to widespread support for NGO-led campaigns. NGOs remain highly aid-dependent, however, with little support from government or other stakeholders.[127]

Turkmenistan remains a very closed society with strong, authoritarian power structures that do not promote the development of real CSOs. Many of the registered associations in Turkmenistan are, in fact, government-organised NGOs, which are established as traditional communist-era groups, such as the Youth Union.

In Uzbekistan, there are continuing close links between Soviet era 'associations' and the current government. A mapping report from 1998 notes a number of examples of these old-style public associations active in the country, such as ECOSAN, an organisation dealing with environmental issues[128].

Western donor agencies have provided considerable support to the development of civil society in the CIS states and Afghanistan, viewing strong civil society as being important to the transition from centrally planned communist states to democratic, liberal market economies.[129]

The media plays an important role in informing the public about environmental, conservation and biodiversity issues. Kazakhstan, Kyrgyzstan and Tajikistan support relatively free, diverse media communities, with a mixture of state and private, online and traditional, nationwide and local media companies. Uzbekistan and Turkmenistan have more limited media freedom and diversity[130]. In all countries, environment and natural resource issues are under-reported topics.

3.3.2 CSO/NGO approaches and projects

The following provides a summary of some of the country and issue-specific approaches currently being implemented across the region:

Afghanistan

The Natural Resource Management Department of the Aga Khan Foundation in Afghanistan is working on poverty reduction, improving rural livelihoods and environmental conservation with a particular emphasis on the active participation of communities and relevant stakeholders, both in the public sector and civil society organisations. A key approach includes community-based natural resource management groups within local Community District Committees. The Rupani Foundation works on community forestry and is starting environmental education across Badakhshan. Environment Watch Afghanistan and Afghanistan Environmental Society conduct Kabul-based environmental awareness campaigns around international events such as World Environment Day.

Since 2006, the Wildlife Conservation Society has helped establish the community-based Wakhan Pamir Association and the Band-e-Amir Community Council, helped draft over 10 of the country's environmental laws and policies, and has been providing training to government and CSOs on conservation techniques, wildlife monitoring and baseline surveys, and controlling illegal hunting. The WCS is working with the government and local communities on research and conservation of snow leopards and mountain ungulates, including Marco Polo sheep (a subspecies of argali), urial, markhor, ibex and other wildlife species. A team of over 50 community rangers has helped capture

(126) Asian Development Bank (2015). Civil Society Briefs: Kazakhstan. Available at: https://www.adb.org/sites/default/files/publication/175220/csb-kaz.pdf, accessed 26 March 2018.
(127) Giffen J. and L. Earle with C. Buxton (undated). The Development of Civil Society in Asia. INTRAC, Oxford, UK. Available at: https://assets.publishing.service.gov.uk/media/57a08c3de5274a27b200108f/R7649-report.pdf, accessed 26 March 2018.
(128) Giffen J. et al (undated). Ibid.
(129) Giffen J. et al (undated). Ibid.
(130) Freedom House (2017). Freedom of the Press 2016. https://freedomhouse.org/report/freedom-press/freedom-press-2016, and IREX (2016) Media Sustainability Index 2016, https://www.irex.org/sites/default/files/pdf/media-sustainability-index-europe-eurasia-2016-full.pdf.pdf

Altyn-Emel national park, Kazakhstan. Successful conservation management has allowed the park's Asiatic wild ass population to grow, and animals have been translocated to help re-stock steppe areas in central Kazakhstan.

and collar four snow leopards and has obtained over 5 000 camera trap photos of snow leopards. The WCS continues to support the management of Band-e-Amir and Wakhan National Parks, including the drafting of management plans. The programme has also focused on anti-poaching work and international wildlife trafficking, and it has studied the health status of livestock and wildlife in the Pamirs since 2006, including field surveys and telemetry to document the spatial-temporal range overlaps between livestock and wildlife. The programme has piloted a disease surveillance system with the help of 11 paravets in Wakhan, who have been trained to detect and report contagious diseases in livestock and wildlife.

Iran

There are many local NGOs working in sustainable rural development and natural resource management but their achievements in terms of biodiversity conservation are poorly understood and difficult to evaluate. The number of NGOs working directly in the field of biodiversity conservation is small but growing. They are usually based in Tehran or other large cities, and their main activities include national or local campaigns to raise public and government awareness of the importance of biodiversity, increasing the engagement of local communities in sustainable management of natural resources and supporting government in wildlife monitoring activities.

Among the prominent NGOs, the Persian Wildlife Heritage Foundation is involved in surveys to monitor wild ungulates in several provinces, supports the conservation of Asiatic cheetah in the Dasht-e Kavir, Persian leopard in Golestan National Park and Asiatic black bear in Kerman province through scientific and community-based activities. Another NGO, the Iranian Cheetah Society implements science and monitoring activities to help the conservation of the Asiatic cheetah. A third NGO, Alborz, works on the conservation of bustards, brown bear and endangered reptiles and amphibians. In general, these NGOs have built relatively good partnerships with the provincial governments where they work. Although they benefit from positive public perceptions, they struggle to secure funding and there is a lack of coordination among them.

Iran holds the last 50 to 100 critically endangered Asiatic cheetah. Their survival depends on strengthening protected area management in key habitat, avoiding road kills by fencing and funnelling wildlife through underpasses on target segments of roads, and buying grazing rights in selected protected areas and in key corridors. There are also plans to pilot revenue generating mechanisms aimed at increasing the involvement of local communities in cheetah conservation. These include diversifying community income through, for example, ecotourism, sustainable community hunting reserves, support for quality livestock production versus quantity and sustainable fruit production. The project will target the most vulnerable households within these communities, and it will strive to achieve greater participation of women in income-generating activities and conservation activities.

Kazakhstan

In Kazakhstan, there are several conservation, scientific and public awareness activities supported by government and CSO projects. The Association for the Conservation of Biodiversity of Kazakhstan (ACBK), a local NGO, is active across the country. Although largely focused on conservation in the western steppe region (especially on saiga), ACBK has contributed to snow leopard conservation through surveys of prey species in west Tien-Shan, north Tien-Shan and Zhongar Alatau, and to studies of snow leopard in partnership with government and the Snow Leopard Fund (another local NGO connected to the international Snow Leopard Conservancy). Another small project is modelling Snow Leopard Habitat in Response to Climate Change, which was funded by the international Snow Leopard Network Small Grants Programme and implemented by the Kazakh National University, Almaty State Nature Reserve and the University of Cumbria.

Endemic species in the Central Asian mountains, such as this Tien-Shan ground squirrel, near Yssyk-kol lake, Kyrgyzstan, have benefited from the creation of large protected areas supported by conservation projects.

This camera trap photo, taken in 2013 in the Gissar Reserve, Uzbekistan, was the first record of snow leopard in the country. International cooperation and action by national governments and NGOs appears to have reduced the threats to this big cat, and there are indications that the population is stable or increasing in some areas.

Predator-proof pen for livestock, Pamir, Afghanistan. Reducing opportunities for predators to attack livestock is key to securing the support of local communities for snow leopard, bear, wolf and cheetah.

Kyrgyzstan

The international NGO Panthera is active in Kyrgyzstan's Osh, Naryn, Chui and Issykul areas, focused on the conservation of snow leopards, wolves, argali and ibex through: 1) reducing human-snow leopard conflict by predator-proofing corrals; 2) supporting community-based conservancies; and 3) developing an informal informant anti-poaching network to detect poaching and illegal wildlife trade. These activities are supported by regular camera trap and ungulate surveys, as well as training wildlife detection dogs (in partnership with the NGO Working Dogs for Conservation) through a MoU with the Kyrgyz Customs Service. Panthera also implements a long-term ecological study of snow leopard and predator-prey relationships in Sarychat Ertash Reserve using satellite collars.

The Snow Leopard Foundation Kyrgyzstan, with support from the international Snow Leopard Trust, has been monitoring snow leopards in the Sarychat Ertash reserve and surrounding hunting concessions. They also supported the first ever concession granted to an NGO for purposes of protection without hunting. They support the Snow Leopard Enterprise, an incentive programme (handicraft making and sales) to discourage hunting/poaching, and a ranger reward programme in partnership with Interpol (to catch poachers). The GSLEP is focusing on management planning for snow leopard landscapes and monitoring in the mountains and forests east of Issyk Kul and the Gissar-Alai area of Osh Province. WWF Russia is supporting snow leopard conservation in the areas east of Issyk Kul.

NABU is currently supporting Kemin National Park, but has also been very active in anti-poaching work (Gruppa Bars), conservation education and outreach. It has also been a significant supporting partner to the GSLEP, whose secretariat is in Kyrgyzstan.

WWF and Fauna & Flora International (FFI) are both working on capacity building in Sarychat Ertash Reserve to help combat poaching, monitor snow leopards and engage communities. FFI is providing additional input into the management planning process and is also now involved with Naryn Reserve in the central Tien Shan. WWF is also working on small-scale economic development projects supporting alternative livelihoods, including the construction of alternative energy sources (wind) and an incentive programme using yak products as a tool for financing ranger needs in the reserve. WWF has been active in support of the GSLEP Secretariat in Bishkek.

There are a few national CSOs active in biodiversity conservation. The Kyrgyz Wildlife Society partners with NABU, Birdlife International and Wetlands International in wildlife surveys and protection but has a particular focus on birds and the trade in birds. The 'Ysyk-Kol bashaty' association of Issyk Kul University receives support from FFI and the International Federation of Rangers to work with community associations to conserve the maral deer, implementing awareness programmes, conducting nature excursions and establishing a nursery for young maral on state land. The Association of Forest and Land Users includes 65 entities representing 8 000 forest users and is active in 3 provinces. Lastly, the Mountain Societies Research Institute (MSRI) of the University of Central Asia conducts a wide range of research on conservation and natural resource management issues across the whole region – including a very strong GIS component. MSRI currently has formal relationships with the International Centre for Integrated Mountain Development (ICIMOD), the Aga Khan Development Network and GSLEP.

Tajikistan

CSO/NGO activities in Tajikistan are limited, but nonetheless comprise important local and international efforts aimed at snow leopard and mountain monarch conservation. The combined efforts of these community and private wildlife management and hunting areas was recognised by the GSLEP Working Secretariat for their contribution to higher snow leopard abundance documented in managed hunting concessions compared to unassigned areas[131].

The Zoological Society for the Conservation of Species and Populations, the International Council for Game and Wildlife Conservation, Greater Los Angeles Zoo Association and other foreign NGOs support the Tajikistan Mountain Ungulates Project. Panthera is collaborating with this project and is working in the Tajik Pamirs, including the Darvaz and Hazratisho ranges, specifically on ibex, argali and markhor. These efforts are similar to their activities in Kyrgyzstan, focusing on 1) reducing human-snow leopard conflict; 2) supporting community-based conservancies (so far there are five) and 3) establishing an informal informant anti-poaching network to detect poaching and illegal wildlife trade. These activities are also all complemented by regular camera trap and ungulate surveys to document the impact of their work.

NABU has been working in the Pamir-Alai region between Tajikistan and Kyrgyzstan, in a consortium funded by the European Union to establish a cross-border protected area. Since 2007 NABU has supported the Nature and Biodiversity Conservation Union of Tajikistan.

New Mexico State University in cooperation with the NGO Safari Club International Foundation and the Tajikistan government is implementing the Tajikistan Argali Project. Over the past 6 years they have been conducting population and range condition surveys, which includes a monitoring programme to maintain the sustainability of the argali harvest.

FFI has supported capacity building for the staff of Zorkul Nature Reserve.

ACTED Tajikistan is focused on the Murghab and Zarafshan Valley regions, conducting rangeland inventories, training pasture users and mapping conflict situations. It is also researching traditional pasture management and at the conclusion of their current grant will publish a book on the subject.

The Nature Protection Team works with local people to conserve wild fauna with a particular focus on mountain monarchs and Bukhara deer in the Pamirs and Dashti-Jum. Their goal is to promote the wise use of natural resources including community hunting schemes and eco-tourism ventures. The Regional Environmental Centre for Central Asia has received small grants from USAID and the World Food Programme to deal with water issues and climate change adaptation. The Kukhiston Foundation works in Tigrovai-Balka State Nature Reserve, supporting 8 environmental education centres. It also implements small grants for climate adaptation in vulnerable areas, with pilot schemes in Darwaz, Panjakent, Jirgatal, Muminabad and Hamadoni on flood control, irrigation schemes and reforestation. The National Genetic Resources Centre, which is linked to academic institutions in St Petersburg, has collected 11 000 seed samples of agricultural crops and wild relatives to be stored in genetic banks. Finally, the Association of Mountain Farmers is a transboundary cooperative funded by GIZ/USAID, which operates in Murghab and Badakhshan.

Turkmenistan

The Royal Society for the Protection of Birds supported a national team in Turkmenistan. As a result of this partnership, a national list of important bird areas (IBAs) for Turkmenistan has been published.

The Michael Succow Foundation has been involved in the extension of the protected area system in Turkmenistan since 2008

(131) Snow Leopard Working Secretariat (2013). National Snow Leopard Protection Priorities (NSLEP): Tajikistan, 2014-2020. Global Snow Leopard and Ecosystem Protection Programme. Available at: http://www.globalsnowleopard.org/wp-content/uploads/2016/05/Tajikistan_NSLEP.pdf, accessed 26 March 2018.

and is conducting scientific baseline research on carbon stocks and the implementation of conservation projects with a focus on tugai ecosystems and deserts. The national partner for project implementation is the National Institute of Deserts, Flora and Fauna under the State Committee for Environmental Protection and Land Resources.

Uzbekistan

Uzbekistan is still in the early stages of building local capacity at the CSO/NGO level. The Uzbekistan Society for the Protection of Birds is affiliated to the Birdlife International partnership and receives some international support. A national list of IBAs for Uzbekistan has been published.

The Michael Succow Foundation has been involved in the implementation of nature conservation and landscape restoration projects in Uzbekistan since 2010, with both governmental and non-governmental partners. The foundation was involved in the development of a master plan for protected areas in Uzbekistan. Surkhan Nature Reserve, Ecocenter 'Djeiran', Ugam-Chatkal National Park and Lower-Amudarya Biosphere Reserve received technical and advisory support. The Michael Succow Foundation also helped introduce camera trapping as a research approach in 2011 in Southern Karakalpak Ustyurt.

Beginning in 2013, WCS, Panthera and the WWF have variously supported a project aimed at snow leopard conservation, especially in the Gissar Reserve, the country's largest reserve and containing the western-most population of snow leopards. These projects have helped train rangers and managers, provided supplies and technical equipment, and developed a camera trap-monitoring programme, which obtained the first camera trap photos of snow leopards in the country. Other organisations active in supporting conservation efforts include the Zoological Society of Uzbekistan and the Saiga Conservation Alliance.

3.4 Private sector

Corporate engagement and green economy approaches supporting conservation and sustainable management have only just started in the region but show promise and should be encouraged. There are opportunities to share and learn from neighbouring regions – in Mongolia, for example, the Oyu Tolgoi mine in Mongolia is funding long-term biodiversity monitoring, anti-poaching training for rangers, specialists and administrators from several of Mongolia's protected areas, and the creation of multi-agency anti-poaching teams whose jurisdictional capacity is greatly expanded by their collaboration.

Among the seven countries in the area, corporate involvement in conservation is perhaps the most developed in Iran. Among the promising approaches across the region are:

- Provincial head offices of the Iranian Department for Environment have developed small-scale collaborations with local corporates (e.g. mines, manufacturers) who support public awareness campaigns and educational materials.
- Dana Insurance Company, which has been supporting cheetah conservation in Iran since 2013. The support includes a work-incentive healthcare for the 126 game guards of cheetah protected areas and their families, and provides compensation for any livestock killed by cheetahs, for any cheetahs killed accidentally (e.g. roadkills), and for any damage to ranger stations.
- Chagaz mine in Yazd province has built a ranger station in an area used by cheetahs. It also supports the salary of three rangers and has purchased two motorbikes for the local DoE rangers.
- Corporate support of conservation activities is also emerging in Kazakhstan, where two mining companies assist ACBK (a local NGO) with small grants to support saiga antelope conservation.
- Kumtor Gold Mine in Kyrgyzstan financially supports biodiversity conservation activities in nearby located Sarychat-Ertash Strict Nature Reserve and in other areas.

Going beyond 'corporate social responsibility' (CSR) type approaches to greening business practices and the economy as a whole is in its infancy in the Central Asia region. Green economies have been defined as those that 'result in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities'[132]. The concept implies not only the use of planning tools and the application of social equity principles, but also significant investments in research, as well as fundamental changes in infrastructure, extractive industry practices, and energy. Initiatives in this direction include the major planning and policy work undertaken by Kazakhstan as part of its efforts to decrease reliance on carbon-based fuels.

([132]) UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication – A Synthesis for Policy Makers. Available at: https://sustainabledevelopment.un.org/content/documents/126GER_synthesis_en.pdf, accessed 26 March 2018.

Bread (on sale here at a market in Tajikistan) is a staple of the Central Asian diet, with most wheat grown in Kazakhstan. Donor projects address the need for improved varieties and more sustainable production in response to climate change and other pressures.

3.5 International agencies and donors

The majority of aid to the region is bilateral, with multi-lateral sources comprising just 19 % of the total in the 5 years from 2010 to 2014 [133](Table 3.5).

Levels of aid dependence are low in the larger economies of the region – the 2015 DAC country aid was equivalent to less than 0.1 % of the gross national income in Iran, Kazakhstan and Turkmenistan. In the much smaller economies of Kyrgyzstan and Tajikistan, the 2015 DAC country aid was equivalent to between 1 % and 3 % of gross national income (GNI), while in Afghanistan aid was equivalent to over 18 % of GNI. Afghanistan is by far the highest aid recipient, receiving over 86 % of the aid flows to the countries of the region in 2015 (Table 3.6).

The USA was by far the largest contributor of aid to the region in 2015, providing over 39 % of all DAC country aid. Germany, Japan and the UK (11 % each) were the other major contributors, with the EU providing 6 %. Over 85 % of these funds went to Afghanistan. If Afghanistan is excluded, Japan and Germany are the largest donors, with the largest funding in 2015 going to Iran (Germany) and Kyrgyzstan (Japan).

The region as a whole receives only a small amount of support for environment and conservation-related activities. GEF funding, as described in the following section, is the predominant source among multilateral organisations but represents just 1 % of all multilateral aid.

Bilateral agencies

European Union

The EU's Regional Strategy Paper for assistance to Central Asia (2007-2013) identifies the environment as a priority. Two EU-funded programmes, 'Promoting Integrated Water Resources Management and Fostering Transboundary Dialogue in Central Asia' and the 'EU-Central Asia regional programme on Environment, Water and Climate Change' (EURECA I and II) aim to strengthen regional cooperation in the sector.

EURECA I had a dedicated budget of EUR 9.2 million and was implemented during the period 2012-2015. Projects under the programme included the Forest and Biodiversity Governance, including Environmental Monitoring (Flermoneca) project, which ended in 2015. The project aimed to 'enhance regional cooperation and partnership with Europe in the fields of forest and biodiversity governance', and focused on Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. There were three components: forest law enforcement and governance, ecological restoration and biodiversity conservation, and environmental monitoring. Other projects under the programme focused on regional cooperation for water resource management, and environmental awareness.

EURECA II (anticipated budget of EUR 13 million, 2016-2020) continues the focus on climate change, water management and

([133]) Source: OECD.stat, using actual disbursement totals for Multilaterals (including all EU institutions) as recorded in constant dollars. https://stats.oecd.org/, last accessed on 23 January 2017.

Table 3.5 Summary of main sources of aid to Central Asia

Aid source (2010-2014)	EUR (million)	As a % of total
Bilateral aid from DAC countries	21 553	75 %
Bilateral aid from non-DAC countries	1 853	6 %
Multilateral aid	5 338	19 %
Private	50	<1 %
Total aid	28 794	100 %

Source: OECD (2017).[134]

Table 3.6 Net ODA receipts by the countries of the region, 2011-2015

Country	Net ODA (EUR million)				
	2011	2012	2013	2014	2015
Afghanistan	4 562.00	4 309.15	3 275.92	3 096.46	2 758.46
Iran	54.62	83.31	72.85	37.08	69.69
Kazakhstan	15.38	27.46	8.00	14.54	6.31
Kyrgyzstan	135.54	106.77	120.85	139.46	132.54
Tajikistan	117.69	124.23	113.62	137.69	104.77
Turkmenistan	9.38	10.08	7.08	7.69	5.00
Uzbekistan	39.00	53.62	81.54	75.23	132.62
Total	4 933.62	4 714.62	3 679.85	3 508.15	3 209.38

Source: OECD (2017).[135]

([134]) OECD (2017). Geographical Distribution of Financial Flows to Developing Countries 2017: Disbursements, Commitments, Country Indicators. OECD, Paris. Available at: http://www.keepeek.com/Digital-Asset-Management/oecd/development/geographical-distribution-of-financial-flows-to-developing-countries-2017_fin_flows_dev-2017-en-fr/

([135]) OECD (2017). Ibid

Processing apricots, Tajikistan. USAID has supported work to improve the harvesting, processing and marketing of apricots, with the aim of improving nutrition and increasing income for rural households.

the environment. The programme targets Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, responding to the objectives of the Multiannual Indicative Regional Programme for Central Asia 2014-2020.

A new programme in Afghanistan (EUR 36 million) is addressing climate change in Afghanistan through sustainable energy and ecosystem management, starting in 2017. And a national collection of varieties of fruits and nuts of Afghanistan has been established, funded by the EU and through a partnership with the University of Florence (Italy), to protect an essential germplasm as a source of variability and resilience for the cultivated species.

Other EU projects in the region support the green economy, but are not directly involved in biodiversity conservation. They include energy efficiency in homes in Afghanistan, and supporting the transition to a green economy model in Kazakhstan. The EU's Instrument contributing to Stability and Peace has supported training for local media in the region on data analysis and multimedia storytelling on environmental themes.[136]

USA

The USA is the largest bilateral donor to the region. USAID, the main conduit for US bilateral funds, has a 2015-2019 Central Asia Strategy, which focuses on expanding trade and markets; enhancing regional cooperation on shared energy and water resources; and supporting more effective and inclusive governance institutions. As part of its effective and inclusive governance package, USAID will be providing support for civil society advocacy, as well as improving government services for health and literacy.

Germany

Germany has supported the development of policy, legal frameworks and community-based approaches to managing forests, wildlife conservation and trophy hunting, as well as improving rural energy efficiency in Tajikistan. In Kyrgyzstan GIZ assisted in policy, legal framework and forest sector reform and developed community-based wildlife management. Currently GIZ focuses on ecosystem-based adaptation to climate change in Tajikistan, Kyrgyzstan and Uzbekistan, with on-the-ground activities on participatory forest management.

UK

The UK's funding is primarily focused on governance and security issues, health and wealth creation.

Japan

The Japanese International Cooperation Agency (JICA) is focusing on the promotion of democracy and market economies. Their priorities for Uzbekistan, Kazakhstan, Kyrgyzstan and Tajikistan include (1) programmes for improving electric power and transport infrastructure, and (2) programmes to enhance market economies by activating the private sector. JICA activities in Afghanistan are focused on infrastructure, agricultural and rural development.

Multilateral agencies

A large number of multilateral agencies are active in the Central Asia region, including the United Nations Office on Drugs and Crime (UNODC), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP) and GEF, as well as two multilateral development banks, the World Bank and Asian Development Bank. Many of these agencies are active in the environment sector, including on biodiversity conservation and wildlife trade. Activities on wildlife trade in particular increased following the recognition of wildlife trafficking as a key issue for sustainable development by the UN General Assembly.

([136]) The project, implemented from 2016-2017 by Internews, was called 'Media for improved reporting on environment and natural resources in Central Asia'. It produced the Living Asia online platform (http://livingasia.online/) and resulted in the production of higher quality content on environmental issues.

Kazakhstan's steppe has large areas of shallow wetlands that are vital for migratory waterbirds and fish. GEF has supported improvements to the protection and management of the wetlands at both policy and field levels. Activities included monitoring and enforcement, alternative livelihoods and environmental education.

Table 3.7 Net ODA disbursements from DAC countries and EU institutions, 2015

Country	ODA (EUR million) (2015)								
	EU	Australia	Canada	Denmark	Finland	France	Germany	Italy	Japan
AFG	147.92	60.85	113.92	66.38	22.54	16.31	278.54	79.69	244.00
IRN	1.31	0.23	0.15	0.00	0.00	7.85	45.08	0.31	2.23
KAZ	10.92	0.00	0.08	0.00	0.08	4.08	9.54	0.08	-25.54
KYR	25.77	0.08	0.69	0.15	2.00	0.54	26.62	0.08	32.38
TAJ	21.85	0.00	1.08	0.08	1.69	2.00	23.85	0.15	13.69
TUR	3.54	0.00	0.00	0.00	0.08	0.23	0.77	0.00	-1.00
UZB	9.08	0.00	0.00	0.00	0.08	5.15	7.00	0.23	97.46
Total	220.38	61.15	115.92	66.62	26.46	36.15	391.38	80.54	363.23

Table 3.7 (continued)

Country	ODA (EUR million) (2015)								
	Korea	Netherlands	Norway	Sweden	Switzerland	UK	USA	Others	Total
AFG	42.00	42.62	65.92	79.31	26.92	352.54	1 255.00	11.92	2 906.38
IRN	0.15	0.54	1.92	1.46	0.23	1.15	0.54	7.85	71.00
KAZ	-5.54	0.31	0.08	0.00	0.08	6.38	14.38	2.31	17.23
KYR	6.15	0.00	1.00	0.08	20.69	3.15	38.08	0.85	158.31
TAJ	0.62	0.00	1.08	0.15	24.08	14.15	21.46	0.69	126.62
TUR	0.23	0.00	0.00	0.00	0.00	0.54	4.00	0.15	8.54
UZB	11.54	0.00	0.08	0.00	3.77	1.77	5.69	-0.15	141.69
Total	55.15	43.46	70.08	81.00	75.77	379.69	1 339.15	23.62	3 429.77

UN agencies

UN agencies lead on the implementation of many GEF projects (see below). UNDP Iran supported conservation of the Asiatic cheetah, a multi-provincial carbon sequestration project, and a project on sustainable management of land and water resources for a total amount of EUR 2.4 million, ending December 2016.
Multi-donor funds

Multi-donor funds

The **Global Environment Facility** (GEF) is one of the largest multilateral contributors to biodiversity conservation in the region. The 6th GEF funding cycle (2014-2018) has a total indicative allocation for the seven countries of EUR 72.17 million (compared to EUR 62.2 million for 2010-2014). Of this, 48 % (EUR 34.63 million) is for climate change, 28 % (EUR 20.32 million) for land degradation and the remaining 22 % (EUR 15.68 million) for biodiversity. Three countries (Iran, Kazakhstan and Uzbekistan) were expected to receive 63 % of these funds.

Examples of conservation-related GEF projects include:

Afghanistan:
- Establishing integrated models for protected areas and their co-management (EUR 4.9 million) implemented by WCS and scheduled to finish in 2018.
- Conservation of snow leopards and their critical ecosystem in Afghanistan (EUR 2 million).

Iran:
- Building a multiple-use forest management framework to conserve biodiversity in the Caspian Hyrcanian forest landscape[137] (EUR 1.5 million), directed at strengthening the national and local policy framework governing competing land uses in the Caspian forests.

Kazakhstan:
- Conservation and sustainable management of key globally important ecosystems for multiple benefits (EUR 6.2 million).
- Improving the sustainability of the PA system in desert ecosystems through promotion of biodiversity-compatible livelihoods in and around PAs (EUR 3.3 million).

Kyrgyzstan:
- Conservation of globally important biodiversity and associated land and forest resources in the western Tien Shan forest mountain ecosystems to support sustainable livelihoods (EUR 3 million).

Tajikistan:
- Conservation and sustainable use of Pamir Alay and Tien Shan ecosystems for snow leopard protection and sustainable community livelihoods (EUR 3.2 million).

Uzbekistan:
- Sustainable natural resource use and forest management in key mountainous areas important for globally significant biodiversity (EUR 4.8 million).

There are several more projects, including transboundary ones that are discussed in section 3.1.2.

The GEF Small Grants Programme, administered by UNDP, provides grants to CSOs for a wide range of activities related to biodiversity and sustainability. The programme operates in all the countries of the region except Turkmenistan.

In addition to these projects, GEF is funding action on land degradation. A multi-country partnership programme, the Central Asian Countries Initiative for Land Management, has been created. Financing in the programme's first phase includes a GEF grant of EUR 16.8 million. A second and third phase are anticipated for sustainable land management activities in Kyrgyzstan, Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan, in partnership with national governments, implementing agencies and other donors.

The **Critical Ecosystem Partnership Fund** (CEPF)[138] provides small grants for civil society conservation action in biodiversity hotspots. The provision of grants is guided by priorities identified through a process and document known as an ecosystem profile. CEPF funded the preparation of the first ecosystem profile for the Mountains of Central Asia hotspot in 2017 and expects to provide grants in the region in 2018.

Other funders have included the **Global Green Growth Initiative** that provided support for Afghanistan (EUR 870 000 in 2014) and Kazakhstan (EUR 80 000).

([137]) https://www.thegef.org/project/building-multiple-use-forest-management-framework-conserve-biodiversity-caspian-hyrcanian
([138]) CEPF is a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the MacArthur Foundation and the World Bank. See http://www.cepf.net/Pages/default.aspx

4

Lessons learned

The Central Asian sub-species of the Eurasian lynx (like this one in the Naryn river valley, Kyrgyzstan) is widespread throughout the region's forest and steppe ecosystems. Although under pressure from hunting and habitat degradation, the population appears to be stable.

4 _ Lessons learned

4.1 Protected areas

Protected areas in the Central Asia region are at the core of biodiversity conservation strategies. However, a widespread lack of investment in protected areas means that they are yet to be effective, and significant improvements in the status, scale and governance of protected areas are necessary if they are to fulfil their objectives. The key lessons on the problems faced by protected area management in Central Asia are described below.

- Many areas identified as conservation priorities by the various priority-setting analyses (including key biodiversity areas, important bird areas, snow leopard conservation units and GSLEP snow leopard landscapes), and collectively referred to as key landscapes for conservation (KLCs) in this chapter (section 5.1), are unprotected. Formal protection is not always the most desirable or practical way to preserve biodiversity, but the mismatch between these areas and the existing PAs suggests that there are important gaps in the PA network. However, the establishment of new, large-scale protected areas with strict rules (e.g. no-take zones) is becoming increasingly difficult and in most cases meets strong political resistance.
- Enactment of international commitments for the protection of threatened species remains weak. Examples include the snow leopard landscapes (section 1.2.4), which should be protected under the Bishkek Declaration but still require special legislation at national level.
- Some existing protected areas are not effectively zoned for conservation. The protected areas that prohibit hunting (e.g. zapovedniks, or strictly protected areas, and some national parks) only cover a small portion of the range of several endangered species[139]. Those that prohibit and prevent livestock grazing are even fewer.
- Across the region, protected areas management agencies face significant challenges. Many PAs are in very remote areas, and staff face severe logistical and practical challenges in accessing them. In the most extreme cases conservation authorities are entirely absent. In many areas, limited or ill-defined authority for enforcement also presents challenges, with rangers lacking the legal power to make arrests. Staff are often not adequately equipped to cope with armed poachers. In Iran, for example, over the past 40 years, an average of 2 to 3 rangers have been killed annually while on duty, many by poachers[140]. In Afghanistan, protection is mainly carried out by community rangers who do not have the right to carry a firearm.

Despite these challenges, promising approaches are underway in a number of locations. Examples include:

- The expansion of protected area networks (new areas, as well as increased sizes and levels of protection for existing areas). Kazakhstan officially established the Altyn Dala State Nature Reserve in 2012; the new reserve covers an area of 4 897 km² and aims to conserve the unique biodiversity of the steppe and desert ecosystems, with a focus on saiga antelope. In Afghanistan, the Wakhan National Park was formally established in 2014; at 11 000 km² in size, it is one of the few global protected areas large enough to protect viable populations of species such as snow leopards. Another example is the conversion of a former trophy hunting concession (Shamshy) located in the Tien Shan Mountains in Kyrgyzstan into a fully protected area for snow leopards.
- The creation of ecological corridors, such as the Yrgyz-Turgai-Zhylanshyk Corridor in Kazakhstan in 2014. This links Irgiz-Turgai State Nature Reserve and Altyn Dala State Nature Reserve and was designed to better protect migrating and calving saiga antelope, using multilevel landscape analysis involving international expertise. However, because it is the first of its kind in the country, the legal status of this new land designation type still needs to be clarified, and because it is not a formal protected area, there are no staff dedicated to its management.
- While increasing the number of personnel is often difficult in the short term, improving the capacity of existing staff can have a dramatic impact on management effectiveness. The use of SMART (the Spatial Monitoring and Reporting Tool) has been an important innovation. SMART is designed to help protected area and wildlife managers to improve the planning, monitoring and evaluating of conservation actions, and thereby target limited resources to where they are most needed. It is being rolled out or considered in a number of protected areas in this region, including Afghanistan, Kazakhstan and Uzbekistan. As more countries and protected areas apply the approach there will be opportunities for shared training and lesson learning, especially in transboundary PAs.

([139]) Snow Leopard Network (2014). Snow Leopard Survival Strategy. Revised 2014 Version. Snow Leopard Network, Seattle, Washington, USA.
([140]) Jowkar H., S. Ostrowski, M. Tahbaz and P. Zahler (2016). The Conservation of Biodiversity in Iran: Threats, Challenges and Hopes, Iranian Studies, citing pers. comm. with Dr B. Sadough, Deputy of Natural Environment Division of DOE, 2011.

Yashilkul lake, Tajik National Park, Tajikistan. The lake, along with the neighbouring Bulunkul lake, is important for waterbirds, and the surrounding mountains for saker falcon. The park is listed as a World Heritage Site.

- Given that local communities are often the only people permanently present in the landscapes that need protection, their involvement is critical for successful conservation. There are examples of community involvement in Afghanistan, with new models of co-management in which local communities are taking on core responsibility for park management in Band-e-Amir and Wakhan National Parks. Although they cannot receive park revenues directly for this work, there are encouraging signs that the National Environmental Protection Agency or the Ministry of Agriculture will be allowed to request that the Ministry of Finance returns funds equivalent to collected park revenues back to the communities within the parks for local projects.

4.2 Landscape approaches to conservation

Biodiversity conservation in Central Asia requires action beyond the borders of existing and proposed protected areas. Although protected areas are clearly necessary, they are mostly too small to harbour viable populations of the region's large mammals. A large proportion (72 %) of snow leopard range areas are outside the protected area system, for example, and the same applies to Asiatic cheetah, Persian leopard, saiga antelope and goitered gazelle. PAs are also too small to allow for the migrations that are an essential part of the survival strategies of many species in response to extreme cold or drought conditions. These species survive in Central Asia because comparatively low human density and limited economic development (especially in the mountains and desert regions) means that large swaths of relatively intact habitat still occur outside protected areas. Sustainable management of these remote landscapes can also contribute to human livelihoods and so potentially reduce the pressures to migrate to urban centres or even internationally.

Key lessons linked to landscape management are as follows:

- One of the major challenges to adopting a landscape approach for conservation in Central Asia is the difficulty of securing explicit government approval and support for the process of devolving management decisions to local communities or local stakeholder groups. The Soviet-era centralisation of power and decision-making has left both government and communities uncertain of the ability of the latter to take on responsibility for the management of resources.
- The long time frame needed to develop local capacity and deliver landscape-level approaches is beyond project funding or government budget cycles.
- Significant investment is needed in capacity building for communities to enable them to engage in joint planning and resource management initiatives.

There are numerous community-based conservation programmes outside protected areas in the region, which provide examples of promising approaches. They include the community-based conservancies in Tajikistan and Kyrgyzstan, which use revenues from hunting and tourism to build support for conservation within the communities through small development projects, and to implement anti-poaching and other wildlife management activities. Another example is Iran, where the government is collaborating with the UNDP to pilot 'community reserves' in critical cheetah habitat to augment protection outside formally established protected areas.

The Altyn-Emel National Park, Kazakhstan, was created in 1996 to protect an area of desert and mountains as well as archeological sites. It is part of a World Heritage Site.

Markhor on rocks worn by years of use, Tajikistan. Large mammals occur at low densities and range widely in the harsh environments of Central Asia, so even large protected areas may not hold viable populations. Landscape approaches aim to allow wildlife and economic activity to co-exist across large areas.

4.3 Transboundary initiatives

Political borders in Central Asia rarely coincide with ecological limits or species migration ranges[141], and transboundary initiatives involving species and landscapes that cross international borders require specific priority attention. Species impacted by transboundary effects include a number of large steppe and desert mammals such as saiga antelope and goitered gazelle, as well as migratory birds. In mountainous regions where international borders often follow the ridgeline, it is common for snow leopards, argali and other species to range across two countries. Political boundaries create barriers to research on species' ecology and make it more difficult to implement protection activities. The long-term persistence of viable populations of these species requires transboundary conservation.

Key lessons on international collaboration for conservation are listed below.

- Despite the interest in transboundary approaches expressed by the countries of the region, and donor agencies, the mechanisms to deliver them remain poorly developed. National agencies lack the mandate to work internationally, and bilateral funds are often disbursed through in-country programmes and do not have the mandate to fund regional approaches.
- A number of transboundary initiatives have been started in the region, but many have been discontinued due to short project time frames that do not allow for the necessary extensive multi-party negotiations, and the development and implementation of multi-national initiatives. An example is the Pamirs Transboundary Initiative between Tajikistan, Afghanistan, Pakistan and China, which in 2006 developed a suite of recommended actions and a draft map for a four-country transboundary protected area agreed upon by all four parties. Supporting the continuation of such projects can have a huge impact on conservation across the region.
- Promising approaches include a growing number of transboundary projects which have recently been developed or agreed by donors such as GEF and UNDP (see section 3).
- International agreements such as the CMS CAMI, and GSLEP have recognised the need for transboundary conservation. CMS (including CAMI) has several species-focused programmes aimed at enhancing transboundary conservation efforts for saiga antelope, Bukhara deer, Siberian crane and argali.[142]

4.4 Wildlife crime

Wildlife crime is a major problem throughout the region. It occurs at national and international levels and impacts many of the key species of conservation concern in the region. Tackling it requires an integrated approach involving multiple agencies and international cooperation. The following lessons and promising approaches have been identified for Central Asia.

- Wildlife trade must be addressed at every link in the trade chain if enforcement agencies and officers are to maximise their opportunities to detect and have a legal basis for prosecution. Currently, the legal systems in the various countries of the region do not adequately cover all of the links, leaving gaps that can be exploited by criminal gangs. Reviews are needed to help (a) ensure that each country has a full set of laws covering all the key stages in the illegal wildlife trade chain, and (b) to the greatest extent possible, laws are harmonised across borders, making sharing of information and collaboration between law enforcement agencies easier. The legal analyses conducted by CIC-FAO[143] provide a foundation for region-wide harmonisation of wildlife trade-related legislation. Legal elements that need review and harmonising include illicit possession, transportation, labelling, aiding and abetting, falsification of documents, advertising (online or in print), and import and export. Other elements that need development include (i) predicate offences[144] in organised crime, (ii) anti-money laundering and anti-terrorism financing legislation that specifically or generally apply to wildlife crimes.
- There is some support at government level for action on the illegal trade, especially where it threatens iconic species. Promising approaches to addressing the problem include (i) the now complete ban on snow leopard trade in all Central Asian countries; (ii) also for snow leopard, the creation of SLAWEN, designed to improve inter-agency and cross-border communication, and (iii) an increase in fines for poaching generally (however this has not yet happened across all countries).
- Many wildlife crimes are not successfully prosecuted because of poor handling of evidence collection and case presentation. In some cases, this is an issue of inadequate capacity in the agencies concerned, in others a lack of clarity on the necessary protocols. Official protocols are needed to cover (a) proper handling and preservation of evidence from point of seizure to prosecution, (b) use of 'controlled deliveries'[145] to find and prosecute smuggling rings, and (c) agreements for cross-border information sharing and enforcement.
- Limited resources and capacity limit the effectiveness of the response to wildlife crime. Amongst other things, enforcement personnel need to be trained in the identification of illegal wildlife products. One approach is a mobile app – Wildlife Alert – that has been created for military personnel in Afghanistan to help them avoid buying illegal wildlife trade products[146].
- The inclusion of communities has proved effective in enforcement efforts. A programme in Afghanistan has supported the deployment of community-based rangers inside a protected area. There are also examples of the work of community rangers from northern Pakistan (South Asia chapter) outside protected areas.

(141) López-Hoffman L., R. Varady, K. Flessa and P. Balvanera (2010). Ecosystem services across borders: a framework for transboundary conservation policy. Frontiers in Ecology and the Environment 8, pp. 84-91.
(142) See CMS-CAMI Activities at http://www.cms.int/cami/en/activities-cami

(143) Morgera E. et. al. (2009) Op. cit.
(144) Predicate crimes are illegal acts which fall under the purview of a wider body of law that are addressed by specialised criminal statutes, such as organised crime, money laundering and terrorism financing.
(145) An enforcement technique that allows for known illegal shipments to pass customs while being tracked to a final delivery, allowing enforcement personnel the opportunity to identify and enforce the law against more of the people involved in the trade chain.
(146) See https://apps.wcswildlifetrade.org

Measuring the paw width of a snow leopard that has been captured to be fitted with a satellite collar and released, Sarychat-Ertash Strict Nature Reserve, Kyrgyzstan. Tracking using satellites allows scientists to study the leopards' movements over large areas of inhospitable terrain, making a vital contribution to planning protected areas and efforts to control poaching.

4.5 Trophy and market hunting

Trophy and market hunting are separate practices. Trophy hunting targets large, iconic species in demand from a particular segment of the hunting market (e.g. argali, Siberian ibex and markhor). Fees are typically high. Market (or commercial) hunting is the hunting of wild fauna to supply particular local or international markets. This could include anything from hunting marmots for fur coats, or saiga antelope to trade their horns on the traditional medicine market. Market hunting for subsistence, domestic and international markets is a more important conservation issue than trophy hunting.

- Off-take for trophy hunting alone is not the most significant threat to central Asian mammals, and it has the potential to contribute to conservation if well planned and managed. Creating a successful and sustainable programme is complicated, however, and, in reality, benefits often flow to the commercial entities operating concessions and the government's overall finances, with negligible amounts reinvested in species' conservation and management.[147] However, there are positive examples for this in the region.
- Any form of commercial hunting should be transparent, accountable and equitable, and promote the socio-economic well-being of those living with the natural resource. Legal hunting should always involve local communities in implementation and management and offer them a fair share of the benefits. These conditions are a pre-requisite to gain the communities' support, promote sustainability and co-management, and limit the illegal offtake by local people.
- Although conservation through trophy and market hunting mechanisms can provide an incentive to control poaching in a landscape, it may not benefit species that are not the targets of hunting. This applies especially to predators, and indeed the management for the target species may compete with threatened predators such as snow leopards. Engagement with communities managing concessions on their management plans or to provide incentives for conservation measures is a potentially effective way to broaden conservation efforts.
- Few species are monitored regularly or with sufficient accuracy to provide a population baseline and assess population trends. Without this information, it is difficult to be sure that hunting is sustainable, even where effective management is in place and operating adequately. Development of practical monitoring methods that yield sufficiently good data is a priority need.
- There are cases where traditional management practices approximate to conservation management. On the Caspian Sea coast of Iran, traditional hunters trap water birds using nets. For decades, these communities have conserved the wetlands where they hunt, regulating their own off-take, strictly excluding shotgun hunters and controlling poaching. As a result, these wetlands are among the most important in the area, hosting the largest winter waterfowl aggregations in the region, including the last individuals of the critically endangered western population of Siberian crane.

(147) See Rosen T. (2012). Op. cit.; see also Wingard J.R. and P. Zahler (2006). Op. cit.

4.6 Civil society organisations

The countries of the region are considered to be 'in transition' from centrally controlled to more liberal economies encompassing aspects of the free market and democracy. Overall this has been accompanied by an increasingly supportive legal environment for CSO activity and an increase in the number of CSOs, though some restrictions remain. International agencies and donors view civil society as having an important role in political and social transition, and have looked for opportunities to support their development, including in the environmental field.

With some exceptions, CSOs in the region suffer from being urban based, remote from the communities they serve, poorly funded and with limited technical capacity. However, there are an increasing number of examples of community-based organisations successfully engaged with conservation, as well as some well-established and effective national NGOs. Partnerships between local community-based organisations, national CSOs, international NGOs and government agencies are key to effective conservation interventions. Many CSOs also lack the capacity to effectively develop and conduct media campaigns.

4.7 Biodiversity conservation research

Thanks to the Soviet science sector's practice of collecting intensive biological inventory data, Central Asia had a strong history of biodiversity monitoring. However, much of that information was lost following the Soviet collapse, and funding for monitoring and research was greatly reduced.

- Monitoring and research is widely recognised as critically important to the design and development of biodiversity conservation interventions, and all of the countries in this assessment have dedicated governmental funding for science and some formal institution responsible for major research into biodiversity. Nevertheless, funding for basic work to provide accurate baselines and ongoing trend assessments is inadequate. Many priority research and monitoring needs are not being addressed, and others are only covered because of the support of foreign-based NGOs (e.g. research on saiga conservation in Kazakhstan funded by Frankfurt Zoological Society, on snow leopard in Kyrgyzstan and Tajikistan supported by the Snow Leopard Trust and Panthera, and on argali and snow leopards in Afghanistan by the Wildlife Conservation Society).
- There is a lack of data sharing and publication of the research results. Obstacles include the highly top-down approach to scientific study in much of Central Asia, a consequence of Soviet-era academic practices; a lack of mechanisms for peer review; and an administrative culture that does not demand analysis that meets international standards.
- Capacity to engage with international conservation biology is growing, but still limited. Obstacles include language difficulties and limited opportunities to study abroad or otherwise interact with international science.

4.8 Private sector

While there are a number of examples of corporate support to conservation activities (section 3.4), greening of business practices is limited. The following are key lessons and approaches.

- There is considerable potential to scale-up and replicate the existing positive examples of private sector support to conservation. The best practice examples set by leading companies may be a basis for setting standards for industry as a whole. Government has a key role to play, setting standards and creating an environment where companies that support CSR and green their business practices benefit from doing so. There is also a need to regulate the engagement of companies to avoid conflict of interest (for example where a corporate supports conservation activity by an agency which also has regulatory or licensing powers).
- Priority concerns that need to be addressed as part of the greening of business practice include (i) the needs of migratory species and the impacts of linear infrastructure, and (ii) the loss of wetlands and temperate grasslands (both critical for a range of ecosystem services) as a result of overuse of water for irrigation and overstocking of domestic animals (e.g. the Sistan/Hamun Wetlands).
- Renewable energy is an important potential growth area for the green economy. Kazakhstan, for example, has been identified for its wind energy potential; Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan are all considered good prospects for solar energy; and Kyrgyzstan's small rivers present hydropower potential[148]. There is a need for further research in these areas, as well as development of policies and plans to create a foundation for investment.

(148) Morgera E. et. al. (2009). Op. cit.

5

Strategic approaches

Starostin's loach is a blind cave-fish restricted to caves in the Koytendag mountains in Turkmenistan. Cave fish are highly vulnerable to any disturbance or pollution which affects that specialised habitat.

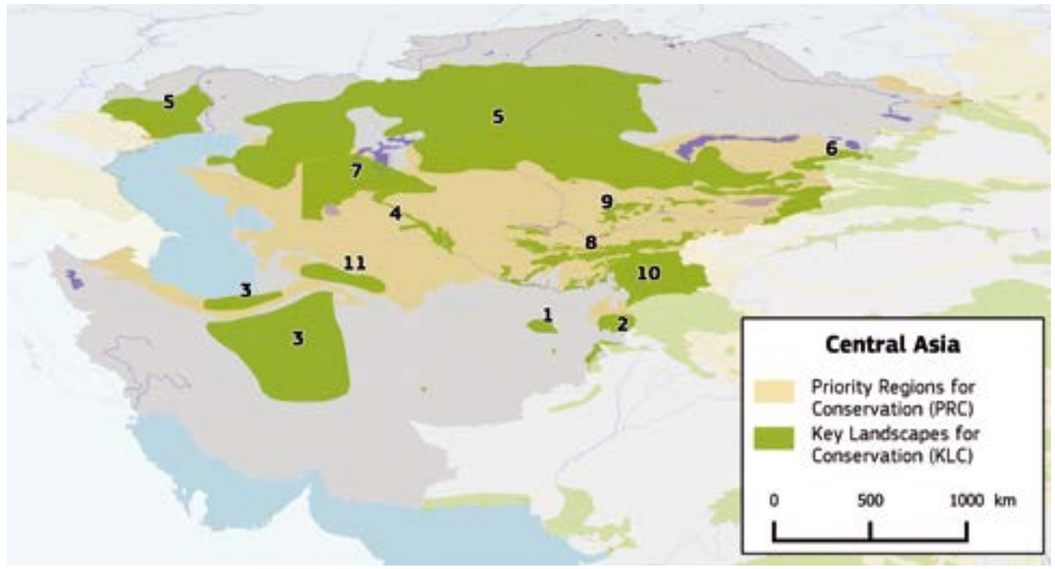
5 _ Strategic approaches

5.1 Priority geographies

Biodiversity and ecosystems are not distributed evenly across Central Asia. While the priority regions for conservation (PRCs, see section 1.2.4) help to define the most important parts of this huge area, key landscapes for conservation (KLCs) are identified to highlight smaller, landscape-level priorities, which are of particular importance for conservation. KLCs should be considered as priorities for the funding of conservation-related actions and should also be areas where potentially damaging projects (particularly infrastructure and large-scale land-use change) should be subject to specific scrutiny for biodiversity impacts.

The definition of KLCs relies on existing analyses, which are only as good as the available data, so there could be important areas that are not included. In addition, large-scale maps do not effectively capture linear ecosystems (e.g. rivers) or fragmented ecosystems (e.g. karst).

Figure 5.1 Priority regions for conservation and key landscapes for conservation in Central Asia (see Table 5.1 for details)



5.1.1 Identifying KLCs in Central Asia

Due to the relative lack of regional priority-setting approaches toward biodiversity conservation in Central Asia, the KLCs for this region were determined through a combination of factors.

Key biodiversity areas have been identified for the mountainous eastern part of the region, which falls within the Mountains of Central Asia biodiversity hotspot (see section 1.2.4). This includes parts of eastern Kazakhstan, the extreme east of Uzbekistan and Turkmenistan, the Wakhan-Pamir valley in Afghanistan, and all of Kyrgyzstan and Tajikistan. The KBA analysis was combined with analysis of Snow Leopard Conservation Units and Snow Leopard Landscapes. KLCs 1 (Afghanistan Wakhan Pamir and Hindu Kush), 6 (Kazakhstan mountains), 8 (Uzbekistan foothills and mountains), 9 (Kyrgyzstan foothills and mountains) and 10 (Tajikistan foothills and mountains) were primarily defined using this data set.

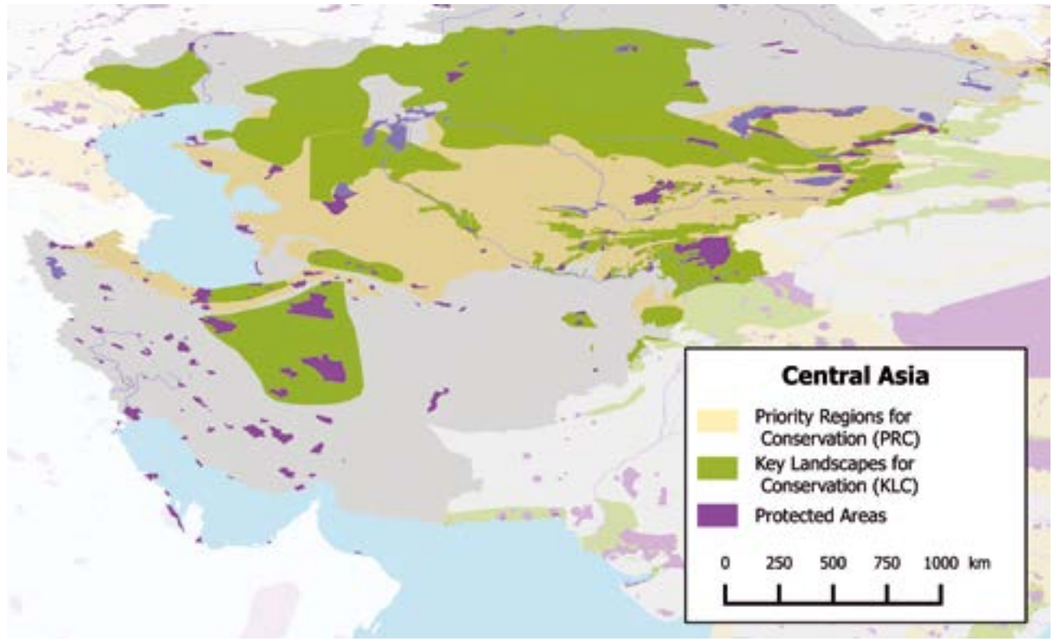
The remaining KLCs were identified through a combination of previous international and national faunal and floral assessments and input from regional experts during consultations[149]; these included critical forest cover areas (e.g. mountain conifer, fruit trees, tugai), critical species areas (e.g. saiga) and critical wetland areas (e.g. important bird areas). Particular efforts were made to ensure that coverage included the full complement of ecosystems in the Central Asia region, including steppe, desert, wetlands and the various diverse forest communities found in the region. KLCs defined in this way (though KBA, SLCU and Snow Leopard Landscapes data were also used in some cases) were number 2 (Afghanistan Eastern Forest Complex and Wetlands), 3 (Iran Mountains and Desert), 4 (Bukhara-Tugai Woodland), 5 (Kazakhstan Steppe and Semi-Desert), 7 (Uzbekistan Steppe, Semi-Desert and Desert) and 11 (Turkmenistan Mountain, Desert and Steppe).

5.1.2 List of KLCs in Central Asia

The total area identified as KLCs is over 1.8 million km², 30 % of the total area of the countries covered in this chapter. Further details are in Tables 5.1 and 5.2.

Only about 7 % of the area identified as KLCs is within protected areas. Table 5.2 presents a summary of protected area coverage by KLC group and country.

Figure 5.2 Protected area coverage of KLCs in Central Asia



[149] In-country consultations for this assessment included Iran, Afghanistan, Kyrgyzstan, Tajikistan and Kazakhstan. Other regional experts were consulted at regional meetings (e.g. CMS CAMI in Vilm Germany; CEPF consultation events) or via phone or email.

Table 5.1 List of KLCs in Central Asia

# on map	KLC group	KLC name	Country	KLC size (km²)	Special significance
1	Afghanistan Wakhan Pamir and Hindu Kush Watersheds	Wakhan	AF	10 950	Key landscape for snow leopard, Marco Polo sheep (argali ssp.); also ibex, urial, wolf, brown bear. Headwaters of Amu Darya and other major rivers for region.
		Central Highlands	AF	8 575	
		Dashte-Nawar	AF	375	
		Northern Hindu Kush	AF	13 293	
2	Afghanistan Eastern Forest Complex and Wetlands	Eastern Forest Complex	AF	20 936	Important montane conifer forest with deodar cedar, pine, spruce, fir. Unusual boreal/ Himalayan/ Asiatic mix of species includes snow leopard, common leopard, markhor, musk deer, Asiatic black bear, yellow-throated marten, leopard cat, palm civet. Wetlands and riparian areas host numerous threatened bird species and large numbers of migratory birds.
		Imam-Sahib-Darqad	AF	1 210	
		Hamun-i-Puzak	AF	438	
3	Iran Mountains and Desert	Dashte-Kavir	IR	270 572	Desert region home to last remaining Asiatic cheetah as well as gazelle spp., wild ass, houbara bustard, Pleske's ground jay. Montane regions hold urial, Persian ibex, common (Persian) leopard, brown bear, Persian fallow deer. Hyrcanian region has rare sub-tropical beech/oak forests with high biodiversity.
		Caspian Hyrcanian Forest	IR	23 382	
		Kopet Dag	IR	15 214	
4	Bukhara-Tugai Woodland	Bukhara-Tugai Forest	KG	203	Critical habitat for Bukhara deer; waterways are key regional habitat for otter, jungle cat, waterfowl, migratory birds, sturgeon spp. and other fish species.
		Bukhara-Tugai Forest	TJ	7 096	
		Bukhara-Tugai Forest	TK	10 378	
		Bukhara-Tugai Forest	UZ	20 890	
5	Kazakhstan Steppe and Semi-Desert	Ural Steppe	KZ	87 284	Contains the majority of world population of saiga antelope and major populations for threatened great bustard and sociable lapwing, as well as at least six species of eagles. Wetlands of critical importance to breeding and migratory waders and waterfowl (e.g. white-headed duck).
		Ustiurt/Betpak-Dala	KZ	1 010 430	
6	Kazakhstan Mountains	Zhungar Alatau	KZ	16 624	Over 2 500 plant species; mid-elevations dominated by extensive spruce forests. Home to important populations of snow leopard and threatened argali subspecies. Lakes important to threatened endemic fish and bird species such as Dalmatian pelican, relict gull.
		Northern Tien Shan	KZ	26 380	
		South Altai	KZ	1 652	
		Ugam-Chatkal/West Tien Shan	KZ	927	
		Borolday	KZ	333	
		Kyzylkol	KZ	42	
		Chokpak	KZ	102	
		Karatau	KZ	428	
		Tolebi	KZ	151	
		Merke-West Tien Shan	KZ	709	
		Altyn-Emel	KZ	5 296	
		Charyn Park-Toraygyr	KZ	2 577	

Table 5.1 (continued)

# on map	KLC group	KLC name	Country	KLC size (km²)	Special significance
7	Uzbekistan Steppe, Semi-Desert and Desert	Ustyurt Uzbekistan	UZ	122 107	Key landscape for saiga antelope; deserts important for saxaul woodland, sand cat, houbara bustard, reptiles (tortoise, agamids, lacertids, etc.).
8	Uzbekistan Foothills and Mountains	Hissar-Allay-Gisar	UZ	5 633	Relict walnut forests, pistachio. juniper; westernmost population of snow leopard, Menzbier's marmot, mark-hor, ibex, argali (Severtzov's); urial and perhaps leopard found in other ranges.
		Alaykuu-Allay-Gisar	UZ	1 473	
		Talimarjan Reservoir	UZ	859	
		Northern Nuratau	UZ	2 952	
		Nuratau	UZ	1 048	
		Western Zeravshan	UZ	1 276	
		Dalverzin	UZ	40	
		Pskem Basin	UZ	2 834	
		Akbulak Basin	UZ	717	
		Bashkyzylsay Basin	UZ	174	
		Karabau Dukentsay	UZ	348	
		Kugitang Baysuntay	UZ	2 000	
		Angren Plateau	UZ	775	
9	Kyrgyzstan Foothills and Mountains	Northern Tien Shan	KG	17 101	Foothills are important sites for walnut and ancestral fruit tree woodlands. High mountains hold fir forests and important populations of snow leopard, argali, ibex, brown bear; rivers and lakes contain unique assemblages of fish species.
		Besh-Aral	KG	975	
		Kassan-Sai	KG	831	
		Leilek	KG	65	
		Son-Kul Lake	KG	350	
		Chatyr-Kul Lake	KG	247	
		Alai valley	KG	1 266	
		Shekaftr	KG	1 271	
		Chatkal valley	KG	746	
		Aflatun	KG	657	
		Besh-Tash	KG	542	
		Chychkan	KG	348	
		Nyldy	KG	164	

Song Kol lake, Kyrgyzstan, lies at over 3 000 m above sea level, and is the largest freshwater lake in the country. The lake is listed as a site of international importance under the Ramsar Convention because of its significance for migratory waterbirds. Pressures include poorly managed tourism.

Table 5.1 (Continued)

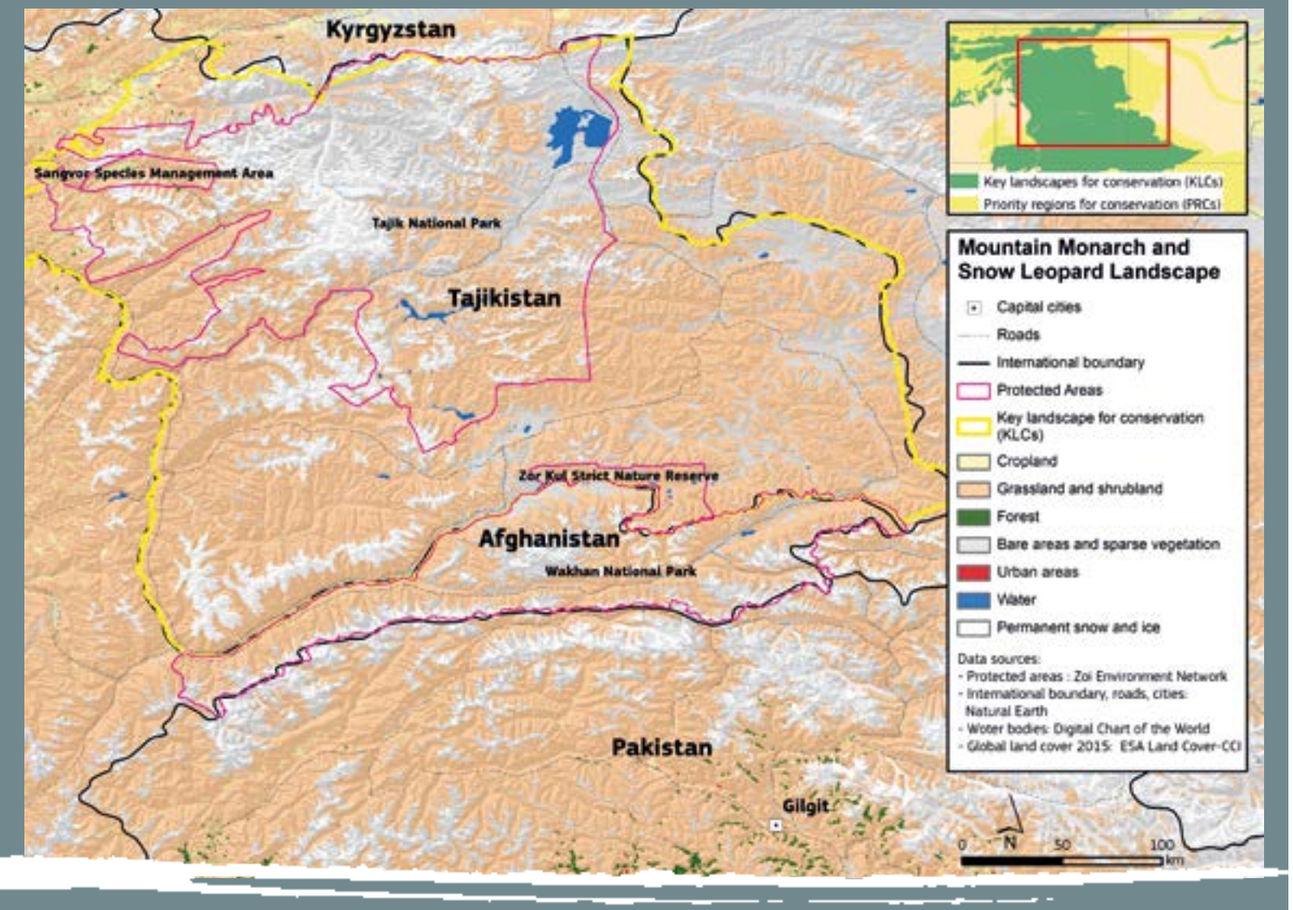
# on map	KLC group	KLC name	Country	KLC size (km²)	Special significance
10	Tajikistan Foothills and Mountains	Tajik-Pamir	TJ	69 227	Globally important markhor range; also home to snow leopard, argali, ibex, urial, brown bear. Foothill forests still contain remnant woodlands of walnut, apple, pear and other native fruit and nut trees.
		Alaykuu-Allay-Gisar	TJ	15 130	
		Tavildara	TJ	2 228	
		Asht	TJ	335	
		Kayrakum	TJ	647	
		Romit	TJ	734	
		Kushvoristan	TJ	915	
11	Turkmenistan Mountain, Desert and Steppe	Tallymerjen	TK	1 675	Deserts host gazelles, wild ass, urial, wild goat, a complex community of small mammals including jerboas, jirds, ground squirrels, piebald shrew, etc. and high reptile diversity (lizards, snakes, tortoise). Important bird species include houbara bustard and Pander's ground jay.
		Koytendag	TK	730	
		Kopet Dag	TK	16 765	

Argali (Marco Polo sheep), Tajikistan. Conservation of wide-ranging species requires landscape approaches, which engage local communities, private sector and government to find ways to integrate ecosystem conservation and economic activity. Many landscapes are transboundary, so need international cooperation for their protection.

Table 5.2 Protected area coverage of KLCs in Central Asia

Map #	KLC group name	Area covered by protected areas (km²)[i]	% of total area covered by protected areas	Important protected areas
1	Afghanistan Wakhan Pamir and Hindu Kush Watersheds	19 152	34.44	Wakhan National Park, Band-e-Amir National Park
2	Afghanistan Eastern Forest Complex and Wetlands			(no data)
3	Iran Mountains and Desert	47 502	15.36	Touran Biosphere Reserve, Miandasht Wildlife Refuge, Naybandan Wildlife Reserve, Bafgh National Park, Miankaleh Wildlife Refuge, Kavir National Park, Golestan National Park, Central Alburz Protected Area
4	Bukhara-Tugai Woodland	no data	no data	(no data)
5	Kazakhstan Steppe and Semi-Desert	30 629	2.66	Naurzum Nature Reserve, Ustyurt Nature Reserve, Altyn Dala Nature Reserve
6	Kazakhstan Mountains			Imaty Nature Reserve, Ile-Alatau National Park, Aksu-Jabagly Nature Reserve
7	Uzbekistan Steppe, Semi-Desert and Desert	6 703	4.08	Saigachy Nature Reserve
8	Uzbekistan Foothills and Mountains			Ugam-Chatkal National Park, Zaamin National Park, Chatkal Nature Reserve, Kitab Nature Reserve, Kyzylkum Nature, Nurata Nature Reserve, Surkhan Nature Reserve
9	Kyrgyzstan Foothills and Mountains	3 216	6.56	Sary-Chelek Nature Reserve, Ala Archa National Park, Sarychat-Ertash Nature Reserve, Besh Tash National Park, Issyk Kul Nature Reserve, Naryn Nature Reserve, Chong-Kemin National Park
10	Tajikistan Foothills and Mountains	29 335	30.46	Pamir National Park, Zorkul Nature Reserve, Ramit Nature Reserve, Tigrovaya Balka Nature Reserve
11	Turkmenistan Mountain, Desert and Steppe	3 024	10.23	Repetek Nature Reserve, Hazar Nature Reserve, Bathyz Nature Reserve, Köpetdag Nature Reserve, Sünt-Hasardag Nature Reserve, Gaplaňgyr Nature Reserve

i 'Protected areas' are PAs listed on the World Database of Protected Areas and classified as IUCN categories I-IV.



Box 1 _ The transboundary Pamir and Hindu Kush (KLC 10)

The transboundary Pamirs and northeast Hindu Kush, also known as the Roof of the World, cover approximately 85 000 km2 of ecologically interconnected biomes in eastern Afghanistan and Tajikistan. The area includes a great variety of mountain habitats in the most pristine part of the Central Asian highlands, ranging in altitude from 650 m in southern Tajikistan to 7 500 m in the Wakhan corridor of Afghanistan. It is home to an abundant and stunning diversity of wildlife, including an estimated 450 snow leopards, one of the highest densities of the species known anywhere; the largest known population of argali sheep and among the densest populations of markhor and Siberian ibex in the world.

Despite its remoteness and low human density (average 4-5 people/km^2) the area has seen a 50 % increase in livestock numbers over the last 15 years. Combined with lower mobility of flocks, this has resulted in overgrazing of winter pastures and an increase in the transmission of disease from livestock to susceptible wildlife. Poaching for subsistence or trade has also increased, as well as shrub and fuelwood collection. To preserve this very valuable habitat and its natural resources, Afghanistan has created a national park in Wakhan based on a model of co-management with communities, while Tajikistan has authorised the creation of private or community-based conservancies relying on sustainable hunting and tourism to protect wildlife. Finally, the Pamirs and Hindu Kush have been identified as one of the places in Asia most at risk from the negative effects of climate change, a threat for which the people living in the area remain largely unprepared. Approximately 320 000 people belonging to at least 9 ethnic groups inhabit the area, along with their approximately 550 000 head of livestock.

Priority interventions include: continue supporting and scale-up community-based conservation initiatives; improve the co-management of Wakhan National Park, upgrade the knowledge of conservation staff and their professional qualifications; develop protocols for coordination between multiple management and enforcement agencies to ensure that all the authorities support conservation actions, and are deterred from participating in illegal activity and co-opted into supporting enforcement activities; develop sustainable rangeland and woodland management actions, mitigate the risk of disease transmission from livestock, and build long-term resilience to the deleterious effects of global warming.

5.2 Strategic approaches to addressing the main pressures on biodiversity and ecosystems

5.2.1 Improve the management of protected areas and strengthen the network

Governments in the region have put in place some 497 PAs covering 352 164 km^2 (section 3.1.2). However, at 5.6 % of the land area, this coverage is less than half the world average (14.8 %). Furthermore, PAs were not created based on a systematic assessment of biodiversity values and protection needs. Also, the existing PAs often lack financial support and staff, and so are not effectively protected. As a result, important species and habitats remain inadequately protected. Recent efforts have begun to address this situation, but in some instances (e.g. Afghanistan) work only started in the past few years. PA support activities remain highly dependent on donors and CSO support. An increased national and international effort to develop a comprehensive protected area network remains a priority to maintain the unique natural heritage of Central Asia, its potential to contribute to local livelihoods and sustainable economic development, and to mitigate global climate change.

Short-term actions should focus on improving the management of existing PAs, especially in response to urgent threats, as well as laying the foundations for the expansion of the PA system.

- Provide support to improved management effectiveness for existing PAs, including (a) updating management plans; (b) upgrading staff numbers and their professional qualifications; (c) ensuring the staff are appropriately paid and provided with essential equipment and facilities; (d) maximising the effective use of resource for enforcement through continued use of the SMART[150] approach (e.g. in Afghanistan, Kazakhstan and Uzbekistan); (e) developing protocols for coordination between multiple management and enforcement agencies to enable collaboration. Involve existing training institutions (e.g. the Central Asia University) and build their capacity to act as training providers.
- Assess the internal zoning and resource-use rules applied in existing PAs, especially in the light of new information and monitoring results. Where necessary, encourage reviews and changes to maximise both conservation impact and opportunities for generating economic returns from PAs.
- Promote expansion of the formal protected areas system, based on (a) a system-wide analysis to determine where the highest conservation impacts can be achieved, including the use of the newly developed key biodiversity areas analysis for the Mountains of Central Asia hotspot; (b) an assessment of the challenges and opportunities including local communities' perceptions, and government capacity; and (c) an analysis examining the economic case for the expansion, including opportunities for PAs to contribute to local livelihoods and the regional economy.
- Support establishment of baselines and improved monitoring of the social and biological aspects of PAs, to contribute to management and conservation planning and to measure the impact of the PA on livelihoods. Key needs are strengthening the capacity to design and use monitoring programmes, along with the essential equipment and funding.
- Support establishment and improved management of protected areas in key wetland systems that are heavily threatened and at risk of permanent damage.

In the medium to long term, the priorities should be (a) to build cooperation with stakeholders around the PAs and across international boundaries, to address the conservation of wide-ranging species and the landscapes upon which they depend, and (b) continue to strengthen the management of protected areas by addressing institutional and funding weaknesses.

- Building on initial successes in the region and in Pakistan, enhance the formal involvement of local communities in management decision-making and implementation.
- Support government agencies to increase the number and capacity of enforcement personnel. Adapt and scale-up existing field staff training modules (e.g. community rangers in Afghanistan). Support a region-wide SMART rollout in selected protected areas through training, sharing and lessons learned.
- Identify and develop long-term PA funding mechanisms. Build up the funding base from government, but also explore and develop other revenue-generating mechanisms including corporate sponsorships, earmark receipts from trophy hunting and ecotourism for PAs, and develop conservation trust funds and public-private partnership mechanisms for PA management. Identify opportunities to expand or replicate existing examples of income-generating programmes.

5.2.2 Scale up landscape and species-based approaches to conservation outside protected areas

Central Asia and adjacent parts of East Asia (e.g. the Mongolian steppe) are unique in the context of the Larger than Tigers report series in that they still contain intact wilderness landscapes, with minimum human footprint and enormous areas of habitat. These habitats support species that practise long

(150) Spatial Monitoring and Reporting Tool, http://smartconservationtools.org

migrations and require large areas (e.g. species of antelope and gazelle) or rely upon transboundary areas (e.g. snow leopards on the mountain ranges that are often country borders). In this context, protected areas alone are too small to conserve viable populations or the entire area used by some species. Since large areas remain relatively intact, there is a time-limited opportunity to put in place governance mechanisms to sustainably manage them and the impacts of land-use change and large-scale developments. Key areas for action are (a) landscape-scale conservation planning, (b) disease management and (c) transboundary cooperation.

The following are strategies to strengthen landscape-scale conservation management.

- Put in place systems for essential monitoring and research to improve understanding of key threats to species.
- Engage communities and local governments in conservation efforts, including through initiatives to decentralise management of natural resources and pastoral systems to them, while building their capacity to manage. As part of these efforts, learn lessons from existing successful examples of community-based conservancies in Tajikistan and Kyrgyzstan, which use revenues from hunting and tourism to build support for conservation within the communities. Replicate and scale-up these initiatives, where appropriate, across the region (see also section 5.2.4).
- Evaluate the potential for value-added supply chains for local commodities (e.g. pistachio, yak wool), as a mechanism to engage local communities in sustainable landscape management and provide local economic opportunities. Develop pilot projects.
- Mitigate the impacts of infrastructure developments that bisect key landscapes, working through environmental planning and safeguard mechanisms, and through the implementation of the CMS Guidelines for Linear Infrastructure.
- Work with government, the private sector and communities to mitigate the impacts of dams and irrigation programmes on critical wetlands and restore these wetlands where possible.
- Increase the ability of civil society and government to use the media to communicate key information on sustainability and biodiversity.

Disease is a significant threat to the region's wildlife, with important impacts on community livelihoods and the economy. Action is needed to limit the spread of disease (e.g. PPR and CCPP) between domestic livestock and wild sheep and goats.

- Research, identify and map outbreaks to better understand and predict the spread of the disease and thus identify key areas for intervention. Develop disease risk and transmission models that will support the identification and engagement of all the relevant stakeholders and the application of integrated disease management strategies.
- Facilitate field missions in each key landscape to evaluate the exposure level of livestock and, where possible, wildlife to PPR, CCPP and other infectious diseases of importance to the region (e.g. brucellosis).
- Investigate intervention options in key landscapes that may include (a) livestock vaccination, (b) geographical separation of wildlife from infected livestock to limit contact, and/or (c) improved range conditions to nutritionally support immune responses to exposure.
- Develop a rapid response network of veterinary experts across the region to be able to respond quickly and effectively to outbreaks, including collecting data and identifying potential mitigation measures.
- Create a health information network to share important information with relevant stakeholders.
- Develop integrated approaches for disease research and management at agency and ministry levels.
- Train young scientists and future leaders in the agricultural, environmental and health sectors in an integrative and trans-disciplinary (or multidisciplinary) approach to study and manage PPR and other diseases at the livestock/wildlife interface.
- Build a transboundary programme across this region to track, test, train and create a rapid response network with government partners, as well as develop pastoralist responses and mitigation activities, to slow and halt the spread of these diseases.

International cooperation is critical to conservation efforts in Central Asia because of the many transboundary ecosystems and wildlife populations in the region. International action has been initiated for some species and ecosystems through a series of regional initiatives, such as those developed under CAMI, including the species' action plans (e.g. Argali Action Plan) and medium-term programmes of work (e.g. Saiga Antelope Memorandum of Understanding; Bukhara deer Memorandum of Understanding), and the Global Snow Leopard and Ecosystem Protection Program (GSLEP). These plans have been developed by regional experts and await support for implementation. Specific actions in support of these plans include the following for priority areas.

- Develop cooperation agreements;
- Adapt funding mechanisms that target transboundary landscapes;
- Support exchanges between neighbouring areas;
- Build on the foundations established by existing/past projects (e.g. the Pamirs Transboundary Initiative between Afghanistan, China, Pakistan and Tajikistan).

Rangers in the Korghalzhyn Nature Reserve, Kazakhstan. Improved protection has reduced illegal waterbird hunting, fishing and burning. The success is a result of improved enforcement combined with efforts to create alternative, sustainable livelihoods for local people.

5.2.3 Intensify efforts against illegal poaching and wildlife trade

Until recently, wildlife crime has received less attention in Central Asia than in adjacent regions. The obstacles to effective control are similar to other parts of Asia and include a lack of sustained political commitment, problems with enforcement (inadequate capacity, cross-border collaboration and legal frameworks), few prosecutions and uncontrolled demand.

A key short-term need is to raise awareness and commitment to address the problem among policy- and lawmakers.

- Work to raise awareness of the illegal wildlife trade and the economic damage it does, working at all levels of government, local communities and the public at large. Advocate concrete government action, including safeguards and punishments for poaching by government officials and other state employees, and action against corruption by ensuring that enforcement staff are adequately rewarded and supervised. Strengthen regional cooperation through mechanisms such as ICCWC.

In the medium term, the development of stronger legal frameworks and institutional capacities for effective monitoring and enforcement will be key to progress.

- Adapt and scale up existing training programmes for field staff and police, customs, the judiciary and other law enforcement officials. Ensure that field personnel are able to correctly identify wildlife products and properly handle the entire process of seizing wildlife as evidence for later use in prosecutions. Put in place support services to provide on-going support and outreach to agencies implementing wildlife trade laws.
- Support the upgrading of legal mandates for enforcement and prosecution along the entire illegal wildlife trade chains. An initial assessment and prioritisation of critical gaps in the regulations may be necessary in some countries. This involves analysing the following aspects of each country's framework: (i) the ability to improve, hinder or prevent effective actions covering all points in the trade chain (including poaching, domestication, pet trade, online trade, air and rail transportation); (ii) the powers and responsibilities of enforcement authorities (including police, customs, government and community rangers) related to

Hunter in the Tien Shan mountains, Kyrgyzstan. Trophy hunting has the potential to generate income for local communities and provide an incentive for biodiversity conservation. However, careful management is necessary to ensure that off-take is sustainable.

reporting, inspection, detention, seizure, arrest and conducting controlled deliveries); (iii) coordination, reporting and information sharing; and (iv) the rules that support effective prosecutions (including protocols for securing and producing evidence and sentencing requirements).

- Promote greater data sharing on illegal wildlife trade, including for example expanding or replicating the SLAWEN approach to cover more than just snow leopard. Data sharing should include new forms of information that is becoming available through the use of new technologies, such as DNA assessments for cross-referencing against seizures and evidence gathered from the use of the SMART system.

Long-term efforts against the illegal wildlife trade involve strengthening national legislation and the role of Central Asian countries in international institutions.

- Provide support for Central Asian governments to enable them to participate more effectively in key international agreements on wildlife (e.g. CITES, CMS, Ramsar, WHS), and also to introduce wildlife trade issues into other international agreements, such as free trade arrangements.
- Encourage the implementation of commitments under international agreements at national level. This might include reviewing the current implementation status of these agreements, ensuring full functionality of the CITES Management and Scientific Authorities, and compiling data on trade to inform management and enforcement policies.

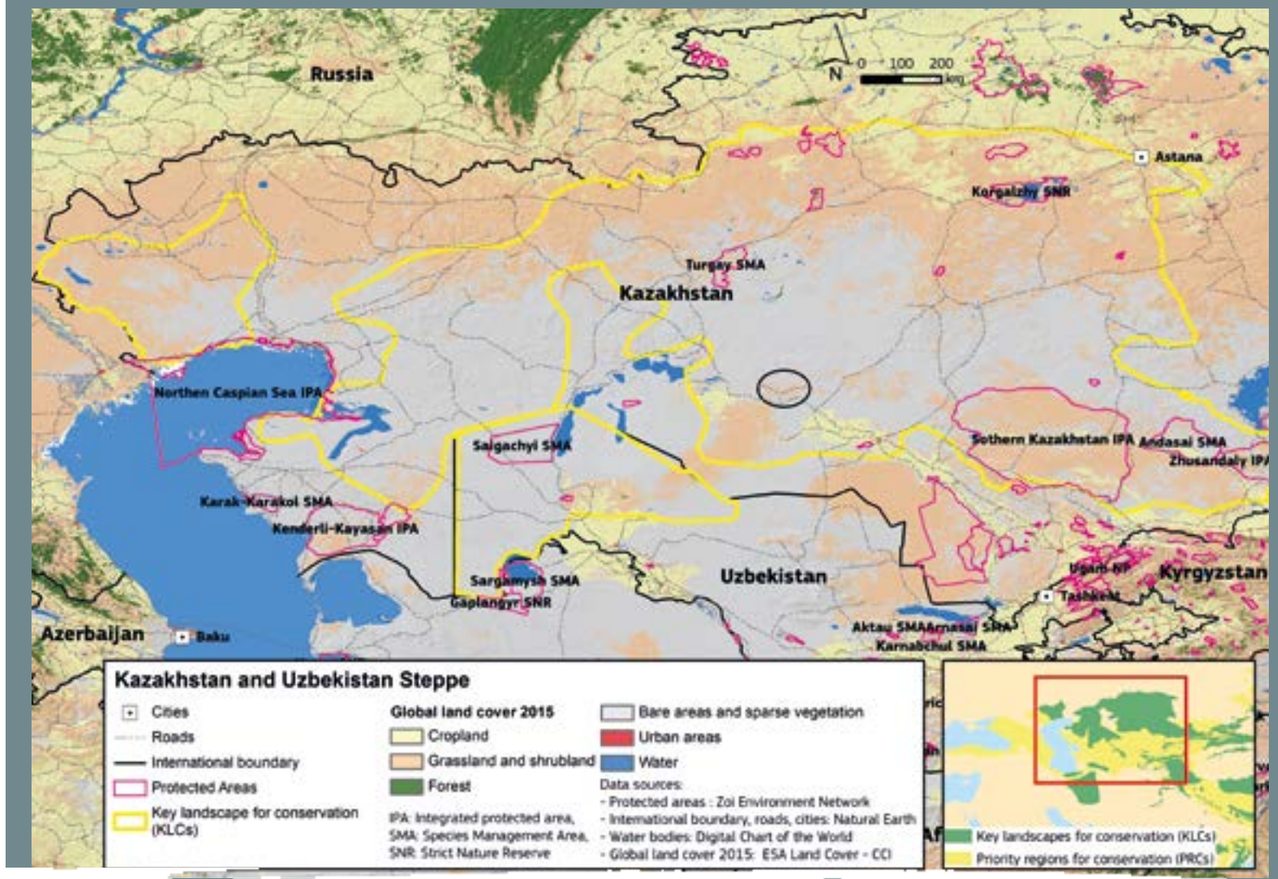
5.2.4 Ensure that trophy and market hunting is sustainable

The management of trophy and market hunting continues to be a major challenge in the region. Market hunting may be a particular problem, because it is more likely to act as a conduit for illicit trade and because the larger offtakes are likely to have greater impacts on the targeted wildlife population. For both types of hunting, weak enforcement and lack of funding have resulted in a substantial decrease in active management, and this has led to rampant poaching and efforts to make the resource pay for itself by, for example, promoting trophy hunting or setting high quotas despite unknown or decreasing populations[151]. This situation is leading to the decline of species populations and loss of income. However, hunting and trade are also opportunities that, if properly managed, can provide long-term economic incentives for conservation. Regulated hunting systems also provide a valuable mechanism to involve local communities in the management of species' populations and provide them with a share in the benefits of sustainable management.

In the short term, the greatest need is to assess key efforts that offer solutions to sustainable, community-based approaches, which might be replicated or scaled up.

- Carry out a thorough review of trophy hunting programmes across the Central Asia region. The review should include bottlenecks (such as legislative gaps, poor management

([151]) Morgera E. et. al. (2009). Op. cit.



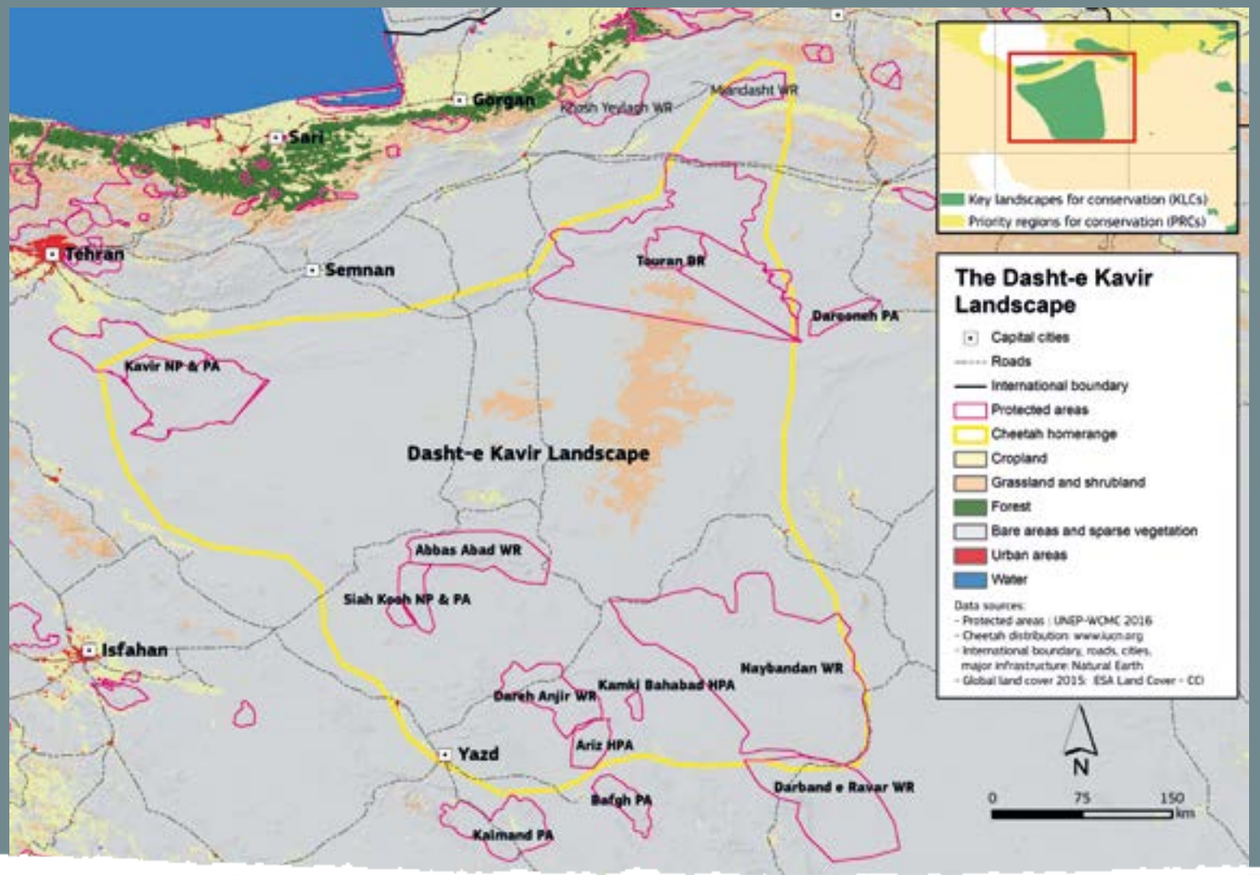
Box 2 _ Kazakhstan/Uzbekistan steppe (KLCs 5 and 7)

The temperate grasslands and deserts extending across Kazakhstan and Uzbekistan are massive conservation landscapes consisting of mostly flat grassy plains and rolling grassy hills or desert scrub. The Betpak Dala of Central Kazakhstan supports one of the greatest migratory spectacles on earth – the long-distance seasonal movements of critically endangered saiga antelope. Both great bustard and houbara bustard breed here. The greater flamingo migrates to the region's hypersaline lakes, while critically endangered lapwings migrate from Africa to breed. On the fringes of the Ustyurt, species such as urial sheep, caracal cat and khulan (Asiatic wild ass) can be found.

The landscape's unique biodiversity is threatened by the expansion of infrastructure such as fences, railroads and highways; illegal hunting and trade; and deadly disease outbreaks, which cause periodic large-scale die-offs for saigas and other species populations. Khulan, once widely spread across the landscape, have been reduced to small relict populations due to hunting and habitat fragmentation.

Many protected areas have been established across the region; notably the Ustyurt Strictly Protected Area, Altyn Dala and Turgai Conservation Areas, and Korgalzhy National Park in Kazakhstan, and Saigachy Reserve in Uzbekistan. While these protected areas are of great value, preserving landscape connectivity and the ecological integrity of the spaces in between them is equally important, to allow for the long-distance movements of many of the region's most threatened species. Within the saiga landscape, the Altyn Dala is a conservation region that is defined by the movements of the saiga population and not only includes protected areas but also initiatives to maintain connectivity and ecological integrity in the spaces in between. Relocation of khulan to the area has recently begun, part of an effort to return the full suite of large terrestrial mammals to the region. On the Ustyurt plateau, border control agencies have created gaps in border fences that allow saiga to migrate between Kazakhstan and Uzbekistan.

Priority interventions across the region include: addressing fragmentation of the landscape due to the increasing development of linear barriers; developing clear policy guidelines to manage activities associated with habitat degradation such as intensive livestock rearing and tilled agriculture; better understanding disease outbreaks and implementing responses to prevent future mass die-offs; and sustained efforts to improve capacity to reduce illegal hunting and wildlife trafficking.



Box 3 _ The Dasht-e Kavir, home range of the Asiatic cheetah (KLC 3)

The Dasht-e Kavir, also known as the Great Salt Desert, is composed of a complex assemblage of desert ecosystems covered to various extents by xerophyte and halophyte vegetation and stretching over a considerable surface of 80 000 km² (approximately the size of Austria) in central Iran. It is home to a diversity of mammalian species, including the last remaining population of the critically endangered Asiatic cheetah and its main prey species, the Persian ibex, wild sheep and goitered gazelle. With an estimated 50 to 60 individuals left, the Asiatic cheetah is considered the rarest big cat on earth, and the burden of securing the survival of this splendid species is entirely upon Iran.

Although vast and sparsely populated, the Dasht-e Kavir supports millions of livestock, a growing mining industry and the rapid development of linear infrastructure to connect the more than 25 million people who live in urban centres (e.g. Esfahan, Mashhad, Tehran, Yazd) located around the landscape.

To protect the valuable wildlife of the area and prevent cheetah extinction, the Government of Iran has created a network of 13 national parks, protected areas and wildlife refuges covering approximately 45 000 km². Unfortunately, this protected area network is failing to achieve its objectives due to a serious lack of funding, limited management capacity, and limited conservation actions in the corridors linking the protected areas.

Priority interventions include: strengthening protected area management regimes and law enforcement; reducing road kills by fencing and funnelling wildlife through underpasses on target segments of roads; buying livestock grazing rights in target protected areas and key corridors; combatting illegal wildlife hunting by promoting sustainable hunting practices and creating sustainable hunting reserves co-managed by hunter associations and wildlife protection authorities; and piloting innovative and viable revenue generating mechanisms aimed at increasing the financing of protected areas.

Community meeting, Afghanistan. Building on strong local traditions and with support from government, NGOs have been able to engage local people in conserving the wildlife and resources that their livelihoods depend on.

Snow leopard with satellite tag collar, Afghanistan. Tracking snow leopards has revealed information on their range, hunting behaviour and social interactions, which is vital to understanding the threats they face and to planning for their conservation.

and corruption), and make recommendations on the need for adaptive monitoring to determine the sustainability of offtakes and quotas, and the transparency and equitability of fund disbursement.
- Review the current permitted market hunting systems, including the legal and management context, target species and markets being served. Ensure that the regulations are consistent with CITES.

In the medium and long term, action is needed to promote the sustainable management of trophy and commercial hunting programmes.

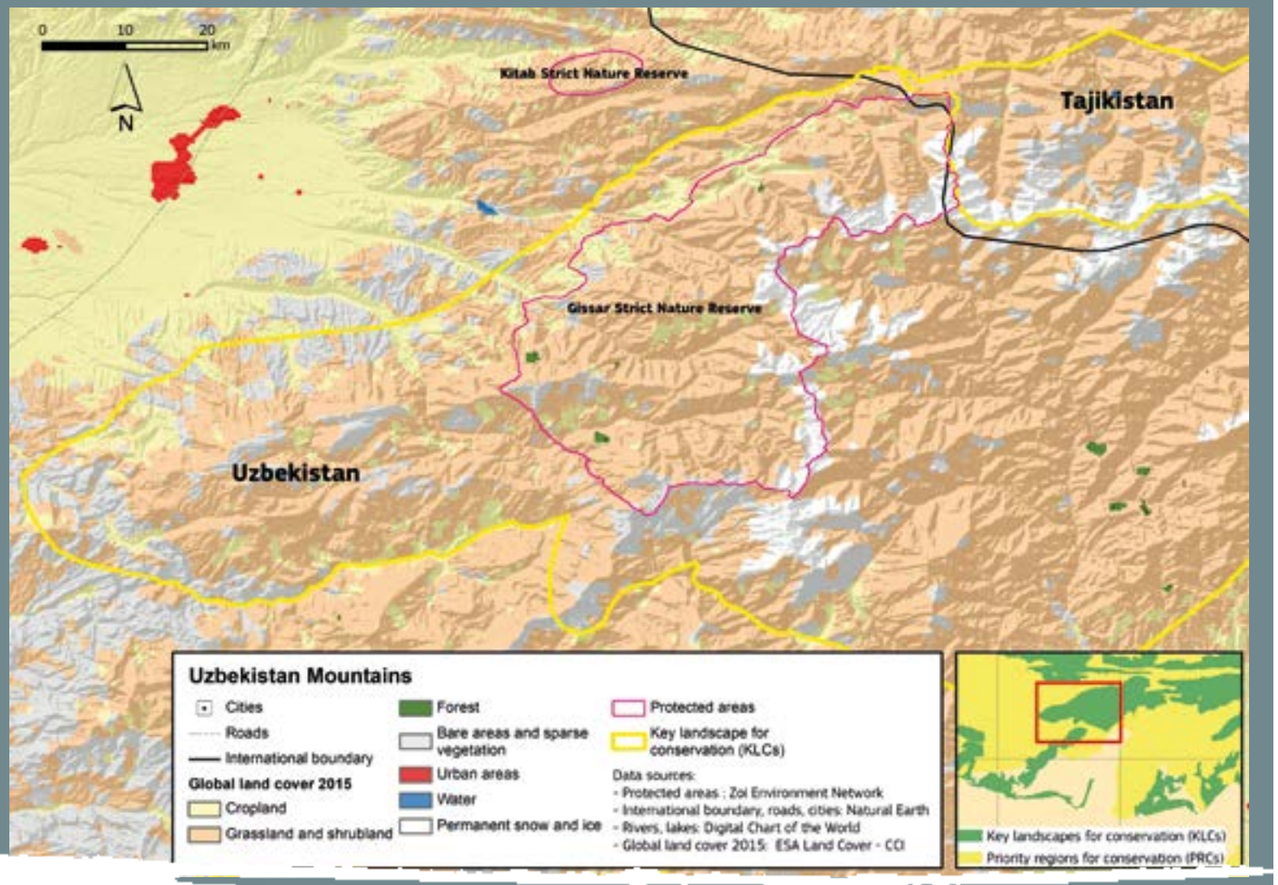
- Support responsible trophy hunting programmes to put in place (i) regular and scientifically accurate monitoring of target populations to assess baselines and trends; (ii) monitoring of ecosystem health indicators to ensure that protection measures do not exclusively benefit the hunted species at the expense of others (e.g. natural predators); (iii) an adaptive plan to set sustainable offtake targets annually; (iv) transparent, area-based permitting and fund disbursement processes; (v) in the case of community-based trophy hunting: functional, committed and legally registered local community governance institutions; and (vi) committed and uncorrupted local authorities to ensure that poaching is controlled and conservation is a main outcome.
- Encourage the improvement of market hunting mechanisms to be transparent, accountable, equitable and co-managed with local communities. Community involvement should link some responsibility for implementation and control with a fair share of the benefits.

5.2.5 Strengthen the recognition and capacity of civil society to directly engage in and support conservation efforts

Engaging local communities and society in the management of extremely large, multiple-use landscapes is critical for the future of both wildlife and pastoralist communities in Central Asia. Examples include co-management structures for protected areas where people live in or alongside the park, and devolving management responsibilities for regions outside protected areas to local communities and authorities. Although the Central Asia region is sparsely populated, the extensive overlap between local communities and critical habitat for wildlife makes civil society engagement fundamental to the success of conservation and enforcement activities.

Action is needed in three key areas: awareness, engagement and government support. Which area is prioritised will depend on local circumstances and opportunities.

- Build on existing local knowledge to strengthen awareness among local communities of why wildlife, other natural resources and ecosystem services are important to present and future livelihoods. Emphasise the shared dependence of people and biodiversity on ecosystem functions, and the potential for healthy ecosystems to contribute to rural livelihoods.
- Build the capacity of agencies planning and implementing projects (including conservation, infrastructure and economic development) to engage with stakeholder communities and ensure genuine involvement in decision-making. Ensure that project design includes on-going consultation and gives a leading role to the



Box 4 _ Western Gissar Mountains in Uzbekistan, a unique centre of origin for plants in Asia (KLC 8)

The Gissar range is the most western part of the Pamir-Alay mountain system and one of the westernmost extensions of the Central Asian highlands. The western end of Gissar in Uzbekistan is a uniquely diverse, and holds all of the distinctive and rare species of flora and fauna found in the Pamir-Altai mountain range. It also has the majority of endemic plant species of Uzbekistan and a rich and still not completely documented vertebrate diversity, with some 150 species, including the Egyptian vulture and the westernmost populations of snow leopard and Siberian ibex. In addition, there are geological formations that are unique in Eurasia, and stone age and Greco-Bactrian artifacts, which make the area a world-renowned cultural heritage site.

Gissar and Kitab state reserves in Uzbekistan were founded in 1983 and 1979, respectively, and are located in the Kashkadarya Region, on the western spurs of the Gissar mountain range. These reserves have extremely diverse vegetation (>1,000 species of plants) with many endemics. They are the main centres of origin for plant genera such as Ferula, Cousinia, Allium and Astragalus. The reserves also have a rich fauna.

The main threat to this unique region comes from livestock overgrazing. In the future, with climate change, the Gissar mountains are predicted to become increasingly attractive to populations seeking refuge in this cooler and more humid part of the country (the average annual temperature is 14 °C in Gissar, and average rainfall >500 mm). This climate-change driven migration will further increase human encroachment into fragile habitats, along with illegal activities such as uncontrolled livestock grazing, plant collection and illegal hunting.

Priority interventions include: developing management plans for protected areas, including climate resilient approaches; improving and implementing existing legislation for the protection of rare natural resources; and incentivising the local population to reduce livestock grazing through the development of other livelihood activities compatible with the sustainable use of natural resources.

community in appropriate areas, such as the monitoring of environmental and livelihood impacts.
- Encourage the creation of an enabling regulatory and funding environment for CSO participation. Government support for NGO and CSO work is essential within the Central Asia context. Education and outreach may need to be directed toward government agencies if they lack an understanding of how civil society can contribute to important conservation outcomes or perceive such shared responsibilities as a threat.

5.2.6 Enhance knowledge, learning and access to information for biodiversity conservation

Research and data sharing are fundamental to policy development, decision-making and to addressing problems, and developing more effective approaches to resource management in the region. In many cases, funding for long-term monitoring programmes ended at the end of the Soviet era in the region; the data gathered by the projects was also lost. Current challenges include lack of resources, weak capacity and a culture that does not support publication and transparency.

In the short term, priorities include fieldwork on some or the most pressing issues affecting biodiversity and resource management.

- Support focused research that addresses key questions for the management and establishment of protected areas and conservation in wider landscapes; for example, to predict and mitigate the impacts of linear infrastructure projects, and to identify transboundary actions. Information needed on priority species includes estimates of population size, trends and species' movements. Research is also needed on the impact of threats, including grazing (e.g. pasture degradation and competition), human-wildlife conflict (livestock predation, retributory killing of predators), and wildlife poaching and trade. Finally, research should look at the success or failure of conservation initiatives, including rotational grazing, predator-proof corrals, livestock insurance schemes and trophy hunting.
- Support the establishment (or continuation) of long-term data gathering programmes that address the threat from climate change to the ecosystems and human livelihoods of the high mountains of the region, to enable these impacts to be factored into conservation planning. Monitoring results should be combined with climate change modelling to inform local vulnerability assessments, and contribute to adaptation and mitigation strategies at the local, national and regional levels.
- Support the establishment of baseline data on wildlife disease, both through dedicated research and through collaborating with other wildlife studies or when there are other opportunities to take samples from wildlife. Integrate the results of wildlife disease work with disease surveillance schemes for domestic livestock, as they are the most likely source of disease spillover to wild ungulates, such as saiga and wild caprids.

Medium and long-term efforts should focus on building the capacity of individuals and institutions within the region to carry out dedicated work on conservation management and wildlife health. Actions should also ensure that the design of projects and programmes incorporates research for adaptive management.

- Support training programmes and other capacity-building actions in priority biodiversity-related sciences, in order to improve the capacity to design and implement focused research, both in the field and in laboratories. Approaches might include increasing the opportunities for research staff to engage in scientific exchanges and learn in partnered projects, both regionally and internationally. Special emphasis should be placed on research needs and exchanges in priority landscapes.
- Put in place mechanisms to ensure that research informs biodiversity management planning and policymaking.

5.2.7 Strengthen the role of the corporate sector and promote a greener economy

Corporate engagement and the green economy are still new concepts in the Central Asian region, with only a few examples in the countries covered by this assessment. However, the economic and environmental crises that many countries are experiencing have put the spotlight on the need for more corporate responsibility and on the role of governments in promoting responsible management of resources. There are significant opportunities to promote green initiatives by harnessing the expertise, resources and networks of the private sector.

In the short term, actions should focus on assessing existing programmes so as to develop an understanding of the potential and opportunities for expansion in the region, as well as the adoption of international standards.

- Compile information on existing industry practice, assess its economic and environmental impacts. Include a review of examples of best practice in other regions that could serve as lessons for replication in the region.
- Encourage private sector involvement to support development of value-chains involving local people close to protected areas, or creating new ones, for example payments for ecosystem services where PAs protect important water catchments.

Wind turbines, Kazakhstan. The country's potential for wind power is ten times its current electricity consumption. Only a small percentage of Central Asia's potential for solar and hydropower generation has been exploited.

The flower Schmalhauenia nidulans *is a member of the daisy family known only from the high alpine meadows of the Tien-Shan mountains in Kyrgyzstan, Kazakhstan, Uzbekistan and western China. Like many of the region's unique species, it will benefit from transboundary efforts to collaborate over the management of the region's natural resources.*

In the medium to long term, efforts should focus on putting in place both voluntary and mandatory standards for business activities, and on the development of renewable energy.

- Raise awareness of best practices and build partnerships between businesses by organising visits to ongoing best practice programmes in the region or further afield.
- Work with the private sector to develop value-added supply chains that incentivise local communities to engage in sustainable landscape or protected area management, and provide local economic development.
- Promote adoption of the mitigation hierarchy (avoidance, minimisation, restoration, offset) by extractive industries (as a priority sector), as well as other businesses [152].
- Make a link between good environmental practice, good corporate governance and economic performance. Encourage membership of, for example, the Extractive Industry Transparency Initiative as a way of promoting greater transparency and reducing opportunities for corruption. As a part of improved governance, establish clear principles and guidelines for the engagement of NGOs, conservation projects and government agencies with corporates so as to avoid actual or perceived conflicts of interest.
- Encourage affected communities and interested NGOs to monitor and report on the impacts of business activities.
- Engage the various governments and major financiers (private sector and multilateral investment banks, including the new Asian Infrastructure Investment Bank) to agree appropriate regulatory standards and guidance.
- Address the strategic gaps in data needed for planning green economy development. In many cases this may involve taking advantage of existing global programmes, rather than initiating new work. An example is the World Bank's Renewable Energy Mapping Program, which the countries of the region could join to help address the lack of data needed to plan the transition to renewable energy in the region.
- Take advantage of the high potential for wind, solar and hydropower energy in the region, with the appropriate social and environmental safeguards. The same arid conditions that create the deserts and steppes of Central Asia mean that all of the countries in this region have significant potential renewable energy resources. At the same time, support programmes to enable consumers and industry to shift away from the use of fuels for heating and power, which cause high levels of greenhouse gas emissions (e.g. coal) and reduce sequestration (fuelwood)[153].
- Ensure that the needs of migratory species are incorporated into planning economic development projects, especially linear infrastructure projects. This includes strengthened environmental impact assessment (EIA) and strategic environmental assessment (SEA) procedures, as well as strategic and project-level decision-making processes. The CMS has produced a Guideline for Linear Infrastructure and an atlas of existing and proposed linear infrastructure and migratory mammals, which highlights the highest priority sites for each species and provides a suite of recommendations for solutions to mitigate these threats. Where migrations cross international borders, development policies and projects need to be harmonised.

([152]) Business and Biodiversity Offsets Programme, http://bbop.forest-trends.org/pages/mitigation_hierarchy, accessed 26 March 2018.
([153]) Global Alliance for Clean Cookstoves; http://cleancookstoves.org/impact-areas/environment/ accessed 26 March 2018

5.3 Conclusion

The future of the environment and biodiversity in Central Asia is uncertain. Positive examples of community-led resource management could be scaled up across the region and offer an example that is relevant to much of the rest of Asia. However, these initiatives are currently dependent on external donor support and in many cases the activities of international NGOs. The gains for conservation and local livelihoods that they have achieved could be undermined by higher-level political and economic change, including the liberalisation of markets without adequate safeguards. Mainstreaming community-based approaches to conservation and natural resource management into national policy frameworks is essential for their long-term impact but is not yet a certainty, given that several of the countries in the region are heavily dependent on oil and gas, and that the relationship between government and civil society is complex.

The countries of the region have a history of scientific and environmental monitoring, and its application to conservation. While there is a risk that this will be lost as a result of political change, the foundation of data and institutions represent an opportunity that could be enhanced and developed. Finally, the region's protected areas, although limited in scale compared to the vast land area, already represent a major commitment to conservation. By combining protected area development with the emerging models of community-based conservation, the countries are in a strong position to conserve their unique landscapes, protect the threatened species that depend on them, and at the same time secure and enhance the pastoralist livelihoods that are so characteristic of the region.