

The Red List of **Trees of** **Central Asia**

Antonia Eastwood, Georgy Lazkov and Adrian Newton





FAUNA & FLORA INTERNATIONAL (FFI), founded in 1903 and the world's oldest international conservation organization, acts to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, are based on sound science and take account of human needs.



BOTANIC GARDENS CONSERVATION INTERNATIONAL (BGCI)

is a membership organization linking botanic gardens in over 100 countries in a shared commitment to biodiversity conservation, sustainable use and environmental education. BGCI aims to mobilize botanic gardens and work with partners to secure plant diversity for the well-being of people and the planet. BGCI provides the Secretariat for the IUCN/SSC Global Tree Specialist Group.



THE GLOBAL TREES CAMPAIGN is a joint initiative between FFI and BGCI in partnership with a wide range of other organizations around the world. The aim of the Campaign is to save the world's most threatened trees and the habitats in which they grow through the provision of information, delivery of conservation action and support for sustainable use.



THE IUCN/SSC GLOBAL TREE SPECIALIST GROUP forms part of the Species Survival Commission's volunteer network of over 7000 volunteers working to stop the loss of plants, animals and their habitats. SSC is the largest of the six Commissions of IUCN-The World Conservation Union. It serves as the main source of advice to the Union and its members on the technical aspects of species conservation. The aims of the IUCN/SSC Global Tree Specialist Group are to promote and implement global red listing for trees and act in an advisory capacity to the Global Trees Campaign.

**Published by Fauna & Flora International,
Cambridge, UK.**

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ISBN: 9781 903703 27 4

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COVER PHOTOS

Front cover: Walnut harvest, Kyrgyzstan. The walnut is a key component of the highly threatened fruit and nut forests of Central Asia and is also of great economic importance to people in the region (Chris Loades/FFI).
Back cover: Forest, Kyrgyzstan (Chris Loades/FFI).

COVER DESIGN

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ACKNOWLEDGEMENTS

The production of this *Red List of Trees of Central Asia* would not have been possible without the collaboration, commitment and participation of regional and international experts. The experts who participated in the regional workshop held in Bishkek in July 2006 were: Nadezhda Yakovleva, Kamil Ashimov, Tirkesh Murzaev, Elina Prokhorenko (Kyrgyz Agrarian University, Kyrgyzstan), Sayra Kissanova (Association of Reserves & Natural Parks, Kazakhstan), Iskandar Mirkhashimov (GEF/UNDP project; *In-situ Conservation of Kazakhstan's Mountain Agrobiodiversity*, Kazakhstan), Sovetbek Kenjebaev (Institute of Biosphere, Kyrgyzstan), Akbar Mamadrizokhonov (Khorog State University, Tajikistan), Evgeny Botman, Evgeny Butkov (Centre for Horticulture and Forestry, Uzbekistan), Kairkul Shalpykov (Institute of Biology and Pedology, Kyrgyzstan), Galina Malosieva, Leonid Andreychenko, Ishenbay Soodonbekov (Bishkek Botanic Garden, Kyrgyzstan), Gulnara Sitpaeva, Alfa Kurmantaeva,

Natalya Nelina (Institute of Botany and Phyto-introduction, Kazakhstan), Magjan Isin (Research Institute of Plant Protection, Kazakhstan), Abdukhaliil Kayimov (State Agrarian University, Uzbekistan) and Jarkyn Samanchina (Bashat-Community and Business Forum, Kyrgyzstan).

The Global Trees Campaign is very grateful to the Kyrgyz Agrarian University, Bishkek for hosting the workshop, particularly for the support provided by Dr Almazbek Irgashev, Akylbek Kasymov and Dr Almaz Orozumbekov. We would also like to thank Nuska Botoiarova, formerly FFI's Central Asia Project Coordinator, for all her organisational, administrative and logistical assistance that helped ensure the workshop was such a success.

We would also like to take this opportunity to thank the Red List Unit (IUCN Species Programme), in particular Helen Temple and Craig Hilton-Taylor, for providing technical guidance on the application of IUCN categories and criteria.

Translation between Russian and English was done by Igor Smirnov, BGCI Russia. Amy Hinsley, Programme Officer at FFI, coordinated final editing and production of the report. Georgina Magin, Global Trees Campaign Coordinator at FFI, provided oversight and editorial input and Sara Oldfield, Secretary General of BGCI and Chair of the IUCN/SSC Global Tree Specialist Group, provided expert advice and technical knowledge. Elizabeth Allen, Editorial Assistant of *Oryx* at FFI, assisted with final editing, Liesje Birchenough wrote the case study on the walnut-fruit forest in Kyrgyzstan and Jarkyn Samanchina, FFI's Project Officer in Kyrgyzstan, coordinated production of the Russian version of this report.

ACRONYMS

BGCI	Botanic Gardens Conservation International	IUCN	The International Union for Conservation of Nature
CEC	Commission of the European Communities	NTFP	Non-Timber Forest Product
CECON	Nature Conservation Centre, Guatemala	SSC	Species Survival Commission
CI	Conservation International	UK	United Kingdom
FAO	Food and Agriculture Organization of the United Nations	UNDP	United Nations Development Programme
FFI	Fauna & Flora International	USDA	United States Department of Agriculture
GEF	Global Environment Facility		
GIS	Geographical Information System		

FOREWORD

Trees are important to the well-being of people in every country of the world, providing essential ecological, economic and cultural services. In Central Asia, a vast and varied region with generally relatively low forest cover, tree species are of great value in defining forest ecosystems and providing resources such as fuelwood, timber, fruits and nuts. In fact the genetic diversity of fruit and nut trees within the region is of outstanding global significance. As elsewhere in the world, the trees of Central Asia face an onslaught of threats from habitat destruction, over-grazing, over-harvesting and the increasing impact of global climate change. This report presents a review of the conservation status in the wild of the trees of Central Asia, facilitated by FFI and the IUCN/SSC Global Tree Specialist Group.

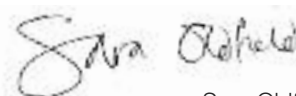
Since its establishment in 2003 the primary role of the IUCN/SSC Global Tree Specialist Group has been to assess the global conservation status of tree species in selected geographical areas and taxonomic groups. This report is the fifth publication in the series.

The collection of information on tree species of conservation concern is vital for planning conservation action. The secondary role of the IUCN/SSC Global Tree Specialist Group is to act as an advisory body for the Global Trees Campaign, which aims to save the world's most threatened tree species and the habitats where they grow. The Global Trees Campaign provides an important practical mechanism for implementation of the Global Strategy for Plant Conservation of the Convention on Biological Diversity. Global tree red listing contributes directly to Target 2 of the Strategy, which calls for a provisional list of threatened plant species by 2010.

In many ways Target 2 underpins the other ambitious targets that relate to *in situ* and *ex situ* conservation and sustainable use and trade in plants. Projects of the Global Trees Campaign carried out in partnership with organizations and individuals around the world help to deliver these various targets. The projects contribute to halting the loss of forest biodiversity and the provision of support to rural livelihoods.

The Global Tree Specialist Group is committed to undertaking a global assessment of the conservation status of tree species. Results of the global assessment will be published as components of the work are completed. This will ensure that regular indicators of progress are produced, updated tree conservation data are made widely available and that tree conservation initiatives around the world can be supported.

This report highlights 67 tree species that are globally threatened, near threatened or of concern because of insufficient information on their status in the wild. It highlights the actions that urgently need to be undertaken to prevent the extinction of these species. Fortunately we have the ability to act, working with nature conservation and forestry agencies, botanic gardens and germplasm banks of the region. Fauna & Flora International and Botanic Gardens Conservation International, the international partners in the Global Trees Campaign, are committed to helping save these tree species from extinction.



Sara Oldfield
Chair of the IUCN/SSC Global Tree
Specialist Group

INTRODUCTION

Central Asia forms a vast region that stretches from the Caspian Sea in the west to the great Tien Shan mountain range in the east. The region is composed of five independent republics: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. All five countries were once part of the Soviet Union until their independence in 1991. The largest of the Central Asian countries is Kazakhstan, with a total land area of just over 2,700,000 km². Tajikistan is the smallest country, occupying 143,100 km².

Central Asia is a region of contrasting landscapes. In the west it is dominated by the barren, rocky Ustyrt Plateau and the vast Turan Plain, with the Kara-Kum Desert in the south and the Kyzyl-Kum Desert in the centre. The Kopetdag Mountains in the south-west form a natural border between Turkmenistan and Iran. The extensive lowland plains in the west and centre of the region, comprising largely desert and arid steppe, eventually give rise to the uplands and then the great mountain ranges of the Tien Shan, the Altai and the Pamir. The highest peaks in Central Asia are Ismoil Somoni Peak (7,495 m), Pobedy Peak (7,439 m) and Lenin's Peak (7,134 m). At altitudes above 3,500 m permanent snow, rock and glaciers dominate the landscape. Although the region is largely arid, a number of large rivers such as the Amu-Darya and the Syr-Darya flow down from the mountains to form lakes such as Issyk-Kul in Kyrgyzstan and the Aral Sea, which lies on the border of Kazakhstan and Uzbekistan. These large rivers are responsible for the verdant, fertile valleys, such as the Fergana Valley, which today are intensively irrigated for crops.

The vastness of the region (almost 4,000,000 km²), its landscapes and altitudinal zonation have led to a wide range of ecosystem types that include steppe, riparian tugai, taiga, wetlands, snowfields and deserts. These in turn are home to threatened species such as snow leopard *Uncia uncia*, saiga antelope *Saiga tatarica tatarica* and beluga sturgeon *Huso huso*.

The region supports some 8,300 species of vascular plants (Kamelin, 2002) of which approximately 10% are thought to be endemic. The mountains of Central Asia are a recognized global biodiversity hotspot (Davis *et al.*, 1995), supporting over 300 wild fruit and nut species. These include wild species of apple (four species), almond (8–10 species), cherry (8–10 species), plum (4–5 species), and walnut (one species) as well as many domesticated varieties. The rich diversity of fruit and nut species in the region led the Russian geneticist and plant breeder N.I. Vavilov to propose it as one of the world's eight centres of crop origin and domestication (Hawkes, 1998). In fact, recent molecular genetic studies strongly support the hypothesis that the domestic apple originated from Kazakhstan (Harris *et al.*, 2002).

There are 500–600 arborescent species in Central Asia, of which 100–150 can be classified as trees, the remainder being shrubs (Lazkov, pers. comm., 2008). This includes taiga species such as *Abies sibirica* and *Picea schrenkiana* as well as desert shrubs such as *Haloxylon persicum* and *H. aphyllum*. High species diversity and endemism is particularly notable in the shrubby genera *Calligonum*, *Tamarix*, *Astragalus*, *Cotoneaster*, *Rosa* and *Crataegus*.

FORESTS AND WOODLANDS OF CENTRAL ASIA

The aridity of the region means that the proportion of land under forest or woodland is relatively low when compared to more humid regions such as South America. Tajikistan has the least, with around 3.9% of its total land area covered by forest or woodland, whilst Uzbekistan has the most, with 10.1% of its land wooded (FAO, 2006a). Kyrgyzstan, Kazakhstan and Turkmenistan have 6.2%, 7% and 8.8% forest and woodland cover respectively. A large proportion of the woodland in Kazakhstan and Turkmenistan is composed of desert saxaul *Haloxylon* spp. shrublands (FAO, 2006a). Located primarily in the mountains, the forests of Central Asia play a pivotal role in environmental protection, preventing soil erosion and desertification, and regulating watersheds.

Despite the relatively low forest/woodland cover, Central Asia supports a diverse range of forest and woodland types, some of them unique to the region. The main and most notable forest and woodland types of the region are:

Saxaul *Haloxylon* spp. shrublands can be found in the desert and arid steppe regions, mostly in Turkmenistan and Kazakhstan. These shrublands, which typically include drought resistant species such as *Salsola*, *Calligonum* and *Elaeagnus*, play an essential role in preventing soil erosion.

Riparian tugai is restricted to the floodplains of the region and is found alongside river courses and streams. Tugai is typically composed of a mixture of willow *Salix* spp., poplar *Populus* spp. and birch *Betula* spp..

Broadleaved fruit and nut forests are found in the foothills and slopes of the Tien Shan, Pamir-Alai and the Kopetdag mountains between 800–2,000 m. These fragmented forests are incredibly rich in wild fruit- and nut-bearing species such as walnuts *Juglans regia*, apples *Malus* spp., pears *Pyrus* spp., plums *Prunus* spp. and almonds *Amygdalus* spp..

Juniper (archa) woodlands/shrublands are found typically in the dry foothill regions or at mid to high altitude (up to 3,500 m above sea level), where they take on prostrate forms. Species include *Juniperus seravschanica*, *J. semiglobosa* and *J. turkestanica*.

Taiga forests comprising predominantly spruce and fir species are restricted to the northern slopes of the Tien Shan between 1,700 m and 2,700 m. Typical species include *Picea schrenkiana* and *Abies sibirica*. The endemic Semenov fir *Abies semenovii* is restricted to small areas in western Kyrgyzstan.

Pistachio *Pistacia vera* woodlands are found on the lower, drier foothills and mountain slopes of western Tien Shan, Pamir-Alai and Kopetdag. One of the most notable areas of pistachio is in the Badghyz Strict Nature Reserve (Turkmenistan), where the trees form extensive open groves covering around 76,000 ha (MNPT, 2002).

FOREST MANAGEMENT AND NATURE CONSERVATION

The majority of the forests and woodlands in Central Asia are still owned by the state, and management is still largely based on the Soviet system of state forestry enterprises or *leskhoz*es (FAO, 2006a). The main objectives of forest management in all the Central Asian countries are focused on

environmental protection, recreation and wildlife management (FAO, 2006a). Central Asian forests are regionally recognized as being essential in protecting common watersheds and arresting land degradation and desertification.

State forestry enterprises are also responsible for the management of some forested protected areas, such as the Badai-Tugai Strict Nature Reserve in Uzbekistan. The rest of the protected areas tend to be managed by nature protection agencies. All five Central Asian countries largely inherited the former Soviet system of protected areas, which includes Strict Nature Reserves (*zapovedniks*), National Parks, Nature Monuments and Special Purpose Reserves (*zakazniks*). The highest protection is provided by *zapovedniks* (IUCN Category I), whilst *zakazniks* have the least protection (IUCN Category IV). To date, there are 39 *zapovedniks*, 14 National Parks, some 67 Nature Monuments and around 150 *zakazniks* in Central Asia. These numbers are likely to increase in the near future as more protected areas are designated. A number of *zapovedniks* were established to conserve distinct forest types such as the Zaaminsky State Reserve (unique juniper forest) in Uzbekistan and Sary Chelek Biosphere Reserve (fruit and nut forest) in Kyrgyzstan.

The political and economic collapse of the Soviet Union between 1989 and 1991 has had a profound effect on all the Central Asian countries, with consequences including war and civil unrest (UNDP, 2005). The ensuing sharp economic decline has had a huge impact on people's lives in the region, with nature conservation and environmental protection subsequently receiving low

priority. The majority of protected areas and *leskhoz*es are severely under-resourced and lack the necessary institutional capacity, financial support and expertise for the effective management of biodiversity and law enforcement (MEP, 1998; MNPT, 2002; Cornet and Rajapbaev, 2004; Jashenko, 2006).

FOREST USE

Despite the low forest cover in Central Asia, the people of the region have always had a strong association and dependency on forests to provide firewood, timber and food (nuts, fruit, mushrooms and honey). In fact, the name of Kazakhstan's former capital, Almaty, literally means 'the Father of Apples'. The long association of humans with apples in the region is demonstrated by the lack of distinction between some wild species and their cultivated varieties (Juniper and Mabblerley, 2006).

Wood fuel is still important in Kyrgyzstan and Tajikistan where a high proportion of the population live in rural areas and do not have access to fossil fuels. In Tajikistan more than 80% of rural households rely on wood fuel as a main source of cooking energy (FAO, 2006a). Since independence all the Central Asian countries apart from Turkmenistan have seen an increase in the demand for wood fuel (FAO, 2006a). Primarily due to low productivity, forest plantations make up only a small proportion of the total forest cover in Central Asia. These are mainly set aside for protective measures rather than for wood production. Most of the Central Asian countries depend on imported wood, although imports have drastically reduced since the break-up of the Soviet Union (FAO, 2006a). Although logging is officially illegal in the majority of the indigenous forests in Central Asia, substantial quantities are still removed

(FAO, 2006a). Trees are felled for timber and, in the case of walnut, to produce veneer for furniture. The amount of illegal felling that is currently taking place is not known.

Non-timber forest products (NTFPs) such as walnuts, apples and pistachios are an important source of livelihoods for rural communities in Central Asia. Collection of NTFPs ranges from subsistence harvesting to collection for international trade with, for example, China or Turkey. In southern Kyrgyzstan, walnut is the most important NTFP and can be a major source of income for the local population, especially during years of good harvest (Fisher *et al.*, 2004).

For rural communities the forests also provide grazing for livestock and the under-storey of wood pastures is cut for hay to provide fodder during the winter months. Although grazing is illegal in the majority of *leskhoz*es in Kyrgyzstan, livestock grazing in woodland is very much the norm (Fisher *et al.*, 2004).

THREATS TO FORESTS AND WOODLANDS

The Global Forest Resources Assessment 2005 (FAO, 2006b) indicates that the extent of forests and woodlands in Central Asia has remained relatively unchanged since 1995. However, the reliability of the data provided for the assessment is uncertain owing to the region's lack of capacity to monitor and conduct forest inventories since the break-up of the Soviet Union. There is also very little official information on the actual status of forests, their associated species and levels of degradation.

A number of reports, national biodiversity strategies and the experience of regional experts (MEP, 1998; MNPT, 2002;

Safarov, 2003; Cornet and Rajapbaev, 2004; IRIN, 2003) all indicate that Central Asian forests and woodlands are under severe threat from over-exploitation, desertification, pests and diseases, over-grazing and fires. A combination of factors including the cessation of subsidized timber from the former Soviet Union, rural poverty, a lack of alternative energy sources and the lack of institutional capacity to protect and regulate forests have all added to the pressure on vulnerable forests of the region. The forests and woodlands growing on the foothills of the Tien Shan, Pamir-Alai and Kopetdag mountains, especially those near rural settlements, are most threatened. This includes the slow-growing juniper forests of Tajikistan and Kyrgyzstan, which are threatened by firewood collection and over-grazing. Kyrgyzstan, for example, lost some 35% of its montane juniper in just a few decades (MEP, 1998). As firewood becomes increasingly scarce around settlements, villagers have to go deeper and deeper into the forest to satisfy their daily fuel needs.

Although an important source of income for rural communities, unsustainable rates of harvesting of NTFPs such as walnuts continue to pose a huge threat to the region's unique fruit and nut forests. The threat is further compounded by unregulated logging, grazing, hay-making and, more recently, pests such as the gypsy moth *Lymantria dispar*. In the Jalal-Abad province of Kyrgyzstan local foresters and residents have noticed marked reductions in the walnut and apple harvest in recent years (IRIN, 2003). A biodiversity hotspot report by Conservation International (CI, 2008) states that some 90% of fruit and nut forest habitats have been lost in the last 50 years.

The forests of the Tien Shan and Pamir-Alai mountains and the floodplain tugai forests provide crucial environmental protection and ecosystems services to the predominately arid Central Asian region. Their loss and degradation not only threatens globally unique biodiversity and rural livelihoods but also endangers water supply and regulation, essential to fertile agricultural areas such as the Fergana Valley and major metropolises in the region.

METHODOLOGY USED FOR CONSERVATION STATUS ASSESSMENT

The IUCN/SSC Global Tree Specialist Group, in association with the Global Trees Campaign, uses a number of approaches to undertake global assessments of the conservation status of tree species (Newton and Oldfield, 2008). These include, most importantly, close collaboration with regional and international experts in botany and forestry, as well as extensive literature reviews and searches on online taxonomic and herbarium databases, supported by GIS mapping.

To undertake an assessment of the conservation status of Central Asian trees the Global Trees Campaign organized a workshop in July 2006 to bring together a range of regional experts from the Central Asian countries. A total of 25 participants from Kyrgyzstan, Kazakhstan, Tajikistan, Uzbekistan and the UK attended the workshop in Bishkek, Kyrgyzstan. Regrettably, the workshop organizers were unable to arrange for an expert from Turkmenistan to attend. Over the 3-day workshop the participants, through much discussion and debate, produced a list of nationally threatened tree species, a candidate list of globally threatened Central Asian tree

species, and a preliminary Red List of globally threatened trees from Central Asia using the IUCN Red List categories and criteria (IUCN, 2001). During the workshop a map of regional forest cover, derived from satellite remote sensing imagery, was used to define the potential distributional range of selected species. For this purpose the Moderate Resolution Imaging Spectroradiometer (MODIS) Vegetation Continuous Fields (VCF) product was used (Hansen *et al.*, 2003). This product depicts the percentage tree cover at a resolution of 500 m using a supervised regression tree algorithm. For each species considered distributional ranges were derived by exploring the expert data elicited during the workshop using ArcView v. 9.1 (ESRI, Redlands, USA; www.esri.com). Following the workshop the preliminary Red List was reviewed and revised with the assistance of the Red List Unit, IUCN Species Programme and additional research in the literature and online databases.

RESULTS OF EVALUATION

Over the course of the 3-day workshop 25 experts from Kyrgyzstan, Kazakhstan, Tajikistan, Uzbekistan and the UK evaluated 96 Central Asian tree and shrub species according to the IUCN Red List categories and criteria (IUCN, 2001). Twelve tree and shrub taxa listed in the Red Data Book of Turkmenistan (Atamuradov *et al.*, 1999) were not evaluated as no national experts from Turkmenistan attended the workshop. The full Red List of globally threatened trees from Central Asia with associated categories and criteria can be found on page 13. A summary of the results of the evaluation are in the table below.

SUMMARY OF RESULTS

Conservation Status	Number of taxa
Extinct	0
Critically Endangered	23
Endangered	13
Vulnerable	8
Near Threatened	5
Data Deficient	17
Least Concern	30
Total Evaluated	96
Not Evaluated	12

Of the 96 taxa evaluated, 44 are categorized as Critically Endangered, Endangered or Vulnerable, meaning that they are threatened with extinction in the wild according to the IUCN Red List categories and criteria. A further five taxa are Near Threatened and 17 are Data Deficient. Data Deficient taxa are those taxa that are deemed not to have sufficient information available to assign a Red List category. In the current evaluation this is primarily because of the lack of knowledge of the conservation status of species whose distributions extend outside Central Asia, for example, into Afghanistan or Iran. In addition, the lack of capacity of scientific institutions to undertake fieldwork, particularly since the break-up of the Soviet Union, has reduced the availability of up-to-date information. This is especially pertinent for Kazakhstan, the ninth largest country in the world.

A high proportion of the threatened taxa are Critically Endangered, that is, they face an extremely high risk of extinction in the wild. Many of these are narrow endemics, such as *Abies semenovii* and *Crataegus knorringiana*, whose fragmented populations are threatened by cutting and/or over-grazing. Others, relatives of domesticated fruit trees and shrubs such as *Pyrus korshinskyi* and

Ribes malvifolium, are threatened by over-harvesting of fruits and collection of saplings as rootstock for grafting. More specifically, *Calligonum triste* is directly threatened by desertification and soil salination resulting from the drainage of the Aral Sea.

A number of the species that are Endangered or Vulnerable are wild relatives of domesticated fruit and nut varieties. This includes wild apricot *Armenica vulgaris* (EN), which is threatened by unsustainable harvesting and over-collection by national and international plant-breeding companies. Two wild apple species, *Malus niedzwetzkyana* (EN) and *Malus sieversii* (VU), are still found in the fragmented fruit and nut forests of Central Asia and are threatened by habitat degradation, mainly from agricultural development and over-grazing.

A number of species are directly threatened by over-collection for firewood. This includes *Juniperus schugnanica* (VU), *Calligonum calcareum* (CR) and *Calligonum paletzkianum* (VU). Populations of these species have all seen dramatic declines in recent years, particularly those in the vicinity of rural settlements.

The experts evaluated both walnut *Juglans regia* and pistachio *Pistacia vera* as Near Threatened even though recent paleontological evidence for walnut in the Fergana Valley (Kyrgyzstan) suggests it may have an anthropogenic origin, rather than native (Beer *et al.*, 2007). For walnut, the experts have taken a precautionary approach until further evidence becomes available because of the global significance of the walnut forests in Central Asia and their importance as an international genetic resource.

CURRENT CONSERVATION MEASURES FOR THREATENED TREES OF CENTRAL ASIA

As described in the introduction, all five countries of Central Asia have a long-established tradition of nature protection and forest management. This is also true for scientific research in the biological sciences and is evident in the extensive network of botanic gardens, arboreturns, universities and academic research institutions throughout the region.

However, as previously discussed, the region has undergone dramatic economic, social and political transition following independence from the former Soviet Union in 1991. This has had a profound impact on the capacity of forestry, nature protection and scientific institutions to survey, manage and monitor forests, woodlands and threatened species. The majority of state conservation agencies and research institutions are severely under-resourced and are unable to conduct baseline surveys, let alone regulate and manage forest resource use. In turn, botanic gardens and germplasm banks lack the staff and basic equipment to maintain globally important *ex situ* collections of threatened trees.

There is immense pressure on Central Asian forests and woodlands to provide firewood, timber and NTFPs. State forestry agencies and protected areas therefore face huge challenges in the conservation of threatened trees and the sustainable use of forest products. These challenges are exemplified by the 44 globally threatened tree species, a significant proportion of which are wild relatives of globally important fruit crops.

The global importance and plight of the unique forests and fruit and nut diversity of Central Asia has recently begun to be

Box 1: Examples of recent forest conservation projects in Central Asia

- Archa JUMP Project on the Sustainable Management of Juniper Forests in Southern Kyrgyzstan (CEC)
- Central Asia Transboundary Biodiversity Project in West Tien Shan (GEF)
- Conservation of Tugai Forests and Strengthening Protected Areas System in the Amu-Darya Delta of Karakalpakstan (UNDP and GEF)
- Impact of the Transformation Process on Human-environmental Interactions in Southern Kyrgyzstan (Volkswagen Foundation)
- In-situ Conservation of Kazakhstan's Mountain Agrobiodiversity (UNDP/GEF)
- Kyrgyz-Swiss Forestry Support Programme (Intercooperation)
- Community Conservation of Globally Important Fruit and Nut Forests in Kyrgyzstan (FFI)

recognized with a number of internationally funded projects. Some of these projects are listed in Box 1.

Although the above projects vary greatly in scope it is essential that any lessons learnt, best practice and possible solutions are disseminated effectively

throughout the region. Not only do the Central Asian countries share a recent political legacy, watersheds and mountain ranges, but they also share many similar issues and problems regarding nature conservation, environmental protection, rural development and the sustainable use of natural resources.

Case Study: Community Conservation of the Walnut-fruit Forests in Kyrgyzstan

FFI is working with local partners in Kyrgyzstan to improve the conservation of walnut-fruit forests by promoting the involvement of local communities in forest management. Threats to forest integrity include: limited natural regeneration because of grazing pressure and hay-making within the forest; illegal cutting of trees and collection of firewood; over-harvesting of fruits and nuts; pests (such as gypsy moth) and disease.

In recent times, local people have had little opportunity to engage in forest management and planning, although they do have access to forest resources through the leasing of forest plots. These fruit and nut forests are a vital resource for local people, providing fuelwood, food, fodder and grazing for livestock, as well as an important income from the walnut harvest.

The project is initially working in Kara Alma, bringing together community representatives, the local forest service and other stakeholders for open discussions on key issues, resulting in a collaborative conservation management plan for the sustainable use of the forest. In addition, following a participatory needs assessment, training and essential equipment are being provided to the local forest service to increase their capacity to work with local communities to protect and manage the forest. Through the provision of small grants and associated training, local people are being supported to adopt environmentally sustainable livelihood options to reduce socio-economic pressures on the forest. These small-scale income generation initiatives have included bee keeping, fruit preservation, and various small workshops.

Liesje Birchenough, Eurasia Programme Manager, Fauna & Flora International

PRIORITY NEEDS FOR ACTION

The forests of Central Asia, with their incredibly rich diversity of fruit and nut trees, are of global significance. The conservation of this unique inheritance is paramount, not only for the region but for the whole international community. It is therefore imperative that the international community provides the necessary financial resources, investment and training to build the capacity of scientific institutions, nature conservation and forestry agencies, botanic gardens and germplasm banks to manage and conserve this unique heritage effectively.

The region's state forestry agencies and protected areas network require substantial investment and capacity building. With so many challenges faced by these agencies, training in the development of participatory forest management plans, local community engagement, rural development and natural resource management is urgently needed. Many of the state agencies lack basic equipment and infrastructure such as uniforms, horses or vehicles, communication equipment and ranger posts. In order to alleviate the immediate pressures on forests from firewood collection and illegal logging, pilot projects that provide alternative sources of energy to villagers should be trialled, assessed and rolled out.

A review of the status of the region's botanic gardens, gene bank facilities and *ex situ* tree collections needs to be undertaken. This should be coupled with a review of the *ex situ* collections held outside the region. Once the state of these institutions is known a programme of institutional capacity building, possibly with the formation of a regional network of *ex situ* conservation facilities, should be initiated. Representatives of the 44 threatened tree species not yet conserved

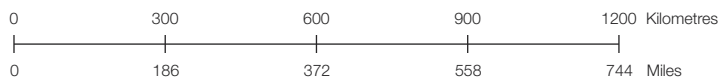
in *ex situ* collections should be established as soon as possible to act as an insurance policy against extinctions in the wild. National plant genetic resource authorities should be provided with the necessary legal and policy training to establish multi-lateral agreements for the exchange and utilisation of plant genetic resources. Once established, these agreements could be a mechanism to ensure long-term funding for the conservation of globally important genetic resources. It is a sad irony that the progenitor of the domesticated apple, *Malus sieversii*, is threatened by extinction in its natural environment, whilst the export value of apples from the top ten apple-producing countries is over US\$3 billion a year (FAO, 2008). More poignantly, *Malus sieversii* germplasm collected in the 1990s from Kazakhstan is currently being used by the USDA Agricultural Research Service to improve disease resistance in current apple cultivars (Forsline *et al.*, 2003). So far, researchers have discovered *Malus sieversii* samples that show resistance to apple scab, fire blight, drought and numerous soil pathogens (Pons, 2006). These research findings once again highlight the global importance of conserving the wild relatives of domesticated fruit and nut trees.

Twenty-three of the trees and shrubs evaluated are Critically Endangered. Species recovery plans using both *in situ* and *ex situ* methods need to be developed and implemented urgently. Close collaboration between different agencies in neighbouring countries may be required for transboundary species.

Eighteen of the species are Data Deficient (DD). For a number of species this is because of scientific institutions' lack of capacity to conduct basic surveys. A number of potentially threatened species have not been surveyed since before

Soviet times and their current conservation status is not known. Other DD species require collaboration with experts in China, Afghanistan, Iran and Pakistan in order to establish their conservation status.

CENTRAL ASIA



THE RED LIST OF TREES OF CENTRAL ASIA

Abies semenovii B.Fedtsch.

CR B1ab(v)

Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop
Endemic to Kyrgyzstan, this species has a very narrow distribution range. It is restricted to two localities (Talas and Chatkal) with an extent of occurrence less than 100 km². Threats include cutting and disease.

Ammopiptanthus kamelinii Lazkov

CR B2ab(iii,v)

Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop
A recently described species, *A. kamelinii* (Lazkov, 2006) was previously included in *Ammopiptanthus nanus* (Popov) Cheng. Endemic to Kyrgyzstan, the species has a very limited distribution restricted to Kavak-Too Mountain between 1,600–2,000 m above sea level. Threats include mining, fossil exploration, poor regeneration and natural hazards. The total number of individuals in Kyrgyzstan is around 3,000–4,000.

Amygdalus bucharica Korsh.

VU B2ab(iii,v)

Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop
Endemic to Central Asia, this species is in decline in Uzbekistan. Main threats are grazing, collection of fruit for almond oil and poor regeneration caused by intermittent fruiting.

Amygdalus ledebouriana Schlecht.

EN B1ab(iii)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop
The species is endemic to east Kazakhstan in the Altai and Tarbagatai mountain ranges. It occurs on mountain slopes and along river valleys. The extent of occurrence is less than 100 km². Threats include cutting, habitat reduction and the collection of fruit and flowers. The flowers are particularly in demand for international women's day. The nuts are used for almond oil production.

Armeniaca vulgaris Lam.

EN B1ab(iii)

China, Kazakhstan, Kyrgyzstan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop
The wild apricot, the origin of all cultivated apricots, is considered very rare in all three Central Asian countries where it

naturally occurs. In Kazakhstan, it is only known from three localities: Talgar, Turgen and Torkulak. Threats to the species include construction, development of tourist resorts, cutting for fuelwood, harvesting of fruit and the collection of germplasm by both national and international plant-breeding companies. The distribution of wild apricot in China needs to be determined.

Atraphaxis muschketowi Krassn.

EN B1ab(iii)

Kazakhstan, Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop
The species has a very restricted range in Central Asia. In Kazakhstan it only occurs between the Kaskelen and Talgar gorges where individuals are sparsely distributed. Expanding tourism and other recreational activities threaten localities.

Berberis iliensis Popov

VU B1ab(iii)+2ab(iii)

Kazakhstan, China

Assessor: Central Asian regional tree Red Listing workshop
This *Berberis* species is restricted to the Ili River basin in Kazakhstan and China. The small fragmented sub-populations are threatened by water extraction, cutting and fire.

Berberis karkaralensis Kornilova & Potapov

CR B1ab(iii)+2ab(iii)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop
A narrow endemic restricted to central Kazakhstan in the Kent and Karkaraly mountains. Although the species occurs in protected areas it continues to be threatened by tourism, grazing and natural fires.

Betula jarmolenkoana Goloskokov

CR B1ab(iii,v)+ B2ab(iii,v)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop
A narrow relict endemic restricted to three river basins (Kokpa, Tekes and Bayankol/Narynkol) in one mountain range. Declines in the extent of habitat have been observed, primarily because of fire.

Betula kirghisorum Sawicz

CR B2ab(v)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop
Although known from four localities, including the Siberian

lowlands of Kustanai province and the Chingiz Tau Mountains in eastern Kazakhstan, the species has a very restricted area of occupancy (less than 10 km²). The total population is less than 1,000 individual trees and regeneration is poor.

Betula pamirica Litv.

VU B2ab(v)

Tajikistan (possibly Kyrgyzstan)

Assessor: Central Asian regional tree Red Listing workshop

This birch species is restricted to the Pamir-Alai range in Tajikistan (possibly also Kyrgyzstan) at altitudes between 2,500–3,300 m. The species is scarce, declining and only known from five localities (Darvaz, Vanj, Rushan, Gunt and Shokhdara). The species is considered to be a synonym of *B. tianschanica* Rupr. by some taxonomists.

Betula schugnanica (B.Fedtsch.) Litv.

CR B2ab(v); C1

Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

This birch species is endemic to the Gorno-Badakhshan range in Tajikistan at altitudes between 2,000–2,500 m. It is restricted to four localities (Shabdara, Gunt, Rushan and Darvaz) with a total population size of less than 250 and declining. The species is considered to be a synonym of *B. tianschanica* Rupr. by some taxonomists.

Betula talassica Poljakov

EN B2ab(iii)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

The species is restricted to two localities in Kazakhstan: the Aksu River basin and rivers in the Karatau mountain range. Although some protection is afforded to the Aksu sub-population, as it is located in a protected area, declines have been observed in the Karatau range. The species is sometimes treated as a synonym of *B. pendula* Roth.

Betula tianschanica Rupr.

EN A2ac; B2ab(ii,iii)

Uzbekistan, Kazakhstan, Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

The species occurs in river basins and valleys of western Tien Shan (Ugam, Pskem and Chatkal). Populations are fragmented and in decline, threatened by livestock, avalanches and tourism.

Calligonum calcareum Pavlov

CR B2ab(iii,v)

Kyrgyzstan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

The species is restricted to a specific soil type in the Sokh River basin. It is threatened by over-grazing and cutting. Its timber is highly valued for tandoori cooking.

Calligonum elegans V.P.Drobow

EN B2ab(iii,v)

Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

The species is restricted to a narrow ecological niche in the Sokh River basin, southern Ferghana. It is threatened by cutting and grazing.

Calligonum matteianum V.P.Drobow

EN B2ab(iii,v)

Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

The species is restricted to a narrow ecological niche in Bukhara province. Threats include cutting and grazing.

Calligonum molle Litv.

EN B2ab(iii,v)

Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

The species is restricted to a narrow ecological niche in the Bukhara province. Threats include cutting and grazing.

Calligonum paletzianum Litv.

VU B2ab(iii,v)

Turkmenistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

The species is found along the Uzbekistan/Turkmenistan border and is restricted to a narrow ecological niche. The sparsely distributed populations are threatened by grazing and collection for firewood.

Calligonum triste Litv.

CR B1ab(iii)+2ab(iii)

Kazakhstan, Turkmenistan

Assessor: Central Asian regional tree Red Listing workshop

In Kazakhstan this species is only known from one locality, the Pri-Aral Moyunkum. It is threatened by the drainage of the Aral Sea, desertification and soil salination. The species is considered endangered in Turkmenistan although details on its distribution are not known.

Crataegus darvasica Pojark.

CR B2ab(iii,v)

Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

This very rare endemic hawthorn is only found in south-west Darvaz of Tajikistan. It is in decline because of over-grazing and cutting.

Crataegus necopinata Pojark.

CR B2ab(iii,v)

Tajikistan (possibly Afghanistan)

Assessor: Central Asian regional tree Red Listing workshop

The species occurs in the Darvaz Range and downstream of the Vanj River in Tajikistan, although it may also occur in neighbouring Afghanistan. The species is threatened by cutting for timber.

Crataegus knorringiana Pojark.

CR B1ab(iii)+2ab(iii)

Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

The species has a very limited distribution with only one locality, a ravine in the Alai Mountains. Human disturbance, over-grazing and cutting threaten the species.

Juniperus schugnanica Komarov

VU A2ad

Kyrgyzstan, Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

The species is endemic to eastern Tajikistan (Gorno-Badakhshan) and the adjacent area of Kyrgyzstan in the Pamir-Alai Range. The fragmented populations are restricted to valleys and gorges and are threatened by cutting for firewood. Populations in the vicinity of settlements are most threatened with observed declines of over 30% in the last 20 years.

Lonicera karataviensis Pavlov

CR B2ab(iii)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

The species is only known from two localities in the Karkara gorge in Kazakhstan. The total population is 600–700 individuals and although the populations occur in a protected area the species is still threatened by tourism development. A recent taxonomic revision in Kyrgyzstan described populations previously thought to be *L. karataviensis* as *L. sovetkinae*.

Lonicera paradoxa Pojark.

EN B2ab(iii,v)

Kyrgyzstan, Tajikistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

This honeysuckle species is considered to be extremely threatened in all the Central Asian countries where it occurs. Threats include cattle grazing and tourism.

Malus niedzwetzkyana Dieck.

EN B2ab(iii,v)

Afghanistan, China, Kazakhstan, Kyrgyzstan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

A very rare species in Central Asia, with individuals sporadically distributed in fragmented populations. Threats include loss and degradation of habitat because of agricultural expansion and development, genetic erosion (grafting of commercial varieties and hybridization) and over-grazing. As a wild relative of domesticated apple the species is of global importance as an international genetic resource.

Malus sieversii (Ledeb.) M.Roem.

VU A2acde

China, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

As with *M. niedzwetzkyana*, threats include loss and degradation of habitat because of agricultural expansion and development, genetic erosion (grafting of commercial varieties and hybridization) and over-grazing. In Kazakhstan its habitat has declined by over 70% in the last 30 years. Molecular genetic work strongly indicates that *Malus sieversii* is one of the main progenitors of domesticated apples (Harris *et al.*, 2002) and is therefore a species of significant global importance. With most commercial apple cultivars having a narrow genetic base it is imperative that the wide genetic diversity in this species is conserved both *in situ* and *ex situ*.

Picea schrenkiana Fisch. et. Mey. ***prostrata*** K.Isakov

VU B2ab(iii,v)

Kazakhstan, Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

This alpine form of *P. schrenkiana* has a very narrow altitudinal range (2,800–3,100 m). There are only seven known localities in the northern Tien Shan. Threats include cattle grazing, cutting and climate change. There is taxonomic uncertainty about the distinctness of this form in Kyrgyzstan.

Polygonum toktogulicum Lazkov

CR B2ab(iii)

Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

This species has a very limited distribution with an area of occupancy less than 1 km². It grows close to a large settlement and is threatened by over-grazing. There are only approximately 2,000 individuals of this species.

Populus berkarensis Poljakov

CR D

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

A narrow endemic, with a total population of less than 50 individuals. It grows in mountain gorges and rocky slopes at altitudes of 1,000–1,200 m. Very little is known about rates of decline or threats.

Prunus tadjikistanica V.I.Zapryagaeva

EN B2ab(iii,v)

Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

A species endemic to western Pamir (the Gisar mountain range) between 1,800–2,000 m. Threats include cutting and agricultural expansion.

Pyrus cajon V.I.Zapryagaeva

EN B2ab(iii,v)

Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

A rare endemic of Gorno-Badakhshan province, this wild pear species is threatened by agricultural expansion.

Pyrus korshinskyi Litv.

CR B2ab(iii,v)

Kyrgyzstan, Tajikistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

This wild pear is known from only a few fragmented sub-populations. It is threatened by over-grazing, fruit harvesting and the collection of saplings for rootstock.

Pyrus tadshikistanica V.I.Zapryagaeva

CR B2ab(iii,v)

Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

Restricted to the Darvas Mountains at 1,300–1,600 m, populations of this endemic pear are very small and fragmented. The species is threatened by cutting.

Ribes malvifolium Pojark.

CR B1ab(iii)+2ab(iii)

Tajikistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

This wild currant species has a very limited distribution with only two known localities. Threats include fruit collection and livestock grazing.

Rhus coriaria L.

VU B2ab(iii)

Tajikistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

The species has a very limited and fragmented distribution and is threatened by over-grazing.

Sibiraea tianschanica (Krassn.) Pojark.

CR B2ab(iii)

Kazakhstan, Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

The species is listed in the national Red Data books of Kyrgyzstan and Kazakhstan. It has a very limited distribution and has not been collected for several years. Threats include agricultural expansion, tourism and housing developments.

Rosa pavlovii Chrshan.

CR B2ab(iii)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

Considered as a distinct species by Kazakh botanists, this narrow endemic occurs at only a few localities in north-east Kazakhstan. It grows in wet meadows alongside the river Irtysh (Dzhangaliev *et al.*, 2003). It is in decline and threatened by housing developments and urban sprawl from Pavlodar city. *Rosa pavlovii* is considered to be a synonym of *R. majalis* Herrm. by some taxonomists.

Spiraeanthus schrenkianus (Fisch. et Mey.) Maxim.

EN B2 ab(iii,v)

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

In Kazakhstan there are only three known localities, in the Betpak-Dala Desert and the Syrdarga Kara-Tau. Threats include habitat degradation and cutting. The species may occur in Kyrgyzstan.

Sophora korolkovii Koehne

CR B1ab(ii,iii)+2ab(ii,iii)

Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

Although considered to be a synonym of *Styphnolobium japonicum* (L.) Schott (ILDIS, 2007), Kyrgyz botanists consider this to be a distinct species of *Sophora*. With a very limited distribution *Sophora korolkovii* is threatened by grazing, construction and mining.

Swida darvasica (Pojark.) Sojak

CR B2ab(iii,v)

Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

The species has a very limited distribution and is threatened by agricultural expansion, cutting and over-grazing.

Zygophyllum bucharicum B.Fedtsch.

CR B1ab(iii)+2ab(iii)

Uzbekistan (possibly Tajikistan)

Assessor: Central Asian regional tree Red Listing workshop

Growing along the border of Uzbekistan and Tajikistan and restricted to a narrow ecological range the species is threatened by over-grazing.

Zygophyllum darvasicum Boriss.

CR B2ab(iii,v)

Tajikistan (possibly Afghanistan)

Assessor: Central Asian regional tree Red Listing workshop

The species is endemic to Gorno-Badakhshan; in the Dervas Range and by the Pange River. It is very scarce and threatened by cutting. It may also occur in Afghanistan but its current status there is not known.

SPECIES EVALUATED AS NEAR THREATENED

Fraxinus sogdiana Bunge

NT

China (west Xinjiang), Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

This species of ash, which grows along rivers in open deciduous forest, is threatened in Kazakhstan. Threats in Central Asia include cutting for timber and changes to water regimes.

Juglans regia L.

NT

Afghanistan, China, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkey, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

Although recent palaeontological evidence for walnut in the Fergana Valley (Kyrgyzstan) suggests that walnut may be anthropogenic in origin rather than native to the region (Beer *et al.*, 2007) the evaluation has taken a precautionary approach because of the global significance of the walnut forests in Central Asia and their importance as an international genetic resource.

Juniperus seravshanica Kom.

NT

Uzbekistan, Turkey, Kyrgyzstan, Kazakhstan, Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

Although widespread in Central Asia declines have been observed in the region, particularly in Kazakhstan and Kyrgyzstan. The timber is favoured for saunas and the species is also threatened by over-grazing and fires.

Populus pruinosa Schrenk

NT

Afghanistan, Iran, Kazakhstan, Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

Although the species has a wide distribution it has a very narrow ecological range, restricted to river banks in arid areas. The species is threatened by changes in water regime (irrigation and hydroelectric power stations), cutting and agricultural conversion.

Pistacia vera L.

NT

Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

Although widely distributed throughout Central Asia the pistachio is threatened by fruit collection, livestock grazing and cutting.

SPECIES EVALUATED AS DATA DEFICIENT

Amygdalus susakensis Vassilcz.

DD

Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

The species is only known from its type specimen. There are no recent data and its taxonomic status is uncertain.

Astragalus kokaschikii Gamajun

DD

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

This taxon is only known from one locality in the Betpak-Dala Desert in central Kazakhstan. Although a very narrow endemic, no information is known on patterns of decline or threats. Its taxonomic status is uncertain as it is considered by some to be a synonym of *Astragalus krascheninnikovii* Kamelin (ILDIS, 2007; IPNI, 2007).***Astragalus tscharynensis*** Popov

DD

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

The species is recorded from the Boguta Mountains in the Charyn River basin. No collections of the species have been made in the past 100 years and it may no longer exist in the wild. Exhaustive surveys are required to determine its true status and whether it is extinct.

Atraphaxis teretifolia (Popov) Kom.

DD

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

This rare relict species only occurs in the Betpak-Dala Desert. Its distribution is less than 100 km² but there is no information on declines or threats.***Calophaca soongorica*** Kar. et Kir.

DD

China, Kazakhstan, Kyrgyzstan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

In Kyrgyzstan the species is known from one locality in the Besh-Aral National Park. Its status in Kazakhstan, Uzbekistan and China is not known.

Cercis griffithii Boiss.

DD

Distribution unknown

Assessor: Central Asian regional tree Red Listing workshop

In Central Asia the species is known to occur on the border between Uzbekistan and Tajikistan, although very little is known about its status. Records indicate that it may also occur in Afghanistan, Pakistan and India; this requires verification, however.

Cotoneaster karatavicus Pojark.

DD

Kazakhstan

Assessor: Central Asian regional tree Red Listing workshop

The current status of this narrow endemic, restricted to the Karatau mountain range in southern Kazakhstan, is not known.

Crataegus ambigua C.A. Mey.

DD

Kazakhstan, Russia

Assessor: Central Asian regional tree Red Listing workshop

Known from only one locality in Kazakhstan, the conservation status of this species in Russia is not known.

Daphne altaica Pall.

DD

Kazakhstan, Russia

Assessor: Central Asian regional tree Red Listing workshop

In Kazakhstan the species is known to occur in the Altai, Manrak and Tarbagatai Mountains and is considered threatened by fire and grazing. Its status in Russia is not known.

Hedysarum scoparium Fisch. et C.A.Mey.

DD

China, Kazakhstan, Mongolia

Assessor: Central Asian regional tree Red Listing workshop

The status of this species in Mongolia and China is not known.

Malacocarpus crithmifolius (Retz.) C.A.Mey.

DD

Afghanistan, Iran, Kazakhstan, Turkmenistan

Assessor: Central Asian regional tree Red Listing workshop

Although threatened in Kazakhstan the status of this species in Afghanistan, Turkmenistan and Iran is not known.

Platycladus orientalis (L.) Franco

DD

China, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

Although the species is threatened in Uzbekistan its status in China is unknown.

Pyrus asiae-mediae (Popov) Maleev

DD

Kazakhstan, Kyrgyzstan, Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

The species has not been seen since it was originally described and may actually be extinct. Its taxonomic status is not clear.

Sibiraea altaiensis (Laxm.) Schneider

DD

Kazakhstan, Russia

Assessor: Central Asian regional tree Red Listing workshop

Although threatened in Kazakhstan the status of the species in Russia is not known.

Sorbaria olgae Zinserl.

DD

Uzbekistan

Assessor: Central Asian regional tree Red Listing workshop

This species is considered to be extinct in Uzbekistan. Extensive fieldwork and exhaustive surveys are required for confirmation.

Sorbus turkestanica (Franch.) Hedl.

DD

Tajikistan

Assessor: Central Asian regional tree Red Listing workshop

Herbarium specimens, now thought to have been misidentified, indicated that this species was once widespread in Central Asia. However, current general opinion is that it is only present in Tajikistan.

Zygophyllum kaschgaricum Boriss.

DD

China, Kyrgyzstan

Assessor: Central Asian regional tree Red Listing workshop

The status of the species in Kyrgyzstan and China is not known.

SPECIES EVALUATED AS LEAST CONCERN

Abelia corymbosa Regel et Schmalh.

Widespread distribution across western Tien Shan in Central Asia.

Aflatunia ulmifolia (Franch.) Vassilcz.

Although rare in Kazakhstan the species is widespread and common in Kyrgyzstan.

Alnus glutinosa (L.) Gaertn.

Widespread in Europe and Central Asia.

Amygdalus petunnikovii Litv.

Although the species has a limited distribution in Central Asia there are no immediate threats. The species tends to grow on inaccessible cliffs and in both Kyrgyzstan and Kazakhstan the populations are located in protected areas.

Berberis kaschgarica Rupr.

The species is restricted to high altitude areas in Kyrgyzstan and China. Although the extent of occurrence is less than 10 km² there are no immediate threats to populations.

Calophaca wolgarica (L.f.) DC.

Occurs in Russia, Kazakhstan and the Caucasus.

Caragana tragacanthoides (Pall.) Poir.

Although considered to be Vulnerable in Kazakhstan the species has also been recorded in China, India, Nepal and Pakistan (ILDIS, 2007).

Celtis caucasica Willd.

Occurs in Kazakhstan, Turkey, Kyrgyzstan, Iran, the Caucasus, Tajikistan and Uzbekistan.

Corylus avellana L.

Widespread in Europe.

Crataegus korolkowi Regel ex C.K.Schneid

Widespread in Kazakhstan and Kyrgyzstan.

Crataegus pontica C.Koch

Widespread in Central Asia.

Diospyros lotus L.

Widespread distribution including Central Asia, the Mediterranean and the Caucasus.

Euonymus koopmannii Lauche

Widespread in western Tien Shan.

Euonymus verrucosus Scop.

Widespread distribution including Russia, Eastern Europe and Tajikistan.

Ficus carica L.

A widespread species.

Jasminum humile L.

Although considered to be Endangered in Tajikistan the species is also recorded as occurring in China, Afghanistan and India (TROPICOS, 2009).

Juniperus sibirica Burgsd.

Widespread in Russia, Tajikistan and Kazakhstan.

Keyserlingia mollis (Royle) Boiss.

Widespread distribution including Pakistan, Tajikistan and Afghanistan.

Ledum palustre L.

Although rare in Kazakhstan the species is widespread in the Russian Altai.

Platanus orientalis L.

Very widespread, ranging from the east Mediterranean throughout the Middle East to the south-east provinces of the Euro-Siberian region.

Populus nigra L.

Widespread in Europe.

Punica granatum L.

Although threatened in Central Asia by over-grazing, the species has a wide distribution that includes the Mediterranean, Iran, Turkey and the Caucasus.

Quercus robur L.

Widespread in Europe.

Restella alberti (Regel) Pobed.

Although the species has a restricted distribution in Uzbekistan and Kyrgyzstan, there are no immediate threats. Most of the populations in Uzbekistan are in a protected area.

Ribes janczewskii Pojark.

Although rare in Kazakhstan and the Gorno-Badakhshan province of Tajikistan the species is widespread in the other Central Asian countries.

Sorbus persica Hedl.

Widespread distribution including Uzbekistan, Kazakhstan, Kyrgyzstan, Iran, Caucasus and Afghanistan.

Sorbus tianschanica Rupr.

Widespread in Kyrgyzstan and Kazakhstan.

Tamarix androssowii Litv.

Widespread distribution including Mongolia, Kazakhstan, Uzbekistan and Turkey.

Vitis vinifera L.

Although threatened by collection the species is widely distributed in Central Asia and the Mediterranean.

Ziziphus jujuba Mill.

Widespread distribution including China and the Caucasus as well as Uzbekistan, Kyrgyzstan and Tajikistan.

SPECIES NOT EVALUATED

The following trees and shrubs are listed in the Red Data Book of Turkmenistan (Atamuradov *et al.*, 1999) but have yet to be globally evaluated according to the IUCN Red List categories and criteria (IUCN, 2001). Although these species are threatened in Turkmenistan it is unlikely that the majority will be threatened globally as many have distributions outside Turkmenistan.

Cerasus blinovski (endemic to Turkmenistan)

Colutea atabaevi (endemic to Turkmenistan)

Homalodiscus ochradeni (Iran, Turkmenistan, ?)

Lepidolopha fedtschenkoana (Turkmenistan, Uzbekistan)

Malus sieversii subsp. *turkmenorum* (endemic to Turkmenistan)

Pistacia badghysi (endemic to Turkmenistan)

Pyrus turcomanica (Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan)

Reaumuria badghysi (endemic to Turkmenistan)

Reaumuria botschantzevii (endemic to Turkmenistan)

Ribes melananthum (Iran, Turkmenistan, ?)

Sorbus graeca (Iran, Turkmenistan, ?)

Sorbus turkestanica (Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan)

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ANNEX 1

IUCN RED LIST CATEGORIES AND CRITERIA

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time-frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time-frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
 1. An observed, estimated, inferred or suspected population size reduction of $\geq 90\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
 2. An observed, estimated, inferred or suspected population size reduction of $\geq 80\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may

not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 80\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 80\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 100 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 10 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at only a single location.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.

- c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR
2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 50 mature individuals, OR
 - (ii) at least 90% of mature individuals in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

- A. Reduction in population size based on any of the following:
1. An observed, estimated, inferred or suspected population size reduction of $\geq 70\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 3. A population size reduction of $\geq 50\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 50\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 5000 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than five locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than five locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 2500 mature individuals and either:
1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 250 mature individuals, OR
 - (ii) at least 95% of mature individuals in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population size estimated to number fewer than 250 mature individuals.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).
- ### VULNERABLE (VU)
- A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:
- A. Reduction in population size based on any of the following:
1. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

- (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.
2. An observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
 3. A population size reduction of $\geq 30\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
 4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
- B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than 10 locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
 2. Area of occupancy estimated to be less than 2000 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than 10 locations.
- b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 1000 mature individuals, OR
 - (ii) all mature individuals are in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
1. Population size estimated to number fewer than 1000 mature individuals.
 2. Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.
- E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

Source: IUCN (2001)





The Red List of Trees of Central Asia

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