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**Forestry Outlook Study for West and Central Asia**
**(FOWECA)**

**Thematic paper**

# Wildlife issues and development prospects in West and Central Asia

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# BACKGROUND

The Forestry Outlook Study for West and Central Asia (FOWECA) is one of a series of regional forestry sector outlook studies initiated by FAO in collaboration with member countries to examine trends development of forests and forestry.

Using 2020 as a reference year, FOWECA aims to analyze the trends and driving forces that will shape the forestry sector during the next two decades and to identify policies, programmes and investment options that can enhance the sector's contribution to sustainable development.

This outlook study includes the following countries: Afghanistan, Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iran, Iraq, Jordan, Kazakhstan, Kuwait, Kyrgyzstan, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Tajikistan, Turkey, Turkmenistan, United Arab Emirates, Uzbekistan, and Yemen.

FOWECA is expected to produce about 23 country outlook papers, a regional report and series of thematic studies focusing on common issues related to the sector in various ecological zones or countries in the region.

This working paper aims to contribute to the regional outlook report since wildlife management is seen as a common concern in the region. It collects the information available on wildlife management and conservation issues in the region which could serve as a basis for the analysis of trends and the identification of options which could enhance the sector's contribution to sustainable development at local and regional levels. The work is mostly based on the information available on the WWF and TRAFFIC Websites, as well as in other national reports and on national NGOs Webpages.

# 1 WILDLIFE ISSUES IN THE REGION

Many of the countries in the WECA region have natural resources with great potential for local and national development. However, they face substantial challenges in realising this potential. Many of these chalenges are related to the economic restructuring process of the central planning system into a market economy (as is the case in newly independent Caucasus and Central Asia CIS countries), and to the need to develop capacities in natural resources policies and practices, which are not only multifunctional and sustainable, but also economically viable and profitable.

Wildlife is one of the most valuable renewable natural resources in the region. So far, this resource has been used unsustainably in the majority of the countries reviewed in the study. This trend has even accelerated recently due to the socio-economic problems related to rapid population growth in the second half of the 20th century and political changes in former socialist countries. Wildlife habitat degradation, poor wildlife management and illegal hunting have led to a steep decline in the populations of wild animals largely present within the region in the past. There is a risk of losing such a potential resource, the sustainable management of which can create commercial opportunities and provide sustained economic, social and environmental benefits. The added value coming from its sustainable use (game farming, trophy hunting, eco-tourism) could provide further employment and income-earning opportunities to reduce rural poverty, improve livelihoods and contribute significantly to the local and national economy. Wildlife products (trophies, horns, teeth, skin) can support village-level arts and crafts as well as local and national processing enterprises. Wildlife income-generating activities contribute towards foreign exchange earnings and at the same time support biodiversity conservation and other environmental objectives (e.g. in situ conservation of wildlife in hunting reserves, alternatives for local people to livestock grazing). The region is particularly rich in valuable game species which are perspective for farm breeding to be used for commercial trophy hunting and meat production (mainly ungulates – wild goats, sheeps, ibex, gazelles).

The technical aspects of wildlife conservation and its valorisation through hunting and ecotourism are nowadays generally well-known and practiced in numerous countries, mainly in Europe and south-eastern Africa. The most significant constraints to their effective implementation in WECA countries are often weak institutional frameworks, out-of-date legislation, centralised authority and a lack of national strategies aimed at tackling the issue. There is a recognised need for clear policies to engage public and government interest in sustainable management of forest and wildlife. There is also a need for capacity building and awareness rising to enhance stakeholder participation in policy formulation and implementation.

The aim of this part of the study is to review the potential for wildlife valorisation in different countries of the region. In order to address common issues, the countries have been divided, for the purpose of the study, into five groups, taking ecological and socio-economic factors into account. The groups are:

- **Arabian peninsula** including Bahrain, Qatar, Saudi Arabia, Kuwait, Oman, United Arab Emirates, Yemen, Iraq, Jordan, and Syria;
- **Western Asia** including Turkey and Cyprus;
- **Caucasus** countries including Georgia, Azerbaijan and Armenia;

- **Central Asia** including Uzbekistan, Turkmenistan, Tajikistan, Kyrgyzstan, Kazakhstan; and
- **Afghanistan and Iran**.

*Detailed information concerning the presence of different wildlife species, current status and main threats to the wildlife is presented later, separately for each group of countries.*

**Arabian Peninsula**

On the **Arabian Peninsula**, the biodiversity is very low comparatively to the others parts of the WECA region. This is due mainly to the ecological conditions (sandy deserts and semi-deserts), but also to human destruction of habitat (overgrazing by livestock, off-road driving) and extensive hunting pressure in past decades. However the region serves as an important stop for birds migrating from Asia to wintering spots in Africa and the diversity of recorded birds is considerable. There is a potential for bird watching tourism development.

As potential hunting species there are Oryx, Ibex and Sand gazelle, which have been recently successfully re-introduced in a number of reserves and are currently protected. Game farming and trophy hunting of these characteristic species can be developed in the future, even if there is no such potential for foreign hunting development as in Central Asian countries where the diversity of ungulates and other game species is considerably higher. Wildlife reserves in Arabian countries are more important for conservation purposes than for national economic development through trophy hunting. However wildlife watching tourism can contribute to the local development in the vicinity of the reserves.

The houbara bustard, a traditional game bird found across the entire Arabian Peninsula, is very attractive for local hunters. The hunting parties organized by elite hunters can bring considerable income to the local people. However, the houbara's population has decreased drastically in recent decades and the bird has become rare. Recent human development in the region with extensive hunting (particularly new hunting techniques using radios/radars and off-road vehicles), together with the lack of effective management and planning have been responsible for such a decline. Now rich Arab hunters travel to other countries in the region (Afghanistan, Iran, Pakistan, Kazakhstan, Turkmenistan, Uzbekistan) and they offer considerable sums to local governments for the opportunity to hunt declining populations of houbara (even if in many cases the bird is protected by national legislation). This represents a threat to the populations of houbara bustard in the whole region.

There is also a considerable market for birds of prey in Arab countries. The birds are imported from neighbouring countries where they are caught (or eggs are collected) from the wild. Such traffic represents a threat to species such as falcons. On the other hand, a formal, well controlled market based on sustainable use could provide additional funds for biodiversity conservation in supply countries.

**Western Asia**

The two countries in **Western Asia**, Turkey and Cyprus, are both a favourite tourist destinations, and as they also have a rich biodiversity with a number of attractive wildlife species, there is a considerable potential for foreign trophy hunting and bird watching tourism development.

Turkey can offer a large number of carnivores such a brown bear, grey wolf, lynx, caracal and different ungulates such red deer, roe deer, wild goat and fallow deer. If well managed, foreign trophy hunting could significantly increase the foreign exchange earnings, help to solve the problem of conflicts with local populations and thus contribute to conservation programs. In areas rich in ungulates, there is a potential to establish wildlife farms and intensive hunting reserves for trophy and meat production to support local development.

Commercial trophy hunting could strengthen wildlife administration and management, and generate resources to combat illegal hunting and protect threatened species.
In Cyprus, there is a potential to develop trophy hunting of the Cyprus mouflon (*Ovis orientalis ophion*), the endemic wild sheep species found only on the island of Cyprus. The demand for such rare species would permit high hunting fees. The income from trophy hunting could contribute to sustainable development and nature conservation.
The close distance from Europe, the main demand market for trophy hunting, and a safe security situation are also positive opportunities for hunting sector development both in Turkey and Cyprus.

**Caucasus**
The **Caucasus** region is also very rich in biodiversity. The environmental quality is, however, in steep decline due to the economic and socio-cultural changes in the past few decades. Unsustainable forest use, including poor management and illegal cutting, overgrazing and other unsustainable agricultural practices, presents the main threat to ecosystems and wildlife habitats. Overexploitation and poaching of game and economically valuable species have severely affected numerous wildlife species. Nevertheless there is good potential for developing sustainable hunting contributing to the development of national economies. A number of valuable wildlife species including the Caucasian tur, wild goat, Persian gazelle, mouflon and bear still occur in the Caucasus region. Initiatives for the development of national and regional conservation strategies already exist. However the national conservation and hunting policies are still in a state of development. The tourist hunting market is very young (or even non-existent), and still developing. In Georgia for example, hunting temporarily stopped in 1996 (with the exception of migratory bird hunting) in order to develop new hunting legislation; before its completion, Georgia remains closed to all foreign hunters except those hunting migratory birds.

Urgent measures need to be taken and long-term strategies elaborated to conserve the biodiversity of this unique region. Saving threatened ecosystems and endangered species requires an integrated approach that would set aside key areas of conservation value deal with economic hardship in local communities and coordinate conservation strategies across national borders. Each of the Caucasus governments is in the process of developing policies regarding protected areas, biodiversity conservation and sustainable use. The countries have joined the international community in the fight to save biodiversity by signing a number of conventions related to conservation. Yet conservation institutions require strengthening and efforts need to be made to involve local communities in implementation of policies regarding biodiversity conservation and sustainable use.

Building capacity in government institutions to protect wildlife and organizing efforts to monitor the illegal trade in plants and animals would help clamp down on poaching and reduce demand for endangered species. Developing strategies on the whole Caucasus region for conservation of priority biomes like forests, wetlands and high mountains would help increase international cooperation in conservation and identify ways to conserve these valuable ecosystems across borders. Creating capacity in local communities for sustainable forestry and use of non-timber forest products would help reduce pressures on forest ecosystems, while providing long-term benefits for local people.

Six focus areas for conservation in the Caucasus have been delineated by WWF:

- Institutional strengthening and capacity building
- Creating a network of protected areas (Econet)
- Conserving endangered species and species of special concern
- Conserving priority biomes: forests. high mountains, and wetlands
- Promoting sustainable resource use
- Promoting public awareness and conservation education

Many interesting initiatives for conservation of wildlife have been launched by the conservation NGOs in the region in the last decade and the situation is likely to improve in the coming years. There are still many challenges ahead to ensure good governance and to involve the private sector in the wildlife use and conservation but the governments seem to start considering these issues and to involve more stakeholders in the wildlife sector development.

**Central Asia**

Countries in **Central Asia** have very rich fauna, even if many species are increasingly threatened by large scale legal and illegal collecting and hunting for the wildlife trade. From the time of the Soviet Union, Central Asian countries inherited a remarkable system of protected areas. Several strict nature reserves (zapovedniks) and 9 national parks protected a broad range of ecosystems. Following independence from the Soviet Union in 1991, however, the financial mechanisms that supported these nature reserves have collapsed, leaving them struggling to support their staff and protect their territories. Moreover, the economic decline of all of the Central Asian nations has pushed environmental protection as a whole to a position of lower priority. In all countries, threatened and endangered species that had been strictly protected by Soviet legislation have begun to be illegally commercially exploited.

The destruction of natural habitats due to overgrazing and forest cutting leads to the extinction of many common species. Throughout the region, the diversity and density of ungulates, predators and birds of prey have been seriously affected by poaching and improperly managed hunting tourism.

All major protected areas are still functioning in the region, but there is a need to find additional funding for nature conservation activities. There is also a need to create numerous new transboundary zapovedniks. Within the last 2-3 years some of the countries of the region start to create new protected areas, to reserve lands for future protection, to increase funding of the PAs from the governmental budget. Besides that, since 2003 GEF-UNEP-WWF project on Econet planning in the region is implemented (endorsed by Governments of all 5 countries), with a goal to create a network of protected areas, ecological corridors and buffer zones with sustainable regime of nature resource use, integrated in the socio-economical development of the region as a whole. A very low human population density in certain areas offers an important opportunity for nature conservation. A positive example of ecosystem conservation can be found in Altyn-Emel national park (459,627 ha). This park in the Ily river valley, Kazakhstan was created in 1996 and is based on a 48,000 ha governmental game area, which existed in Soviet times. In spite of developed ecotourism and trophy hunting the ungulate populations are growing. For example, the initial reintroduced population of 32 kulans increased to 80 by 1988 and to 500 - 600 by 2000. Also found are approximately 7000 goitered gazelles (approx. 3000 in 1988), about 4000 Siberian ibexes, and 200 Marko-Polo argali.

There is huge potential for developing sustainable trophy hunting in Central Asia, but there are still considerable challenges ahead in order to use this potential as a real contribution to the national economies.

**Main problems areas and priority issues in the wildlife sector in Central Asia**
(as identified by the country representatives in facititated workshop on Wildlife Policy and Institutions for Sustainable Use and Conservation of Wildlife Resources, organized by FAO in September 2006)

**Sectoral management**
- Monitoring (lack of)
- Gaps in wildlife management
- Quotas establishment mechanism inappropriate
- Trophy hunting is not developed
- Absence of scientific centers
- Institutional deficiencies
- Weak legislation (on sustainable hunting)
- Unsustainable hunting
- Development of institutional structure / Reforms
- Lack of data, knowledge
- Inventory of fauna in SPA (Special Protected Areas)

**Wildlife Policy and Legislation**
- Weak legislation
- Lack of strategy / action plan
- Lack of wildlife management policy
- Corruption
- Inappropriate allocation of revenues from hunting
- Weak development of SPA (Special Protected Areas)
- Weak control of international trade in trophies and other hunting products
- Property problem

**Socio-economic problems**
- Lack of local community awareness (regarding their rights, legislation, regulations, etc.)
- Local communities have no legal benefits from wildlife
- Private sector: no incentive to invest in wildlife / No investments
- Wildlife operators can not compete with other land use
- Lack of local people involvement in the wildlife management
- Undeveloped benefit sharing (Central government reluctant to decentralization)
- Corruption at the local level, privileges, violation of rights
- Limited experience in the creation of private hunting reserves
- Restricted access to hunting (economical and administrative reasons)
- Poverty (low purchasing power)

**Intersectoral management**
- Weak technical and human capacities
- Lack of specialists
- Conflicts of interests (between hunting, forestry and agricultural sector)
- Competition between domestic animals and game
- Habitat degradation / Overexploitation / Damage of fields (because of hunting and agriculture)
- Absence of game reserves

**Poaching**

**International cooperation issues**
- Lack of international cooperation and support
- Lack of a programme for migratory species

The issue **"Resistance to innovations"** wasn't categorized since it was considered as a cross-cutting problem applying to all categories.

A recent study by TRAFFIC (Hofer, 2002) reveals that hunting tourism in Central Asia is evolving. Increasing numbers of foreign sport hunters' hunt in the Central Asia region since the collapse of state-regulated markets in the early 1990s, but little information exists about the level of reinvestment of these funds in conservation and local development. It has often been reported that few of the funds generated by foreign trophy hunting are actually spent on the conservation schemes for which they were intended. A transparent overview of the actual money flow generated by foreign sport hunters is difficult to obtain from hunters themselves or from the wildlife management authorities. According to the author of the study, "Foreigners hunting highly prized and rare species such as wild sheep and goats present a potential source of foreign exchange income to remote and poor regions in Eurasia. Insufficient documentation reduces trophy hunting's potential benefits for conservation and to regional sustainable development. Without a clear understanding, motivation for law enforcement staff and incentives for enhancement of wildlife management systems remains limited" (Hofer, 2002).

***Afghanistan, Iran***

In spite of having a very rich biodiversity with one of the highest densities of ungulates in the region, **Afghanistan** faces different obstacles for developing a sustainable and profitable hunting sector in the near future. Security threats in a post-war situation will in the short term most probably discourage foreign trophy hunters from considering the country as a preferred hunting destination. Very limited infrastructure and limited capacity of nationals to effectively manage hunting areas, associated with governance problems, overgrazing and illegal hunting will certainly make the sector's development difficult.

**Iran** also has very attractive wildlife resources, with large ungulates and carnivores. However the tourist market is very young. The capacity to manage wildlife sustainably is limited and socio-economic problems cause serious damage to biodiversity. Illegal hunting and habitat degradation have seriously reduced populations of larger ungulates and have consequently affected also large carnivores.

It is quite clear from the review above, that it is not possible to develop effective programmes for wildlife management and conservation anywhere in the region. Problems of poor infrastructure, security fear and corruption, combined with the absence of accepted regulations, the lack of environmental education, the unfavourable economy and weak institutions make wider development of wildlife sector in the region difficult. In addition, the majority of the countries in the region have no tradition to involve local people in natural resources management. However, establishment of pilot projects in areas with high wildlife concentration and suitable conditions for hunting tourism development could prove the potential of sustainable hunting for local and national economies end encourage the stakeholders to consider sustainable wildlife management and conservation as an option in their development strategies.

Nevertheless, as recommended in TRAFFIC wildlife studies (Hofer, 2002); the integration of tourist hunting into conservation and development programmes and projects should be undertaken using a case-by-case approach with a realistic pre-evaluation of the situation. Important questions to be asked are:

- What is the specific target group of hunters interested in this kind of hunt? *(How many are interested? Where do they come from? How can we contact them? What are they willing to pay?)*

- Are there effective and efficient means for successful marketing of conservation-oriented hunting, and can it be marketed credibly?
- What are the criteria, risks and opportunities to implement sustainable tourist hunting locally under specific circumstances? *(Quotas? Monitoring and control? Administration? Re-investments?)*.

The tourist hunting should be integrated into conservation programmes where possible and encourage increased dialogue between tourist hunting stakeholders. Also implementation of CITES and reporting practices relating to the trade in hunting trophies as personal effects need to be harmonised among the parties to CITES to enable an effective monitoring for the conservation benefit of the species.
Conservation programs should be connected with the programs on recreation and tourism development, propaganda of rational nature use, ecological education and establishment of production based on artificial cultivation and marketing of cash flora and fauna species or their aromatic, medical, decorative products.

## *1.1 Challenges ahead*

There are huge challenges that must be addressed if the conservation of wildlife and biodiversity are to be ensured in the region. In addition to extending and reinforcing a network of protected areas covering representative ecosystems and natural areas, governments must include the local people in the protection, exploitation and management of wildlife resources. The long-term future of the wildlife in WECA region rests mostly with the local people who live with the unique fauna and flora. Through pilot projects at community level, means should be explored to enhance the assessment of resources, benefit sharing, self regulation and community-based management, which can encourage conservation and sustainable development and provide incentives for legal trade. A very good example of such an approach is the project of conservation of Suleiman Markhor and Afgan Urial by the local tribesmen in Torghar, Balochistan province of Pakistan (N. Tareen and M. Fristina, com.pers. and http://www.virtualcentre.org/fr/ele/econf_02_faune/download/t2_08_torghar.doc and http://www.biodiv.org/doc/case-studies/suse/cs-suse-iucn-thorgar.pdf ).
The national governments must support such initiatives and vastly improve their monitoring and control of harvest levels and trade in animal and plant species in particular countries of the region. International co-operation will be required to assist efforts in these countries. Well managed wildlife conservation programmes have the potential to conserve the region's unique assemblage of plants and animals, while generating a significant source of revenue for local communities and reinvestment in conservation that will prove more beneficial to these countries in the long term than the short-sighted policies that are currently in place in some areas (TRAFFIC, 1998).

# 2 DETAILED COUNTRY INFORMATION

## *2.1 Arabian Peninsula*

Countries located on the Arabian Peninsula **(Bahrain, Qatar, Saudi Arabia, Kuwait, Oman, United Arab Emirates, Yemen, Iraq, Jordan,** and **Syria)** all mainly made up of desert plains and hold little biodiversity, although a few endemic plants and animals can be found in this ecoregion. The deserts and semi-deserts of Arabian Peninsula represent probably the biggest continuous bodies of sand in the world. Unique to Oman's Wahiba sands are the long stretches of single species ghaf (*Prosopis cineraria*) woodlands, which can be up to 85 km in length and 20km wide. These woodlands provide vital shade and nesting habitat for birds (Brown 1988).

The sands here are also thought to act as a major ecological barrier dividing the faunal species of the northern mountains from those of central and southern Oman. The best example is the division between Arabian tahr (*Hemitragus jayakari*), which occurs in the northern mountains but not south of the Wahiba, and the Nubian ibex (*Capra ibex nubiana*), which does occur south of the Wahiba but is in turn absent from the northern mountains (Munton 1988).

Many species (i.e. the striped hyaena, jackal and honey badger) have become extinct in this area due to hunting, human encroachment and habitat destruction. Other species have been successfully re-introduced, such as the endangered white oryx and the sand gazelle, and are protected at a number of reserves. Overgrazing by livestock, off-road driving, and human destruction of habitat are the main threats to this desert ecoregion.

The region serves as an important stop for birds migrating from Asia to wintering spots in Africa, and over 250 species of birds have been recorded.

**Biodiversity features**

Characteristic fauna includes the Arabian white oryx, sand gazelle, sand cat, and Ruppell's fox.

Over the last few decades the desert of the Arabian peninsula has, unfortunately, witnessed local extinctions of *Canis lupus arabs, Oryx leucoryx, Hyaena hyaena*, jackal (*Canis aureus*) and honey badger (*Mellivora capensis*). *Gazelle subgutturosa and G. gazella* still survive, though with very small populations and restricted ranges. The sand cat (*Felis margarita*), Ruppell's fox (*Vulpes rueppellii*) and *Lepus capensis* are thought to be far less numerous than they were. The rare Asiatic jackal (*Canis aureus ssp. aureus*) is known to occur in this ecoregion (Nader 1996) but there is little recent evidence to confirm its presence.

In Saudi Arabia, gazelle and oryx have been successfully re-introduced after motorized hunting parties had virtually exterminated them by the early 1970's. At the Uruq Bani Ma'arid protected area, white (or Arabian) oryx (*Oryx leucoryx*) again roam the sands, as do sand gazelle (*Gazelle subgutturosa*) and mountain gazelle (*G. gazella*). *Capra ibex nubiana* survived the exterminations that befell the oryx and gazelle and are officially protected in 3 sites. Both *Oryx leucoryx* and *Capra ibex nubiana* are included on the IUCN Red List as endangered (IUCN 2001). Other characteristic mammals include Arabian wolf (*Canis lupus arabs*), Cape hare (*Lepus capensis*), striped hyaena (*Hyaena hyaena*), sand cat (*Felis*

*margarita*), red fox (*Vulpes vulpes*), caracal (*Caracal caracal*) and Ethiopian hedgehog (*Paraechinus aethiopicus*).

Greater flamingo (*Phoenicopterus ruber*) caused a stir when they bred in Abu Dhabi in 1993, representing the first documented occasion in Arabia since 1922 (Aspinall 1996).

The houbara bustard (*Chlamydotis undulata*) macqueenii is a traditional game bird found across the entire Arabian Peninsula. However, its population has decreased drastically during recent decades and the bird become rare. Recent human developments in the region, particularly new hunting techniques and a tremendous increase in livestock, have been responsible for the decline.

In northeastern Persian Gulf's part of the Arabian Peninsula (Bahrain, Quatar, Kuwait), terrestrial wildlife species diversity is very low and there are few, if any, endemics. Most of Qatar, with its flat desert and scanty vegetation, supports only a sparse and restricted avifauna. Bahrain was believed to be connected to the mainland of Arabia until 6,000 B.C. and its subsequent separation is cited as a reason for the low diversity of mammalian fauna (Al Khalili 1999).

The coastal zone with its intertidal mudflats and offshore islands is important for breeding sea birds and other migrating species, particularly as Saudi Arabia offers a land bridge connecting Africa with Eurasia. One site at Tarut Bay is considered to be the most important site on the Saudi Arabian Gulf Coast for wintering and migrating waders and other water birds, with a total of c. 58,000 waterbirds in 1991/92, and more than 20,000 present in April-May 1991 (Evans 1994). The houbara bustard (*Chlamydotis undulata*), a globally threatened species, occurs regularly in Bahrain as a passage migrant in autumn and a rare winter visitor to the open desert in the south of the island (Evans 1994).

Evans (1994) cites the Gulf coastline in this ecoregion to be especially important for the black-necked grebe (*Podiceps nigricollis*), great crested grebe (*P. cristatus*), socotra cormorant (*Phalacrocorax nigrogularis*), broad-billed sandpiper (*Limicola falcinellus*) and Saunders' little tern (*Sterna saundersi*). The breeding population of *Phalacrocorax nigrogularis* in this area, which is thought to be over 95% of the world population, exceeds 220,000 pairs (Aspinall 1996).

Inland, and particularly striking when seen from the air, are isolated circles of green in otherwise barren areas of desert. These are sites of intensive cultivation of alfalfa and winter wheat, irrigated by artesian water sprayed form hugh booms rotating around a central pivot. Trans-desert migrants are attracted to the greenery of these sites, which are the only known breeding site in the Eastern Province for quail (*Coturnix coturnix*), spotted sandgrouse (*Pterocles senegallus*), and great grey shrike (*Lanius excubitor*) (Bundy et al.1989).

On Oman's central plains, the Arabian Oryx Sanctuary covers c. 25,000 km2. A World Heritage site, it supports a diverse wildlife community, made famous for the successful reintroduction of *Oryx leucoryx*. It contains the largest population in the Arabian Peninsula of Arabian gazelle (*Gazella gazella ssp. cora*), estimated to number about 5,000 with upward fluctuations after good rain (Stanley Price 1989). Other mammals include the sand gazelle (*Gazella subguttorsa*), dorcas gazelle (*Gazella dorcas*); sand cat (*Felis margarita*) and Ruppell's fox (*Vulpes rueppellii*). It is one of the few sites on the Arabian Peninsula hosting a resident houbara bustard (*Chlamydotis undulata*) population. This part of the ecoregion is

unusual as it receives supplemental moisture up to 120 km inland from the coast, provided by heavy dews and fogs influenced by the south-west monsoon. Even though species richness is low, 11 endemic plant species occur here (Ghazanfar 1999).

The Mahazat as-Sayd Special Nature Reserve (2,200 km2) is another key re-introduction site, containing re-introduced *Oryx leucoryx* and Arabian sand or rheem gazelle (*Gazella subguttorosa ssp. marica*). The IUCN Red List categorizes both species as endangered (IUCN 2001). The population of Arabian sand gazelle was estimated at c. 300 in 1994 (Haque & Smith 1995). Also introduced to the site is the blue-necked ostrich (*Struthio camelus ssp. molybdophanes*) from the Sudan as a replacement for the indigenous Arabian red-necked ostrich (*Struthio camelus ssp. syriacus*) (Sibley & Monroe 1990) which became extinct in 1940. The vegetation in this reserve made a dramatic recovery after fencing to keep out livestock; the number of plant species increased from 112 to 142 between 1989 and 1994 (Haque & Smith 1995).

In northern Saudi Arabia near the Gulf of Aqaba, the Jebal al Lawz granitic mountains contain at least 20 peaks at over 2,000m (Evans 1994). The highest peak is Jebel Fayhan at 2,549 m, high enough to receive snow in winter. Vegetation zones are evident, with some stunted *Juniperus* spp. on the summits. The site is of great botanical interest as it contains wild date palm (*Phoenix dactylifera*), the only site in Arabia of wild almond (*Prunus dulcis*), and one of two sites in Arabia of wild tulip (*Tulipa biflora*) (Evans 1994). This is also the only site in Saudi Arabia containing numerous birds of the chukar partridge (*Alectoris chukar*).

Also of importance to wildlife are the Jebel Aja Mountain range and the northern Ha'il extension into the Nafud Desert in Saudi Arabia. The site lies at the centre of the spring flyway for the threatened African wintering population of *Gus virgo* (Evans 1994). In addition there is an impressive spring migration of swifts, larks and wheatears, together with a wide range of raptors. Other characteristic avifauna are the houbara bustard (*Chlamydotis undulata*), Lichensteins sandgrouse (*Pterocles lichtensteinii*), and chestnut-bellied sandgrouse (*Pterocles exustus*).

## Current Status

In **Saudi Arabia**, a comprehensive network of protected areas covers many key sites, based on a system plan (Child and Grainger 1990). These areas are managed by the National Commission for Wildlife Conservation and Development (NCWCD established in 1986), assisted by its two prominent research centres, the King Khalid Wildlife Research Centre (KKWRC) and the National Wildlife Research Centre (NWRC) in Taif. The stony basaltic desert of Harrat al Harrah, whose northern boundary borders Jordan and Iraq, was established in 1987 as Saudi Arabia's first national reserve (12,150 km2). The landscape is dominated by numerous uplifted extinct volcanic cones and black basaltic boulders of the middle Miocene, making vehicle access mostly impossible. The reserve provides habitat to over 250 species of plants, 50 species of birds and 22 species of mammals (Nader 1995; Seddon et al. 1997).
The Uruq Bani Ma'arid is a 12,000 km2 reserve on the western edge of the Rub' al-Khali. Projects to re-introduce *Oryx leucoryx* and *Gazelle subgutturosa* began here in 1995. The NCWCD established the Ibex Reserve (200 km2) south of Riyadh to protect *Capra ibex nubiana* which, in 1994, numbered c. 259 (Habibi 1994). This reserve also serves as a re-introduction site for *Gazelle gazella* which, by 1994, numbered c. 160 (Dunham 1997). The

At-Tabayq Special Nature Reserve in northern Saudi Arabia is also a protected area for *Capra ibex nubiana.*

**Jordan** has started planning and establishing a network of wildlife reserves to protect the very rich bio-diversity attached to its different biotopes. Flora and fauna are diverse in Jordan and particularly birds, of which 50% are migratory. Six protected areas have already been established including the Dana Reserve. A National Biodiversity Strategy has recently been formulated proposing the creation of 18 protected reserves throughout the country. The wildlife reserves system will cover about 4.2% of Jordan's total land area.

The recently established Ministry of Environment (MOE) is responsible for matters related to biodiversity conservation and their objectives are oriented towards the collection and analysis of environmental information and the formulation of laws and regulations. In accordance with the recent Jordan Environmental Law No. (1 ) Issued in 2003, the responsibility of MOE for forest matters are related to the establishment and monitoring of nature reserves and national parks (article 4 (i)). The Directorate of Forests has established a biodiversity unit which could help bridge the gap between themselves and other organizations dealing with biodiversity. In particular, it could guarantee the compliance of forestry activities with the objectives of the National Biodiversity Strategy and Action Plan and other international commitments.

The Royal Society for the Conservation of Nature (RSCN) plays an important role in promoting nature conservation activities and managing the wildlife reserves. It is responsible for regulating hunting and issuing hunting licenses in Jordan. Created in 1966, RSCN employs approximately 200 staff. It is an NGO which has been given the responsibility by GOJ to protect the Kingdom's wildlife and natural heritage. It is an efficient organization creating business from nature and able to mobilize external funding support such as Global Environment Funds (GEF) as well as internal funding from a network of affiliates. The organization has strong political support and its management board includes members of the Royal family. RSCN is involved in many environmentally-related activities including training and awareness raising, tourism development, management of parks, publishing books and documents, networking with environmental clubs and schools.

Within this ecoregion, the Shaumari Wildlife Reserve protects vegetation, *Gazelle spp.*, and the re-introduced onager (*Equus hemionus*). In 1978, this reserve was one of the first re-introduction sites in the Arabian Peninsula for *Oryx leucoryx*. In southern Jordan, the RSCN is in the process of creating the Wadi Rum Nature Reserve, planned to cover approximately 500 km2 (RSCN 1994). The Reserve will address problems of overgrazing and damage to archaeological sites as well as provide protection for wildlife, including the ibex (*Capra ibex ssp. nubiana*) and *Gazella subguttorsa*.

In **Qatar**, nature conservation is the responsibility of the Environment Protection Committee (EPC). Research into fauna and flora is also conducted by the Scientific and Applied Research Centre of Qatar University, but there are no protected areas for nature conservation (Evans 1994).

In **Oman**, the Ministry of Regional Municipalities and Environment, and its Directorate of Nature Protectorates, is the principle body responsible for environment protection and wildlife conservation. The Office of the Adviser for Conservation of the Environment, Diwan of Royal Court, shares this task and is responsible for managing the Arabian Oryx Sanctuary.

On **Bahrain** Island, the Environmental Protection Committee is the government body responsible for environmental matters and protected areas for nature conservation. Al-Areen Wildlife Reserve on Bahrain Island, established in 1976, was built as a sanctuary to conserve vegetation and also functions as a wildlife captive-breeding centre.

The Environmental Research and Wildlife Development Agency (ERWDA) are in charge of biodiversity conservation along the short section of Abu Dhabi coastline in the **UAE**.

The main responsibility for wildlife conservation and environmental protection in **Yemen** lies with its Environment Protection Council. Up to 1994, no areas had legal protection and little information exists on the current situation, although Miller (1994) indicates that UNEP and IUCN have recommended a network of reserves.

**Types and Severity of Threats**

Hatough-Bouran & Disi (1991) describe how flora and fauna in the eastern deserts of Jordan are threatened by overgrazing. Socio-economic changes involving livestock subsidies and the introduction of water tankers have resulted in increased herd sizes and a more sedentary lifestyle amongst the Bedu. Similar overgrazing problems are reported for Saudi Arabia by Thouless et al. (1991), and such pressures are common elsewhere in this ecoregion.

Other common threats to biodiversity in this ecoregion are wildlife poaching, damage to vegetation caused by off-road driving, and habitat disturbance and fragmentation in the form of roads, agricultural projects and oil and gas surveys.

The wildlife poaching is occurring also in protected areas, as for example in Oman's central plains, formally protected in the Arabian Oryx Sanctuary. Despite the protection, poaching reduced the number of re-introduced *Oryx leucoryx* in the sanctuary from over 400 in 1996 to 136 by January 1999 (Spalton et al. 1999).

The entire 1,200 km coastline of the Persian Gulf is vulnerable to major oil spills. Hill (1995) indicates that *Phalacrocorax nigrogularis* is one of the most commonly found oiled dead birds around the Bahrain coastline. Overgrazing by camels, goats and sheep is a common threat to the area's vegetation. The mangroves are under pressure in some areas from overgrazing by camels. Disturbance from fisherman, recreational campers and divers, and the military is a threat along various coastal stretches and islands. However, in some areas the military has fenced off certain sites, protecting the vegetation and eliminating grazing pressure. Feral mice are reported to be a threat, particularly when their population peaks coincide with the tern breeding season on Saudi Arabia's Gulf Coral Islands. Land reclamation and dredging poses a threat to various sites on Bahrain island (Evans 1994).

## *2.2 Western Asia*

### 2.2.1 Turkey

Turkey's territory is covered by different ecosystems with a very rich biodiversity. The mountainous region in northern Turkey is particularly important for its intact conifer and deciduous forests and the diversity of flora and fauna that they support. Carnivores such as the brown bear and the grey wolf live here with ungulates such as the vulnerable wild goat.

The Mediterranean coasts of Turkey, with the coastal plains and lowlands are on one of the major avian migratory routes, contributing to its status as an area of high bird diversity. This ecoregion is also home to a number of globally threatened wildlife species, including the critically endangered bald ibis and Mediterranean monk seal.

Southern part of Turkey is one of the most biologically diverse in the Mediterranean Basin. Extremely mountainous, its high peaks and deep valleys create isolated ecological niches resulting in a high level of plant endemism, particularly among the bulbous species. The overlapping of the Mediterranean and Irano-Turanian floristic zones here has also contributed to the evolution of unique species. Brown bear, grey wolf, lynx and the critically endangered Anatolian leopard can be found there.

Eastern Anatolian montane steppe going from Turkey to Armenia and Iran is located at the junction of three floristic zones and creates a unique biotic blend of species. The mosaic of steppe and patches of woodlands, both remote and intact, are rich in terms of wildlife, too. Mammals such as the striped hyena (*Hyena hyena*), and marbled polecat (*Vormela peregusna*), birds such as the peregrine falcon (*Falco peregrinus*), golden eagle (*Aquila chrysaetos*), and reptiles such as the Armenian viper (*Vipera raddei*) inhabit this region.

There are many Important Bird Areas in Turkey, along with a number of national parks and nature reserves. Unfortunately, agriculture and industrial development have contributed to most of the degradation of ecosystems. More reserves with an effective management are needed to protect diverse habitats.

**Biodiversity Features**

An important feature of Turkey's nature is the world's largest and most intact *Cedrus libani* forest. The forest covers 89,810 ha on Akda, particularly at Elmalı. Small patches of *Cedrus libani* forest can also be found in Lebanon and Syria; these remnants are important for conserving genetic diversity, as they represent the last remaining populations at the southern edge of the species' range. Southwestern Turkey also contains endemic forest types, such as *Abies cilicica* ssp. *isaurica* and *Quercus vulcanica*. The latter is particularly important due to its restricted distribution and its value as a timber tree.

The Amanos mountains region is very rich in wildlife, largely because the difficult terrain has reduced opportunities for human impact. Brown bear (*Ursus arctos*), grey wolf (*Canis lupus*), lynx (*Lynx lynx*) and caracal (*Caracal caracal*) are the main carnivores of interest (Can 2001a, Can 2000). Their presence is an indication of intact habitats.

In the 1950s, the Caspian tiger (*Panthera tigris virgata*) was the rarest carnivore species in the ecoregion, but the last one was killed in 1960. The critically endangered Anatolian leopard (*Panthera pardus ssp. tulliana*) is now the rarest large carnivore species in this area (Can 2001b). Another important species is striped hyena (*Hyena hyena*) which was once widespread, but is now on the Red List. Although there is not much information about its population status within the region it is known to occur in mountains of Turkey, Armenia and Iran.

Wild goat (*Capra aegagrus*) and fallow deer (*Dama dama*) are important herbivorous species found here (Can 2001b). Turkey's last *Dama dama* population survives at Duzlercami "Fallow Deer Breeding Station". Although these deer were introduced to Europe in the 15th century from southern Anatolia, the local native population is now reduced to only around 50 individuals.

The northeastern areas of the country, with their intact forest cover, are also rich in wildlife. Although brown bear (*Ursus arctos*) is well represented in both east and west, the more intact forest cover in the eastern part of the country supports higher numbers of this carnivore. The northeastern areas are also rich in ungulates; it is possible to find Chamois (*Rupicapra rupicapra*) and wild goat (*Capra aegagrus*) in the east and red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*) in the west. *Capra aegagrus* has been classified as vulnerable by the IUCN (IUCN 2001).

There are several Important Bird Areas (IBAs) in this ecoregion. Among these, Kızılcahamam is important for its breeding populations of black vulture (*Aegypius monachus*), a globally threatened species (Magnin & Yarar 1997). The Ilgaz Mountains IBA supports breeding pairs of lammergeier (*Gypaetus barbatus*), griffon vulture (*Gyps fulvus*) and booted eagle (*Hieraaetus pennatus*). The northeastern Black Sea Mountains lie on the main migration routes of many raptors and so attract a high number of them, especially in areas of old-growth forest. Yedikır qualifies as an IBA for the large number of ruddy shelduck (*Tadorna ferruginea*) that roost there in the non-breeding season (Magnin & Yarar 1997).

The Amanos mountains are also designated as an Important Bird Area (IBA) due to their location along a migration route for birds rounding the northeast corner of the Mediterranean on their journey between wintering grounds in Africa and breeding grounds in Eastern Europe. Species and numbers recorded include: white stork (*Ciconia ciconia*), 82,287; black stork (*Ciconia nigra*), 3,303; white pelican (*Pelecanus onocrotalus*), 6,203; and a total of 26,756 birds of prey (Magnin & Yarar 1997).

A population of the critically endangered bald ibis (*Geronticus eremita*) occurs in Turkish Mediterranean coasts. The only population in Turkey, with 61 pairs, it cannot survive completely in the wild, however (Akcakaya 1990); it lives in a breeding station in Birecik, and flies free during the breeding season. The other remaining population of this species, in Morocco, is wild and in good condition with 250 pairs.

A number of large mammal species inhabit Mediterranean coastal plains. Gazelles (*Gazella subgutturosa*), which once enjoyed a wider distribution, are now mainly confined to southeastern Turkey. Their population has been greatly reduced during the last 50 years, and the wild population is believed to number less than 500. The caracal (*Caracal caracal*) inhabits the arid hilly steppe desert and mountain terrain to which it is adapted, and wild boar (*Sus scrofa*) are found in wooded hills and forests. Hyaena (*Hyaena hyaena*) are distributed from Turkey to Iraq; however, the population in Turkey is fragmented and believed to include fewer than 250 individuals (Can 2000). The wolf (*Canis lupus*) has been virtually exterminated from many parts of Turkey, although there are rare reports of sittings in areas near the mountains. Golden jackal (*Canis aureus*) is distributed throughout the country; it may have expanded into the areas that were once occupied by wolves. The jackal is the most widely distributed top predator in the region.

Small carnivores such as badger (*Meles meles*), stone marten (*Martes foina*), and red fox (*Vulpes vulpes*) can be found in favourable habitats.

The endangered loggerhead marine turtle (*Caretta caretta*) and the critically endangered Mediterranean monk seal (*Monachus monachus*) are flagship species for conservation activities in Turkey. Habitat destruction poses the main threat to both species, since the nesting sites are located in areas of high tourism. Another important threat for *Monachus monachus* is destruction and accidental capture by fisherman.

**Current Status**

Protected areas are not sufficient for effective conservation, particularly in the eastern Anatolian mountains in border with Armenia. On Turkey's side there are no protected areas within this ecosystem. In Armenia, principal protected areas are Sevani National Park, and Khosrov, Dilijan and Shikahogh State Reserves.

**Types and Severity of Threats**

The Mediterranean region and the Middle East are among the most degraded areas in the world due to their long history of heavy human settlement. Most coastal sites are heavily impacted by both tourism and agriculture.

An important threat to wildlife is illegal hunting. *Ursus arctos, Canis lupus, Capreolus capreolus, Cervus elaphus*, and *Capra aegagrus* are most threatened by this activity. Even though the rocky slopes and ridges of the Taurus Mountains offer suitable habitat for *Capra aegagrus*, over-hunting has greatly reduced their numbers. There are many wildlife reserves and national parks in the region, but they do not provide adequate protection for these animals. Local people also have a negative attitude towards bears because they try to feed in crop fields and on beehives.

Habitat loss and modification mainly by agriculture, unsustainable use of biological resources, and the impact of introduced and non-native species have degraded natural ecosystems and caused a decline in the populations of wild animals and plants. In the high mountainous areas, the main threat to the vegetation is over-grazing by feral goats as nomads herd their livestock to the high mountains during the summer period. These animals are particularly destructive because they prefer young seedlings and shoots, and areas where they have grazed cannot easily regenerate. In the eastern part of the ecoregion agriculture is so extensive that, except in the hilly areas, all the natural vegetation has been converted to fields. Even in the hilly areas, natural communities are highly degraded due to overgrazing.

Extensive agricultural activities also threaten bird communities. Overuse of insecticides and fertilizers kills many birds every year. One of the best examples of this is offered by the *Geronticus eremita* population in Birecik-Urfa. As noted above, this is the only Turkish population of this species, and one of two populations in the world. Its breeding site is located along the Euphrates River, and each year new hatchlings die from insecticide poisoning.

Inappropriate forest management practices that favour timber production pose another major threat. In addition, the collection and over-harvesting of bulbous plants threaten the wild populations of these species, despite the existence of many regulations and controls designed to protect them. Human-caused fire is another important cause of forest destruction.

Finally, tourism, which is one of the most destructive activities in the lowlands and coastal areas of Turkey, has now also started to affect mountainous areas. As people become more mobile and look for new recreational activities, these more remote areas with their scenic landscapes and forests are becoming more accessible and vulnerable.

### 2.2.2 Cyprus

Located in the Mediterranean Sea, this island ecoregion is home to a variety of flora and fauna. More than 125 endemic plants are found here including the endangered Cyprus cedar (*Cedrus brevifolia*) and the Cyprus oak (*Quercus alnifolia*). The island also serves as a stepping stone between Europe and Africa for millions of migratory birds every year. Over 350 species of birds can be found here, most of which are migratory. Some 46 residents and 27 migratory species breed regularly on the island; about 10 species are endemic. The island is home to a number of mammals such as the Cyprus moufflon (*Ovis orientalis ophion*), which is a rare type of wild sheep found only on the island of Cyprus. Only eighteen percent of the island is covered by its original habitat. Conversion of forest to pastures, urban development, forest fires, and tourism are all causes of habitat loss and continue to be a threat to the country's biodiversity.

**Biodiversity Features**

The island has a significant faunal diversity, though endemism is low. The rare and endemic herbivore, Cyprus moufflon (*Ovis aries ophion*) persists in the region's forests. These forests are considered an important Center of Bird Diversity. There are approximately 81 bird species with a number of endemics such as Cyprus warbler (*Sylvia melanothorax*).

**Current Status**

The Cyprus' forests, which are greatly reduced in extent and still recovering from abuse, cover about 18 % of the island's land area (31% of the land above 1,000 m of altitude). During Classic times, Cyprus was an important shipbuilding center and a timber exporting country. The island has seen great fluctuations in population and prosperity under the historical Roman, Byzantine, and Turkish Empires, and a result has seen a long history of use and abuse of timber resources. During the nineteenth century, the national goat population was greater than on any other island in the Mediterranean. Overgrazing and setting of fires to produce fresh grassland have transformed large areas of mature forest into degraded shrubland. Land clearance and crop terracing have destroyed the majority of deciduous oak (Quercus infectoria) forests of the island these now persist in small stands or lone trees scattered among the crop terraces.

The endemic cedar forests are represented by only a few hundred hectares. Black pine forests are intensively managed for timber, and old-growth pine trees, as well as juniper trees, are found only in high mountain rocky summits of the Troodos range. The predominance of ultra basic substrates is related to the existence of poor soils, and makes soil restoration a very slow and difficult process.

**Types and Severity of Threats**

There is a high potential of human impact, mainly due to the abrupt socio-political partition of the island in July 1974. About 100 km2 of forests on the northern part of the island were burned during conflicts.
Mismanagement of pastures and grazing, as well as tourism development (mainly urban development in the coastal zone) are also considerably increasing the risk of forest fires. Ski facilities and road construction represent a growing threat to important forest habitats and endangered species.

## *2.3 Caucasus*

### 2.3.1 Georgia, Azerbaijan, Armenia

The Caucasus region is located at a bio geographical crossroads where flora and fauna of at least three bio geographic provinces converge. Consequently, the Caucasus region has one of the highest levels of endemism in the temperate world (23 percent of vascular plants and 10 percent of vertebrate are endemic to the region). Landscape and habitat diversity favours high species richness as well: about 5,000 vascular and 7,000 lower plants (including high mountains), and 700 vertebrate animals are found in the region (Georgia 1996, Azerbaijan 1998, Armenia 1999).

**Biodiversity Features**

The region offers species typical to arid ecosystems such as striped hyena (*Hyaena hyaena*), Persian gazelle (*Gazella subgutturosa*), Caucasian hamster (*Mesocricetus brandti*), as well as forests and high mountain species as Caucasian red deer (*Cervus elaphus maral*), chamois (*Rubicarpa rubicarpa*), lynx (*Lynx lynx*). The high mountains and patches of woodlands in eastern Anatolian mountain steppe provide favourable habitat for many large mammal species. Brown bear (*Ursus arctos*), grey wolf (*Canis lupus*) are two important carnivores. Another important carnivore, striped hyena (*Hyena hyena*), was once widespread, but now is on the Red List.

The diversity of fauna is especially remarkable in pistachio-juniper open woodlands and flood plain forests in Azerbaijan and Georgia. However, conservation measures are urgently needed as many species of mammals, birds, amphibians and reptiles are endangered, including the Persian gazelle (*Gazella subgutturosa*), and peregrine falcon (*Falco peregrinus*). Six strict nature reserves protect the biodiversity in this region, but unsustainable agricultural practices and poaching threaten much of the region.

Other characteristic mammals include the East Caucasian tur (*Capra cylindricornis*), West Caucasian tur (*Capra caucasica*) – endemic species of the Greater Caucasus range, wild goat (*Capra aegagrus*), mouflon (*Ovis orientalis gmelini*), European otter (*Lutra lutra*), and critically endangered Caucasus leopard (*Panthera pardus ciscaucasica*). Other common mammals here are wild boar, badger, stone marten, jackal, and European wild cat.

Many species of avifauna is found in this ecoregion including such endangered species as the golden eagle (*Aquila chrysaetos*), and lammergeier (*Gypaetus barbatus*), restricted species such as the Caucasian black grouse (*Tetrao mlokosiewiczi*), and Caucasian snowcock (*Tetraogallus caucasicus*). Other characteristic species include great rosefinch (*Carpodacus rubicilla*), partridge (*Alectoris kakelik*), griffon (*Gyps fulvus*), black vulture (*Aegypius monachus*), white-tailed eagle (*Haliaeetus albicilla*), black stork (*Ciconia nigra*), Guldenstadts' redstart (*Phoenicurus erythrogaster*), gadwall (*Anas strepera*), whooper swan (*Cygnus cygnus*), common pochard (*Aythya ferina*), Greater Scaup (*A. marila*), common goldeneye (*Bucephala clangula*), and Dalmatian pelican (*Pelicanus crispus*).

**Caucasian Black Grouse Conservation**

The Caucasian Black grouse is classified as a globally threatened species and is endemic to the Caucasus region. It is a grouse species with the smallest distribution (about 12,000 sq. km) and a highly fragmented range. Total population is believed to be about 70,000 individuals. The species distribution covers five countries – Russia, Georgia, Azerbaijan, Armenia, Turkey and Iran. But about 60-70% of the range and 60-80 % of the individuals are believed to be in Georgia and Azerbaijan. Some surveys have been carried out, but no regular monitoring takes place and lack of data is one of the main problems. The main threats for this species and its habitats are: habitat degradation caused by increasing grazing pressure, deforestation, and erosion; predation by shepherd dogs; and illegal hunting.

Besides the species global importance, the Caucasian Black grouse also serves as a key habitat quality indicator that can be used to monitor both - the effectiveness of conservation actions and status of high mountain ecosystems. They are sensitive to deteriorating habitat and ecosystem quality, e.g. upper forests, sub-alpine and alpine ecosystems (particularly the rhododendron cover endemic to the Caucasus). Many other species of conservation concern would benefit by conserving the quality of its habitat.

A conservation project is jointly developed by Georgian Center for the Conservation of Wildlife (GCCW) and Azerbaijan Ornithological Society with partnership to BirdLife International, Swiss Association for the Protection of Birds and the German Society for Nature Conservation, and is funded by the Regional Environmental Center for the Caucasus (REC) and WWF Caucasus program. The following activities are conducted currently - Awareness raising campaigns and public participation in the monitoring and management of pilot areas, promotion of eco-tourism in selected areas, and International experience sharing and involvement of all Caucasus countries.

Thousands of little bustards winter in lowlands. The region harbours important populations of southern European waterfowl. Some, such as white-headed duck, ferruginous duck and marbled teal, have quit restricted distributions. During migration and wintering periods, the importance of the region's shoreline and wetlands is heightened. In addition to the year-round species, a large numbers of wildfowl species, including the three mentioned above, and lesser white-fronted goose, a globally declining species, can be found.

The region is also notable for its reptile diversity. Mediterranean tortoise (*Testudo graeca*), Lebetine viper (*Vipera lebetina*), Western boa (*Eryx jaculus*), and Dahl's Whip Snake (*Coluber najadum*) inhabit the region. *Testudo graeca* and *Vipera lebetina* are listed in the Red Books of the Caucasus countries.

Habitat loss and modification mainly by agriculture, unsustainable use of biological resources, and the impact of introduced and non-native species have degraded natural ecosystems and caused a decline in the populations of wild animals and plants. The growth of the agricultural, industrial, construction and energy sectors have led to extensive habitat

change across all landscape types. Urban and industrial areas have grown, while forests have been logged and marshes and wetlands have been drained.

**Current Status**

Economic and socio-cultural changes are causing a decline in environmental quality in the Caucasus. Urban and rural development have converted most of lowland forests to agricultural and development lands.

There is an urgent need for improving wildlife conservation and increasing the level of public concern for the environment. About 5% of the region's area has protective guidelines. Protected areas are not sufficient for effective conservation of all valuable ecosystems in the region. Principal protected areas are Borjomi-Kharagauli National Park, Lagodekhi and Tusheti Strict Nature Reserves in Georgia, Caucasus Biosphere Reserve in Russia, Zakatala Reserve in Azerbaijan and Sevani National Park, and Khosrov, Dilijan and Shikahogh State Reserves in Armenia. The gaps in the reserve network were not assessed. Approximately 35% of mountain forests mainly remain in a natural state, but current attempts to develop commercial forestry in the region along with socio-economic crisis, which stimulates rising of the demands of local population on firewood is a potential threat to these habitats.

Conservation measures that are carried out separately in each respective country of the Caucasus are not as successful as a larger across boundary program, and the likelihood of a lasting positive impact is significantly reduced.

In 1996, NACRES, a Georgian NGO, carried out extensive feasibility study in Armenia and Azerbaijan for potential regional cooperation. The study revealed two major problems:

- Limited numbers of environmental non-governmental organizations across the region and their lack of experience in collaborating with governmental agencies; and
- Poor communications between these countries.

**Georgian Center for the Conservation of Wildlife (GCCW)**

GCCW is a non-governmental, non-profit organization established in 1994 to encourage biodiversity conservation in the Caucasus, with primary focus on Georgia. GCCW applies the techniques of modern conservation biology to environmental policy, natural resources management, and conservation practices in Georgia and the Caucasus. By carrying out study projects and education activities, and assisting national governmental institutions and community-based organizations in capacity building, it hopes to establish sustainable development policies and adaptive management strategies in the region. GCCW is a member of The World Conservation Union (IUCN), The European Center for Nature Conservation (ECNC), The GEF-NGO Network and BirdLife International.

GCCW operates through three main programs. Taken together these achieve synergies in conservation in the Caucasus:

1. **Conservation science:** biodiversity assessment studies; nation-wide wildlife inventory; researches on separate species biology and ecology (with focus on birds); monitoring and recovery programs of endangered species and their habitats; participation in selection, design and management of protected areas.
2. **Public Relations and Communications:** publications; teaching materials; TV programs; workshops, seminars, conferences, training programs; community outreach programs; fellowship and exchange programs; environmental networking in the Caucasus.
3. **Sustainable development:** advocacy for and assistance in developing integrated and sustainable resource management strategies and policies (with focus on wildlife management, forestry, range management, and water and wetlands management); promotion of Community Based Organizations; institutional capacity building; inter-sectoral partnership; eco-tourism development.

As a result of the above described development, a number of species are close to extinction or extirpation in the region. To date, 35 plant species of economic importance are known to have become extinct only in Armenia. A further, 386 species (12% of the flora) are listed in the Armenian Red Data Book (1988). The ecological crisis associated with Lake Sevan in Armenia and Javakheti mountain wetlands in Georgia has been well documented. Vegetated wetlands around the lake have disappeared. In the Ararat valley alone, 1500 km2 of swamps have been drained and transformed into agricultural land. In the mountainous areas, inhospitable climate, and remoteness make the region unattractive for large scale development.

In Azerbaijan, an estimated 1.2 million hectares are currently affected by steep salinity (due to excessive and long-term use of agro-chemicals), and almost 3 million hectares are damaged by overgrazing and uncontrolled logging (Azerbaijan 1998). Flood plain forests and pistachio-juniper woodlands remain on only 5-7% of their original range. Stripped hyena has become a critically endangered species in the region. The only viable population of gazelle (up to 3,500 individuals) is in Shirvan Nature Reserve (Kuliev, 1990).

Georgia and Armenia have developed national Biodiversity Strategy and Action Plans (Armenia 2000, Georgia 2000), where conservation of these habitats is listed as one of the priority actions.

**Types and Severity of Threats**

Unsustainable forest use, including poor management and illegal cutting in combination with uncontrolled timber export, create main threats for forest ecosystems. Overgrazing and other unsustainable agricultural practices are a major cause of habitat degradation at upper line of forests and grasslands (Gokhelashvili et al. 1999). Overexploitation or poaching of game and economically valuable species is another very significant threat to biodiversity here. Numerous species have been severely affected by over hunting. Around 60 species of animals are listed by IUCN (1994), and 140 species vascular plants and 11 species of animals are listed by Azerbaijanian Red Data Book (1985).

## *2.4 Central Asia*

The Region of Central Asia includes 5 States - **Uzbekistan, Turkmenistan, Tajikistan, Kyrghyzstan, Kazakhstan** - and covers a territory of about 4 million sq. km. Despite the many shared cultural, historical, and environmental features of the five nations, this vast region is characterized by great contrasts in landscape and biological diversity - from steppes and deserts to mountain forests and tundra.

This diversity of landscapes in turn supports a rich variety of plants and animals. About 7000 species of angiosperm flora, 900 species of vertebrate and 20000 of invertebrates are described here; in some areas, up to 18-20 % of species is represented by endemic - so that they can be met nowhere else in the World. Many wildlife species are listed in the Red Data Book of IUCN such as Asian cheetah, leopard and snow leopard, kulan, markhour and bukhara deer, different rare eagles and falcons, houbara bastard, and many others.

Mountains of Central Asia, its deserts with riparian forests in the river valleys are recognized to be unique in the scale of the Planet, and they are included in the list of 200 prioritary ecoregions of the World (WWF web pages).

Despite a respect for nature present in the Islamic culture that has shaped much of Central Asia's history, a variety of circumstances has placed these ecosystems under threat. During Soviet rule, Central Asia became subject to unwise agricultural development. The most notorious example is the Aral Sea, which began to dry up when two rivers were diverted into the desert for irrigation. When combined with rapid population growth in the second half of 20th century (Central Asia's population is currently estimated at about 44 million), this short-sighted agricultural development led to the extinction of many species of animals and plants. For example, the Turanian (or Caspian) tiger (*Panthera tigris virgata*) became extinct in the 1950s-1960s, while the population of Asian cheetah (*Acinonyx jubatus*) disappeared in the 1970s.

As a part of the Soviet Union, Central Asia was an heir to its remarkable system of protected areas. A total of 33 strict nature reserves (zapovedniks) and 9 national parks protected a broad range of ecosystems. Following independence from the Soviet Union in 1991, however, the financial mechanisms that supported these nature reserves have collapsed, leaving them struggling to support their staff and protect their territories. Moreover, the economic decline of all of the Central Asian nations has pushed environmental protection as a whole to a position of lower priority. However, the major reserves from Soviet period are still functioning and in addition, within the last 2-3 years, some of the countries of the region start to create new protected areas, to reserve lands for future protection, to increase funding of the PAs from the governmental budget.

Now specially protected nature areas cover from 2.5 % to 4.5 % of the area of Central Asian countries. Totally there are about 200 PA in the region, including 39 zapovedniks and 19 national and nature parks: 74 in Kazakhstan (10 zapovednics, 8 national and nature parks, 56 sanctuaries), 19 in Uzbekistan (9 zapovednics, 1 national and nature parks, 9 sanctuaries), 23 in Turkmenistan (8 zapovednics, 15 sanctuaries), 19 in Tajikistan (4 zapovednics, 2 national and nature parks (*one of them –recently created - 2,6mln.ha, 12% of the area of the country*), 13 sanctuaries) and 61 in Kyrgyzsatan (8 zapovednics, 8 national and nature parks, 50 sanctuaries). (WWF Web – WWF Econet project).
Central Asia's native fauna and flora includes many species that are increasingly threatened by large volumes of legal and illegal collection and hunting for wildlife trade. In all countries, threatened and endangered species that had been strictly protected by Soviet legislation have begun to be illegally used commercially at the beginning of 1990, and only within the last 3-4 years the countries start to overcome this problem. By now, all Central Asian countries have prepared and published their National Biodiversity Strategy and Action Plans which can be seen as important step towards the biodiversity conservation in these plans are implemented and the related legislation effectively enforced.

In parallel with the legal tourist hunting market, illegal practices (trophy hunting) are still largely reported in Central Asia, involving protected and rare species listed under CITES such as leopards, Argali (wild sheep) and Urial (wild goat). For many impoverished citizens, economic incentives in illegal wildlife trade outweigh alternative methods of meeting basic daily needs.

The volume of wildlife trade in Central Asia has remained high since a phenomenal increase in 1990 and 1991 since the dissolution of the USSR. TRAFFIC Europe-Russia initiated a number of wildlife trade investigations in 1995 in the Central Asian countries of the former USSR: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. TRAFFIC researchers interviewed wildlife experts, governmental officials, members of conservation NGOs and surveyed wildlife markets. The study revealed that a number of threatened species are poached and traded, while others are traded at levels which may not be sustainable.

CITES annual report data show that reported exports from the newly independent states in Central Asia reviewed in the TRAFFIC study are destined predominantly for China and Japan, but also Russia, Czech Republic, Poland, Spain, USA, Mexico, Denmark, Canada, the Netherlands, Italy, Switzerland and Syria.

Of the five countries reviewed by TRAFFIC report, only Uzbekistan is a Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Russian CITES Management Authority is responsible for issuing CITES permits for plants and animals and their parts that are traded from Central Asia. All the Central Asian countries have state agencies responsible for setting hunting and harvest quotas, issuing hunting licenses and enforcing controls for use of wildlife in the field. Similarly, legislation to conserve wildlife resources has been enacted in all of these five countries.

To address the challenges of biodiversity and wildlife in the region, TRAFFIC recommends in its report "Overview of Wildlife Trade in the Central Asian Countries" (TRAFFIC, 1998) the following:

- The national governments of Central Asia should follow Uzbekistan in acceding to CITES in order to ease their national responsibilities for the protection, regulation and monitoring of wildlife in international trade. Once each of these countries becomes a Party to CITES, including Uzbekistan, it must designate a Scientific Authority that is separate from the Management Authority that issues the permits.

- CITES Parties should carefully scrutinise all applications to import CITES specimens from the Central Asian CIS countries, and refuse those for which it appears that specimens have been acquired in contravention of national legislation or exported illegally. The CITES Secretariat, and the CITES Animals and Plants Committees should review the impact of the export of CITES specimens from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan on their wild populations, and advise the CIS countries and Parties accordingly.

- The governments of Central Asia, in co-operation with those in countries importing the wildlife from the region, need to place higher priority on protecting threatened native species. Each country could develop a profitable and sustainable trophy hunting industry based on sustainable hunting. Generated revenues should to be divided equitably between the local community and protected area agencies.

- Foreign firms that sell hunting packages in these five countries should avoid or stop offering incentives to hunt endangered species unless there are clear conservation benefits. Companies that support legitimate tours in which hunting is conducted legally, and trophies exported legally, should apply pressure on companies circumventing these legal requirements to clean up their business practices that threaten wildlife.

- International scientific and conservation communities should support initiatives to compile comprehensive and reliable data on population, status and threats for threatened species in order to more accurately set hunting and trade quotas. Emphasis should be put on in situ pilot projects and local sustained management, utilization and conservation efforts.

- Captive breeding and artificial cultivation programs should be developed for commercially attractive species.

**Trophy hunting in the region**

*Wild Sheep and goats*

In Kazakhstan, the most popular animals for trophy hunting are subspecies of Argali *Ovis ammon*. Foreigners began to hunt the threatened endemic Kazakhstan Argali O. *a. collium* in 1990 for trophies, which is the most popular subspecies of Argali among hunters. From 1990-1997, foreign hunters shot 75 Kazakhstan Argali and paid more than US$900 000 for their trophies (US$12 000/Argali).
Kazakh state companies earned some US$130 000 from selling hunting tours for Transcaspian Urial *Ovis orientalis arkal* (LR) and Goitred Gazelle *Gazella subgutturosa* (LR) in 1992. Illegal hunting using spotlights has been reported in Kazakhstan.
Other wild sheep occurring in Kazakhstan include Altai Argali O. *a. ammon* (VU) (CITES Appendix II) (100 individuals), Tien Shan Argali O. *a. karelini* (VU) (800 individuals) and the endemic Kara Tau Argali O. *a. nigrimontana* (CR) (200 individuals) (CITES Appendix I). Trophy hunts for these threatened subspecies are not allowed by the government, however, hunting trips to hunt the critically endangered Kara Tau Argali O. *a. nigrimontana* have been offered in the USA and in Turkey for about US$40 000 each.

In Kyrgyzstan, hunting is open to residents and foreigners. Marco Polo Sheep Ovis ammon polii (VU), a nationally protected species, may be hunted by foreigners for US$13 000-15 000 each. During the 1993-1994 hunting season, the Russian Management Authority issued eight export permits. Kyrgyzstan strictly prohibits the hunting of Tien Shan Argali *Ovis ammon karelini* (VU) (CITES Appendix I), however, in 1991, a number of Tien Shan Argali were accidentally shot instead of Marco Polo Sheep. The present population of Tien Shan Argali is estimated at 7500 animals.

In Tadjikistan Marco Polo Sheep hunts cost US$10 000-20 000 in 1995. Part of the permit fee is directed to the local reserve budgets, and is sometimes the only financial income in the whole district. This money was often spent on basic needs for local people rather than on improving control of wildlife trade or conducting censuses. During the 1993-1994 season, the Russian Management Authority issued export permits for 24 Marco Polo trophies from Tajikistan.

Ban on hunting threatened species was reconfirmed in Turkmenistan in 1991. However, following the request from Turkmenistan authorities the Russian Management Authority continued to issue export permits for threatened species throughout 1994 and 1995. Licence fees for foreigners to hunt endangered Markhor and Bukhara Urial cost upwards of US$20 000.

In Uzbekistan, the endemic Severtzov's Urial O. *orientalis severtzovi* (EN) is a nationally protected species. It occurs primarily in the Nuratinskiy *zapovednik* where its numbers are estimated at 1700-2200, or up to 70% of the world's population. Officially, hunting in the *zapovednik* is not permitted, although the government began allowing foreign hunters to hunt in these reserves in 1992 with an annual quota of five Severtzov's Urials that was reduced to two in 1995. Severtzov's Urial trophies can fetch from US$10 000-20 000.

*Other trophies*

The Tien Shan Brown Bear *Ursus arctos isabellinus* (CITES Appendix I) is classified as threatened in the 1986 *Red Data Book of Kazakhstan*. Respondents estimated that 20-25 skins are illegally taken from Kazakhstan annually and exported to Germany and Pakistan.
In 1992, a German hunting party was reported to have permission to hunt Marco Polo Sheep and Snow Leopards in the Pamir Mountains. The guided illegal hunt on Snow Leopard and Marco Polo Sheep was offered for US$4000. Hunting of Marco Polo Sheep and Snow Leopards was carried out using military and state-owned helicopters. The General Director of the State Tadjik Forestry Association is reported to have offered a hunt targeting the nationally threatened subspecies of Tien Shan Brown Bear *Ursus arctos isabellinus* (CITES Appendix I) and Bukhara Urial *Ovis o. bocharensis*.

*Opportunistic poaching*

Hunting of North Persian Leopards *Panthera pardus saxicolor* was made illegal in Turkmenistan in 1993. One questionnaire respondent, who was offered six Leopard skins for US$1000 each, believes that most of the Leopard skins come from *zapovednik* rangers, who receive poor salaries, equivalent to US$10 per month, and poach what they can to supplement their incomes.
Hunting of Snow Leopards is strictly forbidden in the Central Asian countries of the former USSR. In Kazakhstan, however, several Snow Leopard skins were reportedly sold in Almaty to foreigners. In 1994-1995, there were about 10 skins sold for US$3000-7000. In 1993, local newspapers published private sale advertisements for Snow Leopard skins. Illegal trade in Snow Leopard skins was also reported at the Kyrgyzstan-China border. During inauguration, President N. Nazarbayev appeared in public in traditional Kazakh coat with the collar made of the snow leopard fur.

In Tadjikistan, questionnaire respondents reported trade in Snow Leopard skins and Tien Shan Brown Bear *Ursus arctos isabellinus* skins. In the spring of 1995, one Snow Leopard skin was reported traded in a town market for US$300-400. In the summer of 1995 at the market, two bear skins were exhibited, each worth about US$120. In the same year, 10 Snow Leopard skins were confiscated at the border by Customs officers.
Uzbekistan's impoverished population has become even poorer after the breakup of the USSR. This human crisis has fuelled illegal hunting of sheep, goats and bears. State Game inspectors mentioned that local people hunt Tien Shan Brown Bear and Snow Leopard for the pelts, which they sell to foreigners.

*Houbara Bustards*

The Houbara Bustard *Chlamydotis undulata* is protected in Kazakhstan and listed in CITES Appendix I. The total population of Houbara Bustards in Kazakhstan is about 10 000 individuals. The government granted exceptional permission in 1993 for a Saudi Arabian sheikh to take 100 of these birds.
In Turkmenistan, Houbara Bustards were hunted during 1993-1995 by Arabian sheikhs. These hunts were sanctioned by the President of Turkmenistan. Hunting takes place throughout the year except during the bustard breeding season, generally from the first half of April until June. Sheikhs from Bahrain, Qatar and Saudi Arabia have visited Turkmenistan to hunt bustards since 1993. They often obtain hunting permits for 300-400 birds, but some experts have spoken of hunts totaling 2000-5000 bustards. Local zoologists recorded a dramatic decrease in the Houbara Bustard population in Turkmenistan, which they attribute to this unsustainable harvesting.
Illegal hunting of Houbara Bustards is reported to be common in Uzbekistan. Sheikhs recognizing the demand for foreign currency have made charity donations in their attempts to hunt Houbara.

**Trade in birds of prey**

TRAFFIC's investigators were repeatedly informed of illegal export trade in Saker Falcons with the UAE. Sheikhs offered donations to Kazakhstan to obtain permission to collect falcons. It is estimated that 1500 Saker Falcons were collected annually for export from Kazakhstan between 1992 and 1994. In early September 1995, TRAFFIC researchers noted approximately 300 birds from Central Asia available in Arabian markets.
Saker *Falco cherrug* and Peregrine *F. peregrinus* Falcons are nationally threatened and protected in Uzbekistan. Throughout 1991-1993, there was an increase in the demand for falcons in the UAE and Saudi Arabia. By the end of 1995, a trained falcon in Uzbekistan sold for US$600-700. Uzbekistan is also a transit point for falcons coming from Turkmenistan.

**Trade in reptiles and amphibians**

In Kazakhstan, the most commonly traded species are Marsh Frogs *Rana arvalis* and Horsfield's Tortoise. From 1976 to 1993, 3 356 500 Marsh Frogs, were reported captured and traded in Kazakhstan for terraria, food for other captive animals and laboratory use.
From 1976 to 1993, 1 097 300 Horsfield's Tortoises were reported collected and traded in Kazakhstan. The period 1993-1995 was the most active trading period of tortoises between Central Asia, the USA and Japan. The tortoise population experienced a dramatic decline, most likely due to over harvesting which resulted in a decreased annual harvest from over 100 000 in the past, to the current 40 000 to 50 000. In 1993, the Russian CITES Management Authority issued permits to export 11 404 Horsfield's Tortoises from Kazakhstan to companies in Moscow and the Ukraine. Most tortoises were then exported to Spain (5400) and the Czech Republic (4000), followed by USA (1000), Japan (1000), and the Netherlands (4).
In 1994, permits were issued for the export of 23 686 Horsfield's Tortoises originating in Kazakhstan to the companies in Moscow and the Ukraine. Most tortoises were re-exported. In 1995, the Moscow-based company received permits to re-export 12 350 Horsfield's Tortoises.

In Uzbekistan, Horsfield's Tortoises destined for export to the West are collected within quotas. Demand for tortoises as pets in Russia, Ukraine and other CIS countries is met by illegal collectors. Large numbers of tortoises are smuggled out of the country, especially by trains but also by private cars. In 1993, the Russian CITES Management Authority processed export permits for 600 tortoises.

Reptiles and amphibians are widely traded in Turkmenistan. In Tajikistan, a local expert reported that snake populations in the country will not survive continued extensive harvesting for venom. Populations of Levantine (or Blunt-nosed) Viper *Vipera lebetina* have significantly decreased in Tajikistan due to over harvesting, to the extent that snakes used in serpentaria are now illegally imported. Venom sold for US$1000-1200 per gram in 1992, but has reportedly since decreased in value. One thousand Horsfield's Tortoises were exported from Tajikistan to Sweden in 1996.

**WWF Projects in Central Asia**

In 1996 WWF initiated preparation of the Package of proposals on the urgent measures on biodiversity conservation of Central Asia, which was published in 1998. Now, first WWF projects are on going in the States of Central Asia. Now the first projects from this package are on-going in the states of the region:

- Wetland econet development in Kustanai, Kazakhstan (funded by WWF and Government of Sweden and Finland).
- Bukhara deer conservation and restoration in Uzbekistan, Turkmenistan, Tajikistan, Kazakhstan (funded by LHI, WWF and Government of the Netherlands),
- Leopard conservation in Turkmenistan (funded by WWF and Government of the Netherlands)
- Saiga in Betpakdala, Kazakhstan –Frankfurt Zoological Society (FZS)
- Kulan conservation in Turkmenistan
- GttE from the countries of Central Asia
- And some others of smaller scale….
  Since April 2003 – the major activity -
- **GEF-UNEP- WWF project –ECONET CENTRAL ASIA – all 5 countries of the region**

**WWF**

- assists in the nomination of the unique ecosystems of the region as World Heritage sites;
- supports public awareness in the region for the local people to recognize, that their unique nature is both a national property and world treasure;
- works out new projects, basing on the National Strategies and approved priorities,

**WWF approaches to conservation in Central Asia:**

- Selected species and habitats conservation projects
- Creating a ecologically representative PA system
- Strengthening management effectiveness of PAs
- Assisting governments in fulfilling their international commitments
- Institutional support to governments
- Capacity building of relevant target audiences
- Capitalising on political opportunities
- Building networks for conservation

**WWF Future priorities**

- Assisting the governments in fulfilling their international commitments
- Increase management effectiveness and sustainable financing of PA network
- Conservation and restoration of key ecosystems - freshwater ecosystems and high conservation value forests;
- Model projects on sustainable development – local communities involvement;
- Conservation of key species
- Institutional support to NGO

Building capacity of relevant target audiences

### 2.4.1 Uzbekistan

The Republic of Uzbekistan is situated in the central part of the Eurasian, within the subtropical zone of the northern hemisphere. The territory covers approximately 447,400 km2, and is bordered by Kazakhstan to the north, Turkmenistan and Afghanistan to the south, Kyrgyzstan and Tajikistan to the east. The Republic is divided into 12 main administrative areas (oblasts) and the autonomous Republic of Karakalpakstan in the north-western part of the country.

Almost 85% of its territory is occupied by desert or semi-desert, including the largest desert in Central Asia, the Kyzylkum. These deserts are flanked by the extensive Tien Shan and Gissar-Alai mountain systems in the east and south-east which occupy 15% of the territory. The main water arteries are the Transboundary Rivers, the Amu-Darya and the Syr-darya which deliver their waters into the Aral Sea, a large part of which is within the territory of the republic. These rivers are flanked by broad, flat valleys which are intensely utilized for irrigated agriculture.

The climate of Uzbekistan is described as subtropical extremely continental with considerable seasonal and daily fluctuations of temperature - long dry hot summer, humid autumn and fluctuating weather in winter.
There are three main climatic zones in Uzbekistan: deserts and dry semi deserts, foothills, and mountains.

The economy of Uzbekistan is dominated by agriculture which accounted for 44% of the national Net Material Product (NMP) in 1994 and 22.5% of GDP in 1996. Owing to the geographical / climatic situation of the country, only 10/11% of land is cultivated. There is a very high dependence on irrigated agriculture with 95% of all cultivated land being irrigated. In addition, the agricultural sector is heavily dominated by the production of raw cotton which in 1991 utilized approximately 70% of cultivated land and represents about 80% of the countries exports. However, in 1996 this had been reduced and cotton utilized 35% of irrigated land and constituted 38.1% of total exports.

Economic Transition: In 1991 Uzbekistan declared its independence from the Soviet Union. At that time the economy of Uzbekistan, as part of the centrally planned Soviet system was tightly integrated into those of other Republics. In response, Uzbekistan has been forced to undertake a systematic transformation of its economy, polity, and society. An important aspect of this transformation is the transition from a central planning to a more market orientated economy. At the beginning of 1990-th Uzbekistan has been more successful than many other CIS countries in preventing sharp falls in outputs and incomes and an increase in poverty. The gradual approach of the government foresees three steps: i. arresting any further decline in production; ii. attaining macro economic stabilization as a basis for resumed growth; and iii. creating the conditions for sustainable growth. The decline of the Uzbekistan economy since 1990 has been relatively small compared to that of other CIS States, particularly surrounding countries such as Azerbaijan, Armenia, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan. Uzbekistan had only just achieved a positive economic growth rate, and it remained higher than in many other Former Soviet Union countries and had showed a generally increasing trend in mid-ninetieths[1].

**Environmental Policy and Management**

Uzbekistan's independence and integration into the world economy and political system have provided a powerful incentive for achieving greater human welfare for its people and for the solution of its pressing ecological problems. The protection of the environment in the Republic is considered an integral part of the whole process of economic reforms. The social and economic policies of the state are based on the principles of achieving harmonization of

[1] During the last 4-5 years situation practically reversed, and Uzbekistan together with Kyrgyzstan is in the worst economical situation with highest level of poverty if compared with other countries of Central Asia (pers.comm. Ms.Olga Predalova WWF)

production and environment, and promoting awareness of the gravity of the country's ecological problems.

The ecological safety of citizens is now guaranteed by the Constitution of the Republic. Environmental legislation has established economic and social provisions for the ecological security of the population, on the basis of generally accepted principles of environmental protection and rational use of natural resources. According to Article 55 of the Constitution, land, water, wildlife, plants, and other natural resources are all part of the country's national wealth and therefore must be protected by the state. Uzbekistan signed (1999) and ratified (2000) the Aarchus agreement on the open social access to the ecological information.
An appropriate level of funding for ecological programs is to be attained through the central budget, a system of regional foundations for the protection of nature, nongovernmental ecological funds, and new finance and credit mechanisms developed within the context of the transition to a market economy.

**Institutional, administrative and legal system**

National legislation. The Forestry Code was adopted on June 26, 1978. It regulates use and restoration of forestry resources and responsibility of juridical and nature protection persons when using forestry resources. It is currently under review.

The law "On protection and use of wildlife" was adopted in 1982. It states legal acts aimed at protection, sustainable use, and reproduction of wildlife.

The law "On land" was adopted on June 20, 1990, with changes and additions, made by the Supreme Council of the Republic of Uzbekistan on Nov. 20, 1991, on May 6 1993, and on September 23, 1994. It is directed at the regulation of land-related arrangements with the purpose of providing for rational use and protection of land, maintaining the fertility of soils, saving and improving of the natural environment, and for equivalent development of all forms of management.

The law of the Republic of Uzbekistan "On protection of nature " which was adopted on December 9, 1992: This law installs legal, economic and organizational principles of saving the natural environment, rational use of natural resources, protection of ecological systems, natural complexes and separate objects. It guarantees the rights of the citizens to live in favorable environment. It determines powers of official bodies and departments in the field of nature protection.

The law "On specially protected natural territories" was adopted on May 7 1993. It determines legal, organizational and economic principles of handling of especially protected natural territories.

In addition to the above, regulation in the field of protection of valuable and endangered species of plants and animals in the republic, is carried out on the basis of the Resolutions of the Supreme Council of the Republic of Uzbekistan of September 3, 1993, No. 937-XI1 " On greater protection of valuable and vanishing plants and animals and regulating their use ", Resolution of Cabinet of Ministers of the republic a Uzbekistan of December 15, 1993, No. 600 "About measures on strengthening of protection of the wild animals and plants and regulation of their use" and "Instruction of the Cabinet of the Ministers of the Republic of

Uzbekistan of February 11 1996, No. 76-F about regulation of import/export of predatory birds in the Republic of Uzbekistan".

The order of hunting and fishery in Uzbekistan is carried out according to the above mentioned laws, and also with the "Ordinance On hunting and support of a hunting and fishing facilities on the territory of the Republic", authorized by Resolution of the Cabinet of Ministers on April 1, 1991, No. 95, and also "Rules of hunting and fishery on territory of the Republic", authorized by orders of State Nature Protection Committee of June 8, 1992 and January 5, 1993 and 1997. New laws for protection and sustainable use of wildlife and flora were developed: the Laws “On protection and use of wild fauna” (was adopted in 1997), “On protection and use of wild flora” (was adopted in 1998).

Some aspects of legal regulation of nature use and the protection of the natural environment are placed in the laws "On the property in the Republic of Uzbekistan", "On enterprises in the Republic of Uzbekistan", and "On rent". The Decrees of the President of the Republic of Uzbekistan of January 21, 1994 " On measures on further deepening of economic reforms, support to private property and development of business " and of November 24, 1994 "On increasing the efficiency of land use" also contain norms relating to the legal mode of land use.

For violation of the nature protection legislation the following responsibility is foreseen: administrative, criminal, civil-law (material), disciplinary, and economic penalties. On September 22, 1994 the Code "On the administrative responsibility" and Criminal Code were adopted, where there is envisaged accordingly administrative and criminal liability for ecological offences.

The State Biological Control Service, is the main agency responsible for ensuring regulation of biological resource use in accordance with laws and resolutions, for setting quota's in accordance with expert advise of the Academy of Science, and for issuing licences for exploitation on the basis of set quota's.

There is a uniform licensing system for hunting of animals and catching of fish in Uzbekistan. Licenses (permissions) for individual pleasure hunters and fishermen are issued by the Society of Hunters and Fishermen. State and commercial organizations, as well as foreign citizens get licenses from the State Biological Control Service under the State Committee for Nature Protection.

Export of wild animals in Uzbekistan is done in compliance to the International Rules of Trade of Wild Animals, with licenses issued by CITES. The only species said to be currently exported in significant number is the Central Asian tortoise. Fifteen thousand " animals were exported in 1995 and 7,500 in 1996 (according to quotas in effect during those years). Of other animals, only song and decorative birds bred in private collections are officially moved out of the country.

International Legislation. At this time the Republic of Uzbekistan has joined: the UN Frame Convention on Climatic Change (May 1993.), the Vienna Convention on Protection of the Ozone Layer, and Montreal Protocol on substances destroying ozone layer (May, 1993.), the International Biodiversity Convention (October, 1995), the Basle Convention on control of trans-border transportation of dangerous waste and their disposal (December, 1995). Uzbekistan has ratified the UN convention on Combating Desertification in those countries, which face serious drought and / or desertification (August, 1995.). The republic exhibits

large interest in international conventions which are directed at saving biological resources. Uzbekistan has signed convention on trade in endangered species of fauna and flora (CITES) (1997), the Bonn convention on protection of migratory species of animals (1998) and Ramsar convention on protection of wetlands (2000).

In addition, within the framework of the Bonn convention the following Memorandums were signed: the Memorandum of Understanding on saving of Siberian crane (1996), on protection of thin-beaked curlew (1996), on protection of Afro-Eurasian migrating water birds (1996), conservation and restoration of bukhara deer (2002).

**Institutional Context of Biodiversity Conservation**

The State Committee for Nature Protection (SCNP) is the main specially authorized overall coordinating organ for nature protection. Its basic tasks are as follows:

- Implementing governmental control over protection of natural environment, use of and restoration of natural resources;
- Implementing inter-sectorial system management of nature-protective activities;
- Developing and implementing unified nature-protective and resource-saving policies;
- Taking other actions toward a ecologically sustainable and healthy environment;
- Managing protected areas, and ensuring integrity of their protection regime.

The State Committee for Nature Protection includes 11 departments. Besides this, there are two specialized National inspections within State Committee for Nature Protection: State Biological Control Service responsible for conservation of flora and fauna and reserves management; State Inspection of Specialized Analytical Control.

A certain role in protection of flora and fauna is played by other ministries and departments, the most important of which are the Committee for Forestry of Ministry of Agriculture and Water Management (CF) and the concern "Uzfish" which in the government structure have departmental inspections on protection of biological resources.

Union of Hunters and Fishermen of Uzbekistan is a national-level NGO using, on a long-term basis, game and fishery lands, conserved by an agency-based game keeping service.

**Existing Protected Areas System**

Categories of Protected Areas: In Uzbekistan there are currently four basic categories of protected areas: State Reserves (Zapovedniks), State National Parks, Special State Reserves (Zakazniks), and State Natural Memorials (Table). Currently, the protected areas system consists of nine State Reserves (Zapovedniks) with area of 2164 km2, two National Parks with total area of 6061 km", one Biosphere Reserve (452 km2), nine Special State Reserves (Zakazniks) with the area totaling 12,186.5 km2, and one captive breeding centre for rare animals. The total protected area in Uzbekistan is 20,520 km2 which equals about 4.6 % of the Republics territory. However, in terms of strict / long term protection (i.e. IUCN Category I and II including the National Parks, Biosphere Reserve and State Reserves) only 8,171 km2 or 1.8 % of the Republic's territory is covered.

Distribution by Ecotype: Over half of the over all protected areas system consists of desert ecosystems (53%). Mountain ecosystems dominate the remaining areas (34%). Wetlands include about 6% of the system and tugai (riparian) forest consists of about 1%. In terms of Category I and II areas, mountain ecosystems equal almost the total area, with Tugai being the only other category represented (about 0.2%). Desert, Tugai and Wetlands ecosystems are therefore extremely badly represented in Category I and II protected areas.

**Ex-situ Conservation**

There are two zoological gardens (one in Tashkent, one in Termez) and a botanical garden (Tashkent) in Uzbekistan.

Tashkent zoological garden was founded in 1924 by a group of zoologists from the Central Asian University as a research / education establishment. One hundred and twenty four species are kept on the territory of 3.2 hectares. The basic direction of its activity is the creating of collections of rare and endangered animal species included in the International and Republican Red Book, their captive breeding, and increasing people's awareness of the country's wildlife. A new zoo, created on a portion of the Botanic garden's territory, was publicly opened in Tashkent on 1st of September, 1997. The design of the new zoo fully complies with international rules and regulations in the field.

Botanic garden: Named after academician F. Rusanov, it was organized in 1922 on the area of 8 hectares and originally belonged to Central Asian State University. Since 1944 it has been managed by the Academy of Sciences. In 1953 it was transferred to a new site with an area of 80 hectares. Since 1999 it has had the status of a research department of Institute of Botany, Academy of Sciences. There are studies on species requiring much effort for reproduction, for preservation of rare and vanishing species, their duplication, and introduction in nature. In the collection of live plants more than 6000 species, forms and species from the temperate zone are collected. Other Activity: Since 1991, the State Biological Control Service has being implementing, jointly with JV 'Denis,' a project for captive breeding of Saker falcons. During the last 5 years 27 chicks have been successfully reared. In 1996, for the first time ever, 11 examples were reintroduced into their natural habitats. Based on the same centre, a similar project dealing with Houbara bustard has recently got underway.

**Education, Training and Public Participation**

Uzbekistan has a highly developed education system with almost full literacy and high school / higher education facilities. The system of school education has specialized schools with a more detailed teaching of certain subjects. In terms of the system of professional schools, only a few have biology/ecology related courses in their curricula.

At the level of higher education ecology and biodiversity related programs are concentrated in biological departments of universities and in medical and agricultural schools. Twelve higher education institutions have ecology chairs. The Biological departments of state universities educate specialists majoring in 'biology' and 'ecology and nature protection.' Forestry specialists are educated at the Forestry Department of the Tashkent Agricultural University.
Uzbekistan totals 8919 regular schools, 471 professional schools, and 55 higher education institutions. Legal provisions for education.

The law 'On education' of the republic of Uzbekistan (July, 1992) states a mandatory 9-year basic education and provides for opportunities of free professional and higher education. It also allows for fee paid professional and higher. Up to 7 languages of instruction are used in the regular school system. However, professional and higher education uses only Uzbek and Russian.

The Cabinet of Ministers is made legally responsible (article 9 of the law 'On nature protection' (Dec., 1992)) for creating systems of ecological awareness and education. There are no special laws on ecological education.

A significant role in promoting an ecological 'vision' of the world is played by various NGO's, circles, clubs, and ecological Sunday schools. These tend to be concentrate Funding sources for them can be membership fees, charity, and various donor organizations.

NGO's and Public / Private Participation in Biodiversity Protection

There are more than 30 environmental/public health NGO's in the country, 13 of which are officially registered. The largest are the International Foundation "Ecosan", the Red Crescent's Society, which have direct governmental support; Uzbek Zoological Society (member of IUCN) - more than 300 members. Membership of other NGO's is limited (2 to 20 people). There are many spheres of NGO activities connected with biodiversity conservation involving environmental conservation issues per se and eco-education, information and propaganda.

However, before NGO's potential for the development of biodiversity conservation and sustainable use can be fully realized, it will be necessary for the government to complete relevant legislative reform and for state organizations to more fully recognize/involve NGO's in activities. In addition, NGO's will need to develop a broader membership, and improve their resource base and management capacity. International development agencies and the government will need to support this process.

**Projects and initiatives**

National Action Plan for Environment Protection and Ecological Provisions for Uzbekistan's Sustainable Development (NAPEESD): It was prepared with the assistance of the World Bank. The biodiversity strategy was incorporated into the NAPEESD as one of its major components. The NAPEESD is a unified approach to environmental planning and ensures components are interrelated and supportive.

The National Sustainable Development Commission (NSDC): The NSDC, which is currently being established with the assistance of UNDP, will shortly be responsible for guiding the future Sustainable development within the Republic. Part of its responsibilities will include initiating policies, strategies and action plans to achieve Sustainable development, monitoring their effective implementation, and their review, revision or updating. Therefore, central to its responsibilities will be the effective and integrated implementation of the Rio "Earth Summit" conventions to which Uzbekistan is a signatory. A major instrument for achieving the above will be the NAPEESD, including its biodiversity component.

International Conventions on "Climate Change" and "Combating Desertification": A GEF project to carry out a country study on climate change in Uzbekistan is ongoing with UNDP assistance and preparations to produce a national desertification action plan are underway with "UNEP/UNDP support. Both of these have a significant overlap and interrelation with the biodiversity issues and unified actions on all three sectors should ensure concrete progress for addressing critical environmental problems in the Republic. However, it is important to ensure co-ordination and synergy of action.

Transboundary Biodiversity Project (Western Tien Shan Mountains): This is a GEF/cost sharing project for approximately US$ 18 Million was prepared by the World Bank/Governments of Kazakhstan, Uzbekistan and Kyrgyzstan. Briefly the project had the following basic components: *a*. Development of Biodiversity Strategy & Action Plan for Kyrgyzstan Republic (the BSAP for Kazakhstan and Uzbekistan were prepared with assistance of UNDP); *b*. Strengthening of policies, regulations, and institutional arrangements; *c*. Development of programs to support the Sustainable use of natural resources by local communities in the W. Tien Shan; *d*. Development of financing mechanisms, capable of duplication in the region, which will assist protected areas in meeting recurrent costs; *e*. Encourage regional co-operation and harmonization of environmental standards. Implementation began in 1998. This corresponds closely with the completion and official approval for the National Biodiversity Strategy and the start of the Biodiversity Action Plan for Uzbekistan. The National Biodiversity Strategy provide the necessary strategic and institutional framework for the Transboundary project implementation, which in turn should ensure that the momentum engendered by the development of the Strategy and Action Plan is maintained and practical results realized. The Transboundary project will therefore be highly beneficial in helping to bring about the critical move from policy development to action.

Aral Sea Program (World Bank/ UNDP/ UNEP): The program is intended to address the long term water and land use management problems of the region while in the short / medium term providing support to address the immediate needs of populations within the worst effected areas. In addition to the long term implications the program has for more rational natural resource management in the region there are also three programs with specific importance to biodiversity in Uzbekistan, namely Sub-programs: 4.1 -Amu-Darya Delta Wetlands Restoration (started in 1999); 4.3-Environmental Studies (including biodiversity assessment - started in 1998); and 6 - Integrated Land and Water Management in the Upper Watershed (started in 1998).

Lake Sudochye Wetlands Restoration Project (GEF/World Bank): This project (started in 1999) forms a component of the Aral Sea Program and is aimed at ensuring the preservation / restoration of the Lake Sudochye Wetlands area in the Amu Darya delta, so as to conserve important and highly endangered biodiversity, improve socio-economic conditions in the area (grazing, fishing, muskrat and other wildlife harvesting and improved drainage of farm lands), and improve regulation of drainage water discharges through a major collector canal. The Lake Sudochye area is of particular value for migratory birds (West Asian Flyway) and is proposed as a potential "Ramsar" Convention site.

National Environmental Information Network for Uzbekistan (UNEP/GRID - Arendal) (started in 1999): As part of their Environment and Natural Resources Information Network (ENRIN) in Countries in Transition program GRID-Arendal are assisting the governments of Central Asia in the development of National Environmental Information Networks. In Uzbekistan an initial assessment has been completed and a feasibility study is underway. In

addition to national efforts a regional Environmental Information Network for the Aral Sea Basin is being developed within the Aral Sea Program. Currently, one of the major problems for effective environmental planning, including biodiversity planning, is the lack of accessibility to unified and accurate data for decision makers. The above projects will therefore be of enormous value for biodiversity conservation and sustainable use planning in the future.

Nuratau Biosphere Reserve Proposal (NABU) (started in 1999):
The German Federation for Nature Conservation (NABU) is working together with the state organizations responsible (Committee for Forestry of Ministry of Agriculture and State Committee for Nature Protection) to "preserving or restoring nature in the Nuratau Nature Reserve and adjacent district, and promoting sustainable economic development and ecological development of the region". For this purpose, the Uzbek parties involved have committed themselves to submitting application documentation to UNESCO for certification as an international biosphere Reserve. If implemented, this project, like the Western Tien Shan Biodiversity Project (see above), will be important in putting strategic objectives into concrete actions and providing practical and tested models for other areas in the country.

Action Plan for the Sustainable Development of Tourism in Uzbekistan Project (UNDP):
This project which started in 1995 is intended to provide the guidance for the controlled development of tourism through the preparation and implementation of an action plan and assistance in the areas of policy direction, infrastructure development, and international marketing and training. Important considerations are to improve the institutional structures / staff capacities and also to provide a framework conducive to attracting private sector investment / involvement in tourism. This project has some important implications for protected areas management, and the potential economic benefits that can be gained from rational utilization of biodiversity resources, as it will provide for a more workable situation within the country regarding the development of appropriate eco-tourism.

There has been a big activity to provide special biodiversity conservation projects of Academy of Sciences and ecological NGO in Uzbekistan in last decenie. Some of them were: “ The working out of general scheme of development and disposition of Special Protected Areas in Uzbekistan” (Government of Uzbekistan); “Correlations of the extinction risk of biodiversity in Central Asia” (INTAS); “Important Birds Areas in Uzbekistan” (NABU); “Snow leopard conservation and education project” (ISLT, SEN); “Bukhara Deer conservation project” (WWF-Int., WWF-Pakistan); “Central-Asian Swallowtails research conservation project” (J.&K. McArtur Foundation), "Biological control of aliens invasive species of plants" (CABI-Biosciences), etc.
Nowadays, at least 20 are running (special program on Aral Sea basin research – for more information see INTAS Website). There were numerous McArtur Foundation grants in the region (see Website of McArtur Foundation). Different GEF biodiversity conservation projects on-going now in the region can be found on GEF Website.

**Biodiversity features**

The mountain ecoregion of Gissaro-Alai open woodlands going through Tajikistan, Kyrgyzstan and Uzbekistan, is the depository of ancient Mediterranean, eastern Mediterranean and the younger mountains of Central Asia. Found in the Gissaro-Alai are a number of endemic Central Asian montane species that often are localized to specific mountain ranges. Characteristic vegetation types include coniferous evergreen woodland of

*Juniperus* species, ephemeroid herb vegetation, as well as unique fruit and relict nut forests. The diversity of fauna is equally rich and includes threatened species such as snow leopards, Siberian ibex, Bukhara urial, and numerous birds, fishes, reptiles and amphibians. The mountain forests of Gissaro-Alai play a crucial role in protecting the soil from wind and water erosion that has resulted from forest clearing and overgrazing. Conservation measures leading to sustainability are implemented but need strengthening.

A list of endangered and protected mammal species in Gissaro-Alai includes several species of wild ungulates. The wild sheep, or Bukhara urial (*Ovis vignei bocharensis*) and markhor goat (*Capra falconeri*) occur in the southern spurs of the Gissar range (Kugitang, Baisuntau, and Babatag mountains). Their numbers during the last surveys were not higher than 300-400 animals for markhor, and 300 for urial. At present, both species are under protection in Surkhan nature reserve in Uzbekistan and Kugitang zapovednik - Turkmenistan (Kugitang range). The Siberian ibex (*Capra sibirica*) occurs in Gissar range. The ibex is protected in nature reserves (Zaamin and Gissar) in Uzbekistan, where its density reaches 25 per 100 sq. km. In the Gissar Reserve the number of ibex was estimated in 1000 individuals as of 1999. Common leopard is extinct from the region, but snow leopard still lives in Gissar mountain range. The ecoregion is the most arid area, inhabited by lynx, brown bear (*Ursus arctus isabellinus*); striped hyena is rare.

The flora and fauna of Gissaro-Alai are rich in diversity and contain a number of endemic Central Asian montane species. There are 1200 vascular plant species in Ramit Reserve (Tajikistan) and 1500 in Gissar Reserve (Uzbekistan), with a high number of endemics often localized to specific mountain ranges.

The most common mammals of this ecoregions' forests include wild boar (*Sus scrofa*), various species of rodents and shrews; in the lower altitudes is found the Indian porcupine (*Hystrix leucura*). Predators include wolves (*Canis lupus*), red fox (*Vulpes vulpes*), weasel (*Mustela nivalis*), ermine (*M. erminea*), marten (*Martes foina*), badger (*Meles meles*), otter (*Lutra lutra*), Turkistan lynx (*Lynx lynx*), Tian Shan bear (*Ursus arctos*). The bear is rather common; its density in the Gissar Reserve (Uzbekistan) is estimated as 4-5 per 100 sq. km. Species more common to the juniper forests and higher altitudes include marmots (*Marmota*), tolai hares (*Lepus tolai*), Turkistan red pikas (*Ochotona rufescens*), juniper voles (*Microtus juldaschi*) and Siberian roe deer (*Capreolus capreolus*).

The most common northern desert mammals are the long-eared hedgehog (*Erinaceus auritus*), long-quilled hedgehog (*Piracohinus hypomelas*), and tolai hare (*Lepus tolai*). Yellow gopher (suslik) is characteristic of the clay desert and feeds on the ephemeral plants. A variety of rodents such as gerbils (*Rhombomys, Meriones*), and more than ten species of jerboas (*Allactaga, Dipus, Paradipus, Eremodipus, Stylodipus*) are found here. Both gerbils and jerboas play an important role in the biological functioning of the clay desert. Numerous, deep burrows by the gerbils are critical for vegetation growth. Both form a significant part of the diet of nocturnal predators such as owl, steppe ferret (*Mustela eversmanni*) and corsac fox (*Vulpes corsac*). Endemic jerboas include the selevinia (*Selevinia betpakdalensis*), comb-toed jerboa (*Paradipus ctenodactylus*), and the three-toed and five-toed dwarf jerboas (*Salpingotus heptneri, salpingotus pallidus, Cardiocranius*). Also endemic are representatives of several mammalian genera (e.g., *Diplomesodon, Spermophilopsis, Pyderethmus, Allactodipus, Eremodipus*).

Saiga (*Saiga tatarica*) were once quite common throughout these deserts, coming here for winter periods. Their population size has been significantly reduced however. The goitered gazelle or djeiran (*Gazella subgutturosa subgutturosa*) and marbled polecat (*Vormela peregusna*) are also rare and endangered.

Larger birds of the ecoregion include the houbara bustard (*Chlamydotis undulata*), black-bellied and pin-tailed sandgrouse (*Pterocles alcata, P. orientalis*), cream-colored courser

(*Cursorius cursor*), golden eagle (*Aquila chrysaetus*), short-toed eagle (*Circaetus gallicus*), steppe eagle, (*Aquila rapax*), Egyptian vulture (*Neophron percnopterus*), and saker falcon (*Falco cherrug*). Among the more common bird species are wheatears (*Oenanthe isabellina, O. deserti*), desert warbler (*Sylvia nana*), the desert lark (*Ammomanes deserti*), desert raven (*Corvus ruficollis*), and desert shrike (*Lanius excubitor*). Pander's ground jay or saxaul jay (*Podoces panderi*) is a rare and unusual member of the crow family. Asian desert sparrow (*Passer zarudnyi*) is also rare.
The diverse list of the Gissaro-Alai birds of prey includes vultures (*Aegypius monachus, Neophron percnopterus*), Lammergeier (*Gypaetus barbatus*), eagles (*Haliaetus leucoryphus, Aquila chrysaetos, A. heliaca, Hieraetus fasciatus*), buzzards (*Buteo rufinus*), hawks (*Accipiter nisus*), eagle owl (*Bubo bubo*), small owls. Other characteristic bird species include chukar partridge (*Alectoris chukar*), Himalayan snowcock (*Tetraogallus himalayensis*), northern goshawk (*Accipiter gentilis*), wagtail (*Motacilla*), golden oriole (*Oriolus oriolus*), titmice (*Parus, Remiz*), sparrows (*Passer*), shrikes (*Lanius*), spotted flycatchers (*Muscicapa*), eastern turtle dove (*Streptopelia orientalis*), rock pigeon (*Columba livia*), wood pigeon (*Columba palumbus*) and thrush nightingales (*Luscinia luscinia*). There are many rock birds such as rock nuthatch (*Sitta neumayer*), wallcreeper (*Tichodroma muraria*), and pied wheatear (*Oenanthe pleschanka*).

## Current Status

There are numerous protected areas in Uzbekistan (Zaamin, Gissar, Chatkal in Western Tian Shan (35 686 ha) Nurata in NuraTau (17 752 ha). Also, some national parks exist with more relaxed protection regime (Ugam-Chatkal national park created in 1990 in West Tien-Shan on 574 595 ha). The unique vegetation cover of the Kara Tau mountains requires full protection and classification as a reserve as soon as possible.

## Types and Severity of Threats

The mountain forests of Gissaro-Alai play a crucial role in preventing wind and water erosion. During the past two centuries, a lot of the natural woodland in this ecoregion have been cleared for firewood and overgrazed by the increasing amount of domestic cattle, causing soil erosion.
Due to extensive hay harvesting and overgrazing, floral diversity in most of the high mountain meadows is decreasing, while noxious and weed plant species become more common. Destruction of natural habitats leads to the extinction of many common species
Agriculture, grazing, forestry, extractive industries, building construction, and recreation have caused the greatest impact on these mountain ecosystems. Many foothill ecosystems have shown a marked decline in biodiversity.
The ungulates, wild sheep and goats, are the most affected by human influence in this ecoregion. Wild goats are threatened primarily from traditional hunting by the local population, but they are also the prized trophies for foreign hunters. In addition, urial faces threats from loss of habitat and grazing land due to competition from flocks of domestic livestock as the majority of land in the ecoregion is used for sheep pastures, in some areas year-round.

### 2.4.2 Turkmenistan

The majority of Turkmenistan is encompassed by the Central Asian Southern Desert which is considered as one of the richest desert complex in Eurasia. The hydrothermal characteristics of this area distinguish it from the deserts to the north. Precipitation is greatest during the winter and spring while the average temperature and degree of aridity are higher than in the northern deserts. Consequently, the native flora and fauna have developed physiological and morpho-biological mechanisms that ensure survival in these conditions. Reptile and rodent diversity are particularly high. Along with several endemic jerboa species, this ecoregion is home to rare and endangered cats such as Pallas' cat and the small, secretive sand cat. The main anthropogenic threats are agriculture-related, especially irrigated cotton production. Other significant threats include hunting and poaching, and the overuse of woody plants for firewood and silk production.

Turkmenistan's Kopet Dag region in southern part are well-studied and high endemism is exhibited among many groups of organisms. Key endangered fauna include leopard, wild sheep, bezoar (bearded) goat, hyena, Indian porcupine, and a number of other rare species of mammals, birds, snakes, and lizards. It represents the centre of origin and genetic diversity for wild relatives of cultivated plants such as grapes, pomegranates, figs, almonds, walnuts, wheat, barley and many others. These areas of woodland habitat continue to experience heavy logging[2] and overgrazing. While these areas are currently under protection, enforcement is not always adequate to promote forest regeneration.

Areas of Badghyz and Karabil semi-desert, covering southern Turkmenistan, northern Afghanistan and extending into Iran, are covered by a unique xeric savanna ecosystem, dominated by wild pistachio trees (many say it looks like the African savanna). This area contains key populations of Asian wild ass (kulan), goitered gazelle (dzheiran), striped hyena, and leopard. Other rare or endangered animal species are wild sheep, honey badger, marbled polecat, Indian porcupine, black vulture, and a large number of rare rodents, birds and reptiles. Badghyz lies on one of the ancient Silk Road routes, but the area was largely abandoned and desertified in the Middle Ages.

**Biodiversity Features**

Fauna and flora in southern Turkmenistan (Kopet Dag mountain ranges and riparian forests in the river valleys) expresses the mixed character of their biogeographic connections with Mediterranean and Turanian elements, as well as authochthonous endemics.

Most common among mammals are fox (*Vulpes vulpes*), wolf (*Canis lupus*), jackal (*Canis aureus*), steppe cat (*Felis libyca*), badger (*Meles meles*), wild boar (*Sus scrofa*), weasel (*Mustela nivalis*), marten (*Martes foina*), ground squirrel (*Spermophilus*), gerbils (*Rhombomys, Meriones*), and voles (*Microtus*), hamsters (*Calomyscus*), desert hedgehogs (*Hemiechinus*).

A number of rare and endangered large mammals still inhabit Turkmenistan. Dense forests with mountain springs provide breeding grounds for the leopards (*Panthera pardus ciscaucasica*). They were widespread in the mountains and foothills of Kopetdag until the

[2] This pressure is taken away from the natural habitats to a great extent. As by the end of the century all settlements of the country were supplied by free of charge gas – local people don't need to cut wood for domestic needs – heating and coocking.

early 20th century. Throughout Turkmenistan, 360 leopards were killed from 1924 to 1966. The population of leopards was steadily declining. Its records were constant but sporadic in Kopet Dag. With the establishment of the two Kopet Dag Reserves, regular observations of leopards were conducted showing that their population is not more than 40 animals. By 1990 the condition of this leopard population seemed relatively stable and hopeful; in 1996-1998 there were about 23-25 animals in Western and 25- 30 – in Central Kopet Dag. Leopard is still found also in the western, more mountainous part of Badghyz Reserve (Gyaz-Gedyk range). In the 1940s, this population of leopard was quite dense (14 animals were killed within 500 sq. m. in 1947-48). By the end of 1990-th leopard is comparatively rare in this area and could be estimated at a level about 10-15 animals in Western Kopetdag (Lukarevsky 2001). Striped hyena (*Hyaena hyaena*) is another large predator and scavenger still existing in this ecoregion. Its population had been improving due to the increase in ungulate numbers (Lukarevsky 1995).

The most spectacular large predator, Turanian tiger (*Panthera tigris virgata*) lived in this ecoregion in the 19th century (along Murghab river tugai, or desert riparian forest) but was hunted to extinction about 100 years ago (last tigers were killed in lower reaches of Amudaria – borders of Turkmenistan and Uzbekistan – and in the upper reaches of Amudaria – Tajikistan – in 1958-1962). In the 20th century, ecoregion lost another of its big cats, the Asian cheetah (*Acinonyx jubatus raddei*), a species included in the IUCN Red Data List. From 1930 to 1957 in Badghyz, 25 cheetahs were shot or captured, and about 70 encounters recorded. Cheetahs were often found in Badghyz and Karabil until the late 1950s. The species is still rarely found in northwestern Turkmenistan but is extinct from Badghyz. Reintroduction of this unique large predator to the Badghyz Reserve is recommended.

Wild sheep or urial (*Ovis (vignei) orientalis*) lives in the arid mountains and foothills within two protected areas (less then 2,000 animals). Human activity has significantly decreased this population. Bezoar (bearded) goat (*Capra aegagrus turkmenicus*) is found in Maly and Bolshoi Balkhan ranges and in Kopet Dag. Its numbers have decreased dramatically in the last decades. Most of the population (estimated as several thousand animals) is concentrated in Central Kopet Dag Reserve.

Among other rare and endangered mammal species protected in this ecoregion are: marbled polecat (*Vormela peregusna koshevnikovi*), otter (*Lutra lutra seistanica*), manul cat (*F. manul ferrugineus*), and a number of species of bats and rodents. Since the 1950s, the Turanian tiger (*Panthera tigris virgata*), Syrian brown bear (*Ursus arctos syriacus*) are both extinct. Lynx (*Lynx lynx*) has been extirpated.

Many wildlife animal species occurring in reserves have been extirpated in areas outside of reserves.

Currently, just about 5% of the Kopen Dag ecoregion’s intact habitat is protected within two protected areas (Kopetdag and Syunt-Khasar Dag covering 75.000 ha).

The fauna of Turkmenistan deserts is characterized by a high degree of endemism. Especially rich is the fauna of sandy deserts. Among insects, the characteristic groups include grasshoppers, darkling beetles, scarabaeid beetles, butterflies, termites, and ants. The reptiles are numerous in deserts, and the majority of species inhabiting these ecosystems are autochthonous and belong to the core of the Central Asian herpetofauna.

The Caspian seal (*Phoca caspica*) is an endemic species of this ecoregion (Lisitsyna, 1995). It exhibits wide seasonal migrations around the Caspain Sea according to the dynamics of reproduction, moulting, and feeding. It is a unique species among seals since it reproduces both on ice (in the northern Caspian, January-February) and on land (islands off the Turkmenistan shore). On Ogurchinsky Island there may be as many as 10000 animals during the reproductive period. This species has been a traditional target for hunting, especially in Central and Northern Caspian. In 1997-1998, seal hunting was declared illegal by all Caspian littoral countries.

Many animal species found within Turkmenistan are included in IUCN or local (Turkmenistan) Red Data Lists: honey badger (*Mellivora capensis*), otter (*Lutra lutra seistanica*; in the Murghab river valley), corsac fox (*Vulpes corsac*), leopard (*Panthera pardus*), sand lynx, or caracal (*Caracal caracal michaelis*), jackal (*Canis aureus*), kulan (*Equus hemionus*), dzheiran (*Gazella subgutturosa*), urial (*Ovis (orientalis)vignei varentsovi*), black vulture (*Aegypius monachus*), imperial eagle (*Aquila heliaca*), short-toed eagle (*Circaetus gallicus*), lesser kestrel (*Falco naumanni*), Central Asian desert monitor (*Varanus griseus caspius*). A very common species of reptiles is the central Asian tortoise (*Testudo horsfieldii*) included in the IUCN Red Data list.

Kulan or onager (*Equus hemionus onager*) is an endangered subspecies of Asian wild ass currently found only in this ecoregion. In the 19th century, thousands of onagers roamed Turkmenistan. By 1935, only about 500 animals were left, all of them in Badghyz. Their number continued to decrease until the Badghyz Reserve was established in 1941, for the specific purpose to protect kulan. While only 250 onagers were left at this time, in the1980-1990s this species has shown a rise in numbers due to protection measures. In 1995-96 the Badghyz Reserve had about 7,300 onagers (Atamuradov et al. 1999) and this species was no longer considered endangered. Kulans overpopulated its natural habitats, which lead to their serious distruction and damage to the surrounding agricultural lands. However, without expertise and sustainable management, heavy poaching developed, which lead to the dramatical population decline (from more then 5000 animals in 1995 to some 300 individuals in 2000). Since 2001 a WWF grant started, and serious measure, carried out in cooperation with the Ministry of environment allowed to approve situation seriously, so that we can be sure, that there are not less then 1000 kulans in the ecoregion now.

Goitered gazelle, or dzheiran (*Gazella subgutturosa subgutturosa*) and saiga antelope (*Saiga tatarica*) were very numerous in Turkmenistan in the first half of the 20th century but were decimated by hunting. Today, however, Badghyz Reserve was the only place where gazelles were relatively secure; their population reached 3,000 to 4,000 animals; now there are about 500-700 animals. Another large ungulate, the wild sheep, or urial (*Ovis (orientalis) vignei varentsovi*), was heavily hunted but remains common within the Badghyz Reserve (the most recent estimates approve about 700, no more then 1,000 animals). Even here, the tendency is towards population decline from habitat change and hunting. The ungulate populations of Kugitang zapovednik are in surprisingly good condition. Together with very interesting caves it supports a clear possibility for ecotourism development in the region.

Endemics include the desert dormouse (*Selevinia betpakdalensis*), comb-toed jerboa (*Paradipus ctenodactylus*), three-toed and five-toed dwarf jerboas (*Salpingotus heptneri, S. pallidus*). Also endemic are several mammalian genera, such as *Diplomesodon, Spermophilopsis, Pyderethmus, Allactodipus, Eremodipus* and many others. Rare cats include Pallas' cat (*Otocolobus manul*), cheetah (*Acinonyx jubatus*) which is extinct from the ecoregion, and the small sand cat which is restricted to dune areas with saxaul tree.

The common birds are larks (*Calandrella spp., Galerida spp*.), doves (*Streptopelia*), wheatears (*Oenanthe isabellina, O. deserti*), desert warbler (*Sylvia nana*), desert lark (*Ammomanes deserti*), desert raven (*Corvus ruficollis*), saksaul jay (*Podoces panderi*), desert shrike (*Lanius excubitor*), and desert sparrow (*Paser simplex*).
Larger birds of the region include the houbara bustard (*Chlamydotis undulata*), black-bellied and pin-tailed sandgrouse (*Pterocles alcata, P. orientalis*), pheasant (*Phasianus colchicus*), cream-colored courser (*Cursorius cursor*), golden eagle (*Aquila chrysaetus*), short-toed eagle (*Circaetus gallicus*), steppe eagle (*Aquila rapax*), Egyptian vulture (*Neophron percnopterus*), and saker falcon (*Falco cherrug*). Pander's ground jay or saxaul jay (*Podoces panderi*) is a rare and unusual member of the crow family. The Asian desert sparrow (*Passer zarudnyi*) is also rare.

**Current Status**

During the past two centuries, a lot of the natural forests in this ecoregion have been cleared for firewood and overgrazed by the increasing amount of domestic cattle. This is especially damaging when these activities occur in the upper watersheds causing soil erosion and mud floods in the river valleys, destroying riparian forests habitats. Traditionally, grazing pressure was spread more evenly. However, in recent decades, due to the collective land and farm ownership, it is more concentrated around the rural settlements. Overgrazing in the upper parts of the mountains lands lead to serious destruction of the grasslands and thus to mudflows, disturbing woodlands on the lower slopes. Dry summers of these last years dry out vegetation. Consequently, unusually hot fires destroy unique wild-fruit communities with a very long and difficult regeneration cycles.

Flora and fauna of the sand deserts are particularly vulnerable to human disturbance. Fortunately, serious reforestation measures are taking place in Turkmenistan (e.g., forest planting, gas provisions for heating and cooking to minimize fuel-wood extraction, etc.).

All ungulates are seriously affected by human influence in this ecoregion. Wild sheep are threatened primarily from traditional hunting by the local population, but they are also the prized objects for foreign hunters. Another critical point in Badghyz region is water availability, since there are very few natural water sources there (some only have salt water; wild sheep tolerate water salt content up to 20-22 g/l). In addition, urial faces threats from loss of habitat and grazing land due to competition from flocks of domestic livestock as the majority of land in the ecoregion is used for sheep pastures, in some areas year-round. Wild animals are also disturbed by logging and collecting pistachio nuts. Large fires, many due to human presence, also damage wildlife populations.

Turkmenistan is a newly independent state just developing its environmental protection laws. The country signed the Biodiversity Convention in 1996, however, insufficient protection measures in many cases fail to support natural regeneration and sustainability of forests and control on wild animal populations. Although the existing nature reserves (i.e.Repetek reserve

of 34,600 hectares, a UNESCO biosphere reserve since 1978, wildlife refuges Shakhsenem, Kelif, Zauaboiski, Sarakamysh) are contributing significantly to the overall protected system of most beautiful and diverse ecosystems, they often lack effective management. The current social and economic difficulties in Turkmenistan have caused a sharp decrease in funding for nature reserves, making proper function difficult. In addition, due to low funding, also the nature conservation and research organizations in Turkmenistan have been suffering a steep decline in the last 10 years. As a result, the natural environment could be altered irreversibly.

**Types and Severity of Threats**

The main anthropogenic threats are agriculture, especially irrigated cotton production, hunting and poaching, and the overuse of woody plants for firewood and silk production. Saksaul, juniper, and other trees and shrubs are cut extensively for fuel wood. In the last five to seven years, the area covered by saksaul has decreased by half, leaving the topsoil prone to erosion. The reduction of native species has encouraged the spread of desert moss (Tortula desertorum), which provides no nutritional value for wildlife and prevents the re-seeding of higher forms of native plants. Also the natural pistachio woodland in Badgyz ecoregion have been cleared for firewood (also providing a high-quality smelting charcoal) and overgrazed by the increasing amount of domestic cattle (sheep, camels), causing soil erosion.

Overgrazing of livestock occurs in non-irrigated areas, uncontrolled grazing has encroachment on protected land. Unregulated construction of roads threatens especially fragile desert ecosystems.

Some forms of wildlife, particularly reptiles, are collected and exported to zoos or collectors. The capture of venomous snakes has dramatically reduced the numbers of rare species such as the Central Asian cobra (*Naja naja oxiana*) and sand echis (*Echis carinatus*) as well as many common species.

### 2.4.3 Tajikistan

A large part of Tajikistan is covered by Pamir, a high plateau located at the crossroads of several of Asia's largest mountain ranges: the Himalaya, Karakoram, Hindu Kush and Tian Shan. Affinities with all three mountain ranges encourages a variety of species. Furthermore, the Pamir's high vertical relief, compared to the larger Tibetan Plateau that lies to the east, increases habitat diversity as well. There is also a mountain ecoregion of Gissaro-Alai open woodlands going through Tajikistan, Kyrgyzstan and Uzbekistan, is the depository of ancient Mediterranean, eastern Mediterranean and the younger mountains of Central Asia. Found in the Gissaro-Alai are a number of endemic Central Asian montane species that often are localized to specific mountain ranges. Characteristic vegetation types include coniferous evergreen woodland of *Juniperus* species, ephemeroid herb vegetation, as well as unique fruit and relict nut forests. The diversity of fauna is equally rich and includes threatened species such as snow leopards, Siberian ibex, Bukhara urial, and numerous birds, fishes, reptiles and amphibians. The moutain forests of Gissaro-Alai play a crucial role in protecting the soil from wind and water erosion that has resulted from forest clearing and overgrazing. Overgrazing and poaching are the major threats to endangered vertebrates such as the brown bear (*Ursus arctos isabellinus*), snow leopards (*Uncia uncia*), wolves (*Canis lupus*), markhor (*Capra falconeri*), and Marco Polo sheep (*Ovis ammon polii*) that inhabit this ecoregion. Some conservation measures leading to sustainability are implemented but need strengthening.

## Biodiversity Features

Endangered mammals include the Tian Shan subspecies of brown bear (*Ursus arctos isabellinus*), endemic to the mountains of Central Asia, and snow leopards (*Uncia uncia*). Several species of wild sheep and goats are numerous in the Pamir alpine desert and tundra. The most abundant is Siberian ibex (*Capra ibex sibirica*) and blue sheep (*Pseudois nayaur*), while endangered species include the markhor *C. Falconeri* (*Tian-Shan part of the ecoregion*) and an argali subspecies referred to as Marco Polo sheep *Ovis ammon polii.*

The most common mammals of this ecoregion's forests include wild boar (*Sus scrofa*), various species of rodents and shrews; in the lower altitudes is found the Indian porcupine (*Hystrix leucura*). Predators include wolves (*Canis lupus*), red fox (*Vulpes vulpes*), weasel (*Mustela nivalis*), ermine (*M. erminea*), marten (*Martes foina*), badger (*Meles meles*), otter (*Lutra lutra*), Turkestan lynx (*Lynx lynx*), Tian Shan bear (*Ursus arctos*). Species more common to the juniper forests and higher altitudes include marmots (*Marmota*), tolai hares (*Lepus tolai*), Turkistan red pikas (*Ochotona rufescens*), juniper voles (*Microtus juldaschi*) and Siberian roe deer (*Capreolus capreolus*).

The diverse list of birds of prey includes vultures (*Aegypius monachus, Neophron percnopterus*), Lammergeier (*Gypaetus barbatus*), eagles (*Haliaetus leucoryphus, Aquila chrysaetos, A. heliaca, Hieraetus fasciatus*), buzzards (*Buteo rufinus*), hawks (*Accipiter nisus*), eagle owl (*Bubo bubo*), small owls. Other characteristic bird species include chukar partridge (*Alectoris chukar*), Himalayan snowcock (*Tetraogallus himalayensis*), northern goshawk (*Accipiter gentilis*), wagtail (*Motacilla*), golden oriole (*Oriolus oriolus*), titmice (*Parus, Remiz*), sparrows (*Passer*), shrikes (*Lanius*), spotted flycatchers (*Muscicapa*), eastern turtle dove (*Streptopelia orientalis*), rock pigeon (*Columba livia*), wood pigeon (*Columba palumbus*) and thrush nightingales (*Luscinia luscinia*). There are many rock birds such as rock nuthatch (*Sitta neumayer*), wallcreeper (*Tichodroma muraria*), and pied wheatear (*Oenanthe pleschanka*).

## Current Status

The unique nature of the West and East Pamirs is protected in the Pamir National Park which occupies more than 2,6 million ha (11% of the area of Tajikistan). The network of complex natural refuges exists in the Pamirs: the Pamir refuge which includes the Lake Kara-Kul; the Zorkul refuge with the Zorkul lake system; the Muzkol refuge established between the Trans-Alai and Muzkol Ranges; and the Sanglyar refuge on the slopes of the Peter the First Range. After civil conflicts in Tadjikistan Ramit zapovednik still exist (although decreased in area), but majority of ungulate species were just eliminated while groups of gangsters were blocked in Ramit gorge for a winter.

## Types and Severity of Threats

During the last decades because of the development of plain ecosystems for agricultural crops places of dwelling of many species of animals have been destroyed. Therefore such species as turan tiger and the leopard have disappeared, as well as such species as a Bukhara deer, a striped hyena and Gazela subgutorosa became rare. There are also a number of many species of vermigrades and such birds as a pheasant, a beautybustard, a deserted partridge, and also many species of birds of prey were reduced.

Many, previously numerous species of animals are superseded from the places of dwelling as a result of excessive pasturing, and stay only in the most inaccessible biotops.
The ungulates, wild sheep and goats, are the most affected by human influence. The local people hunt ungulates for meat, and they hunt predators in response to depredation of livestock. Desertification of the alpine steppe habitat is also occurring as a result of overgrazing and fuelwood collection.

**Institutional setting of the wildlife sector**

Protection of forests and fauna is a state affair. Taking into account importance of a problem of mountain forests and their inhabitants, the Government of Tajikistan made in 2004 a decision on combine of the Ministry for Protection and Forestry Production Association of the Republic of Tajikistan and on their base created the State Committee of Environmental Protection and Forestry of the Republic of Tajikistan (SCEPF), in which structure there is an Agency of Forestry and Hunting. All forests and wild fauna of Tajikistan is a state property. The guarantor to preservation, restoration, expansion and rational use of fauna is SCEPF. The main part of a forest is in charge of Agency and a small part - in collective farms. However, the control and rational use of these forests is assigned on SCEPF. Besides, the structure of SCEPF includes 4 reserves, 2 national parks, 13 preserves, 148 nature sanctuaries, and includes also the inspection on protection of flora and fauna, the Tajik scientific research forestry institute, and the Agency of Forestry and hunting which includes 52 timber enterprises.

### 2.4.4 Kyrgyzstan

The Kyrgyz Republic is a small country (198,500km2) dominated by mountains, with over 90% of the country above 1000m altitude. These fragile mountain ecosystems support a unique assemblage of plants and animals. The Kyrgyz Republic has about 2% of the world flora and more than 3% of world fauna. This figure is rather big if we take into account that the country occupies only 0.03% of the whole area of the world or 0.13% of the dry land area.
Since 1991 economic, social and political reforms have been taking place in the country. New political parties and independent mass media have appeared, but economic difficulties still limit their activity. A referendum in October 1998, led to the institution of private property rights in the Kyrgyz Republic.

Agriculture and industry dominate the economy of the Kyrgyz Republic. Arable land represents about 7% of the territory, of which 64% relies on irrigation to enable production. During recent years both these sectors have been seriously damaged by the economic crises associated with political transition.

Today, the population of the Kyrgyz Republic is around 4.6 million people. Overall, 34% of the population lives in urban centres, while the remaining 66% lives in rural areas.

The economic crisis has resulted in both increasing pressures on biodiversity and a reduction in the effectiveness of existing mechanisms for environmental protection. Despite its size, the Kyrgyz Republic has a relatively high species-richness; possessing nearly 1% of all known species in just 0.13% of the world's land mass. Recently declines in many species have become evident, and 9.5% of bird species and 18.1% of mammal species are now considered to be at risk of extinction. A number of rare and valuable ecosystems have nearly disappeared, and forest cover has declined by over half in the last 50 years.

The biological resources of the Kyrgyz Republic play an important role in the economy and traditions of the country. Many species are used directly, either for subsistence or commercial extraction. The country is a centre of origin for domesticated fruit crops, and still possesses a number of wild relatives of these plants (e.g. walnuts, apples, apricots, and pistachio). Natural habitats are a vital part of many traditional land use practices, e.g. grazing which relies on the maintenance of mountain meadows. The loss of biodiversity has both a direct and indirect impact on people's welfare and quality of life – be it changes in water quality, access to natural resources, or erosion of culture and traditions linked to biodiversity. The mountains of the Kyrgyz Republic also play an important role in providing fresh water to other Central Asian countries.

The institutional and administrative base related to biodiversity conservation activities in the Kyrgyz Republic is undergoing rapid transformation the political and economic changes have meant that most organizations are severely under - resourced and are taking time to adapt to the new situation. Both individuals and organizations involved in biodiversity conservation activities are discovering their new roles in this changing environment: the role of state agencies is becoming more focused; the relatively young NGO movement is becoming more diverse and experienced; and businesses are recognizing their social, as well as economic, responsibilities.

In the Kyrgyz Republic, legal protection of natural resources occurs through a series of laws and legal quotas enforced by the prosecutor's office and courts. In principle, the existing legal base covers all elements of the relationships between nature and society. Regional, interstate co-operation on environmental issues is also developing, and agreements have been signed with a number of other Central Asian states. Ecological legislation in the Kyrgyz Republic comprises ten Laws and 70 Acts which regulate activities connected with biodiversity.
The Kyrgyz Republic ratified the Convention on Biological Diversity on 6th August 1996. One of the first commitments of the Kyrgyz Republic government under the CBD was to prepare a **National Biodiversity Strategy and Action Plan (NBSAP)** as an initial stage in biodiversity protection.

The NBSAP represents the first comprehensive review of biodiversity in Kyrgyz Republic. The Kyrgyz Republic contains a great wealth of biodiversity resources – in terms of species, ecosystems and landscapes. Although a small nation by land mass, the Kyrgyz Republic displays a wide variation in elevations and geology, leading to a broad range of habitats, which is reflected in a high diversity of species. The ecosystems represented range from high mountains, to lowland fertile plains and large freshwater systems. The character of biodiversity in the country reflects the high altitude of much of the land, being dominated by montane and alpine species. A range of factors over the last century have had an impact on biodiversity in the Kyrgyz Republic, resulting in declines in many groups, and leading to concern for a growing number of species, including key ones of economic importance. In total, 20 different classes of ecosystem are recorded in the Kyrgyz Republic. Most of these ecosystems (14 or 63.6%) are found between 2000-3000 m altitudes, although only 30.8% of the territory lies within this range. Furthermore, the range of ecosystems is not evenly distributed throughout the country. Sixteen ecosystems (72.7%) are found in Western and Central Tien Shan, while the Ferghana valley and Southern Kazakhstan biogeographic region have the fewest ecosystems, three and five respectively. Thirteen ecosystems are represented in Alai, while ten ecosystems are found in other biogeograhic regions (Northern Tien Shan and Issyk-Kul).

Overall forest loss has been dramatic over the last decades – fir and juniper forests have declined by over 35%, fruit and nut forests have declined by 50%, and pistachio and almond forests have reduced to only 30,000 ha over the last 50 years.

Destruction of natural ecosystems, linked to increases in cultivated lands, poses the greatest threat to biodiversity in the Kyrgyz Republic. Fragmentation of natural communities also results from an extensive road-network, much of which connects seasonal or temporary settlements. Meanwhile, other ecosystems suffer indirect anthropogenic impacts. Overgrazing has restricted regeneration in fruit and nut forests, making their future uncertain. It has led to the degradation of pastures, and to drastic reductions in the numbers of wild ungulates. Threats to species include habitat change, pollution, direct competition with livestock, and the spread of invasive species, and diseases. Many of the remaining populations of species listed in the national Red Data Book are at the critical lower limit of viability, from which the populations may not be able to recover. Even species thought of as common, such as pheasants and wild boar, were completely exterminated in many regions, but have since been reintroduced in some areas.

The Ministry of Environmental Protection developed the BSAP with technical support and management advice from the international conservation NGO, Fauna & Flora International. A grant for the production of the BSAP was offered by GEF (via the World Bank).

NBSAP contains a number of common cross-sectoral implications for biodiversity conservation. The Ministry of Environmental Protection and Forestry is central to state-run biodiversity conservation, as it manages the most extensive areas of conservation priority and receive the majority of resources allocated directly to biodiversity conservation. However, the other government agencies play a very important role in conserving biodiversity outside these protected areas - a role that is likely to become increasingly important. The recreation department of the Administration of the President has management responsibility for Ala-Archa National Park and Tokmok zakaznik. The Chief Division of Hunting Enterprises and Hunting Supervision and the Republican Society of Hunters and Fishermen ('Kyrgyzokhotrybolovsoyuz') have management responsibility for a variety of hunting zakazniks in the country. Oblast and rayon administrations ('hakimiats') have responsibility for various national parks and zakazniks (including natural and geological monuments).

In the Kyrgyz Republic there is a significant resource of highly qualified specialists working on biodiversity issues. As well as working within state agencies, academic institutions and businesses, most of them are also active members of different ecological NGOs. International NGOs addressing biodiversity issues are still becoming established in the Kyrgyz Republic. Key organizations include: Fauna & Flora International, IUCN, NABU, and WWF. In addition, several international organizations provide funding and technical assistance support for projects, these include, the World Bank, Ebert Fund for Central Asia, Eurasia Foundation, Soros-Kyrgyztsan Fund, HIVOS, Know-How Fund, UNDP, TACIS, and the Adenauer Fond (Shukurov & Sadykova, 2000).

**Biodiversity Features**

Characteristic vegetation types include coniferous evergreen woodland of Juniperus species, ephemeroid herb vegetation, as well as unique fruit and relict nut forests. The diversity of fauna is equally rich and includes threatened species such as snow leopards, Siberian ibex, Bukhara urials, argali, makhors and numerous birds, fishes, reptiles and amphibians. The

mountain forests play a crucial role in protecting the soil from wind and water erosion that has resulted from forest clearing and overgrazing. Conservation measures leading to sustainability are implemented but need strengthening. Overgrazing and poaching are the major threats to endangered vertebrates.

A list of endangered and protected mammal species recorded from Kyrgyztsan include Asiatic wildcats (*Felis sylvestris*), argali (*Ovis ammon karelini*), markhor goat (*Capra falconeri*), goitered gazelles (*Gazella subgutturosa*), Asiatic ibex (*Capra ibex*), Bukhara urial (*Ovis vignei bocharensis*), wolves (*Canis lupus*) and brown bears (*Ursus arctos*). Although hunting pressure is severe, snow leopard (*Uncia uncia*) populations still occur in Kyrgyztsan.

In the southeastern edge of the Pamir endangered Marco Polo sheep (*Ovis ammon polii*) can be encountered as well as ibex and blue sheep (*Pseudois nayaur*), the most abundant wild ungulate in the region. Hunting of blue sheep could be sustainable if well-managed.

**Current Status**

There are only few protected areas that do not cover adequately different biotopes found in the country. The Tian Shan region lacks adequate nature reserves for its steppe-meadow ecosystem. One is Bayin Buluke (1,000 km2) that protects habitat for waterfowl like swans Cygus spp. at foothill elevations. Another is Tuomu'er Feng (1,000 km2) a high-mountain area with alpine ecosystems, some upper-elevation forests and much rock and ice, including 7,435 m Pobeda Peak. Various other small reserves have been declared, but the protected area remains inadequate for such a large, diverse complex.
During the last years numerous new protected areas are established, all area of Issyk-kul lake and its surrounding is nominated as Ramsar site, documents are prepared to nominate it as World heritage site (UNESCO). As a whole, there are 61 protected areas in Kyrgyzstan now (8 Zap, 8 NP, 50 sc), and the process of new PA establishment is actively on-going.

**Types and Severity of Threats**

Overgrazing at the higher elevations by horses, sheep and goats, and at the lower elevations by cattle has been reported as a conservation problem for this region. Hunting for meat, for income, or in response to livestock depredation is also probably responsible for diminished populations of some mammal and bird species. The Tian Shan supports much potential habitat for snow leopards and the ungulates that serve as their prey base (today's estimated total population of snow leopard is around 3000 – including Kyrgyzstan). Hunting pressure from the herdsmen whose livestock graze the high elevation meadows is probably severe.

The ungulates, wild sheep and goats, are the most affected by human influence in this ecoregion. Wild goats are threatened primarily from traditional hunting by the local population, but they are also the prized trophies for foreign hunters. In addition, urial faces threats from loss of habitat and grazing land due to competition from flocks of domestic livestock as the majority of land in the ecoregion is used for sheep pastures, in some areas year-round.

### 2.4.5 Kazakhstan

Kazakhstan is the biggest country in the region with a great variety of landscape, from steppe to forests and wetlands, shrublands, lakes and mountains. This diversity of habitat types has allowed a rich diversity of flora and fauna to exist. Notable mammals in Kazakhstan are herds of saiga, ibex, wild boar, lynx and badger. The Kazakh forest is quite distinct from the forest steppe in European Russia. There is a high diversity of rodents especially ground squirrels, hamster, jerboa, vole, and steppe lemming. The Emin valley grassland and steppe-dominated ecoregion on the border between northwest China and Kazakhstan includes cold temperate mountains and a system of shallow saline lakes that provide breeding habitat for many waterfowl including numerous globally threatened bird species, such as Dalmation pelicans (*Pelecanus crispus*) and relict gulls (*Larus relictus*).

The Altai Mountain Range forms a biogeographic divide between Siberia and the desert basins of Central Asia, and represents a centre of biodiversity for many plant and animal taxa. UNESCO nominated the north Altai (Russian part) as a World Heritage Site in 1998, as it represents a complete sequence of altitudinal vegetation zones in Central Siberia including steppe, forest-steppe, mixed forest, sub-alpine vegetation and alpine vegetation. The region is also an important habitat for endangered snow leopard and its prey.

Populations of gazelle and saiga antelope species support healthy wolf populations in the region. Previously millions of saiga migrated to the steppe areas of the north during the summer and back to the semi-deserts for the winter. Unfortunately, within the last decades of the previous century saiga populations decreased from about 2 mln to about 50 thousands total –as a result of heavy poaching and illegal trade (use of saiga horns for oriental medicine in China). Only common efforts of international organizations (IUCN, CITES), Kazakhstan Government, with the help of different international projects (FZS/WWF, Darvin's Initiative, etc.) allowed to stop the process and initially to reverse the situation. Minimal agricultural cultivation and development has maintained the overall integrity of the area making the reintroduction of the endangered Przewalski's horse a possibility.

Principal threats include pressures associated with growing human populations (poaching, livestock overgrazing) and natural resource (mineral and oil) extraction.

**Socio-economic and Political Features influencing the use and management of biodiversity resources**

Since 1991 when the Republic of Kazakhstan declared its state independence, the social and political life in the country has been undergoing great changes. As at this moment the Republic faced the social, political and economic problems, so it starts determining the development priorities. Alongside with the reforms and measures on stabilization of social and economic life the Republic pursued the course of sensible approach to the problems related with Environment Protection. The UN Conference on Environment and Development (Rio-de-Janeiro, 1992) has promoted this policy at a great extend as at this Summit Kazakhstan signed the Framework Convention on Climate Change and the Convention on Biological Diversity thus performing as an equal member of the world environment protection process.

For a long time the rich raw natural resources of the Republic of Kazakhstan have been a major factor of the economy. The result of this policy was that the most prominent economic sectors in Kazakhstan today are the mining industry, extensive cattle breeding and agriculture. They were developed without regard to environment protection measures or to environmental recreation possibilities. Military bases, the Baikonur cosmodrome and weapon testing sites, including nuclear weapons, occupied vast territories. All this has led to the degradation of natural ecosystems, accumulating of the industrial waste, pollution of nature with heavy metals, pesticides, radioactive materials, rocket fuel, and other toxins.

At the present time the mineral resources continue to dominate the country's exports. A model though is required for the sustainable utilization of the natural resources that currently cause great damage to the environment and similar problems are recognized throughout the world. The concept of a sustainable ecology from the viewpoint of development, under which a contradiction between the social and economic growth, nature use and conservation of the ecological system integrity is eliminated, is an alternative to this model. This is in accordance with the principles of the UN Declaration on Environment and Development (1992).

The political changes, which took place in Kazakhstan, the economic hardships of the transition from the command and management administrative system to the market one, have strongly affected the social sphere. The republic has adopted a model of reforms, which envisage macroeconomic stabilization given the social restrictions, but requires the identification of the final objectives of the transition period at minimum social loss. The difficulty in solving such a problem is due to the hard current position of all sectors of the economy.

The analysis of the human development index during the first five years of independence allows one to note that a rate of decline of this indicator during these years has been stabilized. It brings up a need to implement the measures on all environmental problems, including that in accordance with the Convention on the Biological Diversity.[3]

Kazakhstan ratified the Convention on Biological Diversity in 1994. Adding up socio economic and political conditions in the country and responsibilities of Kazakhstan as the Party of the Convention on biological diversity have constructed the preconditions of the development of National Biodiversity Strategy and Action Plan (NBSAP).

**Biodiversity Features**

The landscapes of the Kazakhstan include forests, steppe, shrublands, pinewoods, lakes and wetlands. It features an area of unusual overlap in the range of boreal, steppe and desert fauna. Of special interest are the communities of waterfowl birds of numerous lakes in the limits of steppes, and mamals as Saiga antelope (Saiga tartarica), goitered gazelle (Gazella subgutturosa), Argali (Ovis ammon), together with associated large predators snow leopards (Uncia uncia) and wolves (Canis lupus).

[3] A lot had been done since 1996 – and Kazakhstan is really now in the best economic situation if compared with other central asian countries. Besides that, the government of Kazakhstan put important part of national budget into environment conservation.

**Saiga in Kazakhstan - *Problem of Survival***

**Saiga** (*Saiga tatarica L.*) is a herd migrating animal of arid zones of Eurasia. Most of its population area nowadays is located on Kazakhstan territory. Out of its borders Saiga is met in not big amounts in Russia (Kalmykia) and Mongolia (is registered in the Red Data book). From Kazakhstan some part of population migrate to Bordering regions of Uzbekistan (Karakalpakiya) and Turkmenistan for wintering, and in spring animals return in the opposite direction. Besides, in some seasons it stays between Ural and Volga rivers on the territory of Astrakhanskaya and Volgogradskaya regions of Russia. Those peculiarities of territorial habitat tell us to consolidate with the countries involved in Saiga conservation.

In Kazakhstan during more that 40 years Saiga was the main subject of national commercial hunting (by licenses), and was main source of meat, leather-processing raw material and horns export. In the beginning of 90s its population number (in spring, before breeding began) was 800-900 thousands of specimen, 100 thousands of which were hunted for yearly during the hunting season. But closer to mid-90s situation begins to change in a worse way. Because of the hard economic situation nature protection system weakens. Massively expands illegal hunting (poaching) for horns, which are used as a medicine raw material in Tibetan medicine. Reasons that help increase poaching, are social: people don't have money and jobs, especially in country areas, and find the source of money and food in Saiga hunting. Males' horns become the subject of smuggling, which stimulates animals' disappearing. To suppress illegal horns trade this species was put in 1994 in addition 2 of "Convention about International Trade of Endangered Species"(CITES). This of course helped to decrease horn trade by official ways, but didn't stop their smuggler's trade.

Saiga population number, starting from mid-90s, from year to year continued to decrease and in spring of 2000 was 150 thousands of specimen - it reduced 6 times. In some geographical regions this decrease was even larger, between Ural and Volga rivers - 10 times, in Betpak-Dala desert - approximately 20 times. And only on Usturt because of the small population number and not plain geography Saiga population decreased only in 1.5 times. Besides smuggling, main limiting factors for Saiga are: lots of snow, when it is impossible to get food, and illnesses. Winters with lots of snow were observed twice - in 1993/94 in Betpak-Dala and in 1996/97 between Volga and Ural rivers. In the first case more that 200 thousands of Saiga died, and in second - several dozens of thousands. We need to point out that before after cases of mass dying population grew to the normal in 3-5 years because of Saiga's high prolificacy.

National hunting was minimal in sizes (from 29 thousands in 1995 to 7 thousands in 1998), was controlled and wasn't the main factor of species population dynamic. Never the less, when the population number began to decrease, hunting was officially prohibited in 1998 - in Betpak-Dala region, and in 1999-2000 - on the whole Kazakhstan territory (by Government decree). But this official prohibition was not supported by real measures and Saiga population continues to decrease. Besides, Uzbekistan continues to have commercial trade for Saiga on its territory - there is no consolidation between countries in this. If this situation stays the same, Saiga can disappear in nearest years.

For effective protection of this species and its habitat area it is necessary to make a system of measures that would include ecological, legal, social-economical and organizational-cultural points. Main acts that should be done in this are increasing of protected territories system (with different status and protection ), firstly in mass breeding areas, main migration ways and wintering places of Saiga, developing security measures when building different cultural establishments, doing biotechnical acts for making habitat better, developing standard - methodical acts that would help protections organization, making observations and counting the number of population, strengthening sheriffs' work for effective anti - smugglers' protection, counting Saiga's population regularly, firstly counting numbers, sex and age contents, breeding and habitat conditions (plants, snow, epizootological conditions, etc.). This question is of interest to several countries, its solution is seen in making a regional (international) project with participance and for support of international funds and organizations.

Y.A. Grachov, Kazakhstan - Middle-Asian zoological society, Almaty, Kazakhstan

Saiga antelope (*Saiga tatarica*) is the main game animal in this area. Local people kill them for meat and engage in the export of horns, which are used in Eastern medicine. Previously there were millions of animals migrating to the steppe areas of the north during the summer and to the semi-deserts in the south during the winter. These populations still exist though

their numbers have decreased significantly. Huge populations of saiga antelope, which lived in Kazakhstan, Uzbekistan, and Turkmenistan, are now fragmented; the semi-desert population of Kazakhstan is newly isolated. Groups of goitered gazelle (*Gazella subgutturosa*) inhabit the southern areas but have never established population densities as high as the saiga.
The upper slopes of the West Tian Shan mountains are inhabited by roe deer (*Capreolus capreolus)*, wild boar (*Sus Scrofa*) and brown bear (*Ursus arctos isabellinus*) can be also encountered.

The ecosystems of the steppe and semi-desert foothills and the low mountain belt include such rare ungulates as Kizylkum wild sheep (*O. a. severtzovi*) which inhabits Nuratau and Aktau, and Karatau wild sheep (*O. a. nigrimontana*) in the Karatau range.

Common mammals include red fox (*Vulpes vulpes*), corsac fox (*Vulpes corsac*), wolf (*Canis lupus*), steppe cat (*Felis libyca*), Siberian polecat (*Mustela eversmanni*), jungle cat (*Felis chaus*), weasel (*Mustela nivalis*), Altai ferret (*M. altaica*), ferret (*M. eversmanni*), marbled polecat (*Vormela peregusna*), badger (*Meles meles*), ermine (*Mustela erminea*), saiga antelope (*Saiga tatarica*), arkhar (*Ovis ammon*), ibex (*Capra ibex*), roe deer (*Capreolus capreolus*), tolai hare (*Lepus tolai*), Indian porcupine (*Hystrix leucura*), various jerboas (*Allactaga jaculus, A. elater, A. bobrinskii, Alactagulus saltator, Pygerethmus zhitkovi, Dipus sagitta, Scirtopoda telum*), birch mouse (*Sicista subtilis*), sousliks (*Citellus fulvus, C. erythrogenys*), gerbils (*Rhombomys opimus, Meriones erythrourus, M. meridionalis, M. tamariscinus*), water vole (*Arvicola terrestris*), vole (*Microtus arvalis*), long-eared hedgehogs (*Hemiechinus auritus*), shrews (*Sorex minutus, Crocidura suaveolens, C. leucodon*), mice (*Mus musculus, Apodemus agrarius*). In the forests one can find moose (*Alces alces*), Siberian roe deer (*Capreolus pygargus*), lynx (*Lynx lynx*), common hedgehog (*Erinaceus europaeus*), widely spread varying hare (*Lepus timidus*), badger (*Meles meles*), ermine (*Mustela erminea*), weasel (*Mustela nivalis*), common marten (*Martes martes*) racoon-like dog (*Nyctereutes procyonoides*). There is a high diversity of rodents including ground squirrels (*Citellus rufescens, C. erythrogenus*), hamster (*Cricetus cricetus*), jerboa (*Allactaga saltator*), voles (*Microtus oeconomus, Clethrionomys rutilus*), and steppe lemming (*Eremiomys lagurus*).

Kazakhstan semi-deserts are historic areas for the Przewalskii horse (*Equus przewalskii*), which has not been sighted in the wild since 1968 (Macdonald 1999). The large semi-desert areas are not cultivated thereby maintaining suitable habitat for later reintroduction of this highly endangered species.

The most spectacular large predator, Turanian tiger (*Panthera tigris virgata*) lived in this ecoregion in the 19th century (along the Syrdarya and Ili river *tugai*, or desert riparian forest) but was hunted to extinction in 1962.

Avifauna is exceptionally rich. Steppe representatives include typical species such as lark (5 species), wheatears, pipits, as well as numerous other unusual and rare species (*Chettusia gregaria, Otis tetrax, Anthropoides virgo, Circus macrourus, Circus pygargus, Aquila rapax*). In some areas great bustard can be found (*Otis tarda*). Forest areas are characterized with blackcock (*Lyrurus tetrix*), and other forest birds (*Dendrocopos major, Oriolus oriolus, Columba palumbus, Streptopelia turtur, Parus cyanus, Phoenicurus phoenicurus, Anthus trivialis*) and others. Birds of prey are very numerous. In one day you can see dozens of inhabited nests of different rare species of birds of prey (*Falco tinnunculus, F. vespertinus, F. subbuteo, F. columbarius*). Most numerous are waterfowl birds: swans (*Cygnus olor Cygnus*

*cygnus*), Grey geese (*Anser anser*) ducks and pochards (*Anas platyrhynchos, A. strepera, A. acuta, A. clypeata, A. querquedula, Aythya ferin, Netta rufina, Aythya fuligula*). Other birds found in the region include larks (*Galerida spp.*), doves (*Streptopelia spp.*), wheateaters (*Oenanthe spp*.), Egyptian vulture (*Gyps fulvus*), saker falcon (*Falco cherrug*), hawks (*Accipiter nisus, A. badius*), long-legged buzzard (*Buteo rufinus*), kite (*Milvus korshun*), falcons (*Falco tinnunculus*), buntings (*Emberiza spp.*), warblers (*Sylvia spp*.), and shrikes (*Lanius spp.*).

Both Alakol and Sasakol lakes have historically supported breeding populations of the globally threatened relict gull (*Larus relictus*) and globally threatened Dalmatian pelican (*Pelecanus crispus*). Surveys in 1998 located a large number of pelicans, but failed to record any relict gulls. The little bustard (*Otis tetrax*) breeds in the Tarbagatai Mountains on the northern side of Emin Valley.

There are numerous rare nesting species, both on the lakes and in the forests of the ecoregion: (Bragin,1999, Bragi, Bragina 1999): *Falco naumanni,Circus macrourus, Pelecanus crispus Pelecanus onocrotalus, Cygnus cygnus, Oxyura leucocephala, Platalea leucorodia, Grus grus, Anthropoides virgo, Haliaeetus albicilla, Aquila shrysaetos, Aquila heliaca, Aquila rapax, Falco cherrug, Otis tarda, Otis tetrix, Chettusia gregaria, Syrrhaptes paradoxus, Bubo bubo, Larus ichthyaetus*. Some of the most important species migrating through the area are: *Cygnus bewickii, Branta ruficollis, Aythya nyroca, Melanitta fusca, Grus leucogeranus, Pandion haliaetus, Falco peregrinus, Numenius tenuirostris), Phoenicopterus roseus, Egretta garzetta, Ardeola ralloides, Plegadis falcinellus, Pterocles orientalis, Haliaeetus leucoryphus, Ancer erythropus*. Twelve of these species are included in IUCN Red Data book. During their migration about 3- 3.5 millions of geese fly through the ecoregion, including 23 to 53% of the European population of *Ancer erythropus* and about 100 % of the population of *Branta ruficollis.*

**Current Status**

Rich in biodiversity, the belt of forest steppe attracted human activities long ago, and landscapes of the region have been markedly altered. Forests have been repeatedly cut and used for pasturing and hay fields. During the twentieth century, the southern border of forested steppe moved northward as a result of anthropogenic pressure (Vorobyov and Belov 1985).

On the border with Kyrgyzstan, the population is denser and industrialization more advanced. Oil, coal, iron, and copper deposits are exploited and contamination from such extraction affects air and water quality. Habitat in the foothill steppe areas has been negatively impacted by grazing and hunting.

Agriculture is one of the main threats for the ecosystems here. In the 50's, more then 90% of the area of regular chernozems and around 60 % of dry steppes were ploughed. This led to serious wind erosion, and dust storms became common. The steppe areas which remain are considerably modified due to overgrazing.

There are numerous protected areas in Western Tian Shan, on Kazakstan side Aksu-Dzebagly Nature Reserve with an area of 86.000 ha, created in 1926, can be mentioned. On the other hand, there are no strictly protected areas in the Kazakh semi-desert ecoregion. Some refuges do not adequately conserve constituent ecosystems. Within the last 10 years there has been a

significant decrease in the number of domestic livestock all over Kazakhstan, associated with the destruction of kolkhozes (about 10% of the previous number). As a result, ecosystems have a good chance for rehabilitation. This decrease in the number of the livestock has alternately increased wolf predation on saiga and large rodents.
During the last years numerous new protected areas are established, as a whole, there are 74 in Kazakhstan (10 Zapovednics, 8 national and nature parks, 56 sanctuaries), and the process of new PA establishment is actively on-going. Lakes of Northern Kazakhstan (Naurzum and Kurgaldjino) are suggested to be nominated as the World heritage site (the first nomination prepared in Central Asia and passed to UNESCO).

**Types and Severity of Threats**

The main threat is clear-cutting of kolok forests, followed by conversion to agriculture. Since the end of the nineteenth century, birch forests were most intensively developed for agriculture.

Other threats are overgrazing by domestic animals, set fires and extensive poaching. The poaching of Saiga caused an enormous decrease of saiga's population at the beginning of 1990s. They were poached for their horns only (considered useful in Chinese medicine). These horns were then traded illegally. Thousands of males were killed in open fields, horns removed, and bodies left in place. Later in the decade, prices dropped, lower population densities and high prices for gas (needed to follow animals by motorbikes) made this type of poaching less profitable. However the poaching for individual needs that takes place now (for all ungulate species), to provide the local people the meat (especially in winter), is very strong, as well as disturbance of birds during the migratory and nesting periods. Uncontrolled poaching for zoo-export (birds of prey, reptiles, horns of saiga) is a very serious threat to species.

Other important threat to this ecoregion is mineral extraction. Oil, coal, iron ore, manganese, chromite, lead, zinc, copper, titanium, bauxite, gold, silver, phosphates, sulfur, iron and steel, are mined from this area and the consequent contamination and destruction of habitat is of serious concern.

Kazakhstan presents a landscape that is very scenic with parklike alpine landscapes (Altai Mountains), dense forests and glacially scoured lake-filled basins. Should access to this area increase in the future, it will certainly become attractive for all kinds of mountain tourism, with its attendant ecological costs and benefits.

**Institutional, administrative and legal system**

The Ministry of Natural Resources and Environment Protection was[4] a central executive body of the Republic of Kazakhstan in the area of environmental protection and conduction of cross-sectorial state control. The Ministry is responsible for implementation of the Convention on Biological Diversity, Convention to Combat Desertification, Convention on Climate Change, Montreal Protocol and Vienna Convention. There was the Forestry, Fishing and Hunting Committee within the Ministry structure that is directly responsible for biodiversity protection and sustainable use.

[4] Since August 2003 the Ministry is reorganized. There is Ministry of nature conservation – responcible for general issues, majority of Conventions, etc. The Forestry and Game Management Committee belongs now to the Ministry of Agriculture – and is responsible for all protected areas and rare species.

The Committee of Forestry, Fishery and Hunting (CFFH) performed all the functions of forest management, special executive functions of state control and supervision as well as inter-sector coordination in the area of forestry, fishery[5] and hunting, specially protected natural territories in the Republic of Kazakhstan.
Forests in the Republic of Kazakhstan are still exclusively the ownership of the State. (*The situation is in a process of change with the development of new laws – on-going process during the last 2-3 years*). About 99% of lands of the Forest fund and specially protected natural territories – 25,995.6 thousand ha, are permanently in the possession of the Committee of Forestry, Fishery and Hunting, 1% is in possession of other Ministries and Departments.

The structure of the CFFH included among others:

- 9 state natural reserves
- 6 state national parks
- 14 oblast territorial administrations
- 138 subordinate services for the protection of forests and wildlife
- Kazakh Institute of Upgrade Training of Forest managers and Specialist.

Under the Ministry of Education and Science there is an Experimental Forestry Research Facility.

Average nominal number of staff employed in the forestry sector used to be around 5 000. In 1990-th the number of the personnel had dramatically diminished. It was connected with the reduction of the state budget allocations, decreased amount of operations and reduction of working places. Low salaries in the sector and continuous reorganizations caused an increased instability in the administrative staff and forest guards. The situation completely changed (reversed) during the last 2-3 years.

At present about 30% of the administrative staff of the oblast departments and State enterprises for the protection of forests and wildlife have special training degrees. Sufficient number of trained junior staff and forest guards is also missing. To solve this problem it is necessary to upgrade the level of specialized training of personnel and satisfy the demand of the sector in senior executives and junior managers.

**Research institutes:** Institute of Botany and Phytointroduction, Institute of Zoology and Genetic fund of Animals, Institute of Soil Science, Institute of Physiology, Genetics and Bioengineering of Plants, Institute of Microbiology pay special attention to environmental problems both participating in implementation of activities by the Ministry of Natural Resources and Environment Protection through elaboration of its own environmental projects.

**The non-governmental organizations** of the Republic of Kazakhstan though they are numerous and their activity is directed on environment protection, pay little attention to the practical aspect of biological diversity conservation. Mainly their activity is limited by preparation of projects or substantiation of the development of network of specially protected natural territories or endangered species protection. More numerous parts of such organizations are engaged in the development of ecological education and enlightening. Representatives of the following NGOs, namely, ENVIRS, association of the reserve workers of national parks "Koryk", Public Center on Biological Diversity, and four IUCN members - Kazakhstan-Central Asia Zoological Society, "Green Salvation", “Tethys”, the Center on

[5] Fishery is now separated and belong to another ministry.

Support of Ecological Education, were involved in the NBSAP development process from the start.

Legal system

The law "On Environment Protection" was adopted on 15 July 1997. The law determined legal, economic and social framework for environment protection for the benefit of the present and future generations; it is intended to prevent negative technological impact on the environment, to preserve environmental balance and organize rational nature use in the country. The Water Code of the Republic of Kazakhstan was adopted on 31 March 1993 and the Forest Code of the Republic of Kazakhstan was adopted on 23 January 1993. The law "On Protection, Reproduction and Use of Animals" was adopted on 21 October 1993.

Decrees of the President "On Oil" and "On Land" were signed on 28 June 1995 and on 22 December 1995, respectively. The decree of the President "On underground and underground mineral utilization" was issued on 26 January 1996; the law "On emergency situations of technogenic and natural genesis" was adopted on the 5 July 1996. The law "On environmental expertise", the law "On protected natural territories" and the law "On nuclear power utilization" were adopted on the 18 March 1997, on the 15 July 1997 and on the 14 April 1997, respectively. In December 1997 the law "On energy savings" was adopted. Drafts another laws on environment preservation are in process of elaboration.

In September 1995 the President of Kazakhstan signed the Nukus Declaration of Central Asian states and international organizations on sustainable development in the Aral Sea Region. In April 1996 - the Conception of Environmental Security of Kazakhstan formulated by the Security Council was approved by the President's Decree. The Conception includes basic principles, strategic objectives and priorities of environmental security as the basis for sustainable development of Kazakhstan and the NEAP formulation.

In December 1995 the UNDP and the Government of the Republic of Kazakhstan started Preparatory Assistance for formulation of the National Environmental Action Plan for Sustainable Development (NEAP/SD) in Kazakhstan as the first step towards National Agenda 21.

In December 1997 "**Kazakhstan's development long-term strategy up to year 2030**" (so called Strategy 2030) was declared. A component of it is long-term strategy "Environment and natural resources", which has four main priorities.

**The first Priority** of this Strategy is **creation of ecologically safe environment**. Among the tasks put forward for achieving this priority the following are distinguished:

- Stable improvement of the Environment for it become favorable to live in and for the health of people;
- Restoration of the violated natural ecological systems;
- Creation of the system of adequate stable financing of nature protection programs by the subsurface users and social funds including international ones.

Achievement of the **sustainable use of natural resources** is determined as the **second Priority**. In order to achieve this goal the following should be realized:

- Control for status of environment and monitoring of it, control for nature managers;
- Sustainable use, reproduction and protection of natural resources;
- Transition to the resources saving technologies.

**The third Priority is Conservation of Biological Diversity of Flora and Fauna** that should be provided by:

- Monitoring, rational use, reproduction and protection of flora and fauna;
- Development of the network of specially protected territories.

**The fourth priority - Ecological Education** is paid special attention and it is called fulfill the following tasks:

- Public awareness and education of the society in the field of environment protection and rational use of natural resources, and
- Social cultivation of conscious priority of environment protection problems.

In 2003-2005, certain activities were carried out to draft and revise the regulatory legislation on forestry, hunting and specially protected natural areas.
The new Forest Code of the Republic of Kazakhstan was approved on July 8, 2003, while the Law of the Republic of Kazakhstan "On Protection, Reproduction and Use of Wildlife" was adopted on July 9, 2004. The Law of the Republic of Kazakhstan "On Specially Protected Natural Areas" was adopted on July 7, 2006.

The Committee for Forestry and Hunting has also developed the **Program on Preservation of Rare and Endangered Species of Hoofed Animals and Saigas for 2005-2007**, which was approved by Decree # 267 of the Government of the Republic of Kazakhstan on March 25, 2005.
The Program provides organization of protection for rare and endangered species of wild ungulates (argali, goitered gazelle, Bactrian deer, Turkmen kulan) and saigas to reach the level excluding mass-scale poaching;

- enforce legislative remedies to preserve rare and endangered species of wild ungulates and saigas;
- set up a reliable and effective annual counting of wild ungulates and saigas;
- introduce a control system to monitor the population and habitats of wild ungulates and saigas;
- carry out scientific research to develop biotechnological means for preservation of the gene pool and determine an optimal population of wild ungulate species.

The expected results from the Program implementation include: stabilization of the population of the Bactrian deer, goitered gazelle, argali, kulan, saiga, and restoration of their population in habitats for a steady development, as recorded by population growth data.
In 2006, the national budget assigned 200 million tenge for this Program implementation.

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