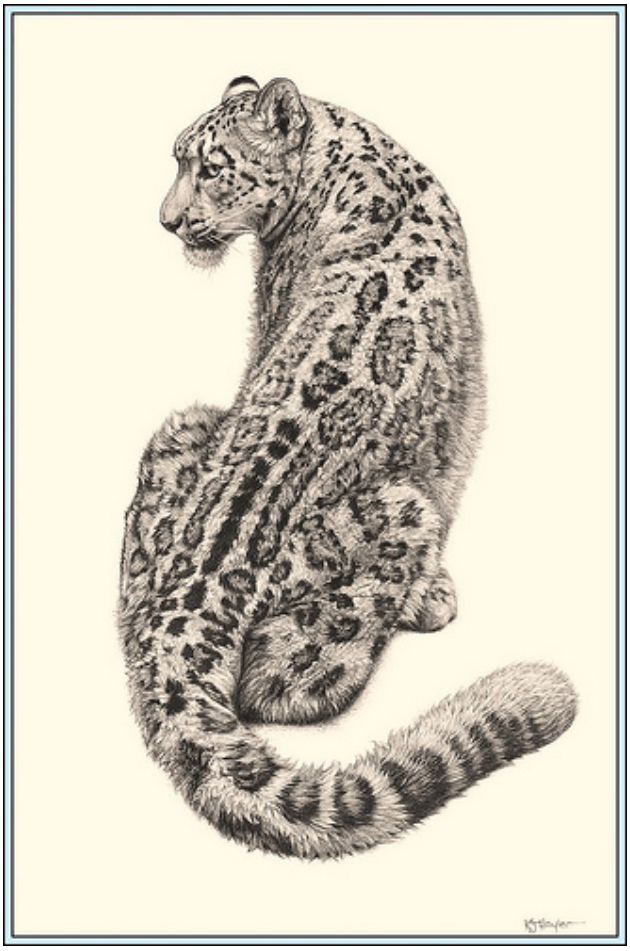
The Altai Mountains Biodiversity Conservation Strategy

Safeguarding the biological diversity and natural ecological processes of the Altai Mountains landscape alongside local livelihoods and economic development

Adopted by the *Aimag* Governments of Uvs, Khovd, Bayan Olgii and Govi Altai

To be followed and championed by government, developers, non-governmental organizations and local residents



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VISION AND PURPOSE

Rising majestically above low-lying steppe and river valleys, and the lakes of the enclosed Great Lakes Basin, the snow-capped mountains of the Mongolian Altai stretch down the western border of Mongolia and then curve in a giant arc north of the Gobi Desert to link with the lesser, more scattered peaks of the Gobi Altai. Snow Leopards hunt Siberian Ibex and Argali Sheep in steep sided ravines, and Musk Deer survive in some of the highland forests. Marmots, pikas and a host of small rodent species live on the alpine meadows and the steppe, watchful of falcons, buzzards and eagles overhead, and foxes and other predators on the ground. But it is no longer easy to see the full range of wild species: one can drive for days before seeing even a fox. Sparsely populated by man, the Altai Mountains have an air of permanence and impregnability that masks the ecological fragility that they share with all high mountain ranges of the world. This fragility has already been demonstrated through over-exploitation of land and wild species of animals and plants, leading to degraded grasslands, damaged forests, depleted wildlife populations and polluted and diminished flows of water to downstream ecosystems. However, man has trodden lightly on this land, in comparison with his impacts elsewhere, and there is an opportunity here for man to conserve the natural world around him

The vision of this Strategy is: "that the ecosystems and wild species of the Mongolian Altai survive intact alongside man and his economic activities. There will be viable and widely distributed populations of large charismatic species such as the Argali (*Ovis ammon*), the Snow Leopard (*Uncia uncia*), the Altai Snowcock (*Tetraogallus altaicus*), the Saker Falcon (*Falco cherrug*) and the Siberian Ibex (*Capra sibirica*), and the no less important other wild species such as foxes (*Vulpes vulpes* and *V. corsac*) and otters (*Lutra lutra*) and the wide range of plants found nowhere else in the world. Rivers will flow clear and unpolluted to the Great Lakes Basin and to China and Russia, the grasslands will be healthy with minimal soil erosion, grazed within their long term capacity to support domestic livestock and wild animals, riparian forests will be restored and the highland forests will be rich in species and protective of the soil. All economic development will be within the limits of the environment to sustain its impacts."

The purpose of the Strategy is "to set out a well supported and clearly justified programme of actions that will achieve this Vision, by removing, mitigating, managing and monitoring current and potential human impacts on wild species and natural ecosystems and establishing a landscape with land uses planned to provide for the needs of both wild species and people."

If this strategy simply take its place on your bookshelf, desk or floor as a volume at best to be dipped into from time to time, and at worst to be forgotten until the next general clear out of paperwork then we will have failed in our aim of providing day to day support to decision making. That is the fate of so many such plans and strategies to conserve biodiversity. A lot of work goes into them; there is heated discussion at the planning workshops that contribute to them, there is translation back and forth so that all can understand and contribute: but all the effort is wasted unless the documents are put into action.

The Altai Mountains Biodiversity Strategy Preparation Team
Ulaanbaatar, June 2009

1. Overview

1.1 Biodiversity

The Altai Mountains cover 600,000 sq km of Russia, Mongolia, Kazakhstan and China (see Figure 1), reach an altitude of 4.500 m above mean sea level and include many peaks over 4000 m. They are home to over 75 species of mammals, and 2000 species of wild plants inhabiting a wide range of habitat types extending from the alpine zone down through scattered high mountain forest and mountain steppe to lowland desert steppe and sparse riparian forests in the valleys. The wild and domesticated species of the Altai Mountains, together with the distinct ecosystems in which they live, comprise the area's biodiversity – a unique assemblage with intrinsic values as an irreplaceable product of natural selection, biogeography and local history, and utilitarian values for human livelihoods today and in the future.

Biodiversity, or “the diversity of life”, refers to all the earth’s living organisms: the species of plants, animals, and microorganisms, their genetic makeup, and the ecosystems of which they are integral parts. An ecosystem is the complex of living species and the non-living environment and of those species. Ecological processes operating within an ecosystem, including the cycling of chemicals and energy flows, are essential for the evolution and development of all organisms, and different physical conditions give rise to different living conditions. Ecosystem diversity is required in order to have species and genetic diversity. Species diversity is the number or richness of plants, animals, fungi, and other organisms, while genetic diversity refers to the variety of genes that are present within individuals, both within a single species and between species.

Figure 1 Map of the Altai Mountains

1.2 Why we need biodiversity

Human life cannot exist without the other life that is contained on earth. When people reduce biodiversity, they are squandering the greatest resource on which mankind depends for food, clothes, medicines, building materials, energy, clean air, clean water, and many other requirements. So conservation of biodiversity is an essential consideration in development planning: the only way to assure a safe future for man - indeed the future survival of man - is to deal with environment and development together.

The grasslands of the Mongolian Altai provide for both wild species and domestic livestock, so damaged grasslands have impacts on human livelihoods. The forests provide habitat for wild species and timber for firewood and construction, so damaged forests also have impacts on human livelihoods and economies. Water pollution, and overuse of water for irrigation or mining, have far-reaching effects on fish and bird populations – and on human users of water downstream.

Quite apart from ethical considerations, and human beliefs that to damage “nature” is wrong, biodiversity conservation provides clear economic benefits and benefits to human well-being in the long term. The key qualifier is “in the long term”. There are of course short term benefits for a few in over-exploitation and destructive behaviour but those few are in effect stealing from the others.

1.3 Threatened biodiversity

Many of the Mongolian Altai's wild species are decreasing in numbers, geographical ranges are contracting, and populations are becoming increasingly fragmented into isolated groups that no longer interbreed. Hunting and plant collection reduce population sizes directly, and overgrazing, mining and infrastructure development, poor forest and water resources management and careless driving threaten species through pollution, habitat degradation and fragmentation.

1.4 Why a Strategy is Needed

It is always tempting for governments, local residents and developers alike to make rapid capital out of natural resources or to promote methods of exploitation that, although successful elsewhere, have not been adequately tested under local conditions. Such behaviour often leads to prolonged or irreversible loss of biodiversity and the productivity of the natural environment. As the Mongolian Altai open up to travelers and there is more development of tourism, mining and road construction, and increased trade, the people of the Altai are looking forward to a different future. There is already a lot of travel between Kazakhstan and Bayan Olgii, horizons are widening and business opportunities may increase. It is precisely in such places in transition that it is important to guide development with the best ecological judgement available – before too much damage is done.

Protected areas provide basic habitat protection and some degree of protection from hunting, but large species move in and out of protected areas. When livestock numbers were lower and grasslands were in better condition, wild species were able to move much more freely across the landscape. However, the space and resources available for wild species outside protected areas have decreased as social and economic influences have driven over-exploitation of grassland, forests and wildlife. Habitats suitable for certain wild species are becoming more and more fragmented into isolated patches sometimes widely separated by inhospitable areas that are difficult for animals and plants to move across. And protected areas themselves have become increasingly subject to heavy grazing, and commercial and political pressure to change the law to allow mineral extraction.

Well managed protected areas are of vital components of biodiversity conservation but they are not enough alone to meet the ecological needs of all species, especially wide-ranging and migratory species. There must also be consideration of biodiversity conservation in the routine business of government, and in the day-to-day decision making and planning of herders, miners and other developers. If biodiversity is to be conserved, environmental protection must be integrated into all development projects and resource use. Conservation actions have long included measures taken outside protected areas to limit grazing, hunting and tree-felling for example, and to prevent or mitigate environmental damage from mining, tourism, road construction and infrastructure development. The Strategy differs in that the action programmes have been developed through a more systematic approach, first identifying the needs of wild species and the needs and impacts of humans, then analysing the areas where conflicts occur, and then defining objectives and required actions.

Knowledge of the biodiversity and ecology of the Altai will be used under the Strategy to guide development:

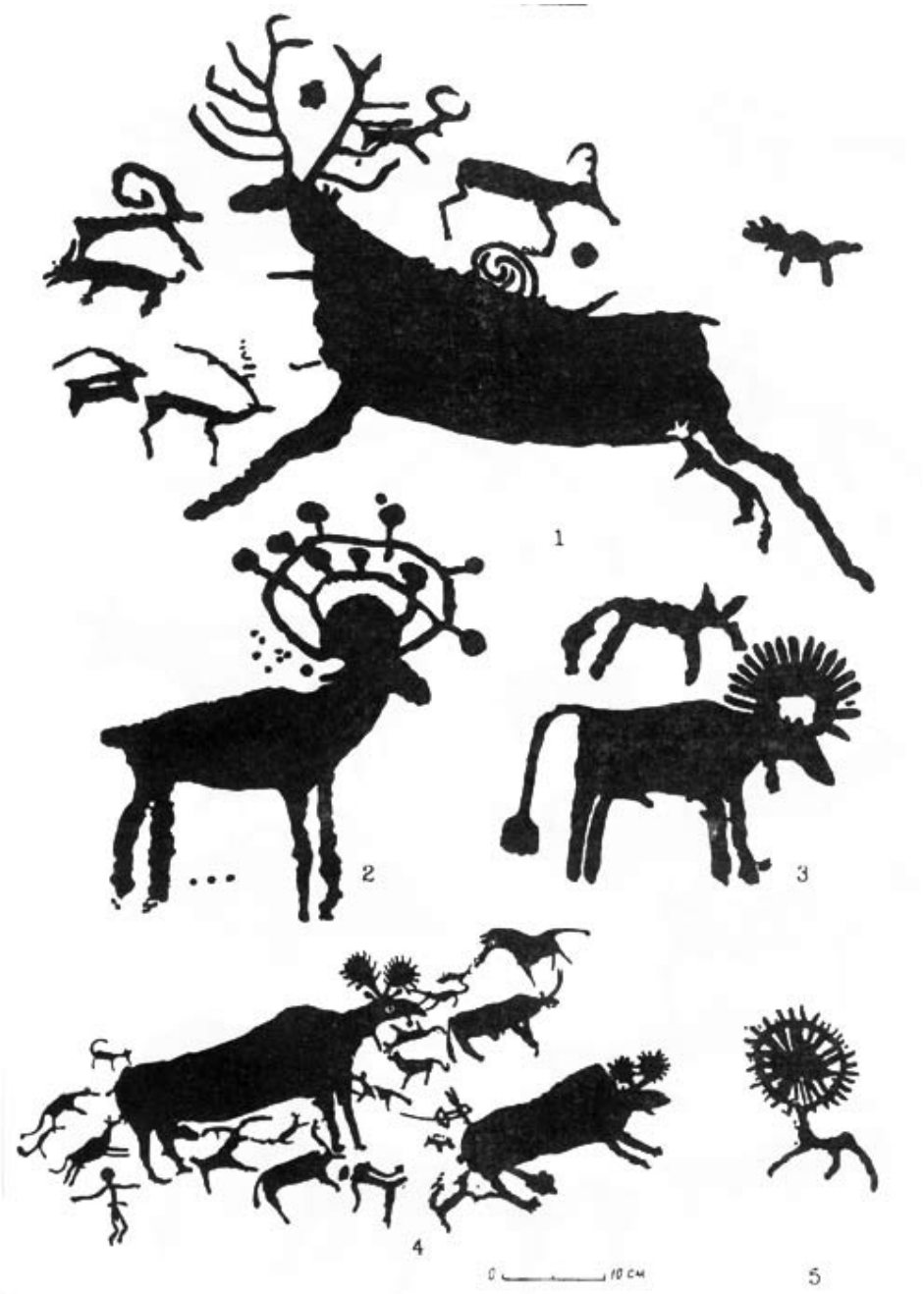
- by identifying opportunities for long term use of the land that will not damage natural species and ecosystems
- by warning against proposed activities that are likely to lead to deterioration,
- and by providing a framework for assessment of the long term costs and benefits of any policy or action.

1.5 What the strategy does

The Strategy examines the status of biodiversity and human livelihoods and economic development in the Altai and identifies the main impacts of humans on biodiversity and the effectiveness of current conservation policies and environmental governance. It considers the sites of major importance for biodiversity alongside the sites of major importance for human livelihoods, including economic and infrastructure development projects such as mining and road construction and then focuses on how best to reconcile the needs of wild species with the current, planned and potential activities of humans in the region. It puts biodiversity and human uses in the wider geographical setting of the greater

Altai[1] and the social, cultural, administrative and policy background that governs or fails to govern human impacts. It analyses the actual and potential threats to biodiversity and presents a comprehensive action programme to reduce, mitigate or eliminate those threats and monitor them in the future. Maps are used throughout to provide a basis for planning.

These ancient petroglyphs (immediately below) are from rocks in the Mongolian and Russian Altai;



[1] ie including all four countries: Mongolia, Russia, China and Kazakhstan

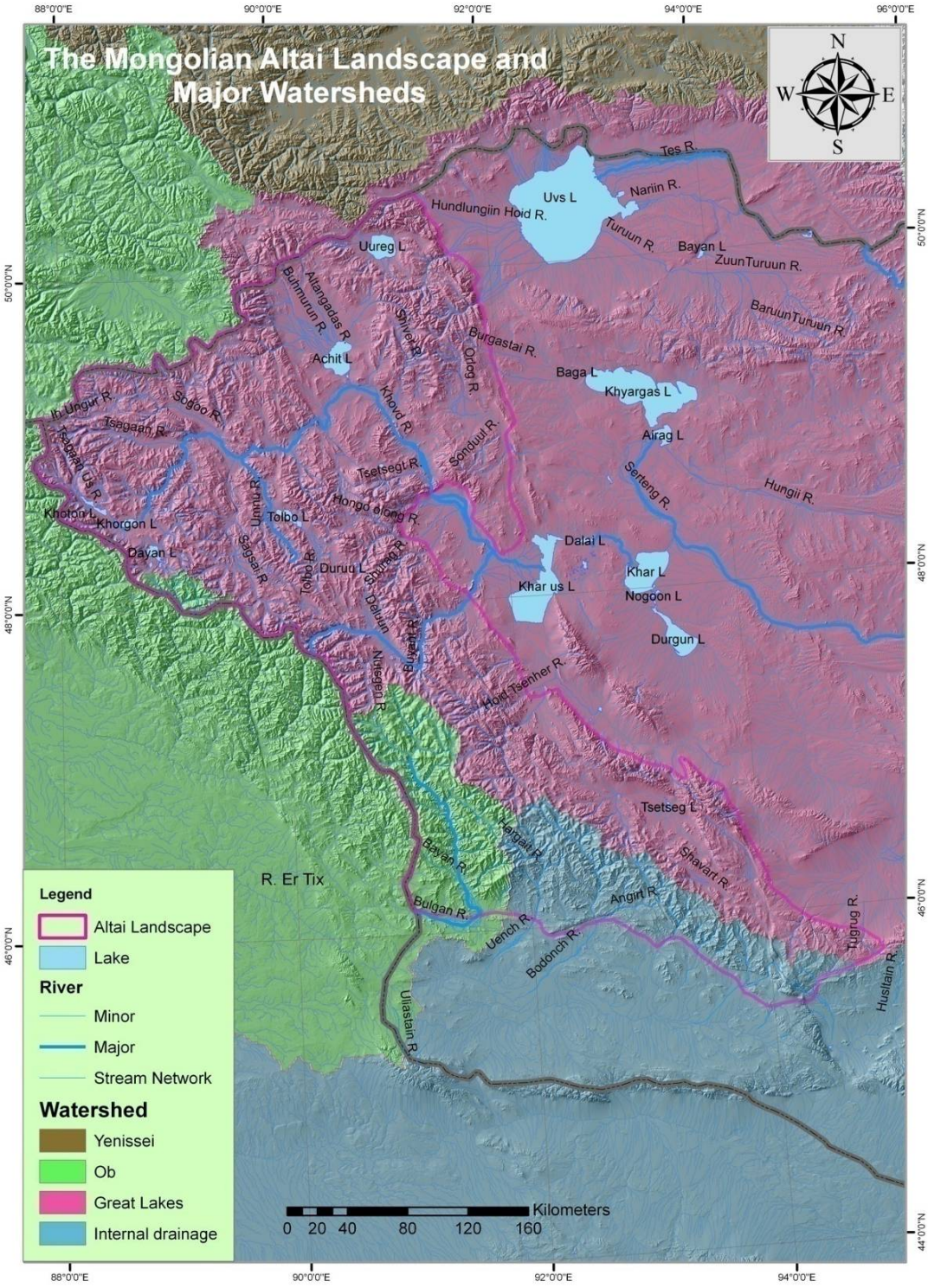


Figure 2 The Mongolian Altai landscape and major watersheds

Central to the Strategy is an integrated approach to rangeland management leading to the compatibility of herding practices and natural wildlife populations, and sustainable markets for high quality livestock products. The Strategy focuses where possible on incentives and peer pressure to

establish restraint in people's behaviour, and backs this up with rigorous law enforcement measures. It includes measures to achieve:

- an effective system of protected areas
- effective environmental law enforcement
- economic incentives for sustainable grazing management, harvests, and tourism operations,
- disciplined land-use planning and decision making,
- environmental safeguards to reconcile economic development and the associated infrastructure with conservation objectives
- and a public equipped and sufficiently confident to make well-informed and reasonable representations to government about actual and potential environmental impacts of government and private sector actions

1.6 Where the Strategy operates

The Strategy covers the Altai Mountains landscape in Mongolia (Figure 2). This region includes the whole of Bayan Olgii *aimag* and parts of Khovd, Uvs and Govi Altai *aimags*. Within those *aimags* it covers the whole of 21 *sums* and parts of 18 *sums* (see Annex 10, Figure 10). Wild species and ecosystems cross administrative boundaries so human decision making with regard to land and natural resource use has to transcend national, *aimag*, *sum* and *bag* boundaries if biodiversity is to be conserved effectively. The Strategy takes into consideration wild species, natural habitats and human activities across the international borders in China and Russia.

The Strategy is directed at the landscape but the Altai mountains are inextricably linked with the adjoining lowland areas, in particular the enclosed Great Lakes Basin (Figures 2 and 9), and so the Strategy provides for watershed protection and other so-called "ecological services" to downstream ecosystems.

1.7 Targets and Objectives

The Strategy's framework is based on identification of nine distinct "conservation targets" (Section 6.5), assessment of the human impacts and the direct and underlying threats to those "targets" (Section 6.6), formulation of 12 objectives to address the threats (Section 6.9), and development of an action programme broken down into eight general thematic groups (Section 7). There is an emphasis in the action programme on making full use of the staff and facilities currently available:

- to improve the ways the laws are implemented,
- to develop genuine co-management arrangements with local residents,
- to search for fundamental solutions that address fundamental human requirements for natural resources where there are conflicts with conservation,
- and to expand work with foreign partners who are willing and able to contribute to conservation of Altai biodiversity

It is all too easy to say that staff and facilities are lacking or that laws need changing, but that will not improve anything soon. The Strategy takes an active approach by seeking to achieve the maximum progress with the current resources and budgets under the current legislation, and simultaneously working on changes to staff complements, budget allocations and legal and policy changes.

The targets, the human activities that affect those targets, the objectives and the types of actions needed to achieve those objectives are shown in Table 1. Note that there is no correspondence across the table: these are simply summary lists. See below for further details and analysis.

Monitoring progress, both through assessment of progress towards the specific objectives using impact indicators, and through tracking progress in carrying out the activities in the action programme, will provide the basis for periodic revisions of the Strategy. This is included under Objective 8 "To establish cross-sectoral and evidence based approach to biodiversity conservation". [2]

[2] http://www.cebc.bangor.ac.uk/ for details of the Centre for Evidence based Conservation

1.8 Framework for implementation

The Strategy has been approved under the law to guide government and the public, including developers, in decisions that influence the ecosystems, animals and plants of the Altai Mountains in Mongolia. It sets out the steps required to ensure that human livelihoods and human economic development in the Mongolian Altai take into account the intrinsic and utilitarian values of biodiversity and therefore lay the basis for the long term future of humans in the landscape.

The Ministry of Nature Environment and Tourism has endorsed the Strategy at Ministerial Council level and this endorsement and readiness to lobby for the Strategy will provide policy and funding support. The *Aimag* Governors will adopt the Strategy as binding in their four year *aimag* development plans, and by extension into *sum* four year development plans. Overall responsibility for implementation of the plan will be at the *aimag* level, with delegation to *sum* level where appropriate. The measures to achieve the Strategy will be incorporated into those *aimag* and *sum* policies, plans and action, and into the day to day decision making of government officials and the local people who rely on grasslands, forests and wild species for their livelihoods.

The local governments, NGOs, developers, and residents who will implement the Strategy are constrained by state policies and legislation and the size of state budget allocations for staff and services. Policy and legal changes take a very long time to achieve, so the action programmes focus mainly on what can be achieved under the policy status quo, including better implementation of current policy, increased budgetary allocations within the *aimag* for environmental protection, and changes in herding practices.

Table 1 Conservation Targets, Human Activities, Threats, "Drivers", Objectives and Types of Action under the Strategy

TARGETS	HUMAN ACTIVITIES	DIRECT THREATS	INDIRECT "DRIVERS"	STRATEGY OBJECTIVES	TYPES OF ACTION

Birds of Prey Mountain Ungulates Carnivores Alpine Galliformes Water quality/flow Collected Plants Riparian Forest Forest animals Rodent and lagomorph diversity	Livestock Grazing Hunting by local people Saker Falcon trade Sport hunting Plant Collection Illegal cutting, forest management and fire Mining Off-road driving and multiple tracks Road construction Water Resource management Inappropriate management interventions Transboundary threats Climate Change Cultivation Waste Management Tourism	Overexploitation of grassland and forest a. Habitat loss b. Habitat fragmentation c. Soil damage d. Eutrophication e. Turbidity f. Siltation Overexploitation of animal and plant populations a. Reduced populations b. Reduced distributions c. Reduced prey availability d. Reduced ecosystem functions Mining, driving, infrastructure a. Pollution b. Soil erosion c. Influx of people d Habitat loss and fragmentation Water extraction and diversions Supplementary feeding etc a. Disease from domestic livestock b. Changes in behaviour Grasshopper poisoning Climate change a. Shifts of habitat boundaries b. Changes in water regime Fires too frequent or too infrequent	Inertia Lack of concern Perverse incentives Reduced movements of herders Mistaken beliefs High demand for wood and grass Government officials not held accountable for all actions High demand for wildlife products People seeking income Poor coordinatioin of water use Increasing demand for locally grown vegetables	Reduce hunting and plant collection Reduce grazing pressures Stop forest loss Restore riparian forest Maintain water quantity and quality Stop damage to biodiversity from industry and livelihoods Reduce off-road driving Establish cross-sectoral and evidence based approach to biodiversity conservation Introduce environmental accounting	Local government decrees, moratoria Law enforcement Public information and involvement Staff, training and motivation Research and monitoring Environmental assessment Financial incentives Securing financial resources and support

1.9 Wide partnership

Many NGOs and major bilateral and multilateral donors are involved in projects and programmes that have impacts on biodiversity in the Altai (see Annex 11), and there are many commercial companies, notably in mining and tourism whose operations both depend upon and have impacts on natural resources and biodiversity. Many such organizations have been involved in discussions about the Strategy and in review of the first draft. Letters of support have been received from those indicated in Annex 11. The Altai Sayan Project itself will run until December 2011 and will fund parts of the Action Programme.

Most residents depend for their livelihoods directly on the maintenance of natural ecological processes and the stability of local grassland, forest and aquatic ecosystems. Representative individuals and groups have been consulted at various stages and have lent their support to the final Strategy.

There is a wide constituency, and implementation of the Strategy requires the collaboration of all these groups.

2. The place and the people

The Altai mountains, situated where the four great countries of Russia, Kazakhstan, China and Mongolia converge, include many peaks over 4,000 m amsl, the highest being the twin-peaked Mt Belukha (4.506 m) in Russia (Figure 1). They are old, folded mountains lifted again in the Miocene and Pliocene (23-5m years ago) and subjected to new erosion and valley formation. The rocks vary in age from Pre-Cambrian (over 500m years) to Quaternary (less then 1m years) sediments. During the Pleistocene widespread glaciation led to the current topography of wide U-shaped valleys, with hollows and mountain lakes between the peaks. Recent erosion has formed deep ravines in some of the mountains.

2.1 Climate

The position of the Altai mountains in the centre of Eurasia gives them a harsh continental climate with widespread snow and ice cover, and January temperatures as low as -60 deg C on the Ukok Plateau, contrasting with July temperatures of up to 40 deg C on the lower slopes. Summers are short, however, and cool at higher altitudes. Mean annual precipitation is relatively high in the western Altai, reaching up to 1,500 mm or more, mostly as snow at altitudes of over 2,000m, decreases in the eastern Altai to around 300 – 400mm at 3,000m amsl and around 100 mm or less at lower altitudes.

The Mongolian Altai lie in the 100mm to 250mm isohyet range (Figure 4). The mean annual precipitation at Khovd (1,400m amsl) is 123mm. Between 2004 and 2007 the annual precipitation in Olgii varied from 98mm to 171.5mm, and in Khovd from 84.2mm to 133.5mm. Mean annual precipitation aggregated for six *sums* in Bayan Olgii over the last 30 years is shown in Figure 3 and shows no significant decline. Annual mean air temperature has been rising, glaciers and snow caps have been receding, and climate change is predicted to have increasing impacts on evaporation rates and melting of the glaciers (see Annex 5).

Like mountains elsewhere the high Altai landscape is dynamic: extremely low winter temperatures and stark contrasts between day and night temperatures lead to rapid physical weathering of rocks, and resultant land slips and rock falls. There are frequent avalanches, and considerable glacial erosion, and there have been three major earthquakes felt in the region over the last 100 years. Many of the peaks have permanent snow and ice cover, and there is evidence that this is decreasing as a result of global and local rises in mean annual temperature (Davaa et al, 2007;

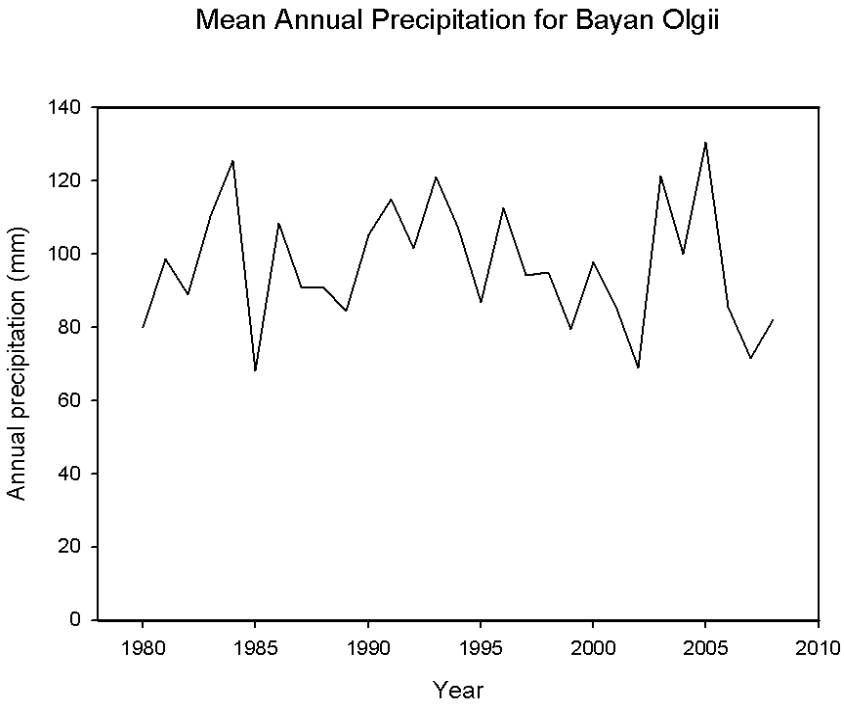


Figure 3 Mean annual precipitation for six Bayan Olgii *sums*[3] 1979-2008

A pika (*Ochotona* sp), relative of the hares and rabbits but often mistaken for a rodent. Pikas are "keystone species" that provide vital ecosystem services in maintaining grassland health, as well as being food for predators and making holes that other animals use for shelter and breeding.

[3] (Tsengel, Nogoonnuur, Altai, Sagsai, Ulaankhus, Deluun)

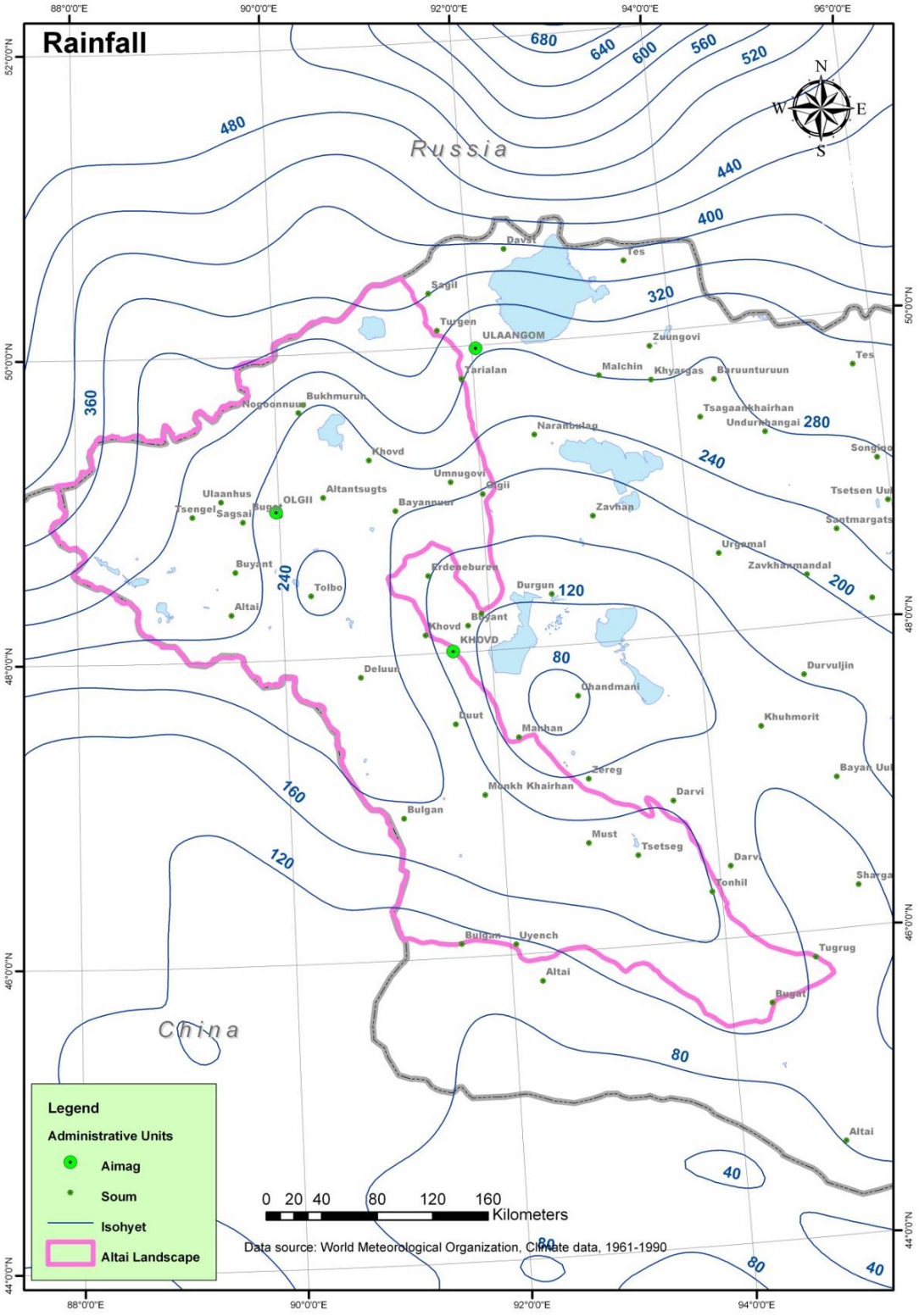


Figure 4 Precipitation map of the Altai

Soninkhishig, 2009). The low-lying areas are strongly influenced by the seasonal snow beds above, and radiation is high with a mean of eight hours sunshine per day.

Differences in aspect and valley orientation result in huge local differences in winter conditions. On the east side of the Khokh Serkh massif for example, the mid-level slopes remain free of snow during winter, and on the other side they are covered in snow all winter. Livestock herders on the Bayan Olgii side therefore ascend to winter grazing grounds higher up, whereas herders on the Khovd side descend to graze their flocks at lower altitudes in winter. Such differences of course have influences on the lives of wild species too.

Current data show rises in temperature but no decrease in precipitation in the Altai, and some studies show a slight increase in precipitation. However, it is still predicted that by 2080, increases in evaporation of surface water will be ten times greater than increases in precipitation in the Altai (see Annex 5).

2.2 Fragility of ecosystems

Renewable natural resources are limited and the capacity of the land to support humans is relatively low. The climate is harsh, with great extremes of temperature, low precipitation, severe storms and a short growing season. Top soils are thin, with low fertility, and the ecosystems are fragile and extremely vulnerable to most forms of economic exploitation (see Annex 4). Transhumant livestock herding provides the main agricultural production, although there is also significant vegetable cultivation near the *aimag* centres and some grain too. Unsustainable uses of soil, surface and ground water, forests, grasslands, wildlife, and fish, are occurring. Industrialization and mining are subject to legally established environmental safeguards but those safeguards require strengthening both on paper and in implementation.

2.3 Geographical scope

This Strategy covers the Altai Mountains "landscape" in Mongolia, a mosaic of patches of different types of habitat with their constituent species (Figures 2 and 8), the boundaries of which have been determined by careful analysis of the vegetation types mapped by Gunin et al (1999) and later analysed and modified to delineate the Mongol Altai "ecoregion" (Batsaikhan et al 2009). This provides consistency with other biodiversity conservation initiatives. The area covered is 104,250 sq. km.

2.4 Population

The population density in the region, as in Mongolia, is only 1.5 people per sq km, and although the western region has one of the highest natural rates of increase (births minus deaths) in the country, population size has remained almost static for the past few years due to net emigration (see Annex 1). However, increasing numbers and concentration of livestock near population centres have led to deterioration in rangeland health and corresponding threats to the future viability of transhumant livestock herding as a main livelihood unless changes are made in herding practices.

Unemployment is high in the *aimag* centres, and a recent survey found evidence of food shortages in the lives of *aimag* centre residents (see Annex 1).

2.5 Agriculture

Livestock numbers have rocketed in recent years in Mongolia, with official figures for the whole country reaching 43.2 million in 2008 (see Annexes 1 and 5). Livestock numbers in the Altai have increased in parallel with the national herd and there is evidence that overgrazing is reducing livestock productivity (see Annex 5). Species composition has changed dramatically, with goats now the most abundant species nationally: there was one goat to three sheep before 1990 and there are now more goats than sheep in the national herd and equal numbers in the Altai. The market for cashmere has driven this change, but the government has in effect encouraged goat ownership, most recently by providing a cash subsidy for goat herders in winter 2008/09 to compensate for low cashmere prices.

Most agricultural products are sold as raw materials, and the local demand for value-added products is low, simply because of the small population. This reduces the potential for viable markets for

processed agricultural products. Vegetable growing provides food and income for some *aimag* residents and is increasing in some places (see Annex 1).

2.6 Hunting for household use and trade, and capture of Saker Falcons

Local people hunt wild animals and collect wild plants, to such an extent that many once common species are now rarely seen. In the past massive numbers of animals were collected for their skins by full time hunters. That kind of commercial operation is no longer possible, but relentless opportunistic killing of animals by herders when they come across them while herding their livestock is leading inexorably to near extirpation from many places. There is a black economy in the illegal trade of animal products, particularly to China for traditional Chinese medicine. And some species, in particular Altai Snowcock (*Tetraogallus altaicus*) are threatened in Mongolia by hunting for traditional Mongolian medicine (see Annex 5).

There is a government organized capture of Saker Falcons each year for export to the middle-east for falconry. Quotas are set by government, and have not been reduced despite reported falls in the Saker Falcon population size (see Annex 5). The Saker Falcon is on Appendix 1 of the Convention on Trade in Endangered Species (CITES).

2.7 Tourism, including sport hunting

Tourism, mainly based on wilderness and wildlife, is growing (see Annex 1), especially in Bayan Olgii where the mountains and the annual eagle festivals attract visitors and a number of local tour companies have established themselves. Sport hunting for argali and ibex attracts limited numbers of hunters, mainly from North America, but the future of sport hunting is threatened by bad management. Quotas are not set scientifically, trophy size is decreasing, and hunting licence revenue is not returned to local conservation and management as required by law.

A sport-hunter poses with his ibex kill in the photograph below.

2.8 Mining

Mining, mainly for coal, gold and tungsten plays a significant role in the Altai region economy and is likely to increase in the future. Although there are many mining

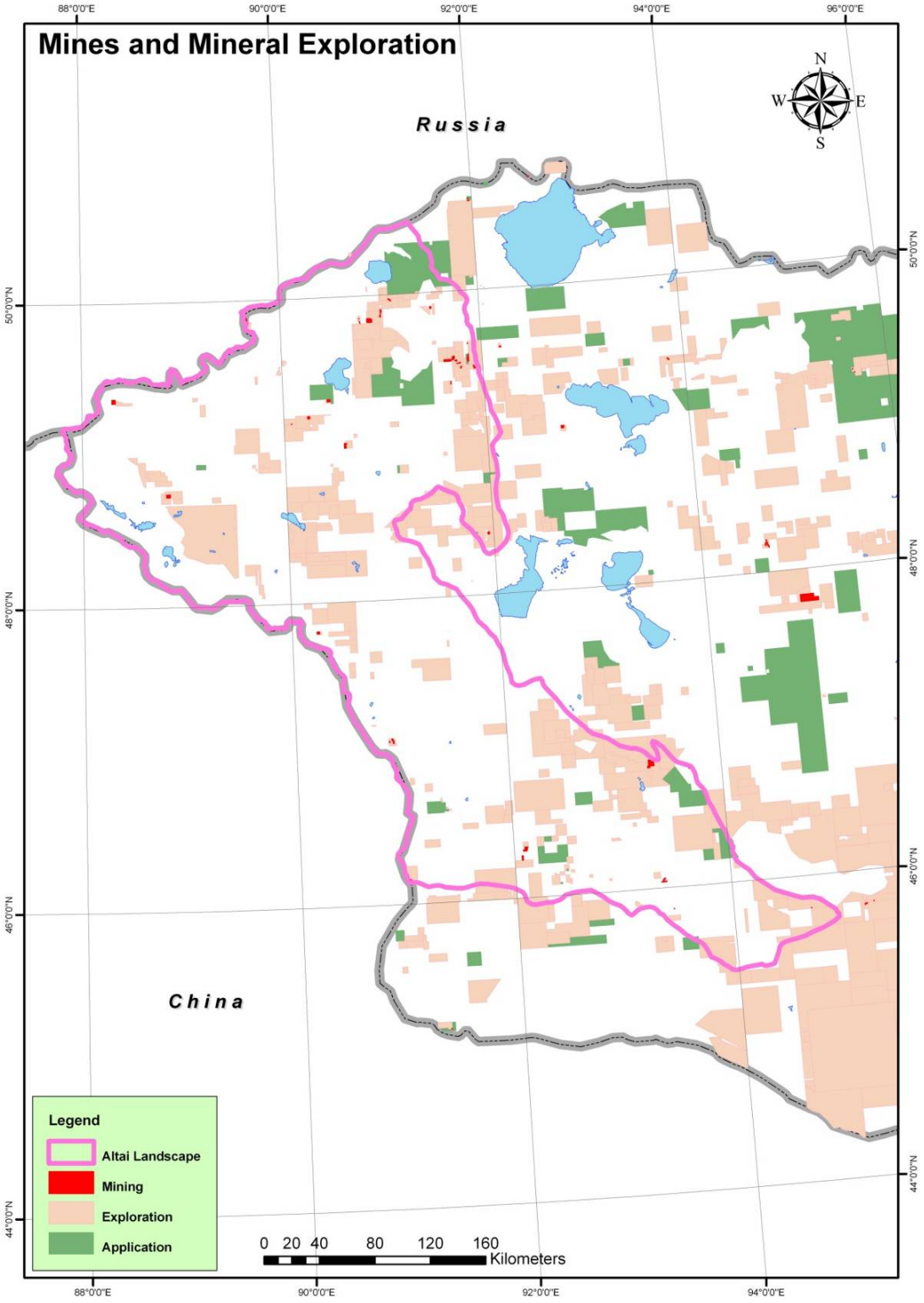


Figure 5 Mines and mineral exploration

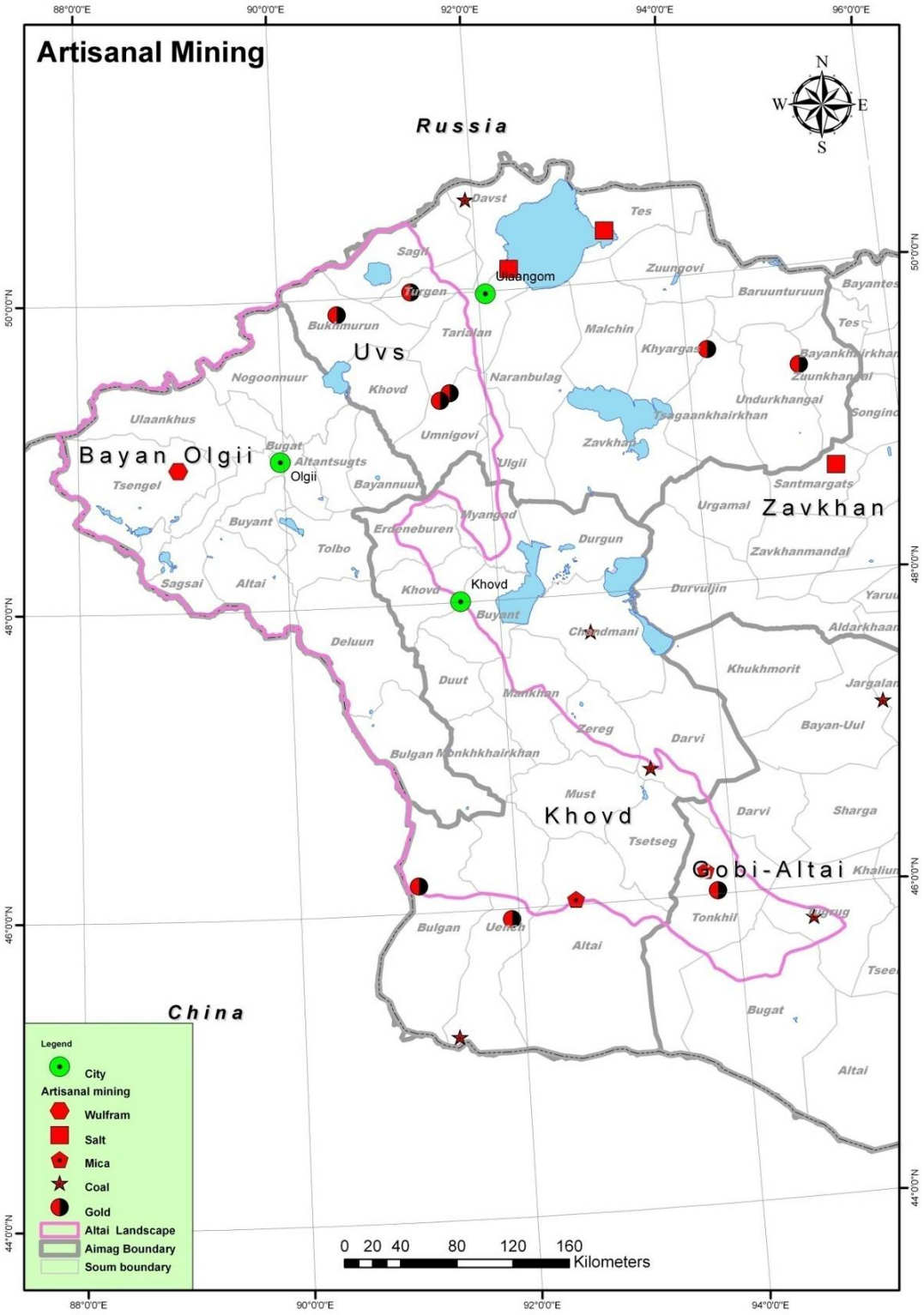


Figure 6 Artisanal mining

licences and exploration licences the number of active mines at present is relatively small. Table 2 shows the numbers and types of mining licences and indicates which correspond to active mines in 2009. There are 66 current mining licences held in the Altai landscape, and ca 29 exploration

licences, and ca 277 applications for exploration licences (see Figure 5 for distribution). A detailed list of mining licences with locations, areas, dates and company names is given in Annex 5.

Table 2 Mines and mining licences in the Altai Landscape

Type of mine	Number of licences	Number of active mines	Number of mines already closed
Gold	22	4	5
Silver	2 (all in Bayan Olgii)		
Tungsten	7 (all in Bayan Olgii)	3	
Mica	1 (in Gobi Altai)		
Mixed Metals	3 (all in Bayan Olgii)		
Rare Metals	2 (both in Khovd)		
Clay	1		
Coal	28 (none in Bayan Olgii)	8	1

Table 3 and Figure 6 show the extent and distribution of artisanal mining, in which about 2,000 people are thought to be involved in the Altai (see Annex 5). This mining is carried out by private individuals often gathering in big camps around a mineral deposit. Such mining has caused environmental problems in some areas, but provides income to people who have no few if any other options. Regulation and institutionalization is under discussion, partly assisted by the Support to Artisanal Mining in Mongolia Project[4]

The photograph below shows artisanal miners sifting sand for gold in Govi-Altai *aimag*.

[4] http://www.sdc.mn/en/Home/Natural_Resource_Management/Sustainable_Artisanal_Mining

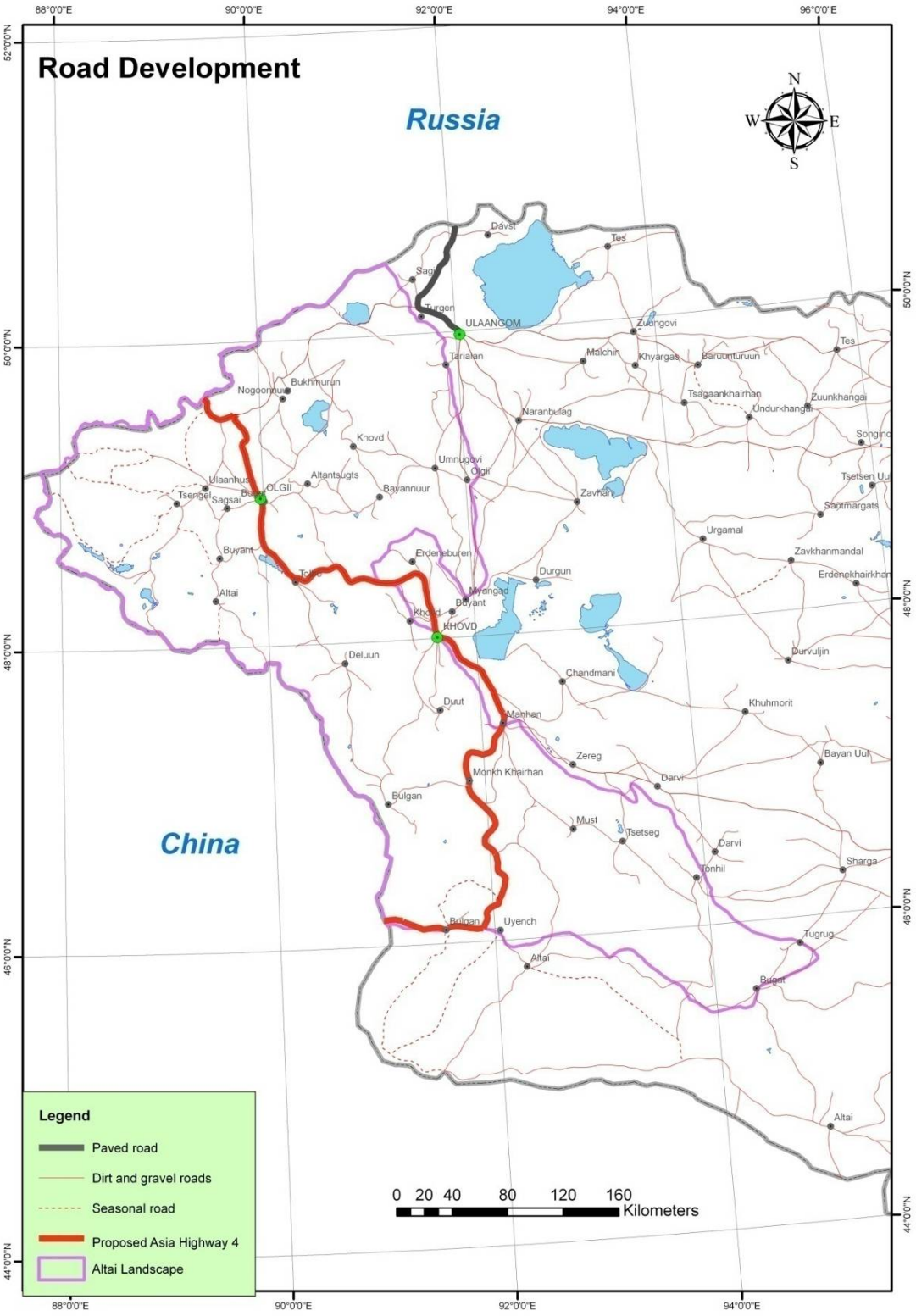


Figure 7 Road network and Asian Highway 4

Table 3 Artisanal mining within the Altai Landscape, 2009

Aimag	Sum	Mineral	Number of artisanal miners
Bayan-Olgii	Tsengel	Tungsten	620
Gobi Altai	Tonkhil	Gold	45
Uvs	Turgen	Gold	90
	Tarialan	Gold	600
	Bokhmoron	Gold	30
	Omnogovi	Gold	570
	Uench	Gold	30
	Bulgan	Gold	20
		Coal	20
	Altai	Mica	8
	Tsetseg	Coal	40

2.9 Transportation

The main means of transportation is by road - mainly unimproved tracks that develop into wide multi-tracks as people deviate from them to avoid getting stuck in mud, and to find quicker routes. The Asian Highway 4 is under construction from China to Bulgan to Khovd and is expected to be extended to Olgii and Russia from 2011 (Annexes 1 and 5). A coal mining road from Tsetseg (Khushuut) to Bulgan is also under construction for the specific purpose of exporting coal to China.

3. Biodiversity and Ecology

3.1 Habitat types

The Mongolian Altai (see Figures 2, 8, 9) lies between ca 1,200 and 4,400 m above sea level. Natural vegetation zones or habitats range from the dry desert and salt lakes of the lowlands to alpine meadows, rocky outcrops, glaciers and permanent snow caps of the peak country. Rivers drain into lakes in hollows formed by glacial erosion and into the larger rivers that flow downstream to the enclosed Great Lakes Basin.

Between the permanent snow and ice cover and the tree line (where it exists) there is an alpine zone of low shrubs and herbs, sedges, grasses, mosses, algae and lichens reaching down to around 2,300 m amsl depending on local aspect and precipitation. Below that lie sub-alpine woodland and boreal forest patches. These forest types are at the southern end of their distribution: they dominate much of the greater Altai but are much reduced in the Mongolian Altai, and consist mainly of larch and pine forests. In drier areas, where there is no forest, the alpine zone merges directly with a mountain steppe zone, which includes small patches of pine and larch on north-facing slopes, but is mainly dominated by wide expanses of meadows and mixed-grass steppes, including shrubs, forbs and grasses, and ribbons of aspen and willow along the rivers. At lower altitudes lies the drier steppe, dominated by feather grasses and unpalatable shrubs such as *Caragana* spp, and to the east and south lies the desert steppe and the Jungarian Gobi. Here too, riparian vegetation along the rivers and streams can form little oases of biodiversity when left undisturbed by man.

Figure 1 shows the relationship of the Mongolian Altai to the greater Altai and Figure 8 shows the distribution of the major vegetation types over the Altai landscape in Mongolia. Table 4 shows the main vegetation or habitat types and the areas which they cover. A brief description of each is given in Annex 3 together with examples of typical animal species found in each habitat.

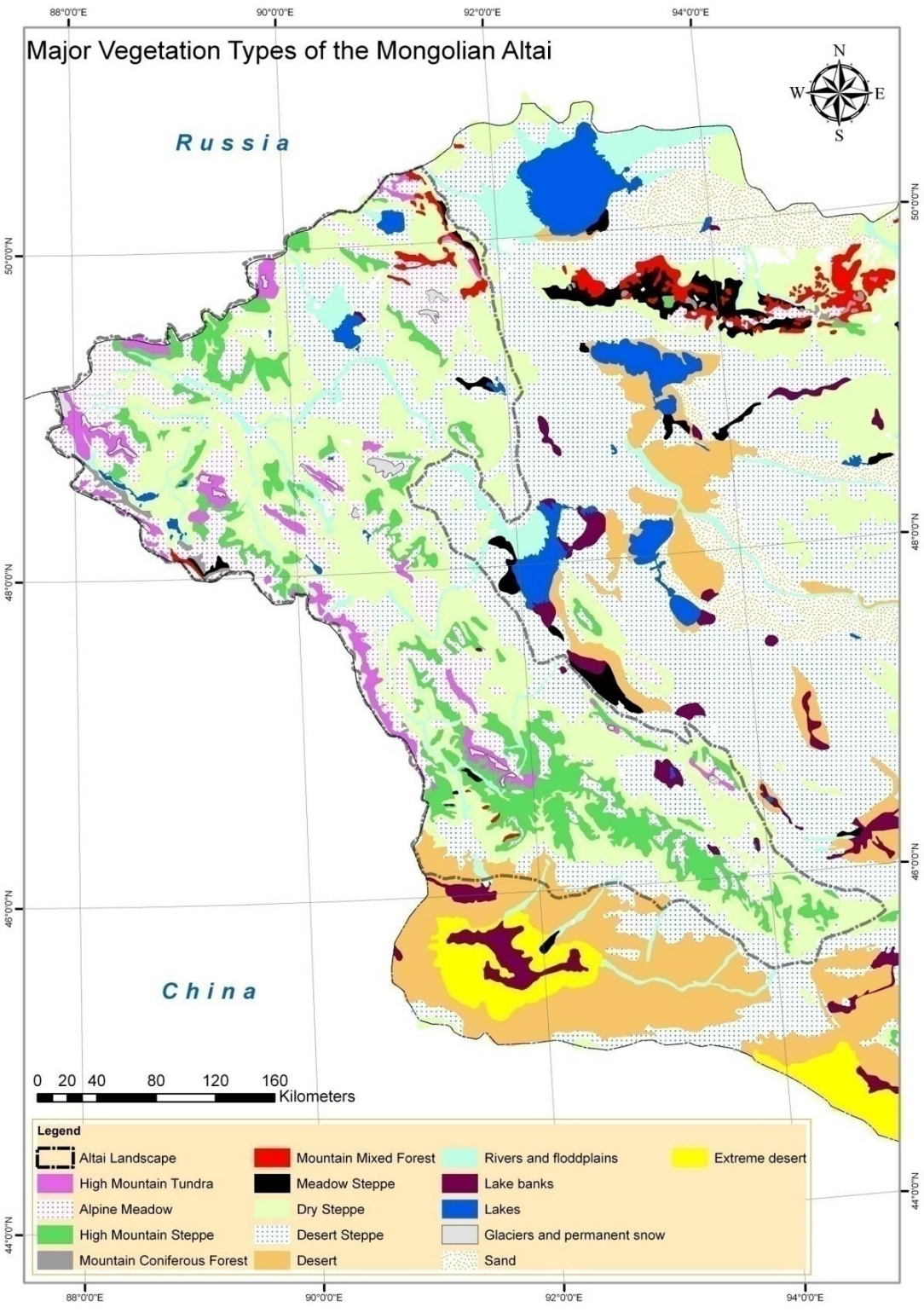


Figure 8 Major vegetation types of the Mongolian Altai

Table 4 Main vegetation types with areas and percentage coverage of the Mongolian Altai landscape

Vegetation Type	Description	Area km^2	% of whole
Desert Steppe	Low grasses and shrubs. *Cleistogenes songorica*, *Allium* spp., *Caragana-Eurotia* and *Stipa-Anabasis* communities	19,750	19
Dry Steppe	Feather grass-sagebrush. Herbs and unpalatable shrubs *Stipa krylovi*, *Agropyron cristatum*, *Chenopodium* spp., *Artemisia* spp.	39,150	38
Mountain Mixed Forest and Subalpine Woodland >1,700 m	Larch (*Larix sibirica*) with some Pine (*Pinus sibirica* at higher altitudes and *Pinus sylvestris* lower down), and poplar, birch and willow in wetter areas.	1,300	1.2
High Mountain Steppe	Grasses (eg *Stipa cleistogenes*, *Festuca lenensis*), sedges (eg *Carex macrogyna*) and herbs (eg *Aster alpinus*, *Oxytropis oligantha*). Edelweiss (*Leontopodium ochroleucum*) occurs here. Tree patches on north facing slopes, mainly pine (*Pinus sylvestris*), larch, and aspen (*Populus tremula*)	14,250	13.7
Alpine Meadows 2,300 to 2,600m	Variable according to humidity, in particular whether fed by snow melt or glaciers. Grasses such as *Poa altaica*, and *P. sibirica*. Various species of *Kobresia*. Alpine meadow-rue (*Thalictrum alpinum*), mountain saxifrage (*Saxifraga oppositifolia*), white gentian (*Gentiana algida*),	17,100	16.5
High Mountain Tundra > 2,600m	Scattered rocky outcrops with low shrubs, herbs, sedges, grasses, mosses and lichens. Ground birch, (*Betula rotundifolia*), *Rhododendron adamsii*, and *Dryas oxyodontha*	4,350	4.2
Permanent snow and ice	Almost 10% of Mongolia's surface water. Main water source for the region's rivers	950	0.9
Rivers and Lakes	Rivers feed into enclosed lakes within the landscape which are mostly mineralized, lakes in deep glacial hollows that flow out into other rivers. Those that flow out of the landscape feed downstream into the enclosed Great Lakes Basin, or into the Irtush drainage in China (Figure 2).	5,100	5.0

There are also patches of desert and damp meadow steppe (see Annex 3)

3.1.1 Rivers and Lakes

Figure 9 shows the major rivers and lakes and Figure 2 indicates the major watersheds, showing how the Mongolian Altai drains mainly inland to the enclosed Great Lakes

Basin to the east. Small parts of the Mongolian Altai, notably the Bulgan River basin, but also the rivers Yolt, Yamaat and Songinot that on the south side of Altai Taban Bogd, flow into the R.Ertix in China and thence to the Irtush and the Ob River and the Arctic Ocean.

The Great Lakes Basin lies to the east of the Mongolian Altai, and is considered in this Strategy because many of the human impacts and actions upstream in the Altai have effects downstream in the Great Lakes. The lakes include (Figure 9) Airag Lake (348 km^2), Khar Us Lake (1,570 km^2 excluding islands), Uvs Lake (3,500 km^2), and another 500 lakes or so covering a further 9,000 km^2.

Figure 9 Rivers and Lakes of the Mongolian Altai

3.2 Species Diversity

The Mongolian Altai range sits biogeographically almost at the eastern end of northern Europe, and the western end of eastern Asia where the Central Asian and Siberian zoogeographical regions meet. The bird fauna of the Altai, for example, includes approximately 60 "European" species that are not found in eastern Mongolia (Axel Braunlich pers comm. 2009)[5], and of course, some of the East Asian species do not occur in the Altai. As a result of the varied ecological conditions, the isolation of the mountains, and their position at the meeting point of the Central Asian Desert, the Mongolian Steppe and the Siberian forests the flora of the Altai is generally rich in species and contains a lot of endemic[6] and relict species. Many of these are of economic interest and have been and are collected for medicine, food and fodder.

There are 288 plant species that are endemic to the greater Altai eco-region (Pyak et al, 2007a), and 1,500 plant species have been recorded in the Mongolian Altai alone. New species are still being described for the Altai, and new records being established. Seven new species (including three species of *Allium*) have been described recently for the greater Altai, a new species of Lagopsis (*L.darwiniana*) was described from Mongolia (Pyak et al, 2007b), and a new record (for *Delphinium inconspicuum*) was made for the Mongolian Altai (Darwin Initiative, 2007)[7].

Notable animal species of the Mongolian Altai include the Snow Leopard (*Uncia uncia*), the Grey Wolf (*Canis lupus*), the Argali (*Ovis ammon*), the Siberian ibex (*Capra sibirica*), which is the main prey of the snow leopard, the Red Deer (*Cervus elaphus*), the Roe Deer (*Capreolus pygargus*) and the Musk Deer (*Moschus moschiferus*). The Goitered Gazelle (*Gazella subgutturosa*) is limited to the foothills, in particular around Achit Nuur. The Altai is also home to a considerable number of predator species. Small predators include the Manul (*Otocolobus manul*), the Wolverine (*Gulo gulo*) and the Sable (*Martes zibellina*). Among the birds of special interest is the Altai Snowcock (*Tetraogallus altaicus*), the endangered Swan Goose (*Anser cygnoides*) and a number of birds of prey species such as the White-tailed Sea Eagle (*Haliaeetus albicilla*), Pallas' Sea Eagle (*Haliaeetus leucoryphus*), the Lammergeyer (*Gypaeetus barbatus*), the Peregrine Falcon (*Falco peregrinus*) and the Saker Falcon (*Falco cherrug*). White Winged Scoter (*Melanitta deglandi*) and Black-Throated Diver (*Gavia arctica*) nest on the mountain lakes and Ruddy Shelduck (*Tadorna ferruginea*) nest on cliffs nearby. The lakes are also resting and feeding places for large flocks of water birds.

The fish diversity of western Mongolia (Mongol Altai plus the Great Lakes) was reviewed by Kottelat (2006). All fish species in the lakes and river drainages of Western Mongolia (except the rivers flowing into the Irtush/Ob drainage) are endemic to this area. They belong to three groups, osmans (*Oreoleuciscus*), stone loaches (*Barbatula* and *Triplophysa*) and grayling (*Thymallus*). Stone loaches and graylings are more frequent in rivers and fast water, while osmans are found in lakes as well as rivers. A brief 2006 survey in Western Monogolia discovered several species of loaches and one species of grayling new to science and the fish fauna is under review (M Kottleat, pers comm., 2008).

Although the diversity of animal species in the Altai and the levels of endemism, are far lower than those found in tropical latitudes, the particular assemblages of species and the intact functioning ecosystems are found nowhere else in the world. Table 5 shows the numbers of species of each of the main groups of organisms and Annex 6 lists the vertebrate species. The native mammal fauna is particularly rich in small mammals – mainly rodents (29 native species out of a total of 75) - that live on the steppe and alpine meadows. Three hundred and forty-one species of birds have been recorded in the Altai (see Annex 6). The bird fauna is rich in waterfowl and shorebirds attracted by the lakes and wetlands of the inland drainage basin.

[5] http://birdsmongolia.blogspot.com
[6] To the "greater Altai" (see footnote 1)
[7] http://darwin.defra.gov.uk/project/11025/

Table 5 Numbers of vertebrate species of the Mongolian Altai according to class and protection status

Class	Total native species	Globally threatened species (IUCN)	Regionally threatened species (IUCN)	Species on CITES Apps I to III	Species on CMS Apps I to II	Species listed as "Very rare"[8]	Species listed as "Rare"[9]
Mammals	75	7	9	I-3 II-3 III-4	I-1 II-1	5	7
Birds	341	16	Not yet assessed	I-8 II-44	I-7 II-42	2	14
Amphibians	1	0	1	0	0	0	0
Reptiles	12	0	1	0	0	0	0
Fish	12	2	3	0	0	1	0
Total	**441**	**25**	**14**	**62**	**51**	**8**	**21**

3.3 Biodiversity of special interest and importance

Twenty-five species that occur in the Altai are classified under the IUCN system as globally threatened (see Table 6).

Table 6 Globally threatened species of the Altai (IUCN)

Saiga antelope (*Saiga tatarica*)	Critically Endangered
Snow Leopard (*Uncia uncia*)	Endangered (EN)
Saker Falcon (*Falco cherrug*)	EN
Swan goose (*Anser cygnoides*)	EN
White-headed duck (*Oxyura leucocephala*)	EN
Egyptian vulture (*Neophron percnopterus*)	EN
Argali Sheep (*Ovis ammon*)	Vulnerable (VU)
Great Bustard (*Otis tarda*)	VU
Five-toed pygmy jerboa (*Cardiocranius paradoxus*)	VU
Wolverine (*Gulo gulo*)	VU
Goitered gazelle (*Gazella subgutturosa*)	VU
Siberian musk deer (*Moschus moschiferus*)	VU
Dalmatian pelican (*Pelecanus crispus*)	VU
Greater spotted eagle (*Aquila clanga*)	VU
Pallas' fish eagle (*Haliaeetus leucoryphus*)	VU
Lesser kestrel (*Falco naumanni*)	VU
White-naped crane (*Grus vipio*)	VU
Great bustard (*Otis tarda*)	VU
Macqueen's bustard (*Chlamydotis macqueenii*)	VU
Relict gull (*Larus relictus*)	VU
Pale-backed pigeon (*Columba eversmanni*)	VU
White-throated bushchat (*Saxicola insignis*)	VU
Yellow-breasted bunting (*Emberiza aureola*)	VU
Lake osman (*Oreoleuciscus angusticephalus*)	VU
Mongolian grayling (*Thymallus brevirostris*)	VU

The full lists of vertebrate species in Annex 6 show other categories of threatened status and protection, including regional assessments and special protection under Mongolian Law. Table 5 shows the numbers of species of each group that are listed as globally or regionally threatened, or on the CITES Appendices.

[8] Mongolian Law on Fauna, Article 7
[9] Decree of Mongolian government (Decree No 264, 2001)

The protection status of the globally threatened bird species is shown in more detail in Annex 6. The Altai is home to 70 per cent of Mongolian bird species, including 15 species assessed as globally threatened (11 vulnerable and 4 endangered) on the IUCN red list.

The osmans constitute a fish species flock – a relatively large number of closely related species confined to a narrowly circumscribed area, that have a variety of adaptations beyond those observed among related species outside the area. Preliminary data show that the evolution of these different species from the ancestral species possibly happened in parallel in different lake: that there are several loach and grayling species in the different drainages, that the riverine osmans include several species and that the larger lakes have several species of osmans some endemic to a single lake, some endemic to a few lakes, some shared by all lakes. The West Mongolian fish species-flocks in an arid landscape are a unique biological phenomenon and the most important feature of the aquatic biodiversity of Mongolia, with no parallel elsewhere in the world.

3.4 Gaps in our knowledge of the biodiversity

There is a lot of anecdotal information about the biodiversity of the Altai, but a shortage of well organized and reliable data, particularly on distribution of species. Many local species lists are based on historical distributions, lists published for the *aimags*, and experts' opinions.

3.4.1 Habitat mapping

There are many different classifications of the vegetatation types and "ecosystems" of the Altai, and most of them are very detailed and have involved a lot of mapping and GIS work for a lot of people. However, there are several drawbacks. First, grassland and forests are being degraded and such degradation is not reflected in the ecosystem maps published. Second, the various systems in use are difficult to reconcile with each other. And third, the sheer number of ecosystem types distinguished is actually too many to present visually to planners and to work with effectively on analysis of gaps in coverage of conservation programmes such as protected areas.

3.4.2 Population sizes and trends

Reliable data on population size, age and sex composition of the large animals are lacking. Various surveys have been carried out, but have not used consistent methodology for sampling and are not statistically robust. The birds are better known than the mammals.

IUCN regional Red List assessments of mammals, fish, amphibians and reptiles have been conducted and Mongolian Red Lists and Summary Conservation Action Plans for Mammals, Fish, and Reptiles and Amphibians were published in 2006 (Clark et al, 2006a,b; Ocock et al. 2006a.b; Terbish et al 2006a.b). The red lists define a systematic evaluation of rarity and degree of threat across all species but they have no legal standing in themselves. The bird assessment is almost complete.

3.4.3 Natural history

The natural history of many of the Altai species is not well known. One species, the White-throated Bushchat (*Saxicola insignis*) spends the winter in the terai of southern Nepal and breeds in the Altai but no-one knows its exact range. Unless we know in more detail where it breeds it is difficult to be sure that it is not under threat from current or proposed human activities. We lack basic information about many species. Although in no way endangered, the White-Throated Dipper (*Cinclus cinclus*) is seen along lowland Altai streams and rivers in the winter but we do not know where it breeds in the summer.

The exact composition of the fish fauna is still poorly known, partly because surveys have not been done everywhere, and partly because of incorrect classification in the past. New species are still being discovered: a 2006 survey discovered several species of loaches and one species of grayling new to science (M. Kottelat, pers comm, 2008).

Annex 20 gives a summary of information that should be sought through research to assist in implementing this Strategy. The size of the area, and the shortage of biologists limit our formal knowledge of the biodiversity, but there is an enormous amount of informal knowledge in the herders who have lived all their lives on the grassland.

4. Human impacts and threats to biodiversity

Damage to the biodiversity of the Altai Mountains landscape and disruption of its ecological processes has been described in numerous publications and project proposals (see for example WWF, 2003; UNDP, 2006) which deal with the major threats such as hunting, plant collection, overgrazing organic pollution of rivers and lakes, displacement of wild ungulates from their grazing grounds, irresponsible mining and waste disposal practices, and the effects of global and local climate change (see also Annex 5). Hunting of a wide range of species is a constant drain on populations of wild species in Mongolia, many of which have suffered massive declines and reductions in range over the last twenty years (Wingard and Zahler, 2006). Overstocking has led to widespread degradation of grasslands including declines in species diversity and damage to the soil structure. And increasing livestock herds have led to eutrophication of rivers, lakes and other surface waters and concomitant threats to biodiversity. Forests have been retreating due to over-felling and unnatural fire regimes, and species composition has been affected. Forest animals have suffered accordingly, and there have been impacts on water resources too.

Man has direct impacts on populations of wild species through hunting too many animals and collecting too many plants, and indirect impacts through causing competition for food between domestic livestock and wild animals, and through habitat destruction, disturbance, and barriers to movement of wild species (Annex 5). Soil and water are fundamental requirements for all forms of biodiversity and ecological processes, and are particularly susceptible to over-use and damage in mountain landscapes (Annex 4).

In the Altai, as in all high mountain areas, soils are young and fragile, and it is easy to cause lasting damage though careless treatment of the soil leading to erosion. The particularly harsh climate of the Altai, with repeated freezing and thawing, and a very short growing season, exacerbates this fragility. Loss of soil leads to reduced plant growth, in some cases to a lack of any plants, and to all the consequences of this for other species at the site and downstream. Vegetation is a great natural protector of soil and when vegetation is removed on fragile soils it is extremely difficult to restore function. It is relatively easy to damage forests and grasslands and their dependent species in mountain areas through heavy grazing, cultivation, vehicle use, and logging. Annex 4 describes the particular fragility of mountain and arid landscapes such as the Mongolian Altai, in relation to soil, water, grassland, forest and wild species of animals and plants.

4.1 Downstream Impacts

The mountains themselves have impacts on the surrounding land, through modification of climate for example, and as the source of water. Mountains form water catchment areas for large surrounding areas so human activities can have far reaching impacts on water quality and quantity downstream. In the case of the Altai the mountains feed to the east into a closed basin whose only outlet is evaporation, so the problems of siltation and pollution are magnified. Land use in the mountains can have enormous impacts on water quality, water quantity, and the timing, frequency and severity of floods in lower lying areas. Khar Us Nuur is already showing signs of increased siltation, lower water levels, and eutrophication as a result of activities upstream (Soninkhishig 2009), and the shoreline of Airag Nuur retreated 5 km in spring 2009 (Chimed-Ochir pers comm. 2009). Fluctuations are part of the ecology of an area like this so just because one year is particularly dry is no reason to change policies: indeed 5km of mudflats every few years could be just what one component of the biodiversity requires for its long term survival. The biodiversity manager is most concerned with long term trends and with changes that can be damaging to species already under stress or at low population levels.

As there is little precipitation at lower altitudes in the Mongolian Altai (Section 2.1), and there may be reduced glacier melt-water in the future (Annex 5), water management initiatives such as irrigation schemes, dams and river channel diversions, could have proportionately large impacts on water resources downstream. Current practices in livestock grazing, mining, vehicle use, road construction, cultivation and irrigation all have destructive impacts on water quality and downstream supply and hence on other species.

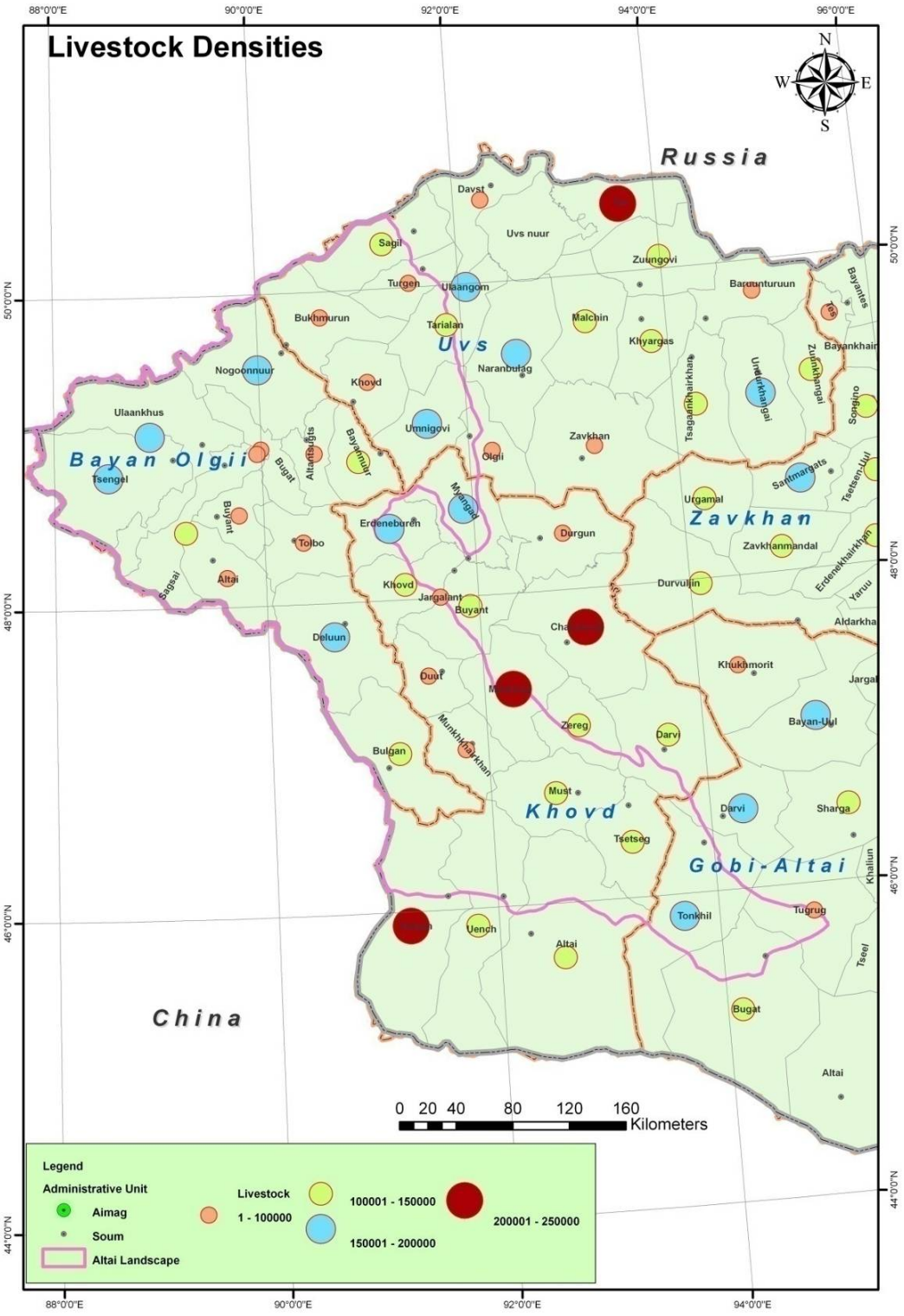


Figure 10 Livestock numbers in each sum

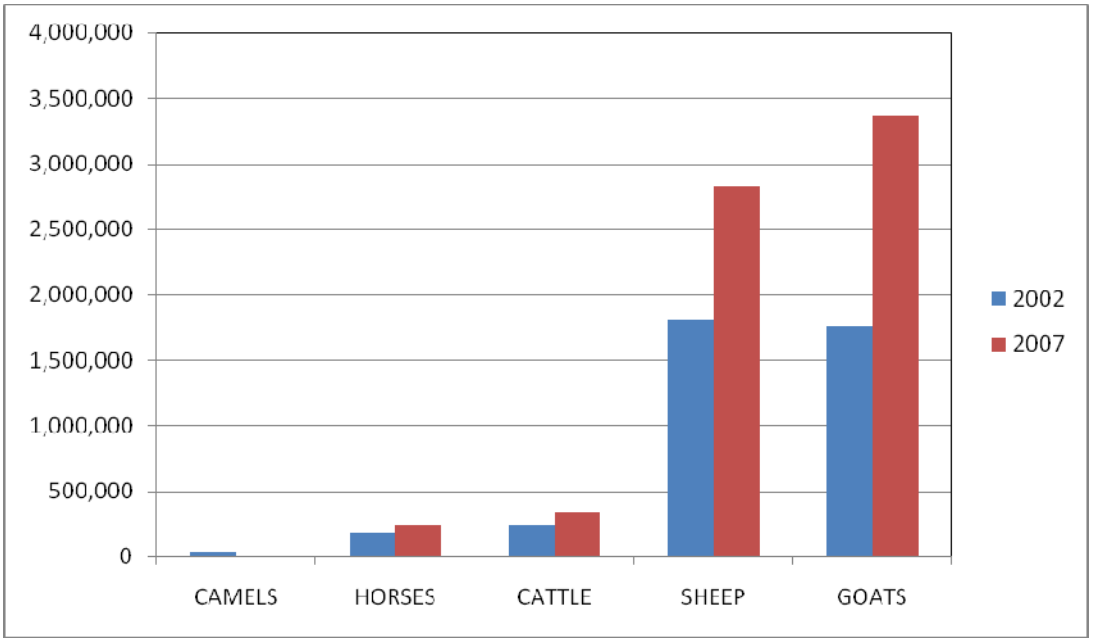


Figure 11 Livestock numbers in Khovd, Uvs and Bayan Olgii 2002 and 2007

4. 2 The major threats to biodiversity

Man, although present in the Altai at pretty low population densities (see Annex 1) is threatening the integrity and function of the local ecosystems and the survival of certain wild species of plants and animals because those ecosystems and species are finely tuned to the unique, harsh conditions of the Altai and there is little scope for absorption of impacts at the scale that man is bringing to the area. In the distant past, at lower population densities still, and following a self sufficient life style of transhumant pastoralism that trod lightly on the rangeland and evolved its own cultural restraints, or "stinting", the ecosystems survived in good condition and the wild species in reasonable numbers. Even wolves were hunted with restraint rooted in cultural norms that ensured care for the environment.

Years of successive upheavals in society have led to the loss of many of these cultural norms in practical everyday life and decision making. Despite a romantic attachment to them and attempts by well-meaning people and organizations, including donor-funded projects, to "teach" them to new generations, such customs are unlikely to take root again easily, if at all. Livestock numbers have increased enormously in recent years. The latest official estimate (2007) for the three western *aimags* is 6.8 million head (Annex 5), compared with 4.7m in 1990 and 5.08m in 2004. Livestock numbers increased by 70% between 2002 and 2007 and goat numbers by a massive 90%. Unofficial but well informed estimates put the national livestock herd at 53 million head compared with the 2008 official figure of 43 million, and it is likely that there are considerably more than 6.8 livestock in the three western *aimags* (Annex 5). There are signs of nutritional stress in the herd. Large numbers die each winter, the proportion of females giving birth and the proportion of young animals in the population are both lower than normal for healthy animals in good condition (see Annex 5).

Overgrazing results in bare ground or ground with minimal plant coverage, and this in turn is thought to have led to increases in the numbers of grasshoppers[10].

Reports by the *aimag* environment inspectors and staff of the UNDP/GEF Altai Sayan Biodiversity Project, in 16 *sums* of Khovd, Uvs and Bayan-Olgii *aimags* reveals an alarming trend in cases of hunting and the local extinction of wildlife (see Annex 7). Hunting is ubiquitous, and detection and recording of detection is sporadic: Annex 7 merely gives examples of where the problem is considered to be most severe. In many places where Siberian Ibex, Argali, Snow Leopards and

[10]http://www.mbforagecouncil.mb.ca/foragegrasslandmanual/6pesticidesdisease/67grasshoppersbiologycontrolandscouting/default.aspx

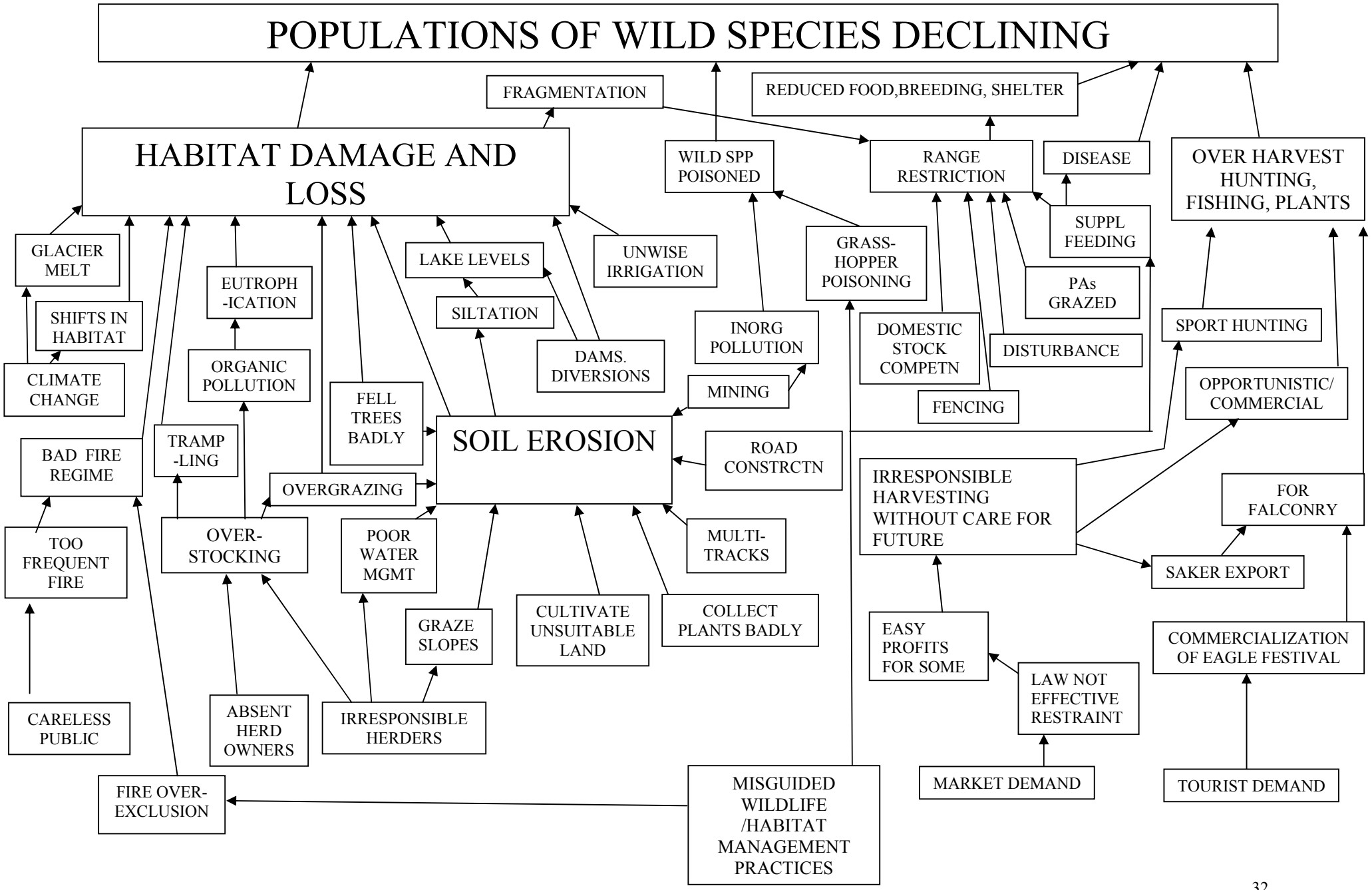


Figure 12 Causes of biodiversity degradation in the Altai

Table 7 Threats to biodiversity from various human activities

Human Activity	The threat	Degree
Livestock Grazing	Damage to soil and productivity through overstocking and overgrazing. Eutrophication downstream through overstocking. (Evidence that overgrazing also leading to reduced livestock productivity)	Severe
Hunting by local people	Relentless killing of wide range of species that have already been reduced to small population sizes.	Severe
Saker Falcon trade	Reduction in Saker Falcon numbers annually. No scientific basis for the quota.	Severe
Sport hunting	High impact on small populations. No scientific basis	Severe
Plant Collection	High impact on plant populations and some impact on mountain soils where Altai Onions, for example, dug on steep slopes. *Caragana* spp and other shrubs used for fuel	Severe
Illegal cutting, forest management and fire	"Grinding" away at the forest edge through poor management of forests leads to overall reduction of forest area.	Severe
Mining	Pollution and land degradation. Potential conflicts with protected areas. Current overlaps with Important Bird Areas. Artisanal mining totally unregulated.	Severe and growing
Off-road driving and multiple tracks	An old problem, resulting in considerable loss of habitat and soil erosion.	Moderate
Road construction	Roads should, if used properly, ease multi-tracking. The main threat is from increased access	Moderate
Water Resource management	Diversion for other uses is a major influence on river flow. Management to plan water use has been lacking but is now being established.	Moderate
Inappropriate management interventions	Examples include putting salt and food out for wild species, introduction of alien fish species into lakes, trying to control *Eclipopheps* swarming grasshoppers with pesticides, and omitting to do environmental assessments on "alternative livelihood " projects.	Severe
Transboundary threats	Not sufficiently known.	Probably moderate
Impacts of Climate Change	Increasing temperatures and melting of the icecaps are expected to intensify, leading to substantial changes in habitats and habitat distributions	Very significant impacts inevitable
Cultivation	Cultivation of unsuitable land, and poor use of irrigation leading to soil erosion, siltation, eutrophication and salinization	Moderate in extent , but serious
Waste Management	Current safeguards not sufficient	Moderate
Tourism	Potential to have severe impacts if allowed to develop uncontrolled. – especially off-road driving	Moderate

Marmots used to be common none have been reported recently. Similar trends have been recorded elsewhere in Mongolia. A problem tree (Figure 12) was developed to help visualize some of the major threats and how they cluster around things like soil erosion.

Sport hunting does pose a risk to wildlife, particularly as the only supposed benefit of sport hunting – the return of licence revenue to conservation – is not being realized. It is divisive too: the sight of victorious hunters celebrating a kill does not sit easily with the other conservation messages, or the religious teaching being seconded in the name of conservation.

Table 7 summarizes the major threats and their characteristics, and further details of these threats are given in Annex 5. Livestock grazing, hunting and plant collection are the major threats to ecosystems and species. Rangeland degradation has been attributed to overgrazing by the National Agency for Meteorology, Hydrology and Environmental Monitoring (NAMHEM). Hunting and plant collection have both been extremely damaging to biodiversity and continue to keep animals and plants at low population levels and to threaten them with local extinction.

Mining also poses threats, through pollution, loss and fragmentation of habitat through mining itself and the associated infrastructure. Artisanal miners (Figure 6) are contributing to the deterioration of the soil greatly as well. Washing of gravel and ore, and use of chemicals such as sodium cyanide and mercury in treatment of ore without proper controls have caused water and soil pollution and may have serious impacts on wild species and humans. Apart from chemical pollution there is the addition of suspended matter to the rivers.

4.3 The threats to man himself

The damaging practices listed in Table 7 are characterized by either

a) consumption of natural resources faster than they can be replenished,
b) disruption of natural ecological processes to such an extent that species requirements are not met, and natural resources are renewed too slowly if at all, or
c) a combination of these.

Many of the human activities described in Annex 5 pose threats not just to other species and to natural ecosystems but to man himself.

5. Biodiversity conservation-related policies and programmes

5.1 National and regional development policy

The Regional Development Concept approved by Parliament in 2001 defined the general policy on rural and urban development for the following 15-20 years. The western region[11] is defined as one of Mongolia's four development regions. The main objective of the concept is to accelerate economic development in the regions and reduce development disparities between urban and rural areas

The Millennium Development Goals (MDGs)-based Comprehensive National Development Strategy of Mongolia includes a chapter on environmental policy, but the environment is not integrated into all government sectors in that strategy.

A programme to stimulate cultivation, "The Third Farmland Campaign" aims to make Mongolians self-sufficient in basic crops such as wheat and potatoes. Apart from large scale potato and grain cultivation, free courses are being offered with some donor financing, to train people who have been allocated land under the land registration scheme (see Annex 1) in basic horticultural techniques, concentrating on common vegetables such as potatoes, tomatoes, and carrots.

[11] Zavkhan, Gobi-Altai, Uvs, Khovd and Bayan Olgii *aimags*

Mongolia intends to sow crops on 280,000 ha this spring, an increase of 67,000 ha since 2008 (Ministry of Food, Agriculture and Light Industry, 2009). Russia is extending a $300 million loan to Mongolia for agriculture development, including support for the 2009 sowing season and, according to Prime Minister S Bayar, to develop "deserted virgin lands " (Montsame, 2009)

The Millennium Road Project will link Mongolia east to west with paved roads: this is not a single project but an overall plan to be completed in stages as finance becomes available. The Western Region Road Development Project to build a road from China to Russia via Khovd and Olgii is described in Annex 5. There are other routes being planned to start over the next 10 years.

5.2 *Aimag* and *sum* development policies

Each *aimag* and each *sum* has a four year development plan that coincides with the national elections and the appointment of *aimag* and *sum* governors. There are also *aimag* strategic development programmes in some *aimags*. Uvs *aimag* for example, has a strategic program for 2008-2012 (Uvs *Aimag*, 2008), which includes a section on environmental protection that takes a cross-sectoral approach and aims for community involvement, and incentives to reduce people's impacts on the environment. It includes a Sea Buckthorn cultivation program and promotion of Sea Buckthorn as an "*aimag* brand" product although the link between this activity and reducing impacts on wild biodiversity is not apparent. There are also measures to assign the management and licensing of sport hunting to local groups, thus giving the main incentive to protect trophy species such as Argali and Ibex. Annex 12 lists major relevant policy documents.

5.3 Protected areas

5.3.1 State Special Protected Areas in the Mongolian Altai

There are ten complete state special protected areas (see Annex 12) in the Altai landscape and part of one (see Table 8, Figure 13). Together these protected areas cover 16,086 sq km or 15% of the Altai landscape. Five of the eight Strictly Protected Areas (SPA) and National Parks (NP) have approved zonation plans (see Annex 12). The most protective zone (Pristine Zone in an SPA; Special Zone in a NP) takes up between 3% and 39% of the total of the protected area. Table 8 shows whether there is legally approved zonation in each protected area and whether buffer zones have been established.

Strictly Protected Areas and National Parks are managed from Ulaanbaatar through locally established protected area administrations. Only Khokh Serkh SPA and Monkhkhairkhan NP have individual protected area administrations (PAA); the others come under *aimag* centre-based administrations (Mongol Altai PAA in Olgii; Khar Us Nuur PAA in Khovd; and Uvs Nuur Basin PAA in Ulaangom. Nature reserves are managed by local government.

Running costs come from national and local budgets, fees from tourism and other services, gifts from individuals and companies, and fines imposed on those who break the protected area regulations. There is a ceiling of income beyond which protected area administrations are obliged to return all income to the central administration in Ulaanbaatar. The annual budgets for Khokh Serkh SPA (659 km^2) and Monkhkhairkhan NP (325km^2) are about 15 million togrogs – ca US$0.15 per ha for Khokh Serkh and ca US$0.30 per ha for Monkhkhairkhan (Schuerholz et al, 2007). Fot the whole of the Mongol Altai Protected Area network run from Olgii the 2009 budget per ha is approximately US$0.08. Average current spending on protected area management in developing countries reported by Bruner et al, 2004 ranged from US$0.05 to US$3.00 per ha, while actual needs were estimated at US$0.90 to US$9.00 per ha.

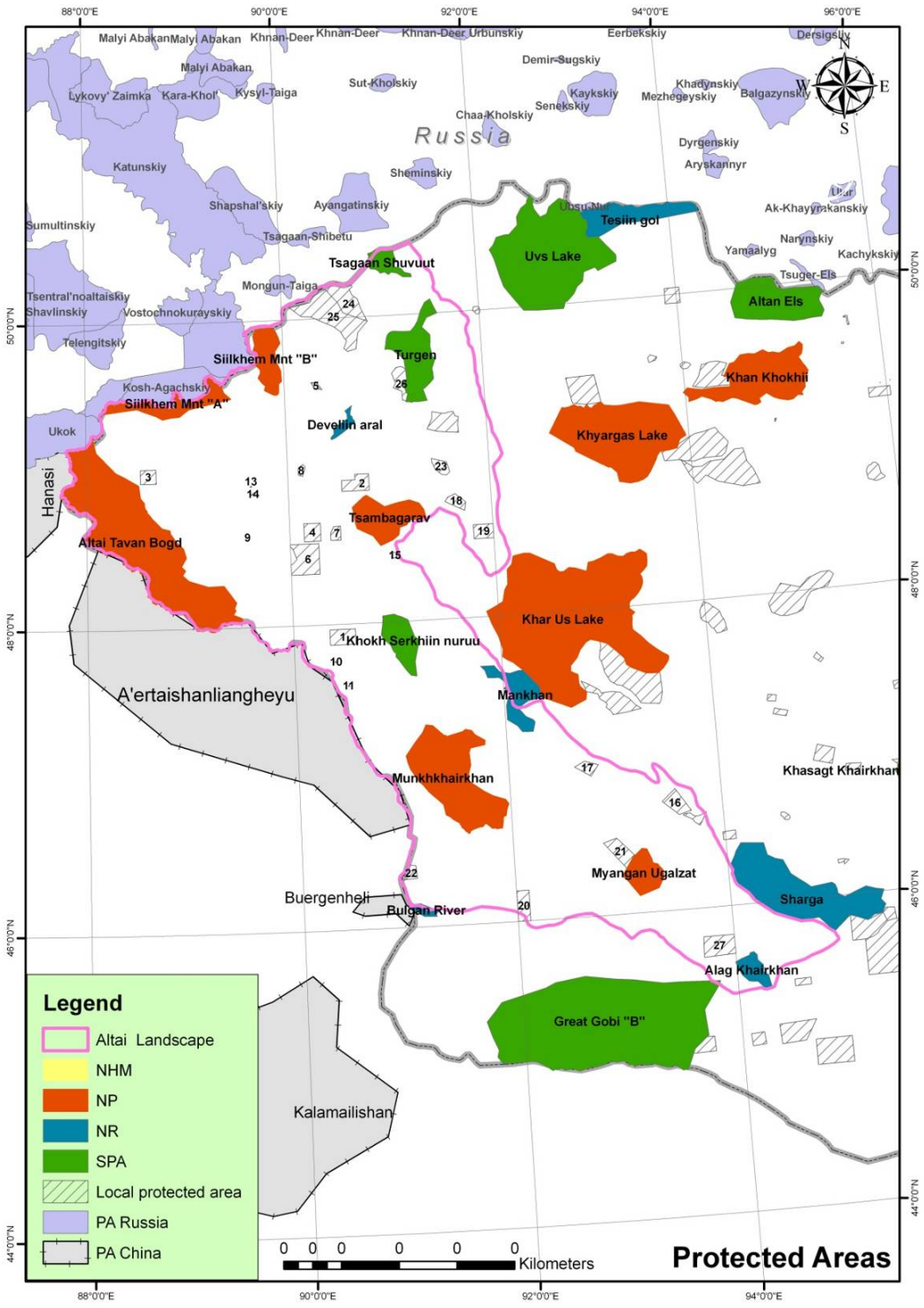


Figure 13 Protected areas in and around the Mongolian Altai

Table 8 Protected areas in the Mongolian Altai

Name (Year)	Area km^2	Objectives Notable features	Grazing	Buffer zone?
Khokh Serkh SPA (1977)	659	To protect habitat of Argali, Ibex and Snow Leopard High mountain tundra with rare species	Extreme	Yes
Tsagaan Shuvuut SPA (1993)	231	To protect Uvs Lake Basin Mountain forest and high mountain ecosystem and core habitat of Snow leopard.	None	Yes
Turgen Uul SPA (1993)	1,160	To protect Uvs Lake Basin High mountain ecosystem with ice caps, Snow Leopard, Argali Ibex	Very High	Yes
Altai Tavan Bogd NP (1996)	6,362	To protect beautiful landscape High mountain tundra, ice cap, and glacier, Argali, Ibex, Altai Snowcock, Medicinal and rare plants such as *Saussurea involucrate, Valeriana officinalis, Juniperus dahurica*	Extreme	Yes
Siilkhem NP ("A" and "B" sections) (2000)	1,428	To protect beautiful landscape, and develop tourism High mountain tundra with Argali wild sheep, Ibex, Snow leopard, and rare flora	Extreme	Yes
Tsambagarav Uul NP (2000)	1,115	To protect beautiful landscape and habitat of snowleopard High mountain tundra with ice cap, glacier, snow ice, medicinal plants including *Saussurea involucrate*	Extreme	Yes
Devel Aral NR (2000)	103	To protect rare animals and their habitat Wild boar, Beaver (was reintroduced now extinct again), Ring-necked Pheasant, Sea Buckthorn.		
Alag Khairkhan NR (1996)	364	To protect landscape and medicinal plants *Saussurea involucrate, Valeriana officinalis*, Argali, Ibex, Snow Leopard and Altai Snowcock		
Sharga-Mankhan NR (Mankhan only) (1993)	815	To protect Saiga Gobi and desert.		
Myangan Ugalzat NP (2002)	600	To protect Argali and its habitat High mountain tundra with plants including Altai onion, (*Allium Altaicum*), Goldenroot (*Rhodiola rosea)*, and Wolverine, Lynx, Snow leopard, Argali and Ibex	Extreme	Yes
Monkh Khairkhan NP (2006)	3,250	To protect high mountain landscape and water source High mountain tundra with ice-cap, glacier, Gobi toad-headed lizard *(Phrynocephalus versicolor*), rich biodiversity, timberline, special virgin nature	Extreme	Yes

SPA = Strictly Protected Area; NP = National Park; NR = Nature Reserve
Grazing pressure: . Data from Schuerholz et al (2007)
Extreme = Exceeding more than twice the recommended carrying capacity;
Very high = Exceeding recommended carrying capacity
None = No livestock use at any time of the year

5.3.2 State Special Protected areas near the Mongolian Altai

There are a number of protected areas adjoining or near the Altai landscape, both within Mongolia and in China and Russia (Figure 13). The closest in Mongolia is Khar Us Nuur NP (8,503 km^2), which protects one of the major lakes of the Great Lakes Basin, used by hundreds of thousands of waterbirds and shorebirds for feeding and breeding. A few Dalmatian Pelicans, on the brink of extinction in Mongolia, still breed in the area. Uvs Lake SPA well downstream of the Altai to the east, is dominated by its eponymous large (3,350 km^2) saline lake (five times saltier than the oceans) which has impacts on the regional climate, and is also host to wetland birds. Just to the south of the Altai lies the Bulgan River NR (77 km^2), a riparian ecosystem famous for the only beavers (*Castor fiber*) to remain in Mongolia, and also home to the Eurasian Otter.

Uvs Lake[12] SPA	3,350 km^2	1993	Saline lake and wetlands
Altan Els SPA	1,775 km^2	1993	Freshwater lake, sand dunes
Khar Us Lake NP	8,503 km^2	1997	Lake basin, wetlands and steppe
Khankhokhii – Khyargas Lake NP	5,559 km^2	2000	Mountain forest, mountain steppe and wetlands
Bulgan River NR	77 km^2	1965	Riparian forest, Beaver, Otter
Sharga (part of Sharga Mankhan) NR	3,086 km^2	1993	Desert Steppe, Desert, Saiga
Great Gobi B (part of Great Gobi SPA)	9,000 km^2	1976	Desert and Desert Steppe, Goitered Gazelle, Wild Ass

In Russia and, to a lesser extent in China, there are numerous protected areas along the boundary of the Altai landscape (see Figures 1 and 13). The most important from the point of view of cross border impacts on the Mongolian Altai are:

RUSSIA	CHINA
Zona pokoya Ukok	Hanasi
Katunsky	Aertaishandliangheyu
Kosh-Agachskiy[13]	Buergenheli

The Golden Mountains of the Altai (Figure 1) is a World Heritage Site that covers several of the Russian protected areas. The Uvs Lake Basin was declared an international Biosphere Reserve in 1997 and was recognized as a World Heritage Site (joint with Russia) in 2003. The site includes Turgen Uul and Tsagaan Shuvuut SPAs (Figure 13), as part of the wider Uvs Lake Basin protected area cluster.

5.3.3 Local protected areas

Local Protected Areas at *sum* and *aimag* level have been established in the Altai landscape to preserve original natural features, to use natural resources sustainably, and to conserve springs and river sources and forests. These areas provide little protection in practice although the status can legally block certain land uses. Annex 8 lists these protected areas, and they are shown on Figure 13 alongside the State Special Protected Areas. The numbers in Figure 13 refer to the list in Annex 8. Local protected areas cover 3,664 km^2 of the Mongolian Altai landscape.

5.3.4 Habitat and Species coverage

A simple assessment of the state special protected areas of the Mongolian Altai landscape in terms of habitat representation, shows heavy over representation of highland zones and

[12] Part of the Uvs Lake Cluster (7125 km^2) which includes Uvs Lake, Altan Els, Turgen Uul and Tsagaan Shuvuut

[13] Now part of Sailiugemski (not on Figure 12)

under-representation of the lower steppe and forest steppe areas (Table 9, Figures 8,13,14 and 15). Percentage coverage of the vegetation types in the protected areas (and again in the core zones) differs significantly from the relative abundance of vegetation types in the landscape.

For example, the upper three zones (Glaciers, High Mountain Tundra and Alpine Meadow) make up 21.6 % of the landscape, 53.1% of the land in protected areas and 79% of land in core zones. Of the lower altitude zones, Dry Steppe, Desert Steppe and Desert combined cover 58.1% of the landscape, but only 24.1% of land in protected areas and just 3.2% of the core zones. Put another way, 38% of the top three vegetation types are in protected areas compared with only 6% of the lower three types. And in the protected areas 25% of the upper three vegetation types lie in core zones, as opposed to only 2% of the lower three vegetation types. On the other hand, High Mountain Steppe, Forest and Lakes and Rivers have good representation in the protected area network.

Detailed data on the occurrence of the vertebrate species (Annex 6) in the protected area system are not available. It is clear, however, that there are many species that have only parts of their ranges within protected areas, and although they may move between protected areas cannot find suitable habitat as “corridors”.

The photograph below shows a volunteer ranger on patrol in the Monkhkhairkhan National Park.

Table 9 How the vegetation types are represented in the protected area system

Vegetation Types	Total Mongol Altai landscape (excluding built up areas)		All State Protected Areas within the Mongolian Altai		All State Protected Area "Core Zones"	
	Area km^2	%	Area km^2	%	Area km^2	%
Glaciers/Snowcap	950	0.9	800	4.9	265	9.7
High Mt Tundra	4,350	4.2	2,300	14.4	735	27.2
Alpine Meadow	17,100	16.5	5,400	33.8	1,150	42.4
Meadow Steppe	400	0.4	175	1.0	60	2.2
High Mt Steppe	14,250	13.7	2,200	13.3	220	8.1
Forest	1,300	1.2	630	3.9	175	6.4
Dry Steppe	39,150	37.7	3,300	20.6	85	3.2
Desert Steppe	19,750	19.0	550	3.4	0	0
Desert	1,500	1.4	15	0.1	0	0
Rivers/Floodplains	3,800	3.7	500	3.1	20	0.8
Lakes/Dry Lake beds	1,300	1.3	230	1.4		0
	103,850		16,100		2,710	

5.3.5 Proposed new protected areas

A number of proposals have been made to enlarge the protected area system in order to advance towards the government target of establishing 30% of the country under protected status.

Seven state and six local protected areas are scheduled to be established over the next 10 years (see Annex 9) and two extensions are planned. In addition there are plans to extend existing protected areas and change status. No exact boundaries are available, but the locations are marked on Figure 16.

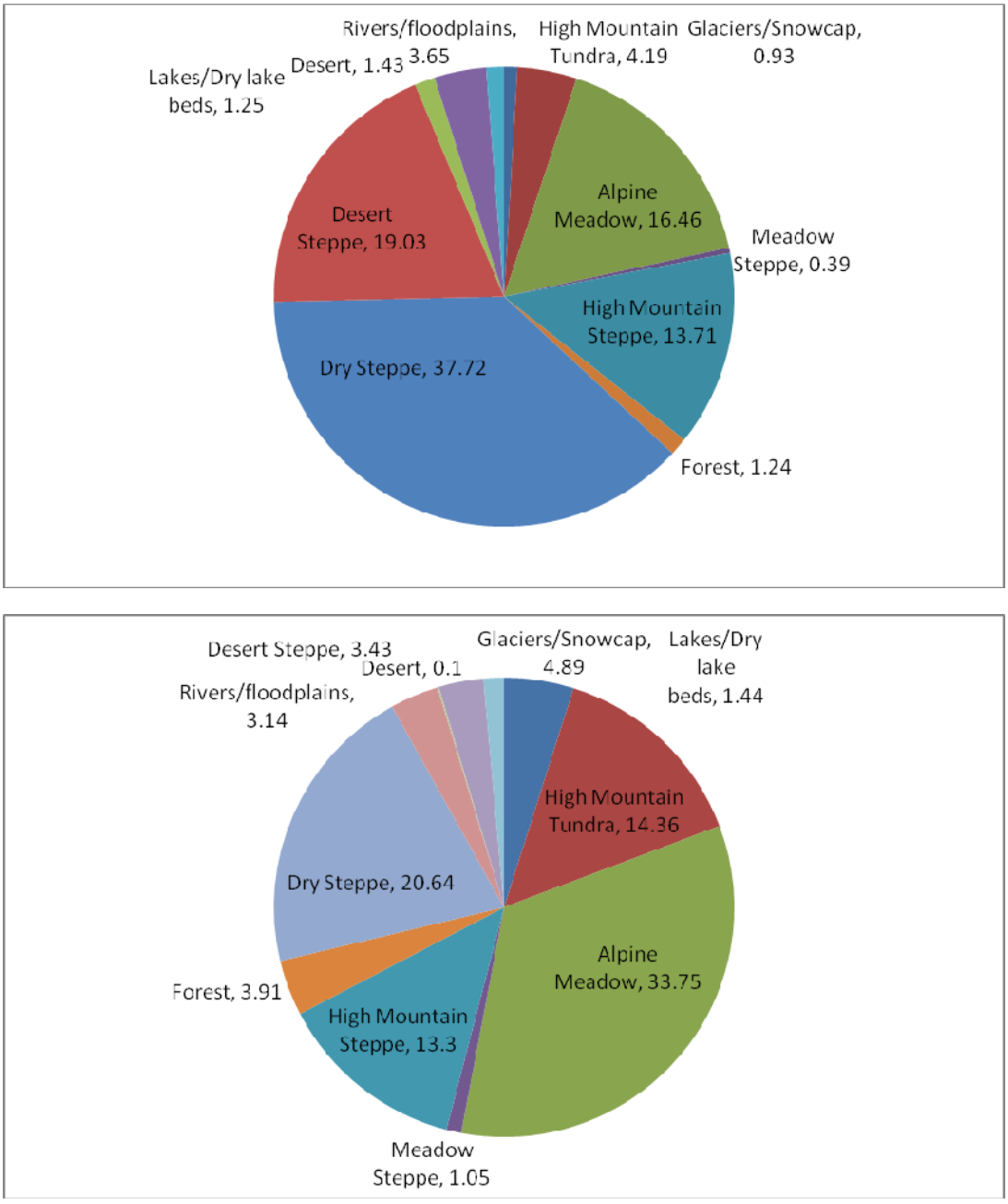


Figure 14 Breakdown of whole Mongolian Altai (above) and Protected Areas (below) according to vegetation types

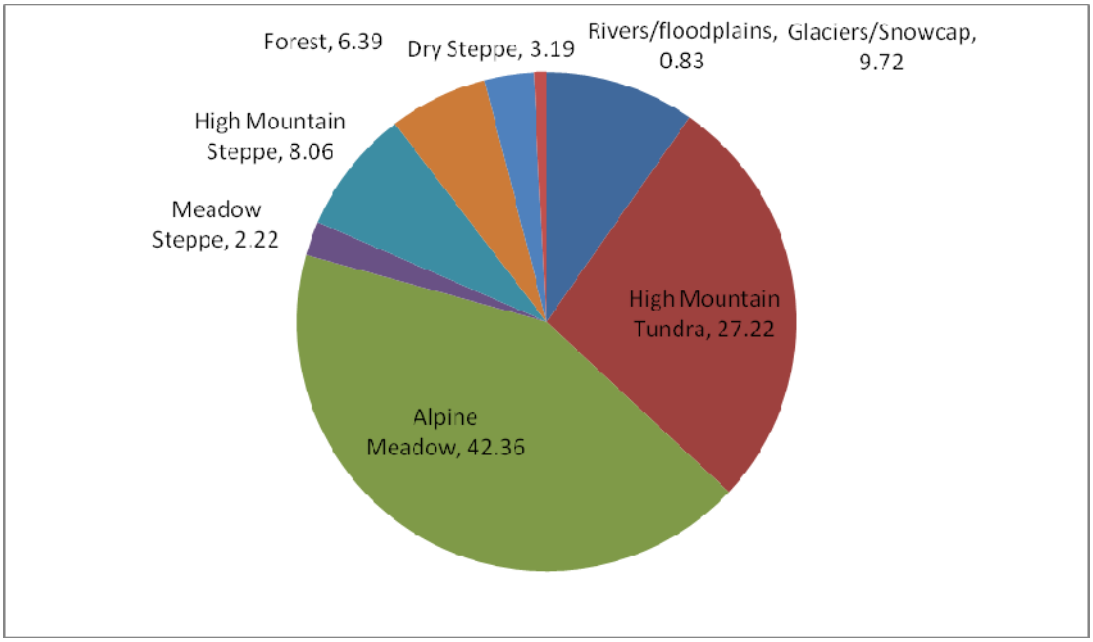


Figure 15 Protected area "core zones" by vegetation type

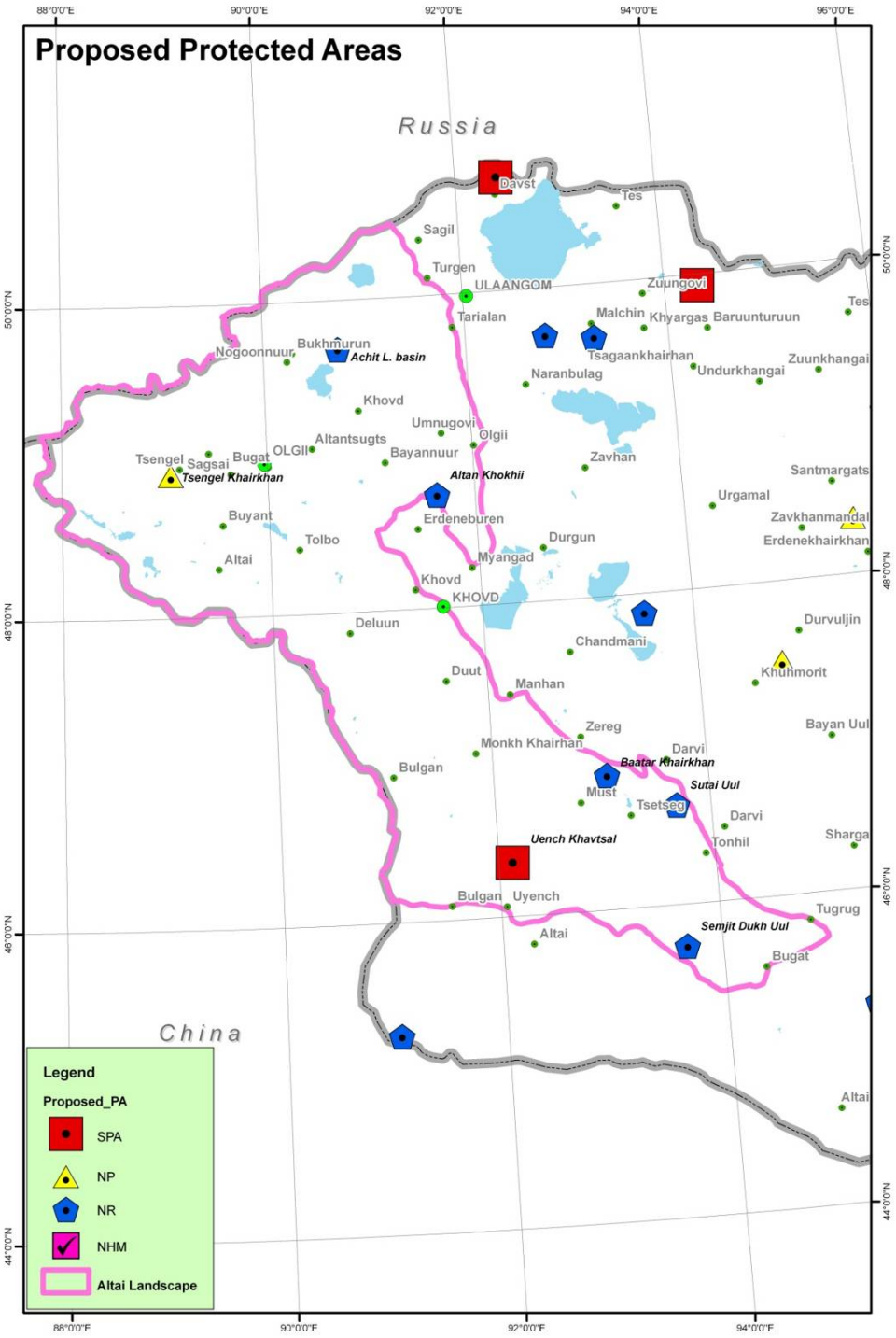


Figure 16 Proposed protected areas

5.4. Internationally designated protected sites and important habitat

5.4.1. Ramsar[14] sites

The Achit Nuur (Lake Achit) Ramsar Site[15] (737 km^2) straddles the Bayan Olgii – Uvs border (Figure 17), lying in an intermontane basin at 1435m and overlapping with the Devel Island Nature Reserve (1,030ha). It is centred on L Achit, a freshwater lake sourced by rivers and streams from both the Siilkhem NP to the north and Turgen SPA to the east and its outflow passes into the Khovd River and downstream to the Great Lakes Basin. The lake, which is frozen from November to May, is an important breeding and resting ground for a great variety of waterbirds, many of them globally threatened. The site supports more than 1% of the regional population of Great Crested Grebe (*Podiceps cristatus*), Black Stork (*Ciconia nigra*) and Ruddy Shelduck (*Tadorna ferruginea*. Several endemic fish species occur in the lake.

Lake Achit is the only Ramsar site within the Mongolian Altai, although there are three other Ramsar sites (Uvs Lake, Khar Us Nuur and Ayrag Nuur) downstream in the Great Lakes Basin (Figure 17; see Annex 13 for details). Proposals for new Mongolian Ramsar sites have been prepared for Khoton, Khorgon and Dayan lakes, and for Tolbo Lake. There are no Ramsar sites nearby in China or Russia.

5.4.2. Important Bird Areas

BirdLife International, has designated Important Bird Areas (IBAs)[16] which are globally important areas for the conservation of birds and other biodiversity. There are eight IBAs within the Mongolian Altai landscape and another ten nearby, five in Mongolia and the others in China and Russia (see Figure 17 and Annex 14 for details of biological features).

Three of the eight IBAs within the Mongolian Altai landscape are fully covered by protected areas: Khoton-Khorgon Lakes IBA and Dayan Lake IBA lie inside the Altai Taban Bogd National Park and Khokh Serkh IBA lies within the Khokh Serkh SPA. Achit Lake IBA is partially covered by the Devel Aral NR and is also a Ramsar Site (see 5.4.1). The others, not covered by protected areas, are Tsengel Khairkhan, Tolbo Lake, Uvsiin Khar Lake and Uureg Lake (see Figure 17).

Nearby IBAs within Mongolia include Bulgan River, Uvs Lake, Khongil, Khar Us Lake, and Jargalant Khairkhan,of which only Khongil lies completely outside a state protected area (Figure 17, Annex 14). Those in China and Russia are as follows:

Russia
Ukok Plateau
Artysh Ridge
Onuku-shina
Arag-dag
Tere-khol Lake

China
Baytik Shan
Altay Forest and Steppe
Qinggil County and Buergen River Valley

[14] The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources, See http://www.ramsar.org/
[15] 2MN007-1376 Lake Achit and its surrounding wetlands 22-03-2004
[16] http://www.birdlife.org/action/science/sites/

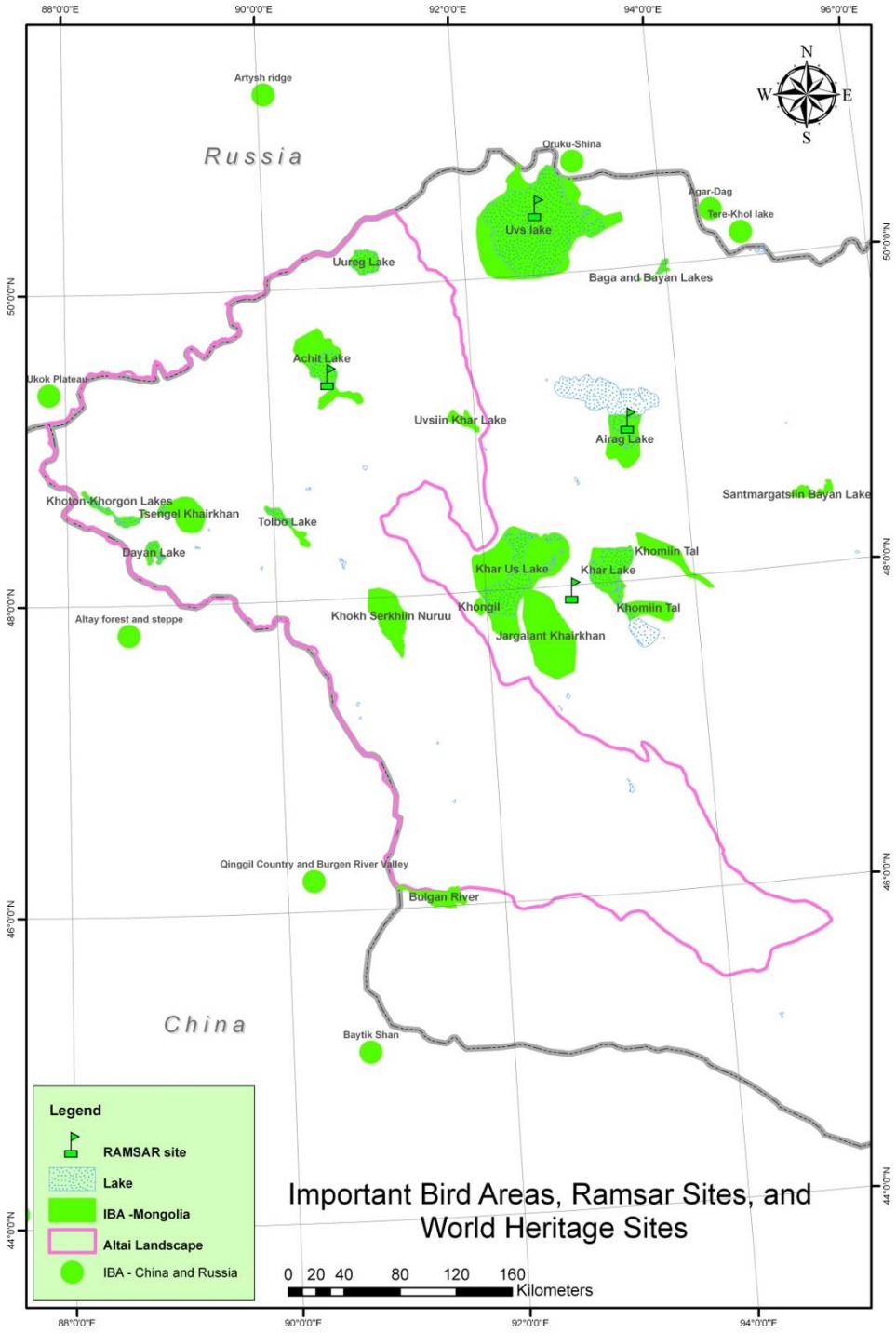


Figure 17 Important Bird Areas and Ramsar Sites

5.5 Nationally designated Sacred Sites

Altan Khokhii mountain (Figure 16) was designated as a national Sacred Site by the President of Mongolia on 30th March 2005. There has long been a local tradition of worshiping this mountain, and the President instituted an official state ceremony of worship to take place once every four years. The ceremony consists mainly of Buddhist prayers: killing animals, drinking, fighting and swearing are strictly forbidden during the ceremony. However, driving

is not forbidden, and such ceremonies typically bring hundreds of vehicles and overnight campers to sensitive sites.

There is no formal legal protection associated with sacred site status, but the designation does lead to some restraint in hunting. Other sacred sites are established at various local levels. Altan Khokhii has also been proposed as a cross-*aimag* (Uvs and Khovd) State Special Protected Area (Annex 9).

5.6 Cooperation across international borders to protect regional Altai Mountains biodiversity

5.6.1 Multilateral and bilateral bases for consultation and action

There is a range of bilateral agreements dating back to the 1990's between Mongolia and the three other Altai nations, including agreements on protection and use of border waters, environmental protection and scientific and technical cooperation for hydrology and meteorology (MNE, 1996). There are also a range of agreements on the Uvs Lake Basin, which is Asia's only transnational Biosphere Reserve. .

5.6.2. Proposed transboundary reserves

There are a number of proposals for cooperation between protected area administrations in Mongolia, Russia and China with the aim of forming official transboundary protected areas Numerous multilateral consultations between all four Altai nations have taken place to develop a proposal for an Altai transboundary biosphere reserve (Michel et al, 2004) in effect a transboundary extension of the Golden Mountains of the Altai World Heritage Site (Figure 1, and Section 5.3.2).

Separate, local level initiatives to link protected areas between Russia and China are also in progress. The most advanced of these is the Siilkhem-Kosh-Agachsky proposal (see Figure 13). There is also a proposal to link management of the Bulgan NR in Mongolia with the Buergenheli NR in China, and various proposals for collaboration between Uvs*aimag* and the Tuva Republic.

5.6.3 Exchange of information with regard to economic development across the borders

A number of transboundary consultation mechanisms have been set up under the UNDP/GEF Altai Sayan sister projects in Russia, Kazakhstan and Mongolia. Meetings are held, but it is not clear how much real progress is being made in establishing lasting mechanisms to consult and cooperate on assessment and mitigation of development activities near the borders. China has not been included in these meetings so far, but there have been cross-border consulations and exchange visits between Altai Taban Bogd and Hanasi protected areas.

Joint surveys of Argali have been carried out between Siilkhem and Kosh Agach protected areas, and joint Snow Leopard protection activities have been coordinated with the assistance of WWF Mongolia and WWF Russia.

5.7 Conservation actions outside Special Protected Areas

Implementation of the main wildlife protection legislation (eg Law on Fauna, Law on Hunting) and also the wider provisions of the Law on Environmental Protection and the Law on Environmental Impact Assessments (1998) is through *aimag* and local government Environment and Tourism departments, Land Agencies and the Environment Bureau of the *aimag* Specialized Inspection Agencies. The relevant legislation concerning protection of wild species of animals and plants and how the legislation is implementation are described in Annex 12, Birdlife (2008) gives a succinct overview.

Land use decisions, environmental assessments and environmental law are dealt with by *aimag* Land Agencies (five to six people per *aimag*), Environment and Tourism Departments (six or seven people per *aimag*), Meteorology, Hydrology and Environmental Assessment Agencies, and *Aimag* Specialized Inspection Agencies (four to five in each *aimag*'s environmental bureau). Until 2009 there was an Industry, Infrastructure and Environment Policy Coordination Division in the *aimag* governors's administrations, but there are now separate policy officers for Environment and Tourism, Agriculture, and Industry and Infrastructure respectively. At *sum* level the relevant staffing is much lower: one inspector, one or two rangers, one land officer, one from NAMHEM and then any protected area rangers in the sum. There are also volunteer rangers in the protected areas and, under Environment and Tourism, at the *sum* level (see Annex 12).

5.7 Assessment of biodiversity conservation

5.8.1 Protected Areas

Protected area management regimes in the Altai fall far short of requirements for effective protection. A protected areas capacity and financial need assessment carried out by WWF and MNE in November 2007 estimated that less than 2% of the whole country is under effective protection in practice, as opposed to 14% on paper; ie inside protected areas. Human and technical resources are insufficient, overgrazing is a major problem, and law enforcement is inadequate (Schuerholz et al, 2007).

Overall coverage

The protected area network does not cover whole annual ranges of the larger species, so measures are needed outside protected areas to protect migration routes. Additions to the protected area network are also required, according to the proposals already made (Annex 9). It is now necessary to select additional areas that could be given official protection under the protected area network, or by local herder groups under co-management agreements with local government. A range of options, including protection during certain seasons only could be considered. No exact boundaries are available for detailed GIS analysis, but the planned locations will not fill the gaps identified entirely.

Zonation

The SPA Pristine Zone and the NP Special Zone, loosely referred to as "core" zones, are the only management zones that provide adequate legal protection but when new protected areas are zoned there is a tendency to maintain the status quo by establishing the "core zones" only in areas not already used by livestock herders. Zonation schemes should better reflect ecological needs in relation to protected area purposes, such as the habitat requirements of wild species, for example.

The ease with which zonation can be revised is a point of weakness of the protected areas: downgrading everything to the lowest level of protection is perfectly legal, and this would leave the protected areas with much reduced legal protection, although still protected legally against mining exploration and mining. Current zonation is not providing sufficient protection, partly because the areas under the highest level of protection are too small, and usually restricted to the high altitude habitats, and partly because the implementation of the protected area law and regulations is inadequate.

Grazing

Livestock grazing within most of the protected areas, both National Parks and Strictly Protected Areas, is at damaging levels (Table 8 and Annex 15).. Each summer, for example over 2,500 herding households, with over 300,000 livestock graze in the Altai Tavan Bogd NP, and over 15,000 livestock remain for the winter (A Atai, pers comm., 2008). Charges are made for grazing within the permitted zones but are very low, and applied per herder, rather than according to how many livestock are grazed, and there is no legal limit on the numbers of livestock (or vehicles) that herders can bring with them. Protected area managers are often ordered by *sum* governors to allow winter grazing in the protected areas, and they feel they have no alternative but to agree. In Khokh Serkh for example, 30,000 or more livestock graze the Limited Use Zone of the SPA on the Bayan Olgii side during the winter. Payment

to the SPA is insignificant at 300 togrogs per herder no matter how many livestock he or she grazes (Annex 15).

Allowing herders to bring their own vehicles into the protected areas, in addition to their livestock, exacerbates the impacts on the habitat. Protected area rangers themselves herd livestock within the protected areas, which reduces their effectiveness in controlling others! With so many people allowed to live inside the protected areas to graze livestock, it is very difficult to control hunting, tree felling and other illegal activities.

Mining

Mining licences and exploration licences overlap slightly with protected area boundaries (0.43% of protected areas are overlapped) and proposed protected areas. Hovever, the licence boundaries follow the boundaries of the protected areas almost exactly in many places (see Figure 18) and if mining is allowed eventually on the boundaries, the impacts on the protected areas could be considerable. Birdlife (2008) analysed overlap of mining and exploration licences with a 20km "buffer belt" around protected areas and in the case of the Altai this indicates signicant potential conflict. Both large scale and artisanal mining take place near protected areas. Some of these sites are shown in Annex 15.

Overlap of mining with Important Bird Areas (Figure 19) is considerable. IBA's do not have any legal standing. However, there is also overlap of mining exploration licence with the Achit Nuur Ramsar Site, which does have legal standing, and this needs addressing.

There have been recent steps taken by the Prime Minister to establish a working group to explore ways of allowing mineral exploration within protected areas, if necessary by changing the law, which at present prohibits both exploration and mining inside state protected areas.

Although its natural history has not been studied in detail anecdotal observations indicate that the widely distributed Corsac Fox (*Vulpes corsac*), pictured above in an old painting, differs significantly in its behaviour from other foxes. Where undisturbed, it is reported to live gregariously in 'corsac cities' composed of several adjoining den complexes shared by multiple family groups, and has also been described hunting in small packs.

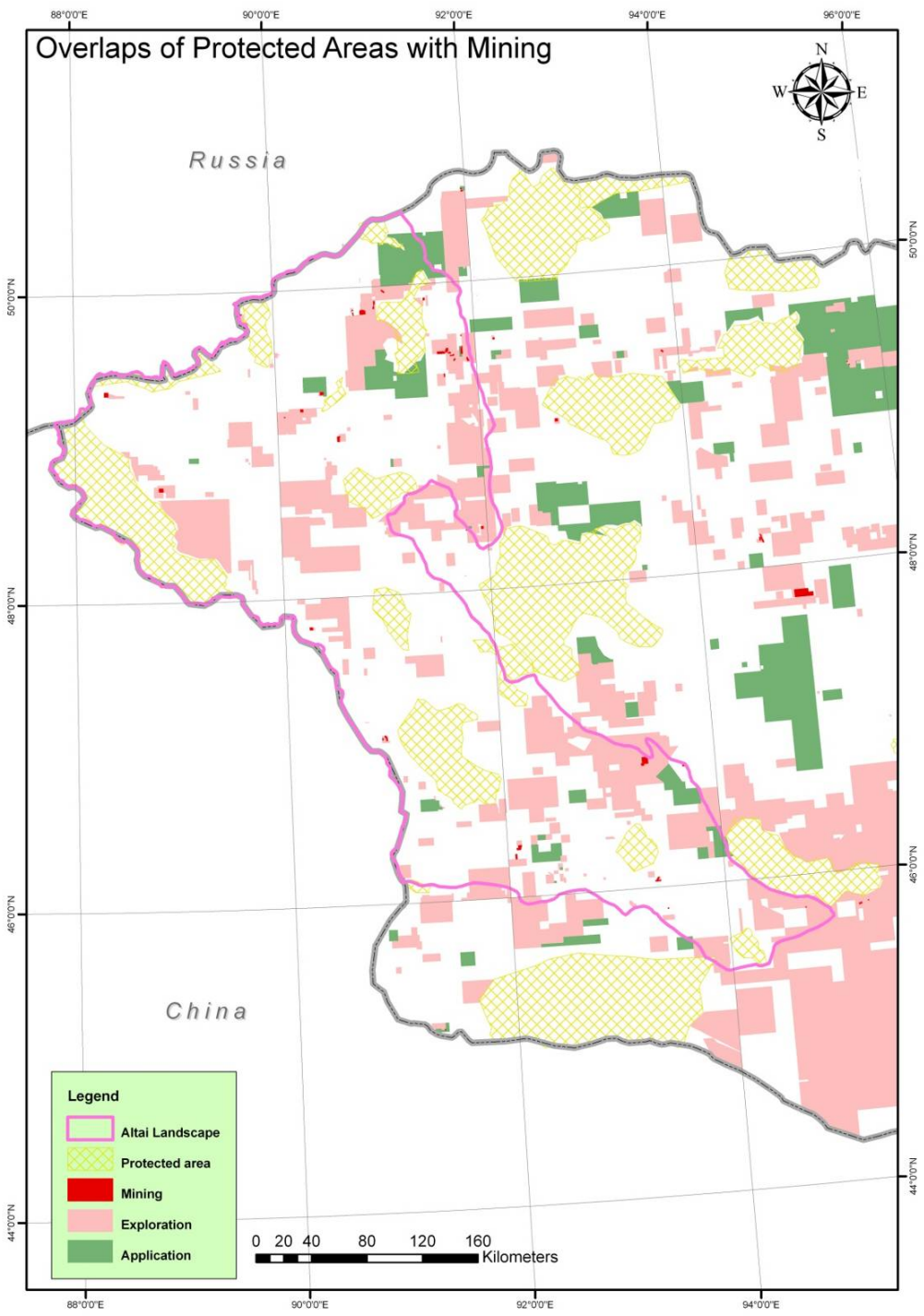


Figure 18 Mining in relation to protected areas

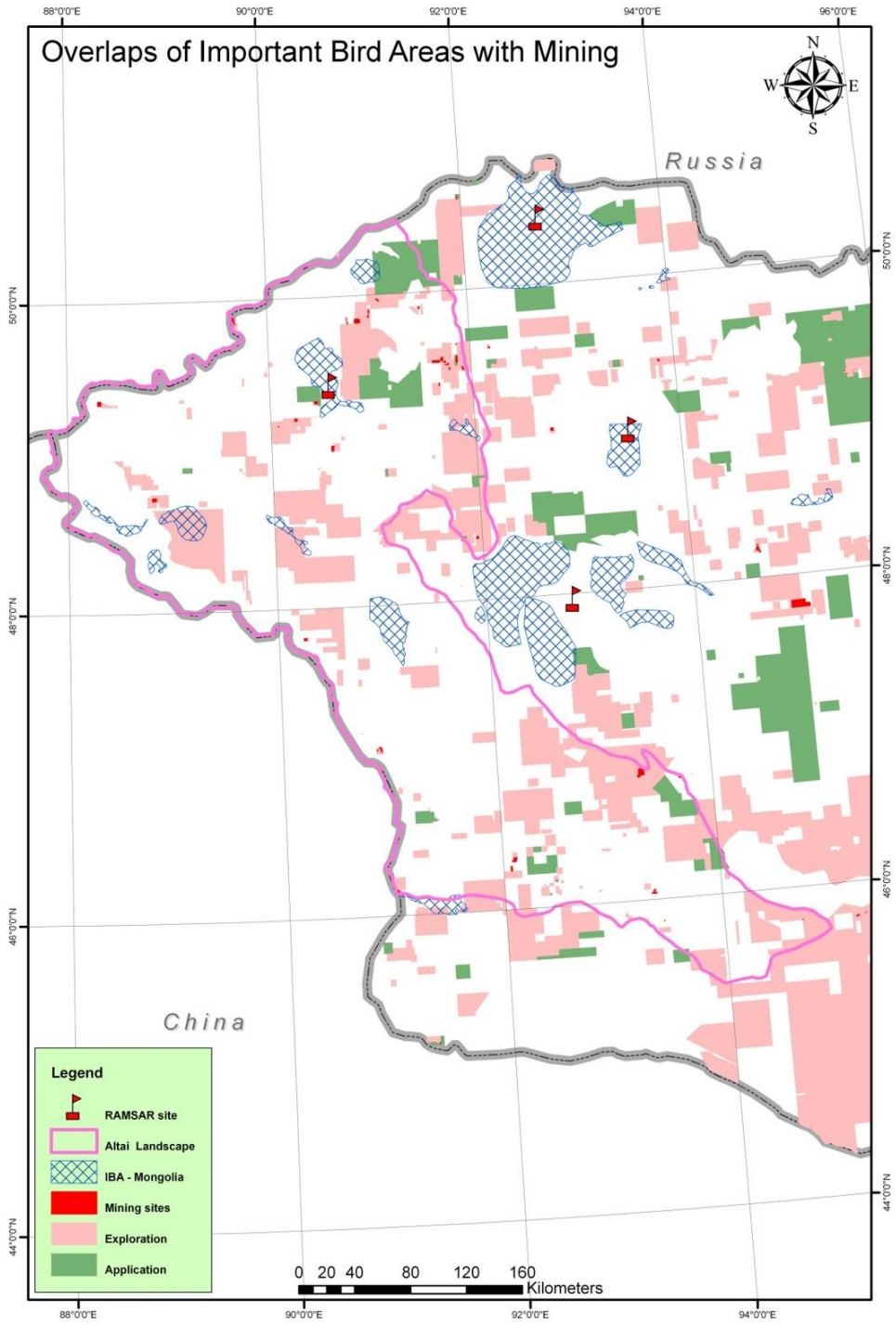


Figure 19 Overlap of mines and exploration with Important Bird Areas and Ramsar Sites

Management planning

The objectives of the protected areas have not been elaborated clearly and used as targets for day to day management in management plans. They focus mainly on species protection, and ecological functions such as watershed conservation for example, are not given any prominence.

Funding.
Funding for protected areas is far too little to fulfil assigned functions. A culture has grown of donor projects supplying running costs and capital items for protected areas over the several years that they are implemented. Such practices do not generally help in the long term unless changes are made at the same time to the parent institutions and its funding arrangements.

There is no doubt that protected areas are underfunded, but even with the current level of funding performance could be enhanced if there was the will and determination on behalf of the management staff to supervise and support rangers effectively, and to seek for partnerships more enthusiastically.

5.7.2 Outside protected areas

In general environmental laws are implemented poorly and unsatisfactorily. Illegal hunting is difficult to detect in a sparsely populated area with few enforcement officials who have no transport, and there is little real cooperation on operations between the various arms of law enforcement.

Cooperation between Special Protected Area staff and law enforcement officials outside protected areas, including inspectors and rangers, has improved and been regulated in the past years, but there are still deficiencies. It was reported by WWF and MNET that 587,652 marmot pelts were traded in Bayan-Olgii, Khovd and Uvs *aimags* between 2001 and 2004; during the same period MNE issued hunting permission for 61,690 marmots, so nearly 10 times more marmots were killed than were permitted.
.
The Buffer Zone Law regulates activities in the buffer zones (see above) but this law is hardly implemented and many inappropriate activities take place.

Arrests take place but there are loopholes and inconsistencies in the laws that make convictions difficult, and it is relatively easy to escape detection for many wildlife offenders. There is a reluctance on behalf of some officials to arrest offenders: small population size may contribute to this, as a high proportion of people are known to each other. The manpower and budget available are too small to ensure effective protection and monitoring of the wildlife resources over the large areas involved.

Once arrested, people are usually cooperative, but the fines and other penalties may not be sufficient deterrents to prevent reoffending, and very often cases do not reach court. Conflicts between poachers and Rangers have escalated at times and Rangers have been killed or wounded in fights.

There is a reluctance on behalf of elected or politically appointed officials to advocate strict controls, including reductions in herd sizes, despite the fact that without reduced herds the grassland will continue to deteriorate. People overexploit natural resources because they view them as “free of charge”. Grazing in excess of the capacity of the land, however, can be detected and local governments have a legal duty to control it, which is being neglected.

There are various initiatives under the amended (2005, 2007) Environmental Protection Law (Article 31) and Ministerial Order No 114 from the Ministry of Nature and Environment (2006) to encourage people to plan together the use of natural resources, pasture in particular, many of them under the auspices of donor-funded projects such as Greengold and the Altai Sayan Biodiversity Project. One of the first steps has been to establish user rights to four season pasture. Duut *sum* in Khovd *Aimag* has been divided into a number of sectors each with a full complement of the pasture types required over the year, and pasture use groups have been established. Outsiders are excluded: so herders from neighbouring *sums* are asked to no longer graze their stock in the sum. Rotation systems have been devised and there is a lot of enthusiasm. But with current stocking levels at an estimated nine times the carrying capacity there is a danger that these steps alone will not produce the results needed (Karl Schuler pers comm. 2009). The need to cut herd sizes is inescapable: yet parliamentarians in

Ulaanbaatar proposed in May 2009 lifting of the animal tax altogether, a measure that is opposed by the green group of members of parliament.

WWF operates its own anti-poaching control force, the Irbis patrols for protection of Snow Leopard and Saiga in particular, and with some success. These patrols are not integrated into the government fabric, but serve as examples of what could be possible with increased government investment.

Attempts at reafforestation have met almost always with poor results – high, often 100% mortality of planted trees.

Environmental Impact Assessment is not satisfactorily dealt with in a professional manner. Mining environmental protection plans are not completely accomplished or monitored sufficiently. Tour companies and even donor projects initiating alternative livelihoods operate without having detailed environmental impact assessment made, with accompanying risks of damage to biodiversity.

There is poor coordination between ministries in activities and decision making, such that initiatives by a government ministry may be in conflict with policy announced by a different ministry and with the decisions and wishes of local government. For example, there have been government calls to reduce the number of goats in the Altai yet another arm of government issued a subsidy (see Section 2.5) that encourages people to acquire more goats (see above). And projects and programs implemented by the Ministry of Food, Agriculture, and Light Industry, the Ministry of Nature, Environment, and Tourism, State Special Agency, and their implementing agencies, are not quite consistent with organizations that are engaged in nature and environmental activities and regulation of policies in the local community. They lack common policy that covers all.

Recently the Prime Minister called for a review of the law relating to mineral exploration in Protected Areas, raising fears that there are intentions to mine inside protected areas, whereas the Law on Protected Areas forbids even mining exploration in protected areas. These initiatives by central government to investigate the possibility of opening up mining concessions within protected areas, through changing of the law if necessary, have been made without sufficient public discussion. Income from mining does not contribute sufficiently to local people's livelihoods: neither through money feeding into the government programmes, nor through direct employment (most of the jobs in many mines go to Chinese nationals).

Research and data for decision making

Scientific facts, data, and information regarding conservation of biological diversity and protection of natural resources are not used regularly in decision-making at local level. This is only partly because there is no central database and information is not easily obtainable. Other reasons include set ideas that are not easy to change through scientific reasoning. There is much information available and several organizations are doing research, but coordination is poor. The South Korean Polar Research Institute, for example, has a research programme on glaciers in the Altai, in partnership with the national University, yet the NAMHEM scientists until recently were not aware of this research,

There are scientists based locally at Khovd University, the Khovd branch of the Agricultural University of Mongolia, and the *aimag* Meteorology, Hydrology and Environmental Monitoring Agencies.

Surveys of species that regularly cross the international borders

Coordination of the lists of protected species for the four Altai countries, and joint surveys and research to assess the status of animal populations that straddle international borders is required. Many species of wild animals range over the national borders between Mongolia and the People's Republic of China or between Mongolia and the Russian Federation or among all three countries. Surveys on one side of the border without coordinated action at the same time on the other side, is inefficient.

Public involvement and information

The general public are not informed sufficiently or kept involved in development planning , including mining exploration and mining. There should be much more effort to inform and involve the public in decision making according to the law.

Agricultural sector policies do not cover community-based natural resources management. Herders have a close relationship with the natural environment and have to live on the edge of survival year after year, yet there is a lingering faith that things will remain the same or revert to previous conditions, that resists some of the ecological knowledge introduced recently. This resistance brings some difficulties in enforcement of the laws and development of alternative ways of using natural resources. However, people are willing to learn, and with patient approaches and careful demonstrations the best of the old traditions and hard work will develop with new scientific knowledge. Some herdsmen are taking the initiative in protecting forest patches. Apart from decision-makers and those who work in the environmental sector the public are in general not aware of the extent of the threat to natural habitats of the rapid increase in livestock numbers and grazing intensity. .

Some traditional ways of nature protection are disappearing. For instance, herdsmen leave their waste in their winter or spring shelters when they move on to their next shelters, and they have reduced the extent to which they use pasture on a rotational basis.

The area's biodiversity is of great interest and importance and many birds, in particular, can be seen even near the cities. Between 2005 and 2007 more than 220 species of birds, many of them in large numbers, were recorded by one person within a 10 km stretch of the Buyant River (Axel Braunlich, pers. comm. 2006 website). Such diversity on their doorsteps could interest people in saving wild species if people were given more stimulation and encouragement

Projects and programmes (see Annex 11) mainly focus on supporting and establishing herdsmen groups and cooperatives and improving livestock management rather than wildlife and environment. Ultimately, herdsmen in general are not interested in conservation of wildlife, and attempts to conserve wildlife must find ways of persuading them of its importance to their own livelihoods.

6. Objectives and Actions

6.1 Immediate action

The purpose of this strategy (see Section 1 2) is to ensure the long term conservation of the biodiversity of the Altai landscape in Mongolia through a programme of actions that remove, mitigate, manage and monitor human impacts on the wild species and natural ecosystems of the area.

Strategies of this type typically list a wide range of agreed recommendations that would achieve the objective if they were followed, yet few get acted upon and the strategies lose momentum. The National Biodiversity Conservation Action Plan (NBAP) (MNE, 1996), for example, was prepared over a 2.5 year period by the newly formed Ministry for Nature and the Environment, with the assistance of GEF and UNDP, and was adopted by Government in July 1996. Widely admired and sought after, the NBAP was reprinted in 1997 due to popular demand. However, although the NBAP was (and is still) used by MNET officials as a tool, and although many of the actions in the plan have been carried out, completion of the plan was not followed up by government or by UNDP/GEF, and there has never been any systematic implementation or monitoring of implementation. Furthermore, the NBAP has been overlooked in other sectors and in many later environmental papers and strategies (Batbold and Laurie, 2004).

The action programmes in this Strategy are approved at the *aimag* government level for each of the four Altai landscape *aimags*. They can be followed immediately with current resources and under current policy. The action programmes start from where we are: if information is required then the gathering of the required data is included as an action; if funds and facilities

are not available, then the actions include measures to raise funds and begin partnerships that might fill the gaps; and if changes are required in national level policy then lobbying for such changes is included as an action. The strategy is therefore given immediacy: implementation, indeed, has already begun.

6.2 Inertia

It is extremely difficult to take action to stop behaviour that has become endemic in recent years: behaviour that threatens not only wild species but the very survival of livestock grazing itself as a viable way of life for humans in the Altai landscape. Each year comes and goes, the summers are short, the winters are hard and the basic needs of a sizeable proportion of the population in terms of food and shelter are not being met.

Many of the conservation measures proposed involve forgoing benefits now in order to gain bigger benefits later. But "stinting", or holding back from using to the full what comes your way, is difficult if you are suffering from lack of food or shelter, or you simply need some money to send your son to a better school, or to buy a new vehicle. So you kill another fox to raise a bit of cash, you shoot some marmots to provide some dietary diversity, you decide to kill only a few of your animals at the onset of winter because the price of meat has fallen and because you think (perhaps mistakenly) that this will maximize the chances of keeping a sizeable proportion alive until the spring. And although there have been calls by conservationists (including some arms of government) to reduce the proportion of goats in each herd, you decide to increase the number of goats you keep because cashmere is where the money is and the government (another arm) is even handing out subsidies per head of goats in the herd and if you don't utilize the rangeland to produce cashmere then your neighbour will make the money instead.

Meanwhile the pasture management and livelihood workshops ebb and flow; the talk of biodiversity conservation continues, with questionnaires and interviews, new people from new projects; the protected area rangers get their new motorbikes; and the biodiversity information centres in the *bag* centre provides a place to meet and talk, and listen to music if there is fuel for the generator. It all sounds good. You agree that the grassland is deteriorating and you give your opinion and it is listened to, and you think there maybe a chance to change the way things are. Yet even though you have a deep emotional attachment to the grasslands where you live, to the blue skies and white peaks of the Altai, you still find it hard to make a change in your own behaviour when other herdsmen around you are not changing theirs, and when you see the rich people from the *aimag* centre or Ulaanbaatar running around in their new jeeps with five dead wolves strapped to the roof, bringing in a new groups of sport huntersfrom the USA. You know that there are only a few argalis left on your local mountain, and you know that none of the licence fee paid by the hunters will ever reach you or contribute to protection of your landscape, and yet what can you do? And as for the snow leopard, although you would never kill one yourself, you really cannot condemn the person who does, because you believe it is indeed a menace to livestock and you think the conservationists would think the same if they came to live with you on the steppe summer and winter.

Another "project" comes along and you join the pasture user group, and the herder group too and you feel that the exclusion of the next sum's herders, the rotation agreed on your pasture user group's allocated four-season grazing grounds, and the opportunities offered by new markets for home-produced dairy products might just save the rangeland. But are you willing to set an example by cutting your herd size, especially the profitable goats? For that is what is at the root of this. And the answer is probably no – not until it is too late. Unless - and here is the key – there are sufficient incentives for people to cut down their livestock herds, possibly through imposition by government of taxes per head of livestock grazed on common land. The projects are doing good work, you think, but they can only go so far: in the end government has to step in and do something.

Those are the not necessarily accurate musings of a hypothetical herder of course, and not based on any particular person, and one could try the same with a hypothetical ranger. The rangers living in the national parks understand exactly what is happening to the grassland:

many of them are herdsmen after all, and see the problems their own livestock face in finding good grazing even in a national park. But they cannot take their own stock out: it is part of their salary in a way and they cannot afford to forego their grazing privileges. Some even run a little shop or something to supplement their salaries further. They are dedicated to their jobs, keen to learn, desperate to get out and about, and disappointed that although they get periodic training and periodic influxes of equipment there is no real system that they can rely on for efficient communication, logistical support and on-the-job supervision to keep them working as a team from their far-flung posts. And yet right at the top in the parent institution in Ulaanbaatar another donor project is planning how to put to rights the protected area system and save biodiversity: and the rangers cannot help being a little bit cynical about the chances of this new project producing any better results for them in the field than the six or seven other projects that they have seen come and go over the last 15 years.

It is not going to be easy to save the Altai's biodiversity. Too many livestock, and too much hunting, are at the heart of the problem, and yet livestock grazing and hunting have shaped the Altai for thousands of years. It is not grazing and hunting per se, but the scale of the current exploitation that has to be curbed. And it is no good blaming global climate change, as some do, and then carrying on as usual: if global climate change is contributing to grassland deterioration then herders have to adapt to that by reducing their own pressure on the grassland even more.

6.3 Rule of law

It is important that decisions on mining in particular, are taken in the long term interests of the local people and the biodiversity, and not in the short term interests of profiteers. Keen attention to the rule of law will be required to achieve this.

6.4 Biodiversity conservation as a routine

Although they need more support than they currently get, leaving biodiversity conservation to protected areas and environment inspectors alone is not enough (Section 1). If it is to be successful biodiversity conservation has to influence the routine day to day business of government, of developers, of donor projects, and of the general public. The legal bases are already in place in Mongolia, but achieving that kind of influence will take time. It has to be a culture able to resist the pressures of the quick deal for immediate profit, and the cries of natural resource users that their livelihoods are being destroyed by regulators. It has proved a losing battle in many places around the world. Look at the North Sea, where European Union regulators have given in again and again to fishermen who claim that they should be allowed to carry on their chosen profession in the face of unequivocal evidence that their chosen profession is leading inexorably to the commercial extinction of a several fish species and the destruction of the sea bottom habitats on which other fish and through them local bird species depend for their survival. In a sparsely populated country like Mongolia, and even more so, in the Altai, where there are only 157 thousands people in 104250 sq km, one might think it should be easier to spread the benefits of natural resource exploitation among the inhabitants, but so far this has not proved the case.

6.5 Targets

It is all too easy in biodiversity conservation to launch enthusiastically into a wide range of activities that might or might not be useful (and might even be harmful) and that never focus together on clear objectives that have been properly assessed for relevance, achievability, and whether or not anyone else is working in the same field and if so what progress they have made.

Nine conservation targets (Table 10) were selected, based on the Landscape Species analyses (Annex 2), to capture best the biodiversity values of the landscape and the current and potential threats to those values. The targets are a mixture of

- individual species,
- species grouped by common habitats or threats, and
- habitats or habitat qualities selected to encompass the requirements of the nominated species.

They are the focus for the action programmes under the Strategy. Here they are arranged roughly in the order of the mean "scores" (Annex 18) given to the constituent species, but this order has not influenced prioritization of the action programmes. Species or habitats omitted from this list of targets are not ignored in the Strategy, but they have not been given the same priority in formulation of objectives. In most cases additional species and habitats will benefit from the action programmes developed to conserve the "targets" above. In some cases we simply lack information on other species, so we are working towards certain targets that will give a protection to other species and ecosystems under their "umbrellas". The Strategy includes measures to monitor constantly how well the action programmes are covering the whole range of Altai species and ecosystems and to adjust programmes where necessary to protect species that have been missed by the original nine "conservation targets".

The Willow Grouse, or Willow Ptarmigan, (*Lagopus lagopus*) is unique in its nesting behaviour. In all other species of grouse, only the female takes responsibility for the young. However, the male Willow Grouse or Rock Ptarmigan often takes responsibility of the young by staunchly defending his territory and his young. The male stays in the immediate vicinity of the nest while the female is sitting, and accompanies the female and the young from the time of hatching until independence.

Willow Ptarmigan. — Willow Grouse

Table 10 The nine conservation targets

THE NINE CONSERVATION TARGETS	
1. Birds of Prey – eg Saker Falcon (*Falco cherrug*), Golden Eagle (*Aquila chrysaeatos*), Lammergeyer (*Gypaetus barbatus*)	▪ Charismatic emblems of the mountains with aesthetic and cultural values ▪ Easily visible indicators of small mammal and bird population sizes ▪ Saker Falcon (EN) threatened by collection for export to the Middle East for falconry ▪ Golden Eagle used for falconry in Mongolia and Kazakhstan, and the impacts of this on wild populations has not been assessed **Other species:** Pallas's Fish-eagle (Haliaeetus leucoryphus) (VU) Lesser Kestrel (Falco naumanni) (VU)
2. Mountain Ungulates – eg Argali (*Ovis ammon*), Ibex (*Capra sibirica*)	▪ Charismatic couple of species that captures the essence of the high Altai when spotted on the mountain tops. ▪ Threatened by habitat change and habitat fragmentation and disturbance that blocks movement between habitat patches ▪ Target of both local poachers and licensed sport hunters. **Other species**: Saiga (*Saiga tatarica*), which lives on the edge of the Altai landscape, is down to very low numbers in Mongolia and is poached for the horns which are highly valued in China.
3. Carnivores – eg Snow Leopard (*Uncia uncia*), Wolf (*Canis lupus*), Red Fox (*Vulpes vulpes*) –	▪ The Snow Leopard is the most evocative animal symbol of the Altai ▪ Rare and spectacular cat who survives over a wide swathe of Central Asia but is seldom seen. ▪ Keystone role as predators of grazing ungulates, rodents and pikas ▪ Important indicators of ecosystem health. ▪ Snow Leopards require sufficient wild prey to ensure that they do not take livestock. ▪ All these species are hunted by local people, either for profit through selling of the skins, or in the belief that killing them will protect livestock. **Other species:** Corsac Fox (*Vulpes corsac*) – which live in groups Otter (*Lutra lutra*),Martens (*Mustela* spp)
4. **Alpine Galliformes – Altai Snowcock (*Tetraogallus altaica*) , Rock Ptarmigan (*Lagopus muta*), Willow Grouse (*Lagopus lagopus*)**	▪ Characteristic species of the Altai mountain slopes ▪ Threatened by hunting for medicine and meat. **Other species**: Black Grouse (*Lyrurus tetrix*)

THE NINE CONSERVATION TARGETS	
5. **Water quality and flow – including impacts on Mongolian Grayling (***Thymallus brevirostris***) and water birds and downstream impacts on Khar Us Nuur.**	▪ Central to an understanding of the impact of man on the Altai is the sensitivity of the soils and the water resources to human impacts. ▪ The wildlife of the Altai (and the downstream Great Lakes Basin) is sensitive to the quality of the water, and to the water levels in the rivers and lakes. ▪ Some fluctuation in water levels is normal in this ecosystem, so trends must be examined rather than taking hasty action. Many of the Altai lakes are important for water birds such as Whooper Swan (*Cygnus cygnus*), Bar-headed Goose (*Anser indicus*), Great Crested Grebe (*Podiceps cristatus*), and Ruddy Shelduck (*Tadorna ferruginea*)
6. **Collected Plants – Garlic Flavoured Onion (*Allium obliquum*), Altai Onion (*Allium altaicum*), *Caragana* spp.**	▪ Plants that are rare in Mongolia and sought after for food, medicinal purposes, ▪ More common plants that are extensively harvested for fuel ▪ Encompasses damage to soil and habitats caused by any extensive plant collection, especially on steep slopes and in arid areas. **Other species,** Sea Buckthorn (*Hippophae rhamnoides*), Saxaul (*Haloxylon ammodendron*) Snowlotus (*Saussurea involucrate*)
7. **Riparian Forest – Willow (*Salix* spp), Sea Buckthorn (*Hippophae rhamnoides*), bird diversity**	▪ Habitat protection of what can be a diverse assemblage of plant and animal species in both summer and winter. ▪ Migrant birds use this habitat type extensively and many passerines are resident throughout the winter. **Other species**: Wintering or migratory passerines eg Red-Mantled Rosefinch (*Carpodacus rhodochlamys)* and Guldenstat's Redstart (*Phoenicurus erythrogaster*)
8. **Forest species – eg Red Deer (*Cervus elaphus*), Musk Deer (*Moschus moschiferus*), Red Squirrel (*Sciurus vulgaris*),**	▪ These species are threatened both by habitat loss and hunting for trade with China. ▪ The Russian Flying Squirrel (*Pteromys volans*) is known from the Altai forests in Mongolia but there are no recent records. Information is required on this species in particular. ▪ Improved forest management required to maintain larch and pine forest habitat for these and other species. **Other species**: Wild Boar. (*Sus scrofa)*
9. **Rodent and lagomorph diversity – eg Marmots (*Marmota* spp), Voles (*Alticola* spp., *Microtus* spp), Hamsters (*Cricetulus* spp), Pikas (*Ochotona* spp) and Hares (*Lepus* spp)**	▪ Twenty-nine of the 73 mammal species listed for the Altai are rodents, most of them occurring on the steppe, desert steppe and forest steppe. Protection of rodent diversity will also protect pikas and other grassland animals. ▪ Both the Siberian Marmot (*Marmota sibirica*) and the Grey Marmot (*Marmota baibacina*) are hunted for their meat and fur ▪ the Beaver (*Castor fiber*) is reduced to a very small population just outside the landscape border to the south. ▪ Three Alticola species (*A. barakhsin, A. macrotis and A. strelzowi*), although widespread outside Mongolia are restricted within Mongolia to the Altai. ▪ There are no recent data on many of these species so their status is unknown.

6.6 Direct and Indirect Threats

The direct threats to the nine conservation targets are shown in Table 11 below. These threats have been divided into “critical” and “secondary” according to the degree of threat they pose to biodiversity. Secondary threats are those that have the potential to become critical threats in the near future. Table 12 shows the indirect threats or “drivers” of the critical and secondary threats.

Guldenstat’s Redstart (*Phoenicurus erythrogaster*) in restored riparian forest along the Buyant River at Otsonchuluu near Khovd *aimag* centre

Table 11 Direct threats to the conservation targets

Conservation Targets	1	2	3	4	5	6	7	8	9
DIRECT THREATS	**Birds of Prey**	**Mountain Ungulates**	**Predators**	**Alpine Galliformes**	**Water Quality and flow**	**Collected Plants**	**Riparian Forest**	**Forest animals**	**Rodent diversity**
Overexploitation of grazing land and forests (through overstocking, overgrazing, multi-tracking, and overfelling for timber and fuel)									
a. Habitat loss		■	■			■	■	■	■
b. Habitat fragmentation		■	■					■	
c. Soil damage					■				■
d. Eutrophication					■				
e. Turbidity					■				
f. Siltation					■				
Overexploitation of animal and plant populations through hunting (including for sport, trade, medicinal use, household use and falconry) and plant collection (including fuel shubs and medicinal plants)									
a. Reduced populations	■	■	■	■	■			■	■	
b. Reduced distributions	■	■	■	■	■			■	■	
c. Reduced prey availability			■						
d. Reduced ecosystem functions	■	■	■					■		■
e. Soil damage from destructive collection methods					■	■			
Mining and Infrastructure									
a. Pollution					■				
b. Soil erosion					■				
c. Influx of people – labour, ease of access, development		■				■	■	■	■
e. Habitat loss and fragmentation		■	■						
Water extraction and diversions									
a. Lowered water levels					■				
Supplementary feeding, salt licks									
a. Disease from domestic livestock		■							
b. Behaviour changes – reduced ranges, hunters attracted		■		■					
Grasshopper poisoning	■								■
Climate change									
a. Shifts of habitat boundaries	■	■	■	■	■		■	■	■	■
b. Changes in water regime	■	■	■	■	■	■	■	■	■	■
Wrong fire regime – fires either too frequent or too infrequent								■	

Table 12 Indirect threats, or "drivers"

DIRECT THREATS	INDIRECT THREATS OR "DRIVERS"
General to all threats	Inertia: unwillingness of people (general public and government officials alike) to change damaging behaviour, especially if the change will result in immediate costs, for later benefits, and more especially if defaulters will continue to benefit in the meantime.
Overexploitation of grazing land and forests through:	
Overstocking and overgrazing	Reduced mobility of herdsmen and their herds concentrating grazing in smaller areas Herdsmen reluctant to slaughter livestock or reduce herd sizes Mistaken belief that pasture can recover in good years even after years of overstocking High demand for cashmere Perverse incentives from government to increase goat numbers
Multi-tracking	Mixture of lack of concern, laziness and expediency
Overfelling for timber and fuel	High demand for logs for construction, including houses and fences High demand for firewood
Overexploitation of animal and plant populations through hunting (including for sport, trade, medicinal use, household use and falconry) and plant collection (including fuel shubs and medicinal plants)	Insatiable market for Saker Falcons for export to the Middle East for falconry Secret nature of the Saker Falcon trade Increasing commercialization of the Bayan Olgii Eagle Festivals High demand and willingness to pay for the privilege of shooting wild argali and ibex Government officials not held accountable for their implementation of the laws with respect to capture and sale of CITES Appendix 1 species, sport hunting licensing, and use of revenues. High demand for Altai Snowcock meat in Ulaanbaatar and elsewhere, especially in hospitals and for people recovering from operations Local unempoloyed residents seek income through poaching and collection of plants Demand for musk pods, saiga horns, argali horns, small animal skins (marmot, fox, squirrel, marten) mainly in China Perception that snow-leopard and wolves are a threat to livestock Local demand for meat of marmots, argali, ibex Demand for medicinal shrubs and fuel shrubs for export and local trade
Mining and Infrastructure	Pressure to develop mines quickly and to skip important assessment Local unemployed residents seek income from illegal artisanal mining
Water extraction and diversions	Increasing market for locally grown vegetables, including melons No coordination of water use Unwise decisions on irrigation of trees in dry areas
Supplementary feeding, salt licks	Inappropriate wildlife and ecosystem management practices

6.7 Opportunities

In planning the action programmes various opportunities have been taken into consideration. These opportunities, listed immediately below, are not to be missed.

1. Increasing dissatisfaction among some sectors of the public with environmental governance
2. A number of keen "green" movements and organizations including a Green Party
3. Demand for wildlife tourism
4. Interest and progress in demonstrating economic benefits through wildlife tourism at local level
5. Herders who have already started some ecotourism initiatives keen to see an end to both legal and illegal hunting of Argali and Ibex because it hurts their business through scaring off the animals.
6. Scope to increase the range of wildlife tourism that will only be viable alongside better conservation practices
7. Wide realization among government officials that environmental degradation is accelerating
8. Large number of donor funded projects in field of natural resource management, in particular water and rangeland. Many of them are working on alternative livelihoods and additional sources of income for local herders: this is an opportunity to influence the types of business activities that are promoted and to work together with those projects to ensure that they at least do no harm to biodiversity and preferably contribute to biodiversity conservation.
9. The Mongolian Altai displays considerable variation in topography, valley orientation and local climate, and the resultant diversity of vegetation types creates opportunities for sustainable development. Apart from anything else it has created a range of beautiful places that tourists are keen to see and spend time in.
10. Well equipped university in Khovd with interest in collaborative work on biodiversity conservation
11. World-wide interest in the biodiversity of the Altai on behalf of the general public and of conservation and ecological research organizations
12. Altai Sayan Project to continue until at least 2011 and interested in supporting some of the actions under this Strategy until then, and in assisting to make links with other global and local partners
13. As a result of the current economic downturn there is likely to be a lull in exploitation of mineral resources – a lull during which government and residents have a chance to prepare for when the demand for minerals increases again, by putting in place all the measures required for a well regulated industry that is informed fully and takes into account biodiversity conservation in planning and implementation
14. The traditions of sustainable waste-free lifestyle of the Mongolian people evolved over thousands of years. They are being lost, but there is an opportunity to make the best of what both the herder civilization and modern science and technology have taught us.
15. There are long established customary mechanisms to regulate grazing on public land but these have depended on high mobility, and have not coped well with the trend towards more settled lifestyles and with changes in the market – the market for cashmere for example. Government has begun to develop legislation for various community management models and many herder groups are finding their way into cooperative arrangements when the conditions are right. Many donor organizations are working with such groups, offering an opportunity to work with them to include biodiversity considerations into their decision making.
16. At high altitude the best exploiters of the pasture are the wild species. This is an opportunity: to desist from grazing livestock in competition with argali and ibex and to develop ways in which the wild species can contribute to local people's income.

6.8 Guiding principles

The following guiding principles for this Strategy are based on those of the 1996 National Biodiversity Conservation Action Plan for Mongolia (MNE, 1996):

1) Wild species and habitats are important not only for man's future material and spiritual well-being, but also in their own right as co-inhabitants of the Earth.
2) Natural resource capital will not be used for income
3) All Mongolians depend on biodiversity and have a responsibility to contribute to its conservation;
4) An ecological approach to resource management is essential to achieve conservation and sustainable development;
5) Development must be ecologically and economically sustainable;
6) Activities within Mongolia's control will not cause damage to the environment of other states;
7) Cooperation with other nations for the conservation of biodiversity is essential;
8) Biodiversity is best conserved in natural rather than artificial settings;
9) Broad public participation in conservation planning and actions is required;
10) The knowledge of local people, such as the nomadic herders, should be preserved, respected, and used.

6.9 Objectives and how to achieve them

The facts are stark, recognized by most, denied by few, but the alternatives, although easy to formulate and agree upon in the abstract, are hard to get started. Plan after plan, strategy after strategy is prepared with a buzz of publicity, yet implementation is put off, and put off, until a new assessment is made, and the same or similar conclusions are made. The action programmes have been developed with that in mind, in an attempt to avoid lists of hopes and aspirations dressed up as actions that never fulfilled. The Objectives to be achieved under the Strategy are:

1. **To reduce hunting of wild animal species and collection of wild plants to sustainable levels (which may be zero)**
2. **To reduce grazing pressures**
3. **To stop loss of forest**
4. **To restore riparian forest**
5. **To maintain water quantity and quality in rivers and lakes**
6. **To stop infrastructure development, commercial businesses and "alternative livelihood" schemes from causing damage to biodiversity.**
7. **To reduce off-road driving and multi-tracking**
8. **To establish cross-sectoral and evidence based approach to biodiversity conservation**
9. **To introduce environmental accounting to local government**
10. **To establish well-regulated wildlife tourism**
11. **To improve protected area coverage and effectiveness**
12. **To secure and maximize benefits from financial resources and technical support through partnerships**

These objectives will be achieved by a wide range of actions, some that apply to more than one objective (many of these to all objectives) and others that are specific to one objective. They are arranged in the Strategy according under the following headings:

A. *Aimag* and *sum* government decrees, moratoria and other actions
B. Law enforcement
C. Public information and involvement
D. Staff, training and motivation,
E. Research and monitoring,
F. Environmental assessment
G. Financial incentives
H. Securing financial resources and support through partnerships.

6.9 The Action Programmes

Actions under the Strategy have been arranged according to both the twelve objectives and the eight general types of intervention (see Section 6.8). Many of the actions apply to more than one objective; some even apply to all 12 objectives, so actions have been classified into 13 groups:

0 = Applies to All Objectives
1-12 = Applies to Objectives 1-12 respectively.

Table 13 is a summary of the main actions arranged according to objectives. Annex 21 includes fuller descriptions and background for each action, and is arranged under the eight general types of intervention (A-H).

The last column notes those organizations or individuals that should take action:

A	Agriculture Department
AG	*Aimag* Governor
ASP	Altai Sayan Project (UNDP/MNET)
AUS	Australian Government
BL	Birdlife International
C	The Courts
ET	Environment and Tourism Dept
HM	Hydrometeorological Office
IA	Specialized Inspection Agency
KU	Khovd University
MC	Mercy Corps
MNU	Mongolian National University
NGO	Nongovernmental Organization
P	The Police
PA	Protected Areas Administration
RMI	Responsible Mining Initiative
RO	Any Research Organization
SDC	Swiss Agency for Development and Cooperation
SG	*Sum* Governor
SPAN	Strengthening Protected Area Network Project (UNDP/MNET)
TAF	The Asia Foundation
UBC	Ulaanbaatar Bird Club or similar
UNDP	United Nations Development Program
USPC	The United States Peace Corps

Table 13 Action programme according to objectives

GENERAL ACTIONS IN SUPPORT OF ALL 12 OBJECTIVES		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A0.1 Increase *aimag* and *sum* budgets for environment and biodiversity. Increase other tax collection to boost funds available for environment.	AG, SG
	A0.2 Lobby for increased funding from Central Government	AG
	A0.3 Enable supporting local legislation including taxation	AG,LA
	A0.4 Consider alternatives to established staff positions	AG, ET
	A0.5 Apply for increase in *sum* environment staff complement	AG,SG
Law enforcement	B0.1 Implement laws assiduously.	P,IA,C,PA
	B0.2 Ensure that rangers wear suitable uniforms	ET,PA
	B0.3 Review patrolling regimes of inspectors and rangers	IA,ET
	B0.4 Find ways to provide transport for inspectors/rangers	AG,ET,IA
	B0.5 Scrutinize court decisions on environmental offences and address any discrepancies with the law	AG,P,PA, ET.IA
	B0.6 Hold police, inspectors and rangers accountable	AG
	B0.7 Increase supervision	ET,IA,PA
	B0.8 Increase spot checks at markets and at temporary roadside police checkpoints.	P,ET
	B0.9 Arrest for possession of prohibited items	P,ET
	B0.10 Strengthen border controls via Customs officers	AG,ET
	B0.11 Monitor existing international agreements and conventions and allocate sufficient funds for implementation	AG,ET, ASP,PA
	B0.12 Make new transboundary agreements	AG,PA
Public information and involvement	C0.1 Increase access of the general public to information	AG, SG
	C0.2 Hold monthly *aimag* centre meetings with guest speakers	ASP, ET
	C0.3 Purchase, equip and run mobile education vehicle	ASP,ET,AG
	C0.4 Establish weekly environmental forum on television.	ASP,SDC
	C0.5 Initiate *aimag*, and later, sum, bird clubs	UBC,ASP
	C0.6 Establish and expand conservation volunteer programmes	ET,ASP
	C0.7 Take volunteers out on conservation actions	ASP,ET
	C0.8 Commission a striking film to draw attention to biodiversity conservation	ASP
	C0.9 Acquire relevant books for *aimag* and *sum* libraries	NGO,AG,KU
	C0.10 Establish web-based Altai biodiversity database	ASP
	C0.11 Publish and distribute high quality maps of the Altai	ASP,ET
	C0.12 Involve local people in long-term monitoring	ASP
	C0.13 Require routine press releases re arrests and court cases	AG
	C0.14 Establish environmental “score cards” for legislators	AG,ET,TAF
Staff, training and motivation,	D0.1 Raise motivation and performance through supervision and support	AG,ET,PA SG
	D0.2 Work towards improving staff selection and complement	AG
	D0.3 Engage recent graduates as interns for work experience	AG,ET,PA
	D0.4 Strengthen selection procedures.	AG,PA
	D0.5 Organize systematic pre-service and in-service training	AG,ET,ASP
	D0.6 Ensure government staff able to comment critically on reports, proposals and environmental assessments.	ET,ASP,PA AG
	D0.7 Institutionalize in-service training	AG,PA,ET
	D0.8 Guide training under projects to focus on specific results and institutionalization of training.	AG,ET,LA
	D0.9 Avoid one-off training courses unless aims very specific	AG,ET
	D0.10 Ensure quality of teachers and training	AG,ET,ASP
	D0.11 Order books through the internet and translate them.	AG,ASP
	D0.12 Guide book selection by donors who already send books	AG,ET,ASP
	D0.13 Work to improve rangers’ public image.	AG,SG,PA
	D0.14 Require supervisors to patrol with rangers	AG,SG,PA
	D0.15 Hold government employees accountable to the public	AG,SG

Research and monitoring	E0.1 Plan general field surveys of biodiversity status	ET,ASP,KU
	E0.2 Carry out the surveys	ET,ASP,KU
	E0.3 Plan detailed studies to assess use – legal and illegal	ET,ASP,KU
	E0.4 Carry out research including desk work and interviews	ET,ASP
	E0.5 Identify indicators of threats	ET
	E0.6 Design monitoring system for species	ET, ASP
	E0.7 Use rangers and local people to the full in monitoring.	ET,SG,PA
	E0.8 Train herders groups in simple rangeland monitoring	ASP,SDC
	E0.9 Monitor river and lake water quality and quantity	TAF,ET
	E0.10 Carry out species, grassland and forest monitoring surveys	SDC,ET,PA
	E0.11 Establish Biodiversity Information System (BIS)	ASP
	Specific research	ASP, AG,
	E0.12 Restoration of damaged land (after cause eliminated)	ET,AG
	E0.13 Status of White-throated Bushchat	ET, RO
	E0.14 Fish species	ET, BL
	E0.15 Prioritize further biodiversity research	ET, RO
	E0.16 Organize international conference on Altai biodiversity	ET, ASP
	E0.17 Send out Invitations nine months in advance	KU,ASP,ET
	E0.18 Use conference to establish baseline of current knowledge, threats and conservation approaches and develop solutions	KU,ET,ASP
		ET,ASP,
		MNU, RO
Environmental assessment	F0.1 Ensure eco-clubs passing on sound ideas and approaches to environment and biodiversity	ET,ASP
Financial incentives	G0.1 Tax use of images and names of Argali, Snow Leopard, Wolf (including Blue) and all other animals by businesses	AG
	G0.2 Promote production of locally made souvenirs and livestock products with publicity using the Altai Mountains “brand”	AG,ASP
		WWF
Planning for biodiversity conservation	H0.1 Establish biodiversity conservation as an integral part of all local land use, pasture management and *aimag* and *sum* development plans	AG,SG
		ASP
	H0.2 Lobby central government for increased funding for enforcement	AG
	H0.3 Prepare and implement integrated species conservation plans for the Altai – begin with Snow Leopard, Beaver, Musk Deer building on work already done.	ET,ASP,

ACTIONS SPECIFIC TO OBJECTIVE 1: To reduce hunting of all animal species and collection of wild plants to sustainable levels (which may be zero)		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A1.1 Moratorium on sport hunting in all four *aimags* A1.2 Moratorium on all commercial and household hunting A1.3 Moratorium on Saker Falcon capture A1.4 Enable arrests for *possession* of poached animals or plants A1.5 Taxes on *Caragana* and other fuel shrubs in the markets A1.6 Subsidies for sales of dung or processed dung bricks.	AG AG AG AG,SG,P IA AG,SG,IA AG
Law enforcement	B1.1 Facilitate rangers's use of newly acquired inspectors' rights B1.2 Post state inspectors at customs offices on borders B1.3 Solicit reports from tourists on wildlife violations B1.4 Monitor, support and learn from the WWF anti-poaching forces (MAPU) B1.5 Routine joint government- WWF anti-poaching patrols B1.6 Institutionalize anti-poaching control forces B1.7 Ban or heavily tax guns B1.8 Involve police properly in wildlife law enforcement B1.9 Establish workable informant system with incentives B1.10 Crack down on abuse of position by inspectors & rangers B1.11 Spot checks for *Caragana* and other fuel shrubs B1.12 Strengthen border controls via Customs officers	AG,IA IA ET,ASP ET,P,IA WWF " " " " AG AG,P,IA AT,PA,IA AG AG,P.IA AG,IA.C
Public information and involvement	C1.1 Publicize details of Chinese Wildlife Trade C1.2 Public information campaign on Altai Snowcock hunting/use C1.3 Printed materials, dialogue re hunting and plant collection C1.4 Innovative materials for distribution by rangers/inspectors C1.5 Develop suitable audio-visual and theatre performances for the mobile education unit (see under General Actions C03)	ASP,ET ASP,ET PA " " " " " " " " "
Staff, training and motivation,	As under General Actions. Important to improve supervision, communication and transport in the field, and support staff so that they feel confident and proud of their positions and able to both make arrests and consult with the public	
Research and monitoring	E1.1 Select species for detailed investigations E1.2 Conduct hunting/trade studies on selected species E1.3 Assess biodiversity impacts of commercialization of annual Bayan Olgii eagle festivals E1.4 Environmental, financial and social audit of sport hunting versus wildlife tourism	ASP,ET KU,RO ASP ASP,ET KU, RO
Environmental assessment	F1.1 Assess critically proposals for ex-situ conservation of wild species of plants and animals	ASP,ET
Financial incentives	G1.1 Pilot payment scheme for *sum* residents if wildlife increases G1.2 Demonstrate how tourism income can replace the initial scheme for payments for increases in wildlife	SG,AG, ASP AG,SG ASP
Planning for biodiversity conservation	H1.1 Plan alternatives to sport hunting H1.3 Seek donor(s) for additional anti-poaching forces	ET,ASP AG,ET ASP

ACTIONS SPECIFIC TO OBJECTIVE 2: To reduce grazing pressures		Action by:
Aimag **and** ***sum*** **government decrees, moratoria and other actions**	A2.1. Political and legal support for 2009 winter cull (see below under **Financial Incentives**) A2.2 Stop winter grazing in protected areas 2009/2010 A2.3 Have protected area administrations establish strict grazing rotation schemes in protected areas by summer 2010	AG,SG AG,SG,PA AG,SG
Law enforcement	B2.1 Assign more of the protected areas to "core zone" status B2.2 Control grazing in protected area buffer zones under law B2.3 Lobby for required changes in national policy and legislation, including through Members of Parliament	AG,PA AG,SG,PA AG
Public information and involvement	C2.1 Public information campaign to persuade the public of the need for livestock reductions, in particular goats. C2.2 Stress the value of the well-adapted native breeds	AG,ET,A SG AG,A,SG
Staff, training and motivation,	As under General Actions. Important to improve supervision, communication and transport in the field, and support staff so that they feel confident and proud of their positions and able to both make arrests and consult with the public	
Research and monitoring	E2.1 Consolidate and validate the various approaches to assessment of grazing capacities and rangeland health. E2.2 Describe grazing capacities E2.3 Look critically at feasibility of relying on herder groups to carry out nature conservation duties. E2.4 Livestock surveys in support of winter 2009 cull E2.5 Investigate how to limit absentee livestock owners	AG,SG,A ASP,SDC ET,A,HM ASP,ET PA A,ASP,RO AG,SG,A
Environmental assessment	F2.1 Subject all "alternative livelihoods" initiatives in the livestock sector to environmental assessment F2.2 Subject all water point establishment to stringent environmental assessment F2.3 Subject all proposals for intensification of livestock production to stringent environmental assessment	ET,A,ASP ET,A,ASP ET,A,ASP
Financial incentives	G2.1 Trigger a subsidized livestock cull winter 2009 through purchase of meat and hides G2.1 / G2.2 Follow up in 2010 with subsidies, publicity, regulations, tax incentives, contracts to keep livestock numbers low G2.3 Increase taxes per head of livestock. Resist moves to remove these taxes. G2.4 Pursue commercial export contracts for meat and hides G2.5 Pursue government investment in meat processing plants G2.6 Take market approaches to add value to livestock products G2.7 Strengthening veterinary service re meat quality G2.8 If market approaches slow to develop, again use government funds to subsidize purchase of meat and hides G2.9 Ensure that donor projects do not simply hand out grants for establishment of wells and other infrastructure	AG,SG,A AG,SG,A IA AG,SG,A IA AG, A AG, A AG,A,ASP A, AUS AG, SG,A AG, ET, SG, ASP
Planning for biodiversity conservation	H2.1 Independently monitor all donor projects, request constant updates and reporting. H2.2 Establish reduction in stocking densities as essential in achieving sustainable grazing schemes	AG, ET, ASP AG,SG,A, ASP, SDC

ACTIONS SPECIFIC TO OBJECTIVE 3: To stop loss of forest		Action by:
Aimag **and** ***sum*** **government decrees, moratoria and other actions**	A3.1 Provide necessary support - regulations, political will etc - to bring illegal logging under control (see below under Improvements in Law Enforcement) A3.2 Provide necessary support to make the forest "user group" schemes work. A3.3 Clarify rights and duties of "user groups"	AG AG AG,IA,ET
Law enforcement	B3.1 Enforce legislation: stop all illegal timber collection B3.2 Pass regulations banning the use of logs/planks for solid fences around buildings B3.3 Root out corrupt practices surrounding permits for timber for house building B3.4 Get full cooperation of the police and the courts in prosecutions B3.5 Confiscate illegal timber from the holder	IA,P,ET AG,SG AG,SG,IA AG,SG,ET IA,P
Public information and involvement	As under General Actions	
Staff, training and motivation,	As under General Actions	
Research and monitoring	E3.1 Assess current forest areas and forest management E3.2 Assess current timber harvest and use E3.3 Assess the fuel problem from fundamental principles and on a regional level.	ET,RO ET,RO ET,RO, ASP
Environmental assessment	F3.1 Provide expert guidance on forest management plans F3.2 Do not support afforestation – planting in new areas	ASP AG,SG,ET
Financial incentives	G3.1 Subsidies on renewable energy G3.2 Taxes on firewood and shrubs	AG,SG AG,SG
Planning for biodiversity conservation	H3.1 Follow ecologically based forest management approach of the proposed MNET/World Bank Forest Landscapes Development and Conservation Project H3.2 Pilot schemes to test solutions indicated under E3.3 above	AG,SG,ET ASP AG,SG

ACTIONS SPECIFIC TO OBJECTIVE 4: To restore riparian forest		Action by:
***Aimag* and *sum* decrees and moratoria**	A4.1 Order and facilitate the demonstrations under Financial Incentives below	AG,SG
Law enforcement	As under General Actions	
Public information and involvement	C4.1 Implement plan to maintain riparian forest and use for firewood, fruit, recreation and tourist campsites C4.2 Invite general public/officials from other sites to look at the restoration, and interest them C4.3 Persuade visiting general public/officials of the benefits to local people in their home *sums* of starting similar schemes.	SG, AG ASP SG,AG SG,AG
Staff, training and motivation,	As under General Actions	
Research and monitoring	E4.1 Monitor the recovery of the riparian vegetation	SG,ET, ASP
Environmental assessment	F4.1 Carry out assessment of adverse impacts on biodiversity, in particular the impacts of fencing on movements of wild species	ET,ASP RO
Financial incentives	G4.1 Subsidize one or two demonstrations of restoration of willow, sea-buckthorn etc in riparian zones through protection from livestock and firewood collection	ASP,AG SG
Planning for biodiversity conservation	H4.1 Plan how to maintain restored riparian forest in long term	AG,ET,SG ASP

ACTIONS SPECIFIC TO OBJECTIVE 5: To maintain water quantity and quality in rivers and lakes		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A5.1 Heavily involve *aimag* officials in pilot work on water user groups and river basin councils A5.2 Stress the transjurisdictional (cross *sum* and cross *aimag* border) collaboration on this work. A5.3. Assign budget for transjurisdictional water management, consultation and actions A5.4 Provide legal backing to water user group working arrangements on limiting of diversions for irrigation	AG AG AG AG
Law enforcement	B5.1 Support and implement water resource management plans for each river basin and enable water user groups and river basin councils to work effectively through improved regulations and enforcement.	AG,SG SDC WWF
Public information and involvement	C5.1 Expand working systems to other places within the basins and to other basins C5.2 Encourage follow up to livestock reductions such as improvement in disposal of dead livestock to prevent widespread decomposition in rivers C5.3 Publicize sound cultivation practices	AG, SG WWF AG, ET ASP AG,ET,A
Staff, training and motivation,	As for General Actions	
Research and monitoring	E5.1 Monitor water quality and quantity	ET,HM, TAF
Environmental assessment and mitigation	F5.1 Evaluate all cultivation projects and changes of crops F5.2 Avoid cultivating land that is easily erodible. F5.3 Plant native species as windbreaks F5.4 Ensure sound rotation systems F5.5 Introduce no-till cultivation for grains F5.6 Introduce integrated pest management F5.7 Use organic fertilizers and minimize use of inorganic fertilizers	A,AG,SDC A,AG,SG A,AG,SG A,AG,SG A,AG,SG A,AG,SG A,AG,SG
Financial incentives	G5.1 Work towards charging downstream water users for upstream communities' collaboration in maintaining water quality and quantity G5.2 Through taxes and other incentives, reduce wasteful use of land for cultivation	AG,SG,ET ASP,SDC WWF AG,SG,IA
Planning for biodiversity conservation	H5.1 Incorporate biodiversity considerations into river basin management plans and water user group plans	AG,SG,ET ASP,SDC WWF

ACTIONS SPECIFIC TO OBJECTIVE 6: To stop infrastructure development, commercial businesses and "alternative livelihood" schemes from causing damage to biodiversity		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A6.1 Tighten environmental assessment procedures. A6.2 Strengthen EA requirements for development projects with potential effects on protected areas A6.3 Instruct environmental departments to require environmental assessments for donor project activities. A6.4 Ensure that environmental departments are much more involved in projects run by donors A6.5 Practice strategic environmental assessment (See H6.1)	AG, IA, ET AG, IA, ET AG, AG AG,ET,IA,LA
Law enforcement	B6.1 Follow the law on mineral resources and respond within time to exploration and mining licence applications. B6.2 Be proactive in acquiring mining licence applications B6.3 Enforce penalties for developers in breach of environmental assessment conditions	AG, SG, TAF RMI AG,SG AG,SG,IAP
Public information and involvement	C6.1 Publicize threats to protected areas from mining in light of working group established by Prime Minister in 2009 to investigate how to change laws to allow mineral exploration in protected areas	NGO, TAF, ASP
Staff, training and motivation,	D6.1 Training on judging the quality and validity of environmental assessments D6.2 Training on inclusion of biodiversity considerations into environmental assessments D6.3 Training in enforcement and monitoring of mitigation and restoration actions D6.4 Use Asian Highway 4 and link road projects as examples to train on the job in monitoring compliance and as learning demonstrations.	AG, ET, ASP, KU AG, ET, ASP, KU AG, ET, ASP, KU AG, ET, ASP, KU
Research and monitoring	E6.1 Investigate all overlaps of mining licences with protected areas and work to resolve them. E6.2 Commission economic assessment of the values of short term profit from mining vs long term benefits of protection of ecosystems from the effects of mining in the Altai	PA,ASP, ET, SG ASP, AG UNDP (SPAN)
Environmental assessment	F6.1 Follow up on all undertakings in the road project environmental assessments including restoration of gravel pits F6.2 Ensure environmental assessments address not only immediate impacts but also long term impacts of increased ease of access along new roads F6.3 Review Durgun dam environmental assessment and assess compliance. F6.4 Subject donor project promoted alternative or additional livelihoods to environmental assessments F6.5 Evaluate environmental assessments critically, requiring evidence and not just statements of the benefits F6.6 Monitor implementation and mitigation	ET,AG,SG ET,AG,SG ASP ET,AG,SG ASP,KU ET,AG,SG ET,AG,SG ASP ET,AG,SG
Financial incentives	G6.1 Seek cooperation from developers in conservation initiatives	ET,AG,SG ASP
Planning for biodiversity conservation	H6.1 Insist on strategic environmental assessments in preference to project by project, so that development is subject to regional controls that take into account other development .	AG, ASP,LA

ACTIONS SPECIFIC TO OBJECTIVE 7: To reduce off-road driving and multi-tracking		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A7.1 Enable all supporting legislation for the new controls. A7.2 Make public announcements for the new controls A7.3 Require that fines are used for biodiversity conservation under the Strategy	AG AG AG,LA
Law enforcement	B7.1 Enforce off-road driving ban in *aimag* centres. B7.2 Pass local regulations to require vehicles to stay on established vehicle routes within *aimag* centres B7.3 Designate parking areas B7.4 Fine offenders or impound their vehicles. B7.5 Extend the campaign to *sums* and beyond B7.6 Link to Asian Highway 4 road building project and interest Asian Development Bank and contractors in the scheme. B7.7 Pass local regulations to require vehicles to follow traffic rules and stay on established vehicle routes anywhere within the region B7.8 Fine offenders or impound their vehicles. B7.9 Control mining roads and heavy traffic.	AG,IA,P AG AG,P AG,IA,P AG,SG,IA AG,SG ASP AG, SG IA,P ET,AG,SG
Public information and involvement	C7.1 Massive public education campaign to demonstrate the problem and show how and why off-road driving is controlled elsewhere in the world C7.2 Erect sufficient signposts in *aimag* centres to inform drivers adequately of the regulations and later outside *aimag* centres to help people find the way, and to define the approved routes between *sums*	AG,ASP SG, ET AG,SG,
Staff, training and motivation,	As for General Actions	
Research and monitoring	E7.1 Study to monitor impacts of the bans, first in *aimag* centres and then in the region generally	ET,RO,KU,
Environmental assessment	As for General Actions	
Financial incentives	G7.1 Fines as above G7.2 Rewards for *sums* and *aimag* apartment blocks that show regeneration	AG,SG AG,SG,IA
Planning for biodiversity conservation	As for General Actions	

ACTIONS SPECIFIC TO OBJECTIVE 8: To establish cross-sectoral and evidence based approach to biodiversity conservation		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A8.1 Institutionalize the functions of the *Aimag* Sustainable Development Councils. A8.2 Discuss options and decide how to assign the functions. Use government funds and assign real power A8.3 Establish enforceable routine consideration of biodiversity conservation in *aimag*, *sum* and *bag* government decision making and planning with integration of this into the day to day business of government in all sectors through regulations A8.4 Require *sum* plans for economic development to include biodiversity and environmental safeguards. A8.5 Require all *sum* plans to be subject to expert review. A8.6 Ensure that *sum* and *aimag* officials work more closely together.	AG AG, ASP,ET AG,SG ASP, LA AG,ET ASP AG, SG AG,SG,
Law enforcement	B8.1 Follow the legal procedures established for the *Aimag* Sustainable Development Councils to guide and control development taking biodiversity into consideration	IA, AG
Public information and involvement	As for General Actions above	
Staff, training and motivation,	D8.1 Use projects to help with the whole field of introducing the ideas of evidence-based conservation and how, when and where to apply environmental safeguards. D8.2 Tackle barriers - most people require simple statistics and sampling knowledge and the ability to review proposals and report confidently and soundly. D8.3 Establishment of evidence based approach to biodiversity conservation D8.4 Stop ineffective and potentially counterproductive biodiversity management measures	AG,ET, ASP AG, SG, ASP, KU AG,SG,KU ET,ASP AG,PA,SG ASP, ET
Research and monitoring	E8.1 Demonstration of policy analysis using the evidence E8.2 Ensure that international considerations are always included always in information available and in decision making. E8.3 Monitor the implementation of this strategy, both through impact indicators and tracking progress in completion of activities	ET, ASP, ET, AG, ASP AG,ET,PA ASP,
Environmental assessment	F8.1 Use clear, evidence based approach to environmental assessment of all economic development, project activities, training courses, tourism operations etc	AG, ET, SG, ASP MC
Financial incentives	As for General Actions	
Planning for biodiversity conservation	H8.1 Prepare periodic revisions to this Strategy using the evidence of information gathered during monitoring and specific research (see E8.3)	AG, ASP, SG, ET, PA

ACTIONS SPECIFIC TO OBJECTIVE 9: To introduce environmental accounting to local government		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A9.1 Introduce unofficial (shadow) environmental accounting to *aimag* and *sum* accounting systems A9.2 Take necessary legal steps to introduce the system A9.3 Seek funding to carry out training	AG, SG, ET, LA AG, SG AG, ET
Law enforcement	As for General Actions	
Public information and involvement	C9.1 Include environmental accounting in the public information programmes described under General Actions	AG, ASP
Staff, training and motivation,	D9.1 Begin to interest staff in the concept by analysing case studies with assistance of donor funded projects already working in the Altai	ET, SDC, WWF, ASP
Research and monitoring	E9.1 Collect information about similar initiatives elsewhere	ASP, ET
Environmental assessment	As for General Actions	
Financial incentives	G9.1 Develop a system that actually provides cash for ecosystem protection of soil and water	AG, SG, ET, LA
Planning for biodiversity conservation	H9.1 Long term planning to demonstrate how environmental accounting can influence biodiversity conservation and economic development	AG, SG, ET, LA, ASP

ACTIONS SPECIFIC TO OBJECTIVE 10: To establish well regulated wildlife tourism		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A10.1 Fill recently created positions of tourism officer at each *Aimag* Governor's office with well qualified individuals A10.2 Use available channels to make changes to protected area entrance fees, increasing them and making them a daily fee A10.3 Establish concession system for tourism in protected areas A10.4 Establish no-vehicle zones in protected areas to stop damage from driving (see also under Objective 11)	AG, ET AG, PA AG,PA,SG AG,SG,PA
Law enforcement	B10.1 Immediate action to control violation of laws by tourist operators B10.2 Critical review of current legislation and proposals for review of standards. B10.3 Enforce no-vehicle zones (see also under Objective 11) through self regulation by tour companies and external regulation by rangers B10.4 Identify any loopholes in laws exploited by tour operators, and laws that unnecessarily restrict or penalize tour operators Otherwise as under General Actions.	IA,P,ET,PA AG,SG,ASP AG,SG,PA, IA,P ET,PA,ASP
Public information and involvement	C10.1 Further develop tourist websites for the Altai. C10.2 Promote domestic tourism C10.3 Distribute maps – make them easily available	USPC, ASP, EA
Staff, training and motivation,	D10.1 Run training courses in how to run small wildlife tour operations and include practical on-the-job training D10.2 Train tourism officers in biodiversity conservation and costs, benefits and risks of eco-tourism D10.3 Establish a licensing system for tourist wildlife guides	ASP, MCI, EA AG, ET, ASP, NGO AG,ASP,PA
Research and monitoring	E10.1 Monitor compliance with new regime and impact on habitats and species	AG, SG, ET, ASP
Environmental assessment	F10.1 Carry out environmental assessment from all angles, of the measures introduced to regulate wildlife tourism.	AG, SG, ET, LA, ASP
Financial incentives	G10.1 Plan financial incentives for responsible wildlife tourism to replace sport hunting. G10.2 Plan and work towards a certification scheme for tour operators G10.3 Small loans for clean, well-run tourist facilities in *aimag* centres and *sum* centres G10.4 Design Altai tourism tax scheme for return of revenue direct to all residents G10.5 Facilitate links between local entrepreneurs and tourist clients G10.6 Demonstrate how tourism can be a family business	ET,ASP,PA SG, AG ET, PA,TO, ASP ET, ASP AG, ASP MC, ASP, AG, SG MC, ASP,SG
Planning for biodiversity conservation	H10.1 A professionally prepared tourism plan which will evaluate current tourism and its impacts, and set out an immediate action programme	ASP, TO, AG, ET

ACTIONS SPECIFIC TO OBJECTIVE 11: To improve protected area coverage and effectiveness		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A11.1 Increase interactions between protected area administrations and local government to facilitate improvement in protection regime.	AG, PA, SG, LA ET
Law enforcement	B11.2 Expand the state and local protected area network B11.2 Enforce protected area regulations and additional decrees from *aimag* governors B11.3 Review law enforcement records for each inspector and ranger and investigate B11.4 Develop proposals for reviews of legislation at state level and communicate them to central government via *Aimag* Governors and MPs.	AG,SG,PA AG,IA,SG ET,PA IA,AG,SG, PA AG, SG,PA,ASP
Public information and involvement	As for General Actions	
Staff, training and motivation,	D11.1 Improve the performance of protected area staff in consultations with local people D11.2 Recruit qualified staff according to transparent selection procedures D11.3 Provide transport and communication	PA, ASP PA PA, AG, SG
Research and monitoring	As for General Actions	
Environmental assessment	As for General Actions	
Financial incentives	G11.1 Increase fees and taxes from herders and others in limited use zones of protected areas.	AG,SG,PA
Planning for biodiversity conservation	H11.1 Prepare management plans, including zonation plans for all protected areas. Include full range of objectives / functions. H11.2 Change the category of some protected areas. H11.3 Emphasize transboundary impacts on protected areas H11.4 Select one or more protected areas for model management by an NGO willing to take over long term management completely	PA,SG,AG UNDP " " " " " ",ASP " " " + SPAN

ACTIONS SPECIFIC TO OBJECTIVE 12: To secure and maximize benefits from financial resources and technical support through partnerships		**Action by:**
***Aimag* and *sum* government decrees, moratoria and other actions**	A12.1 Send out well informed letters/emails from *Aimag* Governors with reasonable proposals for joint work. A12.2 Follow up with further letters/emails and replies to those that respond. A12.3 Form equal partnerships with clear goals and ensure that arrangements are kept A12.4 Insist on and organize joint donor (NGOs and multi/bilateral) project meetings with Environment and Tourism Department and Protected Area staff A12.5 Insist on and organize coordination between individual projects and all relevant government departments A12.6 Monitor and guide existing projects tightly within the scope of established project goals A12.7 Be more proactive in formulation and work planning of new projects A12.8 Control expectatations among "project beneficiaries". A12.9 Insist on being included fully at the development stage of all pipeline projects (several years ahead of implementation) and consider basing more projects inside government offices with full time government staff involvement in implementation. A12.10 Require routine reporting by donor projects with any impact on BD	AG, ASP AG, ASP AG,SG,PA ET AG AG AG, SG AG, SG AG, SG AG, SG AG, SG
Law enforcement	As for General Actions	
Public information and involvement	C12.1 Use the results of the projects as they become available. Publicize them. Stimulate interest in the objectives and the results	AG, SG, ET, PA, LA, KU
Staff, training and motivation,	D12.1 Encourage training activities to be directed always towards institutionalization of training, rather than one-off training courses that are repeated a few years later by new projects D12.2 Use the counterpart system: assign government officials to work full or part time on the projects in order to be more involved and learn more day to day.	AG, ET, KU, NGO AG, SG, LA, ET, PA
Research and monitoring	As for General Actions	
Environmental assessment	As for General Actions	
Financial incentives	As for General Actions	
Planning for biodiversity conservation	As for General Actions	

List of References[17]

Altai Sayan Project (2008) *Protected Areas near Khar-Us lake*. UNDP, Altai Sayan Project (Community based conservation of biological diversity in the mountain landscape of the Mongolia's Altai-Sayan ecoregion) Ulaanbaatar. (In Mongolian)

Asian Development Bank (2004) Mongolia Country Environmental Analysis, Ulaanbaatar

Asian Development Bank (2007) *Initial Poverty and Social Assessment: Mongolia Western regional Road Corridor Development Project-Phase I*. Ulaanbaatar, Mongolia. http://www.adb.org/Projects/project.asp?id=39265

Baasanjav, G and Tsend-Ayush. Ya. 2001. *Fish of Mongolia*. Ulaanbaatar (In Mongolian)

Batbold, D and A Laurie (2001) Briefing for Mid-Term Evaluation, UNDP/GEF Project on Biodiversity Conservation and Sustainable Livelihood Options in the Grasslands of Eastern Mongolia UNDP Mongolia, July 2001

Batbold, D and Laurie, A (2002) Developing and implementing national biodiversity strategies and action plans: Lessons from Mongolia. In: Carew-Reid, J. (ed) Developing and implementing national biodiversity strategies and action plans in Asia. IUCN/UNDP

Batima P (2006) Climate Change Vulnerability and Adaptation in the Livestock Sector of Mongolia, AIACC Project AS 06. International START Secretariat. Washington DC 85 pp

Batima P., Bat B., Tserendash S., and Myagmarjav B. (2007). *Adapting to Drought, Zud and Climate Change in Mongolia's Rangelands, in Book "Climate Change and Adaptation".* edited by Neil Leary et.al., Earthscan, London and Sterling, VA

Batima, P (2004) Progress Report, Potential Impacts of Climate Change and Vulnerability and Adaptation Assessment for Grassland Ecosystem and Livestock Sector in Mongolia. Hydrometeorological and Environmental Monitoring Agency, Ulaanbaaatar: http://sedac.ciesin.columbia.edu/aiacc/progress/AS06_Jan04.pdf

Batima, P.. N Batnasan and B Lehner (2004) The Freshwater Systems of Western Mongolia's Great Lakes Basin: Opportunities and Challenges in the Face of Climate Change WWF Mongolia. Ulaanbaatar.

Batima P., Natsagdorj L., Gombluudev P., Erdenetsetseg B (2005) Observed Climate Change In Mongolia AIACC Working Paper No.12

Batkhuyag B. (1995) *Biology and ecology or the important grasshopper pests of Mongolia and possible control methods*. PhD Thesis. Agriculture University of Mongolia (In Mongolian)

[17] Includes those referred to in the main text and the annexes and others used in preparation of the Strategy

Batsaikhan, N., Sanjmyatav,D., Chimed-Ochir, B (2009). Ecosystem classification of Mongolia. (unpublished)

Bazely, DR, JP Ball, M Vicari, AJ Tanentzap, M Bérenger, T Rakocevic and S Koh (2007) *Broad-scale geographic patterns in the distribution of vertically-transmitted, asexual endophytes in four naturally-occurring grasses in Sweden* Ecography 30: 367-374

Berezovskii, M.M. (1881). *Species list of bird collection of G.N.Potanin field expedition in Nort-Western Mongolia in 1876-1877*. Sanktpeterburg. 337-348. (In Russian)

Birdlife Asia. (2008). *Safeguarding Important Areas of Natural Habitat in Mongolia alongside Economic Development*. World Bank, Ulaanbaatar

Bold, A. (1973) Birds of Mongolia. *Scientific Proceedings of the Biological Institute*. 7:139-163 (In Mongolian)
Bold, A. and Boldbaatar, Sh. (1999) Rare raptors of Mongolia. *General and experimental Biology. 1:129-136*. (In Mongolian)

Bold, A. and Mainjargal, G. (2006) Rare vagrants of Mongolia. *Proceedings of the Institute of Biology. 26:78-81* (In Mongolian)

Bold, A. and Tseveenmyadag, N. (1979) Rare birds of Mongolia. *Brochure. Science and Life. 4:59-62* (In Mongolian)

Bold, A., and Dulamtseren, S. (1981) Rare mammals and birds. *Brochure Science and Life 5: 77* (In Mongolian)

Bold, A., Kishinskii, A.A., Tseveenmyadag, N. (1985) Conservation of rare species of birds in Mongolian People's Republic. *Proceedings of General and Experimental Biological Institute. 16: 122* (In Mongolian)

Bold, A., Stauber, J., Gerdin, M., Grundstein, Mc. (2005) First record of Long-tailed Duck in Mongolia. *Proceedings of the Institute of Biology. 25:186-187*(In Mongolian)

Bold, A., Sumiya, D., Boldbaatar, Sh. (1998) *Mongolia's priorities for water bird conservation and International co-operation (1998-2000)*. In: Adiyasuren, A., Mundkur, T., and Namkhai, A. (Eds.); Proceeding of the International Workshop on Wetland Conservation in Mongolia and North-East Mongolia. Ulaanbaatar, Mongolia. 33-37.

Bold, A., Tseveenmyadag, N., Sumiya, D. (1980) Changes and additions to bird species composition of Mongolian People's Republic. *Proceeding of the general and experinmental biology. 15:87* (In Mongolian)

Bold, A., Boldbaatar, Sh., Mainjargal, G. (2000) Water reservoirs of Ulaanbaatar and theirs role for bird life. *Scientific proceeding of the Biological Institute of Mongolia 22: 137-140.* (In Mongolian).

Bold,A, and Boldbaatar,Sh. (2001) Distribution, Movement and Population dynamics of Saker Falcon in Mongolia. International Conference Report. (In Mongolian)

Boldbaatar, Sh. (2001) *Bird species found in Mongolia for last decade. Biodiversity of the Mongolian Plateau and Adjacent Territory*. Ulaanbaatar. 52-55. (In Mongolian)

Bräunlich, A. (2006) *Bird Migration in Western Mongolia*. Trip report. Khovd. 19pp.

Bräunlich, A. (2006a) From the Field, MONGOLIA. (Unpublished)

Bruner AG, RE Gullison and A Balmford (2004) Financial costs and shortfalls in managing and expanding protected area systems in developing countries. Bioscience 54 1119-1126

Bumjaa, D. (2002) *Flora and vegetation of Mongolia*. Ulaanbaatar.(in Mongolian)

Central Intelligence Agency. 2008. *Mongolia*. Accessed online (September 2008): https://www.cia.gov/library/publications/the-world-factbook/geos/mg.html

Clark, E.L, J Munkhbat, S Dulamtseren, JEM Baillie, N Batsaikhan, R Samiya and M Stubbe. (2006) *Mongolian Red List of Mammals.* Regional Red List Series Vol. 1. Zoological Society of London, London.
Clark, EL, J Munkhbat, S Dulamtseren, JEM Baillie, N Batsaikhan, SRB King, R Samiya and M Stubbe (2006) *Summary Conservation Action Plans for Mongolian Mammals*. Regional Red List Series Vol. 2. Zoological Society of London, London.

Darwin Initiative (2007) *Cross-border conservation strategies for Altai Mountain endemics (Russia, Mongolia, Kazakhstan)*. Department for Environment, Food and Rural Affiars, London. URL: http://darwin.defra.gov.uk/project/11025/

Davaa G., G. Kadota, T. Purevdagva, Kh., and Baasandorj, D. (2007) *Preliminary results of study on flat-top glacier at Tsambagarav Mts. Mongolia*. Ulaanbaatar.

Davaa,G. Batkhuu, D and Oyunbaatar,D. (2008) *Discussion report on water utilization of Buyant river*. Khovd (In Mongolian)

Dawaa, N., Busching, W.D., Sumijaa, D., Bold, A., Samijaa, R. (1994) Kommentierte Checkliste der Vögel und Säuger der Mongolei. *Teil 1: Vögel Naumann-Museum Köthen.*

de Hoyo, J., Elliott, A., and Christie, D.A. eds. (2006) *Handbook of the Birds of the World.* Vol.11. Old World Flycatchers to Old World Warblers. Lynx Edicions, Barcelona. 797pp.

Dudley, N., and J. Parrish (2006) *Closing the Gap: Creating Ecologically Representative Protected Area Systems*. Secretariat of the Convention on Biological Diversity, Montreal Technical Series No. 24. 108 pp

Dulamtseren, S. (1967) Wintering Swans and Ducks in the Khar Us Nuur. *Journal of Mongolian Academy of Sciences 2: 66-67.* (In Mongolian).

Enkhbat, A. (2003) *Altai-Sayan Ecoregion Conservation Action Plan for Mongolia*. WWF Mongolia, Ulaanbaatar

Enkhsaikhan,D. (2009) *Current forest resource of Mongolian Altai mountains*. A report for Altai-Sayan project. (In Mongolian)

Erdenebat, M. (2002) *Fish and aquatic animals of Altai Sayan ecoregion*. Expert reports for Altai Sayan Project (Community-based Conservation of Biological Diversity in the Mountain Lansdscapes of the Mongolia's Altai Sayan Ecoregion) UNDP, Ulaanbaatar, Mongolia. (In Mongolian)

Erdenechuluun, T (2006) Wood supply in Mongolia; The Legal and Illegal Economies, Mongolia Discussion Papers, East Asia and Pacific Environment and Social Development Department, Washington D.C. World Bank http://siteresources.worldbank.org/MONGOLIAEXTN/Resources/mong_timber_int_for_web.pdf

FAO/UNICEF/UNDP (2007) *Joint Food Security Assessment Mission to Mongolia*. URL: ftp://ftp.fao.org/docrep/fao/010/j9883e/j9883e00.pdf

Farrington, J.D. (2001) *A report on the conflict between mining and special protected areas in Mongolia with models for conflict resolution from the United States, Canada and Australia*. U.S. Peace Corps, Ulaanbaatar.
Farrington, J.D. (2005) The impact of mining activities on Mongolia's Protected Areas: a status report with policy recommendations. *Integrated Environmental Assessment and Management 1: 283-289*

Fomin, V.E. and Bold, A. (1991) *Catalogue of the birds of the Mongolian People's Republic*. Moscow. Nauka. 124 p. (In Russian)

Gazar Service. (2009) *Western region land management plan*. Ulaanbaatar. (In Mongolian)
Gombobaatar, S. (2004) *Wintering Water Birds (Anseriformes) and Their Conservation*. (In Mongolian)

Gombobaatar, S. and Bold, A. (2002) *Cuckoos of Mongolia*. Birds, amphibians and reptiles of Mongolia. *1:109-120* (In Mongolian)

Gombobaatar, S. et al (2005) Research on Saker Falcon Food. Scientific Studies of National University of Mongolia. (In Mongolian)

Grubov, B. I., and Yunatov, A.A. (1952) *General research on flora of the People's Republic of Mongolia*.(In Russian)

Gunin, P.D.; Vostokova, E.A.; Dorofeyuk, N.I.; Tarasov, P.E.; Black, C.C. (Eds.) (1999) Vegetation Dynamics of Mongolia. Geobotany , Vol. 26 (233pp)

Hannam, I. (2008) *Assessment of environmental laws* Strengthening Environmental Governance in Mongolia Project, UNDP, Ulaanbaatar.

Hillbruner, C and Murphy, M. (2008) *Food Security and Livelihoods in the Small Urban Centers of Mongolia: Findings from the Aimag Center Food Security Assessment*. Mercy Corps Mongolia, Ulaanbaatar

Honhold,N. (1995) *Livestock Population and Productivity and the Human Population of Mongolia 1930 to 1994.* Ulaanbaatar: Ministry of Food and Agriculture of Mongolia and ULG Consultants.

IUCN Red List of Threatened Species(IUCN red list) (2009) URL: http://www.iucnredlist.org

Kottleat, M (2006) *Fishes of Mongolia - A check-list of the fishes known to occur in Mongolia with comments on systematics and nomenclature*, World Bank, Washington, 103 pp.) http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/fishes_of_mongolia.pdf

Kozlova, E.B. (1930) *Birds of South-Western Baikal Northern Mongolia and Central Gobi. Moskow*. Nauka. Pp. 7-361. (In Russian).

Laurie, A (2008) Technical Reports to Altai Sayan Project (Community based conservation of biological diversity in the mountain landscape of the Mongolia's Altai-Sayan ecoregion) UNDP, Ulaanbaatar

Maroney RL (2005) Conservation of Argali (*Ovis ammon*) in Western Mongolia and the Altai-Sayan. Biological Conservation 121: 231-241 http://www.forestry.umt.edu/students/services/peacecorps/pdf/irm%20-%20maroney.pdf

Mau, G and G Chantsalikham (2006) Herder Group Evaluation – A Study of Herder Groups, their Present Status and Future Potential: Policy Options for the Government of Mongolia. Ulaanbaatar, November 2006 http://www.fs.fed.us/rm/pubs/rmrs_p039/rmrs_p039_018_029.pdf

Michel, S., B. Steinhauer-Burkart and C. Sepp. (2004) *Feasibility study for a transboundary territory in the Altai Mountains*. GTZ, Ulaanbaatar.

Ministry for Nature and the Environment (1996) *Biodiversity Conservation Action Plan for Mongolia*. Ulaanbaatar.

Ministry of Food, Agriculture and Light Industry (2009) *Preparation for Spring Cultivation* URL: http://www.mofa.gov.mn/mn/index.php?option=com_content&view=article&id=142:2009-04-21-09-04-49&catid=1:latest-news&Itemid=279

Ministry of Nature, Environment and Tourism (2008) *The State of Environment report 2006-2007*. Ulaanbaatar.

Ministry of Nature, Environment and Tourism. 2009. *Special Protected Area Administration*. (In Mongolian) URL: http://www.mne.mn/mn/index.php?option=com_content&view=article&id=69&Itemid=111

MNE and JICA. (2001) *CITES Manual*. Ulaanbaatar (In Mongolian)

Mongolian Nature Protection Coalition (2008) Mongolian Nature and Environment Legislative Scorecard Fall 2007 Parliamentary Session. Ulaanbaatar.

Muhlenberg, M., T. Batkhishig, Ts. Dashzeveg, L. Drosler, B. Neusel, and J. Tsogtbaatar (2006) *Lessons From Tree Planting Initiatives in Mongolia*. Mongolia Discussion Papers, East Asia and Pacific Environment and Social Development Department. Washington, D.C.: World Bank.

Munkhtogtokh, O., & Batbold, A. (1995) *Counts of wintering water birds in Great Lakes Valley*. In: proceedings of Natural condition and resource of Western Mongolia and adjacent regions. The Second International Conference of Western Mongolia. Khovd. 107-108. (In Russian)

Murphy, M. and M Leland (2008) Seabuckthorn Value Chain Assessment. Mercy Corps, Ulaanbaatar.

Namkhai A. (2007) Mongolian Specially Protected Areas. Ulaanbaatar. Munkhiin Useg printing (In Mongolian)

National Statistical Office of Mongolia (NSO) (2008) *Mongolian Statistical Year Book 2007*. Ulaanbaatar

Nyambayar, B. (2003) *Wintering water birds at the Khar Us Nuur National Park, Western Mongolia*. In: Proceedings of 2003 International Anatidae Symposium in East Asia and Siberia Region. Hanseo University, Seosan, Korea. 109-116.

Nyambayar, B. and Bold, A. (1999) *About the Golden eagle of Mongolia*. Scientific Writing of the National University of Mongolia. Ulaanbaatar. (In Mongolian)

Nyiri, P. and J Breidenbach (2008) The Altai Road: Visions of Development across the Russian-Chinese Border. *Development and Change 39(1) 123-145*

Ocock, J., Baasanjav, G., Baillie, J. E. M., Erbenebat, M., Kottelat, M., Mendsaikhan, B. and Smith, K. (compilers and editors) (2006) *Summary Conservation Action Plans for Mongolian Fishes*. Regional Red List Series Vol. 4. Zoological Society of London, London.

Ocock, J., Baasanjav, G., Baillie, J. E. M., Erbenebat, M., Kottelat, M., Mendsaikhan, B. and Smith, K. (compilers and editors) (2006) *Mongolian Red List of Fishes*. Regional Red List Series Vol. 3. Zoological Society of London, London.

Olziikhutag, N. (1981) General distribution pattern of lichen in plant geographical zone. Vegetation and flora research of the People's Republic of Mongolia. (In Mongolian)

Onoodor (2006). Poaching Wildlife. Onoodor Newspaper 15 September (In Mongolian)

Onoodor (2008) Interview with Gantulga, Sh – Senior Environmental Officer and Team Leader of "Irves-3", Anti-poaching and Environmental Protection Team in Khovd, Gobi-Altai and Zavkhan. Onoodor Newspaper 27 March (In Mongolian)

Onsager, JA (2000) Suppression of grasshoppers on the Great Plains through grazing management Journal of Range Management 53, 592-602

Oyungerel, B. (2004) *Mongolian Special Protected Area*. Ulaanbaatar. (In Mongolian)

Piechocki, R., Stubbe, M., Ulenhaut, K., Sumiya, D. (1982) Beitraege zur avifauna der Mongolie. Mitt. Zool. Mus. Berlin. Bd. 58, Suppl.:Ann. Orn.6:3-53 (In German)

Pyak AI, SC Shaw, AL Ebel, AA. Zverev, MO Morenko, JG Hodgson, D Oyunchimeg, AJ Willis & BD Wheeler (2007) A new species of *Lagopsis* (*Lamiaceae*) from Mongolia Kew Bulletin 62: 107–111

Pyak, A.I, Shaw, S.C., Ebel, A.L, Zverev, A. A, Hodgson, J.G, Wheeler, B.D, Gaston, K.J, Morenko, M.O, Revushkin, A.S, Kotukhov, Yu.A, Oyunchimeg, D. 2007. Endemic Plants of the Altai Mountain Country. Darwin Initiative/Wild Guides UK URL www.wildguides.co.uk

Sanderson, EW, KH Redford, A Vedder, PB Coppolillo and SE Ward. (2002) *A conceptual model for conservation planning based on landscape species requirements*. Landscape and Urban Planning 58: 41-56

Schuerholz, G., N. Batnasan, D. Sanjmyatav and B Sergelen (2007) *Capacity and Financial Need Assessment of Protected Areas located in the Altai Sayan Region of Mongolia*. World Wide Fund for Nature – Mongolia and Ministry of Nature and Environment, Ulaanbaatar.

Shagdarsuren, O. (1983) *Predatory birds of Mongolia*. Ulaanbaatar. (In Mongolian)

Shagdarsuren,O and Dulmaa, A. (1972) *Hunting and Conservation of Animals in the People's Republic of Mongolia*. Ulaanbaatar. (In Mongolian)

Shar S. (2006) Studies of Mongolian Altai mammals. In *Natural resource and biodiversity of Mongolian Altai Sayan ecoregion*. Series 1: P 32-33. (In Mongolian)
Soninkhishig, N. (2009) Western region water reserve and water resource management today. Ulaanbaatar. Report to Altai Sayan Project (Community based conservation of biological diversity in the mountain landscape of the Mongolia's Altai-Sayan ecoregion) Ulaanbaatar. (In Mongolian)

Svensson, L. (1992) Identification guide to European passerines. 4th ed. Stockholm.

Terbish, Kh., Kh Munkhbayar, EL Clark, J Munkhbat and EM Monks. (2006) *Mongolian Red List of Reptiles and Amphibians*. Regional Red List Series Vol. 5. Zoological Society of London, London.

Terbish, Kh., Kh Munkhbayar, EL Clark, J Munkhbat, EM Monks, M Munkhbaatar, M Baillie, JEM Borkin, L Batsaikhan, N Samiya and DV Semenov. (2006) *Summary Conservation Action Plans for Mongolian Reptiles and Amphibians*. Regional Red List Series Vol. 6. Zoological Society of London, London.

The Asia Foundation (2007) *Mine Licensing: A Mongolian Citizens' Guide*. Ulaanbaatar

The Asia Foundation (2008) *Community Partnerships: A Mongolian Citizens' Guide*. Ulaanbaatar

The Asia Foundation (2008) *Water Quality Monitoring in Rivers: A Methods Manual for Citizen Volunteers in Mongolia*. Ulaanbaatar

Tortell, P, Ts Adiyasuren and N Erdenesaikhan. (2008) *Institutional structures for environmental management in Mongolia.* UNDP Strengthening Environmental Governance in Mongolia. Ulaanbaatar

TRAFFIC (2007) The State of the Wildlife Trade in China. Hongkong. http://search.atomz.com/search/?sp_a=sp1003bbd0&sp_q=china&sp_p=all&sp_f=ISO-8859-1

Tsegmid, Sh. (1961) Geography of the Mongolian People's Republic. Ulaanbaatar.

Tseveenmyadag, N and Bold, A. (2006) Additions and changes to the bird list of Mongolia. *Biology. Proceedings of the Biological Insitute. № 26. p.129-133* (In Mongolian)

UNDP (2006) Project Document "Community based conservation of biological diversity in the mountain landscape of the Mongolia's Altai-Sayan ecoregion" Ulaanbaatar, Mongolia

UNDP (2007) Semi Annual Report January to June 2007 "Community based conservation of biological diversity in the mountain landscape of the Mongolia's Altai-Sayan ecoregion" Ulaanbaatar, Mongolia

UNDP (2008) Terminal Report: Sustainable Grassland Management Project MON/02/301 Ulaanbaatar.

Uvs *Aimag* Government (2008a) Uvs Province Development Strategy 2008-2021 Ulaangom

Uvs *Aimag* Government (2008b) *Uvs Aimag state of the environment report 2004/2008*. UNDP, Altai Sayan Project (Community based conservation of biological diversity in the mountain landscape of the Mongolia's Altai-Sayan ecoregion) Ulaanbaatar. (In Mongolian)

Valutis, L and Mullen, R. (2000) *The Nature Conservancy's approach to prioritizing conservation action*. Environmental Science and Policy 3(6). Science Direct URL: http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VP6-42C654M-7&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=3fcf871b4dd73d9f017367968c9c0874

Wingard J.R. and P. Zahler. (2006) *Silent Steppe: The Illegal Wildlife Trade Crisis in Mongolia.* Mongolia Discussion Papers, East Asia and Pacific Environment and Social Development Department, Washington D.C. World Bank

World Bank (2006) *Mongolia: A Review of Environmental and Social Impacts in the Mining Sector*. Discussion Papers, East Asia and Pacific Environment and Social Development Department. Washington, D.C.

WWF (2001) *Ecoregional Climate change and Biodiversity Decline*: Altai-Sayan Ecoregion. Moscow: WWF Russia.

WWF (2003) *Conservation Action Plan for the Russian Altai Sayan Ecoregion*. Moscow: WWF Russia

WWF Mongolia and Administration of *Land Affairs*, Geodesy and Cartography (2008) *Report on integrating local protected areas in geological information system*. WWF Mongolia and Administration of *Land Affairs*, Geodesy and Cartography (In Mongolian)

Yunatov, A. A. (1968) *Forage plants in pasture of People's Republic of Mongolia*. (In Russian)

Zabelin, B.I. (1996) Research experiences of structure of numbers in wintering birds in East-Western ranges of Uvs nuur Depression. *Journal of Khovd University 7: 57-72*. (In Russian).

Zakharenka, A. (2008) *Assessment of Argali Trophy Hunting Practices in Mongolia: Management, Conservation, and Governance Implications*. University of Georgia and WWF Mongolia.

Kretschmer M and A Zemmrich (2009) Die Vegetation der Westmongolei – Vom Becken der Grossen Seen zum Mongolischen Altai. In Die Mongolie, Herausgegeben von Anne Zemmrich, Sebastian Schmidt, Sabrina Rilke, Reinhard Zölitz. Hamburg 2009. http://www.callidusverlag.de/Leseprobe%20Mongolei.pdf

Zorigt,G. (1989) *Altai Snowcock*. Ulaanbaatar (In Mongolian)

List of some relevant websites

http://birdsmongolia.blogspot.com Alex Braunlich's personal blog featuring images and related information on birds of Mongolia with emphasis on the Altai

http://darwin.defra.gov.uk/project/11025/ Cross-border conservation n strategies in the Altai Mountains by Darwin Initiative and Department for Environment, Food and Rural Affiars, UK. Most information on flora of Altai and scientific and awareness between University of Sheffield, UK, Altai Botanical Gardens, Kazakhstan, Tomsk State University, Russia, and the National University of Mongolia, Mongolia.

http://img.uoregon.edu/mongolian/index.php Archaeology and Landscape in the Altai Mountains of Mongolia, developed by the University of Oregon, giving a graphic and text resource on the Altai region with its physical character, its cultural history, and the interrelationships of monuments and landscape.

http://whc.unesco.org/ UNESCO World Heritage sites including Uvs Nuur Basin.

http://whc.unesco.org/en/list/768 Golden Mountains of Altai, UNESCO World Heritage site, Russia containing site specific information documents and graphical images.

http://www.altai-sayan.org/territ/ UNDP/GEF Project "Biodiversity Conservation in the Russian Portion of the Altai-Sayan Ecoregion" website containing relevant information and landscape maps of the region.

http://www.econet.mn/?page_id=9 comprehensive information, location and images on Mongolia's protected areas developed by WWF Mongolia Programme.

http://www.iucnredlist.org/#nogo1 The IUCN Red List of Threatened Species™ provides taxonomic, conservation status and distribution information on plants and animals that have been globally evaluated using the IUCN Red List Categories and Criteria.

http://www.ramsar.org/ The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. Mongolia has signed and registered a number of sites.

http://www.wscc.org.mn/IBA.html International Bird Life's sites for recognition as being globally important habitat for the conservation of bird populations.

http://www.mbforagecouncil.mb.ca/foragegrasslandmanual/6pesticidesdisease/67grasshopperbiologycontrolandscouting/default.aspx Grasshopper Biology.

Annex 1 Population, Infrastructure and Economy

1. Population size, characteristics, distribution and trends

The Altai has had a long history of human occupation, and there are numerous archaeological sites, including deer stones, tombs, cave-paintings and the ruins of former settlements in the area.

Mongolia's population rose from 758,000 in 1950 to an estimated 2.64 million by 2007, and is still rising at 1.4% per year (Mongolian Statistical Yearbook, 2007). The CIA (2008) estimate for 2008 is 2.9 million and others think that the population is already over 3 million. There is a national census due in 2010.

The fertility rate is 2.3 children per woman, and this, together with an age structure of 50.3% of the population less than 25 years old will ensure that the population continues to grow significantly over the next 30 years.

The population of the main Altai *aimags* (Bayan Olgii, Khovd and Uvs) was 269,800 in 2007 and 270,000 in 2004, yet those three *aimags* have the highest natural rate of increase (births per thousand minus deaths per thousand) in the country (18.0), and the same three *aimags* have by far the highest proportion of households with four or more children aged over 16 (Mongolian Statistical Yearbook, 2007). Significant migration of people to the capital, Ulaanbaatar, and possibly (net from back and forth migration) to Kazakhstan results in a steady, or decreasing, local population despite the high rate of natural increase. The rate of migration is highest among the younger age groups.

The total human population of the three western *aimags* (Khovd, Uvs, and Bayan Olgii)[18] increased from 228,100 to 269,800 (an annualized increase of 0.83%) over the last 20 years. There are an estimated 156,900 people living in the 104,250 sq km of the Strategy's focal area (60% of the combined population of the three western *aimags*). Overall population density in the three *aimags* is low (1.4 per sq km), and 1,51 per sq km in the Altai landscape itself, compared with 1.68 for the country as a whole. Seventy percent of the population of the three western *aimags* live outside the *aimag* centres, and approximately 25% are full time herders.

2 Education and health

With a mean literacy rate of 96.9%, the region's population is generally well educated, although many rural secondary school students have to live in dormitories away from home. There are 20-30 secondary schools in each *aimag* centre, a major university in Khovd, a minor university in Ulaangom, and colleges in all the *aimag* centres.

Life expectancy at birth in the Altai *aimags* ranged from 64.0 in Uvs to 68.2 in Bayan Olgii in 2007, a significant increase over the previous 15 years - from 61.6 and 65.1 respectively. Regional health care and medical facilities are generally poor, and a recent survey carried out by Mercy Corps (Hilbruner and Murphy, 2008) found that 7.9 and 13.4% respectively of the surveyed households in Ulaangom and Khovd city had eaten from less than five food groups in the previous 24 hours, indicating poor dietary diversity. The overall scores indicated a level of household dietary diversity similar to that found in Mali and much lower than in other Asian countries, like Vietnam and Bangladesh. There are dedicated health care professionals in each *aimag* and *sum* centre but they are hampered by poor facilities and drug supplies. Emergency transport from distant *sums* can be difficult or impossible due to the poor road conditions and harsh climate

[18] The Altai landscape depicted in Map 2 covers the whole of Bayan Olgii *aimag*, most of Khovd *aimag*, and parts of Uvs and Gobi Altai *aimags* (Map 6). Government statistics are readily available for *aimags* so figures for whole *aimags* are used when figures for the depicted landscape are not available.

3. Infrastructure

3.1 Transportation

The Mongolian Altai region's transportation network is poorly developed and dominated by dirt roads: there are only around 250km of paved road in the western three *aimags* combined, and multi-tracking is common, with many of the dirt road routes offering a choice of paths several km wide. All journeys between *aimags* and most of the journeys to and from Ulaanbaatar are by road. There are a few scheduled bus services but they rarely run on time, as, like the private hire cars and mini-buses that ply the routes, they tend to wait until they have a full complement of paying passengers before they start. Travel times are unpredictable and although the advertised journey time between Bayan Olgii and Ulaanbaatar is around 48-50 hours, accidents and breakdowns are a constant hazard and often extend the journey by hours if not days.

There are about 10,700 vehicles (60% of them cars) registered in the western three *aimags*, and this number has risen by about 10% over the last four years (MSYB, 2007). Lorries and mini-buses carry freight between the region and Ulaanbaatar, China and Russia. In 2007 Khovd transportation turnover was 85m tonne-km and passenger turnover 16,185 man-km.

New road construction projects are planned and underway. The Asian Highway 4, a road from China through Bulgan to Khovd and Bayan Olgii and on to Russia will begin construction this year with the help of a loan from the Asian Development Bank (see Figure 7). It is expected that completion of this will produce an economic return of 8-10% through acceleration of economic development with China and Russia in the agriculture and mineral sectors (ADB, 2007).

3.2 Communication

Sum and *aimag* centres are well connected through telephone and radio communication and internet is readily available in *aimag* centres and even in some *sum* centres. The mobile phone network extends to all *aimag* centres and also to some *sum* centres. For example, there are 13,882 mobile phones in Bayan-Olgii *aimag* shared among a population of ca 100,000.

3.3 Energy sources

Uvs, Khovd and Bayan-Olgii *aimags* buy their power from Russia for cash. It is delivered from the Khakas hydro-power station through a massive pylon system. Periodically the supply is cut off for maintenance or when the *aimag* authorities fail to pay the electricity bills. In 2008 the pylons blew down after people stole vital bolts. Most *sum* centres are on the same supply, but there are a few *sums* in each *aimag* that remain outside the grid. Gobi-Altai *aimag* uses diesel generators. The Durgun hydro-electric plant on the Chono Kharaikh River downstream from Khar-Us Lake (Figure 9) is currently operating in test mode, due to be expanded to full operation in 2010, but there are already serious concerns about the water level and the viability of the plant. There are smaller hydro-plants planned, under construction, or operational in Bulgan, Uench and Monkhkhairkhan *sums* in Khovd *aimag* and at Kharkhiraa tourist camp in Uvs *aimag*.

Renewable energy from solar and wind powered generators is important for herders as power sources for lights, radios, televisions and other small appliances, and is also used in *sum* centres. Twenty thousand of the 30,000 rural herder households in the three western *aimags* had electricity to some extent in 2007.

3.4 Wells

Drilled, short-piped and mine wells supply water for herders, livestock, *sum* and *aimag* residents, and for irrigation of arable land and tree plantations. In the past much of the pasture land was irrigated. In 1989, for example, about 65.4% of total pasture land in Mongolia was irrigated by 29,000 engineering wells, and 14,000 mine wells, but between 1990 and 1998 the vast majority of the wells failed due to lack of maintenance, or theft of parts. There are now 349 wells in the three western *aimags*, 119 of them in Bayan Olgii. Livestock are also watered at lakes and rivers. Many of the lakes are mineralized and not suitable for livestock watering, but some are used nonetheless.

4. Economy

Most people in the Altai are involved in agriculture, mainly transhumant pastoralism, with some crop cultivation. Raw livestock products, mainly meat, leather, wool, cashmere and dairy, provide the main source of income for rural families. The proportion of the population that is rural is approximately 70%, and there is evidence that this proportion has increased by between 1 and 2% according to *aimag* over the last four years (MSYB 2007). Every year some people give up herding but others take it up. Absentee livestock owners who live in the *aimag* centres or even in Ulaanbaatar employ herders or share-farm with relatives, and the herds may number over 1,000 head.

4.1 Livestock herding

Livestock numbers have rocketed in recent years in Mongolia, with official figures for the whole country reaching 40.2 million in 2007 and 43.2 million in 2008, although some reliable experts think that the real figure may already be around 53 million. Livestock numbers in the Altai have increased in parallel with the national herd (2007 official figure is 6.8m head), and are shown in detail in Annex 5. This follows years during which the national herd fluctuated between about 22 and 28 million, rising to 30.2 m in 2000, dropping back to 23.8m in 2002, and then rising relentlessly to the current unprecedented levels. The composition of the national herd has changed dramatically, with goats now the most abundant species: whereas until the early 1990's goats made up about 20% of the national herd, they now account for about 45% of it. Government has encouraged cashmere production, most recently by providing a cash subsidy (equivalent to 5,000 togrogs per goat) for goat herders in winter 2008/09 to compensate for low cashmere prices. There is a head tax on livestock beyond the first 20 sheep forage units[19] of 75 togrogs per SFU paid in two instalments per year. There are discussions in parliament in June 2009 about exempting herders from paying of personal income tax, and about lifting the current export tax on cashmere.

4.2 Cultivation

There has been an increase in urban based agriculture in recent years, especially crop farming. Thirty-eight percent of Khovd city and Ulaangom households reported that they had access to plots for agriculture (median size about 0.1 ha) but despite the large number of households with access to land, urban agriculture is relatively uncommon with only 11% of these households participating in any type of agricultural production. About 6% grew fruits or vegetables, most commonly potatoes, carrots and turnips, and about 6% raised livestock, mostly cows and sheep, and this production was used primarily to supplement household consumption rather than for income generation. Although current participation in urban agriculture is low, there was strong interest in initiating or expanding agricultural production (Hilbruner and Murphy, 2008).

Vegetable and potato harvests have increased greatly in Khovd *aimag* in recent years (from 10,700 t in 2004 to 19,000 t in 2007) but have decreased, or increased only slightly in the other *aimags*. Bayan Olgii and Khovd in particular provide a lot of their own vegetable requirements. Some necessary commodities are imported from China and Russia. In Ulaanbaatar free training courses in horticulture have been made available to people who have recently obtained land under the registration scheme whereby 0.07 ha per person can be allocated for building and agricultural use.

4.3 Income and food security

The mean monthly income of a Bayan-Olgii household (rural and urban combined) is reported as 207,000 togrogs (Davkharbayar, pers comm., 2009). Mercy Corps (2008) reported mean total monthly income for Ulaangom and Khovd city residents as 139,000 togrogs. The 2008 minimum subsistence level for the western region (five western *aimags*) is Tg70,700. Thirty-two percent of the national population consumed below the minimum subsistence level (or poverty line) in 2006 (MSYB, 2007); the figure for the western region is 38.7%, which is the highest regional figure in Mongolia. These figures indicate considerable inequity in income distribution.

Official unemployment rates range from 2.1% in Khovd to 5.3% in Bayan Olgii, compared with 2.8% for the whole country, but these figures omit unregistered unemployedand do not reflect accurately

[19] 1 Sheep = 1 Sheep Forage Unit (SFU);1 camel = 5 SFU;1 Horse = 7 SFU;1 Cow = 6 SFU;1 Goat = 0.9 SFU

the extent to which lack of income is affecting people's lives. An interview based survey of food security and livelihoods in Khovd and Ulaangom (Hilbruner and Murphy, 2008) showed reported rates of unemployment of 21.7% and 23.8% of the workforce in Khovd city and Ulaangom respectively, with 75.5% and 51.6% respectively of this unemployment already lasting over one year. Many people felt insecure in their jobs too, with 4.3% of Khovd employees and 7.1% of Ulaangom employees reporting that they were not certain that their jobs were secure. In the *aimag* capitals the most common occupation of the employed workforce is small business or self-employed (ca 47% for Ulaangom and Khovd; Hilbruner and Murphy (2008)) followed by ca 31% in government service (including civil service, health, education, communications, utilities and infrastructure) and then factories, mining, agriculture and food production.

UNDP, UNICEF and FAO (2007)[20] concluded that livestock based agriculture provides rural households with sufficient quantities of meat and dairy products and that informal safety nets are strong. However, food insecurity is growing in urban areas. Hilbruner and Murphy (2008) found that about one third of households in Ulaangom and Khovd city were food insecure, a category that ranges from having had nothing to eat for 24 hours (4.0 and 2.4 % respectively in Ulaangom and Khovd) to concern that the household will not have enough to eat (28.1 and 23.0 % respectively).

4,4 Harvesting of wild animals and plants

Many people kill wild animals, either through deliberate hunting or opportunistically when they see them. They also collect a range of wild plants for food and medicine and fuel, cut trees for construction and collect firewood, sometimes whole trees.

There is a market for foxes and other small predators, and there is a licensing system too, that is poorly enforced. A wide range of animals and plants are taken, some of them for profit, others for domestic consumption and use, and Saker Falcons are taken for export under arrangements made centrally in Ulaanbaatar.

4.5 Gross Domestic Product

The regional economy is based largely on livestock based agriculture including wool, cashmere, and meat. Gross Domestic Product in the western region (five western *aimags*) roughly doubled between 2004 and 2007 to 340 billion togrogs: agriculture accounted for 70.5% of GDP in Uvs and 83.4% in Bayan Olgii, with 4.0% and 1.1% respectively taken up by industry and construction, and the rest by services (MSYB, 2007). There are exports of Sea Buckthorn, salt, fish and Mongolian gers. In turn, food and common commodities are imported from Russia and China. Mining and tourism are growing in importance in all three western *aimags*.

4.6 Mining

Mining will play an increasing role in the Altai region economy. Coal mining provides electricity and heating; alabaster and loam are used in building materials; and gold, silver and tungsten are mined. There are gravel digging operations upstream on the Buyant River and raw materials for bricks and other products are dug too. Details are given under Section 2.8 and in Annex 5.

4.7 Manufacturing

There is little manufacturing in absolute terms but for the size of the population it is appreciable. It mainly consists of food and drink production, and processing of wool and skins into felt and other products. There is also some wood processing in Uvs *aimag*.

4.8 Tourism companies and their operations

Bayan Olgii has a number of tour operators based in the *aimag* centre, five of which undertake sport hunting under the aegis of hunting operators in Ulaanbaatar, but there are none in the other *aimag*

[20] **ftp://ftp.fao.org/docrep/fao/010/j9883e/j9883e00.pdf**

centres. Many tourists come through Ulaanbaatar based tourist companies: others come on their own, either by road or by air, and hire vehicles or horses independently. There are drivers with vehicles in Khovd and Uvs who will take tourists on safari. The sport hunting operators are all based in Ulaanbaatar, but they maintain vehicles and retain drivers and other camp staff such as cooks in the *aimags*.

Tourism has grown rapidly over the last four or five years but is still low in terms of absolute numbers of visitors, with 1,200 foreign tourists and 1,000 Mongolian tourists reported by Bayan Olgii in 2008 for example, a 50% increase over three years. The mountains of the Altai, the chance to see Argali and Ibex and to be near Snow Leopards draws naturalists and those who like wild open spaces. Sport hunters come to the Altai to hunt Argali and Ibex, and also Red Deer, Roe Deer and Wild Boar. There is some sport fishing and wildfowling too.

The annual Eagle festivals in Bayan Olgii *aimag* in October attract increasing numbers of foreign and domestic tourists, and recently some have been staying on after the festival, having negotiated with eagle hunters to travel back home and hunt with them. It appears that this is becoming an established pattern.

Annex 2 How the strategy was prepared

The Strategy was developed by a joint working group from the four Mongolian Altai *aimags*: Khovd, Bayan Olgii, Uvs and Govi Altai with the assistance of members from Khovsgol *Aimag* who were present as observers learning through direct experience so that they will be able to prepare an equivalent Strategy for the Sayan Mountains in Mongolia.

1. Series of planning meetings

The process began in September 2008 with the formation of a core team under the UNDP/GEF/Dutch Government funded project "Community Based Conservation of Biological Diversity in the Mountain Landscapes of Mongolia's Altai-Sayan Eco-Region". A series of working meetings was held: Ulaanbaatar (29th September to 1st October), Khovd *Aimag* (10th to 12th December), Ulaanbaatar (18th to 21st January) and Ulaanbaatar (2-3 June). At the initial meeting in Ulaanbaatar the process and draft outline of the Strategy were agreed, and representatives from a wide range of institutions, including non-governmental organizations, government agencies, mining and tourism companies and universities and research institutes were invited to learn about the initiative and provide their input.

1.1 Landscape Species

An additional small meeting was held in Ulaanbaatar (17th December 2008) to discuss the wild species of plants and animals – the "landscape species" - that would be used to identify the main priority areas for biodiversity in the Altai Mountains landscape.

"Landscape species" provide planners with conservation targets. Without clear targets, general biodiversity conservation plans can lose direction as different people have different ideas about what they are aiming to conserve. Landscape species typically use large, ecologically diverse and therefore protect other species and habitats under their "umbrella". They are chosen also to represent a range of threats. There are five main characteristics of landscape species and these were used as a basis for assessing the "candidate" species.

1. Area (large areas protect other species too)
2. Heterogeneity (species that require a wide range of habitat protect other species too)
3. Sensitivity to threats (specific threats or a number of the general threats)
4. Ecological functionality (keystone species concept)
5. Socioeconomic significance (consider economic value – and flagship status)

The landscape species approach selects a few species for conservation attention. Meeting their needs will achieve conservation of other species and/or the landscape as a whole.

Reliable data on Altai species are sparse so this Strategy relied on the knowledge of selected experts and their input into a simple questionnaire. This pragmatic approach was used to select a suite of "Conservation Targets" to provide a focus for assessment of threats and proposed actions under the Strategy.

2 *Aimag* level coordination

The UNDP/GEF Altai Sayan Project's Local Coordinators in each *aimag* led discussions with *aimag* governors and arranged for research, collation of information, and consultation to be done by the core team and co-opted government officials in between the major workshops. The *Aimag* Governors embraced the initiative enthusiastically and issued official orders requiring government officials at *aimag* and *sum* level to collaborate in the preparation process. The Local Coordinators tried to lobby their *aimag* Members of Parliament with limited success.

3 Working group assignments

At the second and third meetings the core team and invited government officials and World Wide Fund for Nature staff members from Ulaanbaatar and from the five *aimags* were divided into working groups largely according to sectors of human economic activity (agriculture, forestry, infrastructure, mining etc). Working group membership is indicated on the participant lists in Annex 2a. The working groups were asked to produce reports on current status of their sectors in the Altai, human impacts on biodiversity, and proposals under the Strategy to address adverse impacts. At the end of the third meeting, in Ulaanbaatar, the participants were divided into a second set of working groups corresponding with specific sections of the draft Strategy, and were asked to prepare initial drafts for their assigned sections. The members from each *aimag*, under the leadership of the Altai Sayan Local Coordinators then undertook to prepare drafts of the whole Strategy according to the agreed outline, by the beginning of March. This was not done.

4. GIS analyses

In order to identify priority areas for conservation action, data on wild species, habitats, human activities, protected areas of various categories, and areas already designated as important habitat, on the one hand, and human distribution, activities, economic development plans, and exploration and mining licences on the other hand, were analysed using GIS overlays. Maps were produced to illustrate these overlaps and priorities in the Strategy. This work was done late in the process, in April 2009, and in order to prepare the Strategy according to the agreed timetable, the information available has not been used to full effect.

5. Biodiversity and threats assessment

The Strategy is based on knowledge of wild species, their distribution, movements, food requirements and breeding behaviour, on the one hand, and the range and intensity of current and potential future threats to biodiversity from human activities on the other hand, to provide a framework under which to plan conservation actions to address the threats in the most important areas for biodiversity. This include actions to maintain representative areas of important habitat types, to control hunting or collection, and to provide for the needs of the wild species in the wider landscape, including the need to move freely over their seasonal, annual and multiannual or lifetime ranges.

Each Conservation Target was assessed for direct and indirect threats and opportunities for conservation were taken into account in setting objectives and planning a programme of actions to achieve those objectives, following approximately the "conservation action planning" process proposed by The Nature Conservancy[21].

6 Review

Initial drafts of the Strategy were reviewed by Altai Sayan Project team members, workshop participants, external experts (including members of the Parliamentary Standing Committee on Environment, Food and Agriculture), and members of the public. Based on discussions at the final (June) workshop and comments received from reviewers a final version was prepared.

7 Public information and involvement

The project Local Coordinators and other members of the core team arranged meetings with the general public to introduce the concept of the landscape approach in general and the Altai strategy in particular, and to collect data on people's opinions about how they and other people affect biodiversity.

These meetings were organized to inform people about the strategy and to ask them 20 questions to test their perceptions on what impacts they have on biodiversity, what impacts other people and institutions have, whether biodiversity is important, whether biodiversity conservation initiatives are worthwhile, and what they would like to see in a biodiversity conservation programme. A University student from Ulaanbaatar, Uransaikhan, designed and carried out this study with a student from

[21] http://conserveonline.org/workspaces/cbdgateway/cap/practices/index_html

Khovd University and the Khovd coordinator for the Altai Sayan Project. A robust survey design was used, and the results are shown in Annex 16. The work served two purposes. It provided a sample of public opinion, and it advertised the Altai Biodiversity Conservation Strategy in eight *sums*. Over 700 people were questioned during the survey. Most people gave their opinion that they themselves had no bad impact on nature but that others did have bad impacts. They expressed high expectations of government to take action to improve environmental governance and were particularly concerned about the irresponsible attitudes of rangers and environmental inspectors. They said that the greatest constraints on conservation are enforcement of existing laws, and the weak performance of rangers and environmental inspectors. It is intriguing that there was no statistical difference between the results from *sums* in which the UNDP/GEF Altai Sayan Project is active (n=4) and those in which it is not (n=4).

Aimag teams held other consultation meetings with the general public in selected *sums*, and in the *aimag* centres, to inform them of the Strategy, to answer questions about the Strategy, and to collect data required for development of the Strategy.

A paper on the rationale of landscape based conservation planning in general and the Altai Strategy in particular was used to inform government officials, team members, Khovd University teaching staff, and the general public (see Annex 17). It was published in full (Independence Council of Mongolia, 2008) and, in a modified, more popular form as an illustrated brochure and distributed widely.

Annex 2a Lists of participants in working meetings

1. List of Participants at 30th September 2008 meeting in Ulaanbaatar

Government Agencies (National)		
NG	A. Enkhbat	Director, Sustainable Development and Policy Coordination Department, Ministry of Environment and Tourism National Project Director
Government Agencies (Local)		
NG	Ch. Tumendemberel	Director of Environmental Agency, Khovd *aimag*
2	D. Chinbat	Director of Khar Us lake Protected Area Administration, Khovd *aimag*
1	A. Jangirkhan	Officer of Industry, Infrastructure, and Environmental Policy Coordination Division, Bayan Ulgii *aimag*
2	A. Atai	Director, Mongol Altai Protected Area Administration, Bayan Ulgii *aimag*
2	I. Saparguli	Director, Khurkh Serkh Strictly Protected Area Administration, bayan Ulgii
2	B. Otgoi	Officer of Industry, Infrastructure and Environmental Policy Coordination Division, Uvs *aimag*
1	B. Buyantsog	Biologist Researcher, Uvs Lake Protected Area Administration, Uvs *aimag*
2	B. Undrakh	Officer of Industry, Infrastructure and Environmental Policy Coordination Division, Khuvsgul *aimag*
Universities and research Institute		
1	Mr. Batsaikhan	Department of Zoology, Faculty of Biology, Mongolian Sate University
1	Mr. Vanchinkhuu	Mongolian State University, Branch in Khovd
1	B. Nyambayar	Wildlife Science and Conservation Centre
Non-Governmental Organizations		
3	Brain Watmough	Tourism Adviser, Mercy Corp
1	B. Chimed Ochir	Director, WWF Mongolia Program office

1	Amanda Fine	Director of WCS Mongolia Program
2	L. Ochirkhuyag	Remote sensing/GIS specialist of WCS Mongolia Program
3	Shelagh Rosenthal	Program Coordinator, The Asia Foundation
1	Ms. Enkhtuya	The Nature Conservancy
2	Mr. Purevsuren	Senior Biologist, Irbis Mongolia
1	M. Badarch	Director, Mongolian Nature and Environment Consortium
Tourist Operators		
1	Jan Wigsten	Nomadic Journeys
Exploration/mining		
3	S. Ariun	Consultant, QGX Mongol LLC
NG	Glen Ainsworth	Environmental manager, Oyu Tolgoi - Ivanhoe Mines Mongolia
International Projects		
1	D. Narantuya	Coordinator, National Geo-Information Centre for natural resource management project
1	Mr. Hein Van Gils	Consutant, National Geo-Information Centre for natural resource management project ITC-NL
2	Ts. Tuya	National Project Manager, Strengthening Environmental Governance in Mongolia
2	N. Batjargal	National Project Manager, Sustainable Land Management for Combating desertification
	B. Oyuntulkhuur	Community Development Officer, Sustainable Land Management for Combating desertification
2	Eleanor Monks	Steppe Forward
2	Jon Bielby	Steppe Forward
Donor Agencies		
3	P. Suvd	Sustainable Tourism management, GTZ
1	Mr. Enkhbold	SDC
3	B. Erdene Ochir	World bank
UNDP CO		
NG	Shoko Noda	Deputy Resident Representative
1	Onno Van Den Heuwel	Programme Officer for Biodiversity Conservation
NG	Mandakh	Consultant Strengthening Environmental Governance in Mongolia
Altai Sayan Project (staff)		
NG	Ts. Solongo	Acting National Project Manager
3	L. Sugarjav	Training and Community development officer
3	Yu. Suvdchimeg	Local project Coordinator in Khovd *aimag*
2	J. Tumursukh	Local project Coordinator in Khuvsgul *aimag*
3	D. Togtokhbayar	Local project Coordinator in Uvs *aimag*
NG	Andrew Laurie	Landscape Planning expert
NG	Ms. Jargal	National Consultant on Landscape planning
3	Ulemj	Consultant in databases
3	G. Gansukh	Consultant
3	Mr. Mendbaatar	Consultant
3	Mr. Bolor Erdene	Consultant
2	Ms. Nomin	Interpreter
1	Ms. Badamlyanhua	Interpreter

Key: NG-not in specific working group,

1. WORKING GROUP 1: Is there any point in preparing this Strategy?

2. WORKING GROUP 2: Who should write the Strategy, and how should consultations be arranged?

3. WORKING GROUP 3 How should we run our public information and involvement process?

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2. List of participants at Khovd Workshop, 10-12 December 2008

Name	Affiliation and title	Working group number
Buyantsog	Uvs lake Special Protected Area Administration. Specialist	WG 8
Dashdendev	Khovsgol *aimag*. Chief specialist of environmental inspection sector	WG 9
Purevdorj	Khovsgol SPA administration, specialist	WG 5
Nyambayar	Khovsgol, Land use department	WG 7
Tomorsukh	Project coordinator, Khovsgol	WG 3
Narantsetseg	Khovsgol SPA administration, specialist	WG 8
Davkharbayar	Bayan-Olgii, Altai Sayan Project Acting Local Coordinator	WG 9
Atai	Mongol Altai Strictly Protected Area Administration, Director, Bayan-Olgii	WG 3
Otgonbaata	Khovd University, Biology Lecturer	WG 1
Khasim	Environmental Inspector, Bayan-Olgii	WG 5
Janat	Climatologist, Hydrometeorology Agency, Bayan-Olgii	WG 9
Jangirkhan	Officer of Industry, Infrastructure, and Environment Policy Coordination Devision, Bayan-Olgii	WG 2
Estai	Government officer, Land use department	WG 7
Tseveenravdan	WWF, Altai Sayan Region Office	WG 10
Onon	WWF Conservation Officer, Ulaanbaatar Office	WG 8
Batbold	WWF, Conservation Director , Ulaanbaatar Office	WG 10
Tseveenkhand	Specialist in Protected Area Department at the Ministry of Nature, Environment and Tourism.	WG 8
Ganbold	Director of Industry, Infrastructure, and Environment Policy Coordination Division, Uvs,	WG 6
Tormonkh	Climatologist, Hydrometrological Agency, Khovd	WG 1
Munkhbat	Climatologist, Hydrometrological Agency, Uvs	WG 3
Ochir	Food and Agriculture Specialist, Uvs *Aimag* Government	WG 4
Togtokhbayar	Altai sayan project, Uvs Local Coordinator	WG 3
Erdene-Ochir	Khovd *Aimag* Agriculture Department Specialist	WG 3
Tovd	Director of Environmental Agency, Gobi-Altai	WG 10
Olonbaatar	Specialist, Environmental Agency, Gobi-Altai	WG 6
Tsoodol	Journalist, Gobi-Altai	WG 2
Batnasan	Altai Sayan Project, National Project Manager	WG 10
Suvdchimeg	Altai Sayan Project Local Coordinator, Khovd	WG 1
Saparguli	Director of Khukh Serkh Strictly Protected Area Administration , Bayan Olgii *Aimag*	WG 9
Altankhuyag	Environmental Agency Specialist, Khovd	WG 6
Ganbold	Altay Sayan Project Community Empowerment and Deveopment Officer, Khovd	WG 5
Chinbat	Director of Khar Us Lake National Park Administration, Khovd *Aimag*	WG 4
Lkhagvadorj	Director of Munkhkhairkhan National Park, Khovd	WG 3
Gantulga	Khovd *Aimag* Environment Agency	WG 2
Lkhagvasuren	Head of Geography Department, Khovd University	WG 1
Myagmarsuren	Dean of Faculty of Natural Sciences, Khovd University	--------

WORKING GROUPS

WG1 Environment and Biodiversity
WG2 Human populations
WG3 Nature conservation
WG4 Agriculture
WG5 Forestry
WG6 Mining
WG7 Transport, industry and infrastructure
WG8 Tourism and sport hunting
WG9 Harvesting of wild species of animals and plants (not including sport hunting)
WG10 Water resource management

3. List of Participants at Landscape species meeting: Ulaanbaatar, 17 December 2008

Anne Winters - WCS country office, living landscape project

Suran – Botanist, Head of Botany Department at the NUM

Terbish – Zoologist, Ecology Department at the NUM

Batsaikhan – Zoologist, Department of Zoology at the NUM

Munkhtsog – Zoologist, Institute of Biology at the Academy of Science

Eleanor Monks – Zoologist, Steppe Forward Programme, NUM and Zoological Society of London

Shar – Zoologist, Department of Zoology at the NUM

Gombobaatar – Zoologist, Department of Zoology at the NUM

John Farrington – Independent expert with research background on mining and protected areas in Mongolia

Mendbaatar – Mongol Nature (contracted to project to build GIS database)

N Batnasan. Altai Sayan Project Manager

J Jargal Altai Sayan Project

A Laurie Altai Sayan Project

Batjargal, Intepreter, Altai Sayan Project

Sugarjav, Altai Sayan Project

4. List of Participants. Ulaanbaatar Workshop 18th – 21st January 2009

Name	Institution	Position	KWG	UWG
Suvdchimeg.Yu	Altai Sayan Project, Khovd	Local Coordinator	1	5
Otgonbaatar.M	Khovd University	Biology Lecturer	1	2
Lkhagvasuren.Ch	Geography department, Khovd University	Director	1	2
Jangirkhan.A	Bayan Olgii *Aimag* Government	Policy specialist	2	7
Myagmarsuren.S	Faculty of Env.Science, Khovd University	Dean	5	3
Tumursukh.J	Altai Sayan Project, Khovsgul	Local Coordinator	3	4
Atai.A	Mongol Altai Arc Special Protected Area Administration	Director	3	5
Delgermaa.D	Department for Children, Uvs *Aimag*	Specialist	8	3
Lkhagvadorj.T	Munkhkhairkhan National Park	Director	3	5
Ochir.Ya	Khovd *Aimag* Government	Agriculture expert	4	9
Togtokhbayar.D	Altai Sayan Project, Uvs *Aimag*	Local Coordinator	4	2
Chinbat.D	Khar Us Nuur Protected Area Administration	Director	4	4
Gantulga.Ts	Department for Nature, Environment and Tourism, Khovd	Specialist	2	5

	Aimag			
Akhitkhan.N	Department for Nature, Environment and Tourism, Bayan Olgii *Aimag*	Specialist	5	9
Ganbold.Z	Department for Development Policy, Uvs *Aimag*	Head	6	7
Altankhuyag.T	Governor`s Office, Khovsgol *Aimag*	Specialist of Environment	6	3
Otgoi.B	Department for Development policy, Uvs *Aimag*	Officer for Environmental Policy	7	3
Estai.J	Department of Land Affairs, Construction and Geodeay , Bayan Olgii *Aimag*	Specialist	7	6
Buyantsog.B	Uvs Lake Basin Protected Area Administration	Specialist	8	7
Davkharbayar.D	Altai Sayan Project, Bayan Olgii	Local Coordinator	9	6
Saparguli.I	Khukh Serkhiin National Park	Director	9	4
Janarguli.P	Department for Meteorology, Bayan Olgii *Aimag*	Director	10	2
Tuvd.L	Department for Nature, Environment and Tourism, Gobi Altai *Aimag*	Head	10	9
Orgiltsetseg.M	Department for Nature, Environment and Tourism, Gobi Altai *Aimag*	Specialist	10	4
Dashdendev.Kh	Department for Nature, Environment and Tourism, Khovsgol *Aimag*	Senior specialist	9	6
Tumentogs	Altai Sayan Project	Monitoring and Evaluation Officer	7	7
Sugarjav L.	Altai Sayan Project	Training and Community Development Officer	4	9
Munkhbolor G.	Altai Sayan Project	Secretary/Intepreter	-	-
Andrew L.	Altai Sayan Project	Adviser	-	-
Jargal J.	Altai Sayan Project	National Consultant	-	-
Odkhuu O.	Independent	Translator	-	-
Erdenesaikhan N	Independent	Volunteer Assistant	-	-
Ochirsukh Ya (one session)	World Wide Fund for Nature	Freshwater Programme Manager	-	-
Sanjmyatav D (one session)	World Wide Fund for Nature	GIS Specialist	-	-

Two working group divisions:
Days 1 and 2: KWG: as for Khovd Workshop (see above)
Days 3 and 4 UWG : as follows:

2. Biodiversity and ecology
3. Human populations, socio-economic conditions and trends, infrastructure and economic development plans
4. Threats to biodiversity and ecological processes and to individual protected areas
5. Current conservation policies and actions
6. Constraints to conservation
7. Proposed action programmes
9 Legal and institutional measures required to ensure implementation of the action programmes, including at state level

5. List of participants at Final Workshop in Ulaanbaatar, 2-3 June 2009

Name	*Aimag* and job title
Z. Ganbold	Uvs Policy development office
B. Togtokhbayar	Uvs Altai Sayan Project Coordinator
B. Buyantsog	Uvs Uvs Lake Basin Protected Area Administration
B. Otgoi	Uvs Policy Development Office of *Aimag* Government
Uy. Suvdchimeg	Khovd Altai Sayan Project Coordinator
D. Chinbat	Khovd Khar Us Lake National Park Administration
M. Otgonbaatar	Khovd Khovd University
E. Tumendemberel	Khovd Policy Development Office of *Aimag* Government
P. Altankhuyag	Khovd Policy Development Office of *Aimag* government
L. Tuvd	Govi- Altai Office of Nature Environment and Tourism, *Aimag* Government
A. Jangirkhan	Bayan-Olgii Nature And Environment Consortium
A. Atai	Bayan-Olgii Mongolian Altai Mountain Special Protected Area Administration
D. Davkharbayar	Bayan-Olgii Altai Sayan Project Coordinator
I.Sapargul	Bayan-Olgii Khokh Serkh Special Protected Area Administration
J.Tumursukh	Khovsgol Altai Sayan Project Coordinator
Kh. Dashdendev	Khovsgol Office of Nature Environment and Tourism, *Aimag* government
G. Munkhbolor	Altai Sayan Project Secretary and Translator
Tumentugs	Altai Sayan Project Monitoring and Evaluation Officer
Solongo	Altai Sayan Project Policy Officer
Munkhbat	Altai Sayan Project Biodiversity Conservation Officer
Andrew Laurie	Altai Sayan Project-International Consultant on Biodiversity Conservation and Landscape Planning
J. Jargal	Altai Sayan Project-National Consultant on Biodiversity Conservation and Landscape Planning
N. Erdenesaikhan	Altai Sayan Project Assistant/Interpreter on Biodiversity Conservation and Landscape Planning

Annex 3 Habitats and vegetation types

Most of the Mongolian Altai consists of dry steppe and desert steppe, which cover ca 40,000 sq km (38 %) and ca 20,000 sq km (19 %) respectively (Figure 8). Forest is particularly sparse in the Mongolian Altai, covering only 1,300 sq km (1.2 %) of the delineated landscape.

1 Dry Steppe is characterized by flat plains and rolling hills covered in feather grass-sagebrush vegetation. Typical grass and sedge species include *Stipa krylovi*, *Agropyron cristatum*, *Elymus* spp., and *Carex* spp., and there are abundant herbs and unpalatable shrubs such as *Chenopodium* spp., *Artemisia* spp. and *Caragana* spp. Large mammals include the Siberian Marmot, the Corsac Fox, the Wolf, and a range of small rodents and pikas. Upland Buzzards (*Buteo hemilasius*) prey on the small rodents, and other common birds include the Desert Wheatear (*Oenanthe deserti*), and the Horned Lark (*Eremophila alpestris*). Saker falcon (*Falco cherrug*) occur here and in the other zones where they can find prey.

2 Desert Steppe, a very dry zone with annual precipitation under 100mm, and frequent high winds and sandstorms, lies between the Gobi desert to the south and the dry steppe to the north. The vegetation is dominated by low grasses and shrubs, such as *Cleistogenes songorica*, *Allium polyrhizum*, *Allium mongolicum* and *Zygophyllum* spp. Distinctive communities include *Caragana-Eurotia* and *Stipa-Anabasis*. Saxaul (*Haloxylon ammodendron*) occurs in places and is much sought after as a fuel.

Mammals and birds include Hare, Manul (*Otocolobus* manul), Cinereous Vulture (*Aegypius monachus*), Chukar (*Alectoris chukar*) and Houbara Bustard (*Chlamydotis undulata*). There are a number of species of small rodents such as hamsters (Cricetidae) and jerboas (Dipodidae) and the Long Eared Hedgehog (*Hemiechinus auritus*) also occurs here. There are Goitered Gazelle (*Gazella subgutturosa*) and Saiga (*Saiga tatarica*) in a few places, but numbers are much reduced. Far in the south of the landscape (Figure 8) there is a strip of **Desert** (1,500 km^2).

3. Forest accounts for less than 2% of the landscape. There is patchy *Mountain Mixed Forest* and *Mountain Coniferous Forest* in parts for the Altai Taban Bogd and the Turgen mountains, and there is in addition a very small amount (100 km^2) of Sub-alpine Woodland (combined with Alpine Meadow on Figure 8). Larch (*Larix sibirica*) is the dominant species, with some Pine (*Pinus sibirica* at higher altitudes and *Pinus sylvestris* lower down), and poplar, birch and willow in wetter areas. At the eco-tone between forest and steppe there is typically forest on the northern slopes of mountains and grassland on the southern slopes. This is because the sunnier southern slopes stimulate growth that cannot be maintained by the water available in the soil. The larch forests were intensively utilized in the past, growth is slow, and there is often little or no natural regeneration for several years in a row, particularly at the forest edges and in forest openings. There are patches of damp *Meadow Steppe* but this vegetation type is rare in the Mongolian Altai. In these high altitude forests precipitation can be up to 300-400mm per year, and the areas are also fed by glacier and snow melt. The forests consist largely of larch (*Larix sibirica*), with pine (*Pinus sibirica*) at higher altitudes, and there is a rich understory of shrubs and small herbs, with lichens on the tree trunks. Red Deer (*Cervus elaphus*), Siberian Roe Deer (*Capreolus pygargus*), Wild Boar (*Sus scrofa*), Red Squirrels (*Sciurus vulgaris*), Musk Deer (*Moschus moschiferus*) and Pewzow's Toad ((*Bufo pewzowi*) occur in the forest areas.

4 High Mountain Steppe (covering 14,250 sq km, or 13.7 % of the Mongolian Altai) is dominated by grasses (eg *Stipa cleistogenes, Festuca lenensis, Agropyron cristatum, Poa attenuata*, and *Helictotrichon schellianum*), sedges (eg *Carex macrogyna, C. rupestris*) and herbs (eg *Aster alpinus, Artemisia argyrophylla, Potentilla nivea, Oxytropis oligantha*, and *O. chionophila*). Edelweiss (*Leontopodium ochroleucum*) occurs here. There are tree patches on north facing slopes, mainly pine (*Pinus sylvestris*), larch, and aspen (*Populus tremula*). Red Deer, Wolf (Canis lupus), and two species of Marmot (Marmota spp.), ground squirrels (Spermophilus spp.), Red Fox (Vulpes vulpes), Corsac Fox (V. corsac), Buzzards (*Buteo* spp.) and Black Grouse (*Lyrurus tetrix*) occur in the zone but are not restricted to it.

Higher up is the Alpine Zone (ca 2.300 to 2,600 m amsl) with a range of vegetation types depending on how much water there is. Some areas are moist, fed by the glaciers and snow melt in the summer, but others are dry, and the vegetation varies accordingly.

5 Alpine Meadows cover 17,100 sq km (16.5 % of the Mongolian Altai) and typical plant species include alpine meadow-rue (*Thalictrum alpinum*), mountain saxifrage (*Saxifraga oppositifolia*), white gentian (*Gentiana algida*), *Aster alpinus*, and *Polygonum viviparum* and various high altitude grasses such as *Poa altaica*, and *P. sibirica*. The characteristic Kobresia vegetation, with several species of *Kobresia* (*Kobresia sibirica*, *K. capilliformis*, *K.filifolia*, *K.bellardii*, *K. sibirica*), *Festuca lenensis*, *Saussurea pseudoalpina*, *Hedysarum songoricum* and sedges (*Carex spp.*) lies at the top end of the Alpine Meadows. At lower levels are a few patches of moist Sub-alpine Woodland.

6 High Mountain Tundra, above about 2,600m, is covered with scattered rocky outcrops with between them a hardy low temperature adapted flora of low shrubs, herbs, sedges, grasses, mosses and lichens. There is ground birch (*Betula rotundifolia)*, *Salix caesia*, *S. nummularia*, *S. nasorovi*, *S. berberifolia*, *Rhododendron adamsii*, and *Dryas oxyodontha,* and up around 3,400m there are a few mountain meadows with sedges (*Carex melanantha*, *C. ensifolia*, *C. ledebouriana*), *Rhodiola quadrifida* and *Waldheimia tridactylides*, *Potentilla nivea*, *Lagotis integrifolia*, *Rhodiola algida*, *Saxifraga sibirica*, and *S. oppositifolia* growing between the rocks.

Siberian Ibex (*Capra sibirica*) and Snow Leopard (*Uncia uncia*) are found in the alpine zone, together with the Altai Snowcock (*Tetraogallus altaica*), the Willow Grouse (*Lagopus lagopus*) and the Rock Ptarmigan (*Lagopus muta*). Lammergeyer (*Gypaetus barbatus*), and herds of Argali (*Ovis ammon*) can also be seen in some places. There are hares (*Lepus tolai*) too, and various high altitude rodents.

The highest mountains are capped by ***permanent snow and ice***, with glaciers descending some valleys. There are over 250 glaciers which, together with the areas of permanent snow, cover about 950 km^2, mainly in the north-west where the Chinese, Russian and Mongolian borders meet. It is estimated that the amount of freshwater resources stored in these glaciers is more than 60 km^3, or about 10% of the surface water found in Mongolia. Glaciers descend to 2570m amsl in some places, and provide the main water source for the Khovd and Buyant Rivers and in turn the Great Lakes Basin. Most of the glaciers are small, less than one km^2 in area: the largest, Potanin is over 50 km^2 in area and 19 km long. There is considerable evidence of retreat of glaciers as a result of climate change.

7 Rivers, Lakes and Riparian Forest

Along the rivers running from the mountains through the steppe were strips of forest, often hundreds of metres wide, that are now largely gone in most areas. There are significant remnants, especially on the Turgen and Khovd Rivers in Uvs *aimag*, and upstream from Achit Nuur on the Bukhmoron River, and there have been successful attempts to restore **riparian forest** by simply fencing against livestock and stopping or restricting access for firewood collection. Willow (*Salix* spp) and Sea Buckthorn (*Hippophae rhamnoides*) are common species in this riverine forest. In their natural state these forests would be occupied by Wild Boar, Red Deer, Red Foxes and Eurasian Badgers (*Meles meles*).

The rivers in the Mongolian Altai receive 50-70% of their water from melting snow and ice (Soninkhishig 2009). Almost all the rivers drain into the enclosed inland lakes of the Uvs and Great Lakes Basins (Figure 2). The main exception is the Bulgan River drainage in the south which becomes the Ulungur in China and flows into the Ertix and thence to the Irtush and Ob drainage and north into Russia. There is a small drainage from the main Altai Range south of Lake Dayan that also feeds the Irtush (Ob) watershed. Some rivers (eg R. Uench and R. Bodonch) flow into the Gobi and disappear there, and others drain into enclosed lakes within the Mongolian Altai (eg R. Zuil to the mineralized L. Tonkhil) (Figure 9).

There are both freshwater and salt lakes within the Altai landscape, and they offer a range of different edge habitats, including reed beds, mud flats, rocky shorelines, ponds and marshland. Lake Achit (see Figure 9) at ca 1400 m amsl is a freshwater lake sourced by rivers and streams from both Siilkhem to the north and Turgen to the east and its outflow passes into the Khovd River and downstream to the Great Lakes Basin. Uureg lake is a saline lake located in an enclosed hollow

between Tsagaan Shubuut Uul and Turgen Uul without outflow and with a high evaporation rate (ca 800-900 mm annually). Namiryn Khar Us and Shaazgai are mineralized lakes at ca 1600m and 1700m above sea level in the north of the region.

The freshwater Dayan, Khoton and Khorgon Lakes, lie at over 2,000 m amsl and are fed by rivers and streams from the Altai Taban Bogd mountains and glaciers. They are extremely cold (Khoton Lake reaches only 6 – 9 deg C at the surface in June) and they flow out eventually to the Khovd River (Figure 9). Fish, waterfowl and shorebirds are common in these lakes. Tonkhil and Ikhes Lakes are mineral lakes of tectonic origin lying at 2,000 and 1,600m above sea level. There are crystallized salt deposits, largely sodium chloride (Soninkhishig, 2009), on the bottom and along the beach, and the Ikhes salt and saltpeter deposits are collected for local use. The bottom of Ikhes is covered with black methane mud, and the shoreline features reed beds.

Tolbo is a large freshwater lake (area 185 sq km) lying above 2,000m fed by over ten inflowing rivers from the surrounding mountains, many of which (eg Khungui, 3863m) are capped with ice. L. Tolbo flows, intermittently, into the Turgen river and thence to the Umnu river. These rivers dry up when the lake water level is low (Tsegmid, 1961).

The rivers and freshwater lakes of the Altai landscape (as delineated in Map 2) support a relatively narrow range of fish species. Two species of *Oreoleuciscus* (osmans) one or possibly two species of *Barbatula* (stone loaches) and two species of *Thymallus* (graylings) have been confirmed but the taxonomy is under review. Wildfowl and shorebirds rest and breed on mineral and freshwater lakes. Some of the lakes, notably Achit Nuur are Important Bird Areas (see main text Section 5.4.2).

Annex 4 Ecosystem fragility

1 Soils

The extremely harsh climate of the Altai mountains, which leads to repeated thawing and freezing, the steep slopes, and the very short summer growing season, make the soils inherently unstable. Once the surface has been damaged it is easy for erosion gullies to develop and expand constantly in runaway fashion.

Livestock herding threatens such soils even at stocking rates that would be sustainable at lower altitudes, on more mature soils. It is relatively easy to reach grazing or trampling intensities that damage the soil structure itself. Constant use of the same route by livestock causes erosion that can spread easily, and excessive trampling reduces the capacity of the soil to absorb water, thus encouraging streams to develop with resultant erosion below.

Crop cultivation damages soils too, through wind and water erosion, when carried out on land that is not resistant to removal of its protective layers of vegetation and the destruction of its surface structure. Cultivation reduces soil fertility, and wasteful farming practices such as cultivating patches for one year only and then moving on to plough new land lead to widespread damage to biodiversity. The natural rate of development of mountain soils is too slow to compete with the dry conditions, the winds, the low temperatures and short summer season of the Altai, so farming practices that may be sustainable in warmer and wetter areas should not be adopted uncritically and without proper assessment, in the Altai.

Any activity, such as off-road vehicle use, mining, or road construction for example, that removes the vegetation and damages the soil surface can easily lead to disappearance of vegetation, runaway erosion gullies, and silt accumulation downstream, if not managed properly.

2. Water

In mountains it is easy for activities at high altitude that affect water quality and water quantity to lead to widespread impacts downstream. Downstream ecosystems are adapted to particular timing of flood and dry periods, or to irregular water flow, and species feeding and breeding cycles can be disrupted by changes in this timing. Wetlands and soils that hold water act as sponges or reservoirs of water that is released slowly in times of drought. The Altai hold water in permanent snow and glaciers, in the soil and underground supplies and in the lakes, many of which are heavily mineralized. Water descends either on the surface, including in streams and rivers, or underground, or by a combination of the two routes. The surface route leads to rapid and substantial fluctuations in supply downstream: the below ground route results in absorption of water in the soil and transpiration losses, but to less fluctuation in supply downstream. Anything that leads to more water taking the surface route leads to greater and more frequent fluctuations in supply downstream and this has impacts on human domestic and industrial use, on hydropower, cultivation, fisheries and indeed nature conservation through impacts on protected areas. Although soil types, the intensity of rain and snow and ice melt and the capacity of the valleys for water storage have their impacts, the fundamental requirement to ensuring that more water takes the below ground route is maintenance of a good vegetation cover in the mountains.

Water pollution in mountains has the potential to have widespread impacts downstream – in increased siltation for example, and both organic and inorganic pollution. Rivers from the Altai feed into the Gobi desert of Mongolia and China, the Arctic Ocean, and into enclosed lakes such as Lake Khar Us and Lake Uureg. Fragile mountain soils, once eroded, tend to lead to high silt loads in the rivers and ultimately cause shallowing of lakes downstream. As many of the lakes have no outlets, so changes in the amounts of dissolved and particulate minerals in the rivers have important impacts on the mineral composition of the lakes.

3 Grassland

Productivity is generally low at higher altitudes and with the short growing season imposed by the Mongolian climate soil damage is slow to repair. Grasses and forbs provide a protective cover to the soil and if that protective cover is destroyed productivity declines and may not recover. The best livestock grazing systems use domestic animals that mimic the original wild fauna. However, some of the species used in mountains, for example horses and cattle, are better adapted for lower altitudes and their feeding styles can damage the soil surface beyond its tolerance for recovery. Livestock are grazed in the Altai both at high altitudes, including on steep slopes, and at lower altitudes on extremely dry land. The plant cover must fulfil the function of resisting erosion, and if it is reduced beyond a certain threshold it can no longer do that. Soil compaction on steep slopes leads easily to gully erosion, so simply the presence of too many animals can set off runaway erosion in some areas. Carrying capacity of livestock is therefore low both on the dry lower areas with variable rainfall and plant growth and on the higher areas.

4 Forest

The capacity of forests to regenerate on steep slopes, poor soils and under the prevailing climatic conditions of the Altai is low. These forests, or forest patches, are particularly sensitive to human-induced ecological disturbances and to changes in climate, and any harvesting of trees beyond the natural capacity of the forest to regenerate itself has far reaching risks both locally through climate amelioration, the loss of specialized habitat for wild species, the loss of minor forest products used by local residents, and downstream through soil erosion following removal of the soil's protective cover of vegetation.

These boreal forests have evolved under a natural disturbance regime that included periodic fire: when this natural ecological condition is removed and when the total area of forest has been reduced the remaining patches are at risk either from more frequent fire regimes than they are adapted to, which lead to depleted forest stands, or by catastrophic fires that follow years of assiduous protection from fire by well-meaning but misguided forest managers and destroy every standing tree. There is a constant flux between the steppe and the forest, with the forest edge retreating and advancing according to changes in the grazing/fire balance. With too frequent or intense fires, the forest edge retreats and forests shrink in size. Larch and *Pinus sylvestris* are resistant to fire to varying degrees, but *Pinus sibirica* is not.

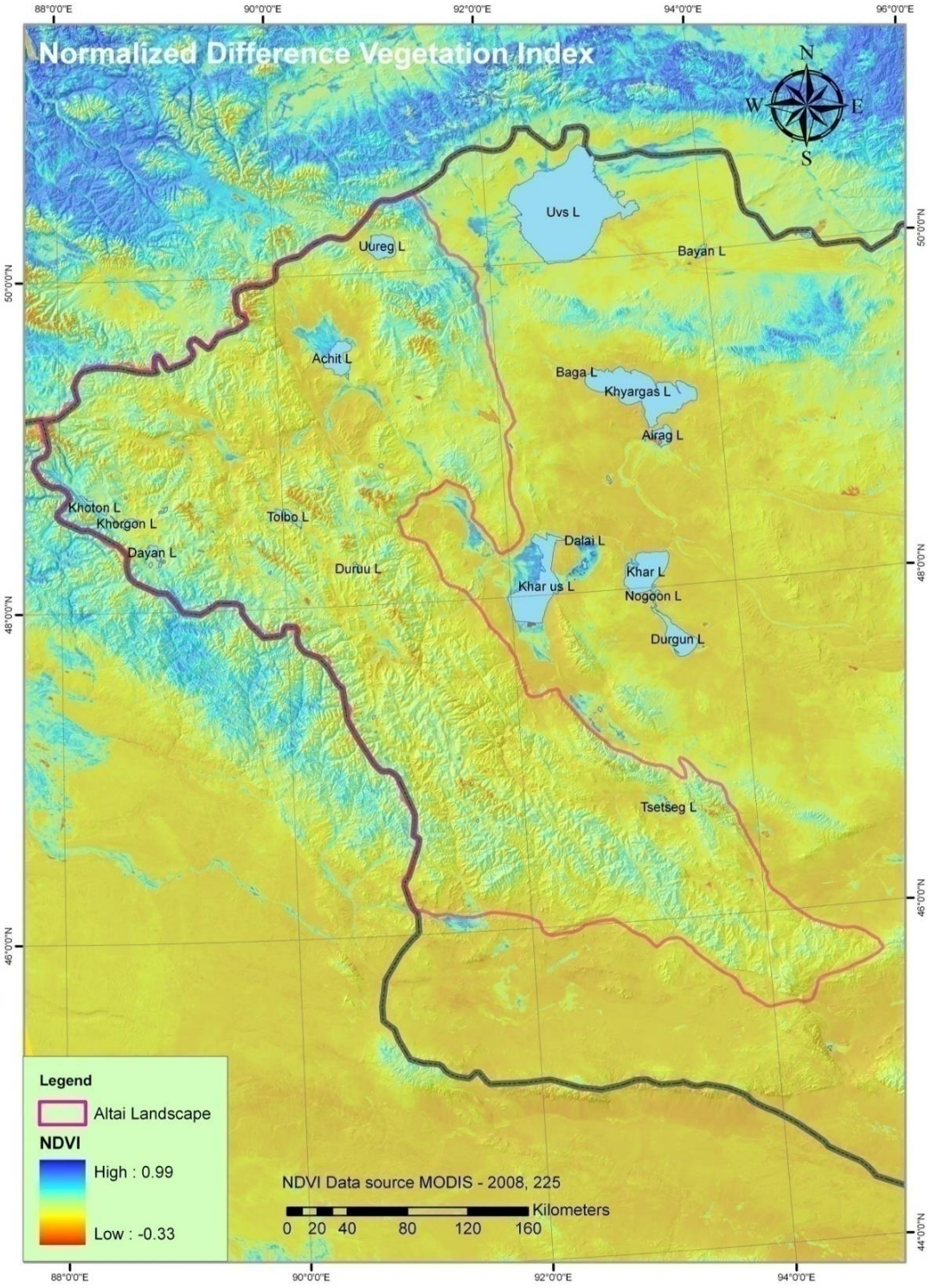


Figure 20 Normalized Difference Vegetation Index (NDVI)

Secondary forests never reproduce the qualities of natural stands, and, particularly in the Altai, overutilization followed by attempts at reafforestation leads to the loss of the natural forest ecosystem, soil damage and erosion. Exploitation of natural stands is possible with extreme care and for a

relatively low sustained yield, but the natural growth rate of larch and pine forests in the Altai is estimated at less than one cu m per ha per year. There really is no scope in the Altai for fast growing firewood plantations, whether of native or exotic species. Working on the rule of thumb for requirement per household of 20m^3 per year the requirement in terms of forest area to satisfy a single household is 20ha. With native birch and aspen the natural growth rate might reach two cu m per ha per year, but this is based on stand management techniques rather than the energy plantation techniques of harvesting the whole plantation together.

5. Wild animals

Mountain species in general tend to live in the open so the large ones are not sheltered by vegetation. Red Deer in the Altai tend to stay in or near the remaining forests, but the Argali and the Ibex live in the open at high altitudes and use inaccessible peak country as their shelter from disturbance and hunting. Although there are many examples of herds becoming habituated to local livestock herders, in general most of the wild ungulates stay away. Argali and Ibex share their food with domestic livestock: there is competition for food at high altitudes in summer, and often exclusion altogether from important lower altitude grazing areas in winter. Maroney (2004) noted that seasonal movements of herders increasingly encroached on Argali habitat that was previously lightly grazed or not grazed at all by domestic livestock, and that this change in herding practices largely displaces Argali into marginal areas inaccessible or otherwise unsuitable for livestock, possibly increasing winter mortality as a result. As food is scarce and the domestic livestock are not as well adapted to grazing at high altitudes the wild species suffer from damage to the sward caused by the domestic livestock's feeding methods. Large variations in climatic conditions from year to year can lead to big differences in the sustainable offtake of any harvesting operations from year to year, so any long term commercial operations that rely on markets that require a constant annual supply risk damage to the populations of animals that are being harvested.

6 Wild plants

Certain wild plants are adapted to the particular mountain conditions and to being grazed by native species or to growing in swards grazed by native species, but cannot survive when the rangelands are intensively grazed by domestic livestock.

7 Contrast with Russian Altai

Figure 20 is an example of a Normalized Difference Vegetation Index (NDVI) image for the Altai from 2008. NDVI is usually used to assess live green vegetation. The forests of the Russian Altai and the Chinese border area appear to contrast sharply with the more open vegetation of the Mongolian Altai.

Annex 5 Major threats to Biodiversity in the Mongolian Altai

1 Livestock grazing

Overgrazing is the clearest immediate threat to the ecosystems of the Altai. Anecdotal evidence for this is strong: local residents commonly comment on the degraded nature of rangeland that they have watched over the last 20 or 30 years, although they often ascribe this to lower rainfall as a result of climate change rather than to overstocking. Meteorological data show that there has been no reduction in annual precipitation in the past 30 years (main text, Section 2). Government officials and scientists observe that there is considerable rangeland degradation due to overgrazing in Bayan Olgii, Khovd and Uvs *aimags*. In 2003 the Animal Husbandry Institute indicated that nearly 7% of Mongolia's pastureland was heavily degraded and an additional 63% was under threat of heavy degradation, compared with 35% under such threat 6 years earlier. More recent estimates suggest that the area currently degraded is now close to 70% of the pasture area (UNDP, 2008).

Casual observations quickly establish an association between livestock grazing and short grass with at best a lot of soil showing (low basal cover), and at worst totally bare ground at worst. Goats and sheep can be seen feeding on large areas of almost totally bare ground with only the occasional grass plant or forb, moving rapidly over the landscape to find enough to eat. And yet there is almost instant springing up of tall vegetation anywhere fenced to exclude livestock. The Przewalski Horse Association takhi reintroduction project at Khomintal east of the Altai in the Great Lakes basin has shown that livestock exclusion leads to lush growth of grass within months[22].

Some scientists argue that as rainfall and grass productivity varies greatly between years it is this variability more than the actual stocking rate that has the greater influence on production each year. This may be true, but the overall stocking rate must lead to a cumulative deterioration in range quality if overuse in any one year affects the ability of the rangeland to recover in a wet year. So it is dangerous to stop being concerned about stocking levels.

Overgrazing (a) destroys vegetation and, through soil damage, the potential of the land to produce vegetation in subsequent years,
(b) through differential grazing pressure creates a sward in which unpalatable species predominate and
(c) through destroying soil structure causes erosion, and siltation downstream leading to shallowing of lakes, and potentially to disruption of fish spawning, and aquatic bird feeding too.

Overstocking per se leads to erosion too, through soil compaction, and adds to organic pollution downstream through eutrophication. There is clear evidence of eutrophication in the Altai correlated with livestock numbers (Soninkhishig, 2009): dung and carcases could be the means of this. Large numbers of domestic livestock result in exclusion of wild animals from important feeding sites even in the absence of technical overgrazing. Anecdotal reports indicate that large Argali rams are no longer, or are rarely, seen. Fewer large rams could be a result of both hunting and food stress.

1.1 Livestock numbers

There has been an enormous increase in number of livestock over the last five years, rising from a total of 4.0 million in 2002 to 6.8 million in 2007. The goat population has risen fastest,from 1.76 million in 2002 to 3.37 million in 2007 and now make up half the livestock population. Table 14 indicates a marked rise in a) total numbers and b) the proportion of the Altai herd made up of goats. Goats now make up 49.4 % of the herd in the three western *aimags* - up from 23% in 1989, 32% in 1995, and 44% in 2002. There are signs of nutritional stress in the herd. Large numbers die each winter, the proportion of females giving birth and the proportion of young animals in the population are both lower than normal for healthy animals in good condition.

[22] http://www.takh.org/Downloads/

Table 14 Number of livestock in four *aimags* in 2002 and 2007

Livestock species	Uvs	Khovd	Bayan-Olgii	Total
Camel 2002	14,800	16,800	6,900	37,500
2007	16,500	18,100	4,300	38,900
Horse 2002	60,900	63,200	60,600	184,700
2007	84,800	92,200	65,700	242,700
Cattle 2002	83,100	72,400	84,300	239,800
2007	130,200	115,200	94,800	340,200
Sheep 2002	754,700	512,900	540,600	1,808,200
2007	1,278,200	907,200	641,000	2,826,400
Goat 2002	556,800	658,600	542,800	1,758,200
2007	1,143,800	1,431,600	791,600	3,367,000
Total 2002	1,470,300	1,323,900	1,235,200	4,029,400
2007	2,653,500	2,564,300	1,597,400	6,815,200

Traditional livestock grazing patterns way in the past had longer rotation periods than modern practices: there is a trend towards less movement of herds now, which exacerbates the problems of overgrazing in certain areas. However, even assuming that the herds could use larger ranges than they do at present and more evenly, there is evidence that the regional (and national) livestock herd is too big. The National Agency for Meteorology, Hydrology and Environmental Monitoring (NAMHEM) calculates carrying capacities for livestock based on standard measures of grassland health and animal consumption, and it is clear from their work that there are too many livestock in the Altai. Duut *sum* in Khovd *Aimag* is estimated to be grazed at nine times the carrying capacity for example. There is great reluctance to reduce livestock numbers. Individual herder households clearly need a certain number of livestock in order simply to survive in their current way of life, and standard figures for this are published. Prices fluctuate greatly: last year the price of a sheep fell from 50,000 to 15,000 togrogs or less, so no one wanted to sell livestock at the beginning of the winter.

1.2 Livestock condition, survival and birth rates

Mortality over the 2008/09 winter was high in the Altai, with herders losing large numbers of their livestock to starvation. Poor condition undoubtedly contributes to winter mortality: it is a vicious cycle, with increasing numbers of animals in poor condition suffering increasing winter mortality. The survivors are in poor condition too: there are reports of high rates of abortion and failure to give birth, among sheep, and extremely high infant mortality among goats this spring. One herder reported losing 70 out of 85 kids already by late April.

During the rise in livestock numbers recorded during the 1990s there was a reduction in the proportion of the animals in the national herd that were breeding females or were born that year and of birth rates, suggesting that animals were being kept until older. Honhold (1995) suggested that food stress was beginning to be apparent in reduced fertility and productivity of the herd and that falling productive capacity despite an apparent rise in animal numbers suggested that resources were already stretched in 1995. Table 15 and Figure 21 show some of the measures used in Honhold's analysis compared with the same measures for recent years for sheep, cattle and goats in the western *aimags*.

Table 15 Herd composition and birth rates (calculated from data in NSO, 2007)

Year	% of herd as breeding females			Birth Rates: number of births as percentage of breeding females		
	Goats	Sheep	Cattle	Goats	Sheep	Cattle
1986	51.2	53.9	41.8	89.7	93.5	63.2
1989	45.2	51.8	40.3	90.7	93.6	65.7
1994	45.2	45.8	39.0	80.5	84.7	65.3
2005	43.1	44.6	38.9	79.1	84.4	79.2
2006	42.6	44.6	38.9	81.3	84.2	79.2
2007	41.7	44.0	38.4	83.5	85.2	79.2

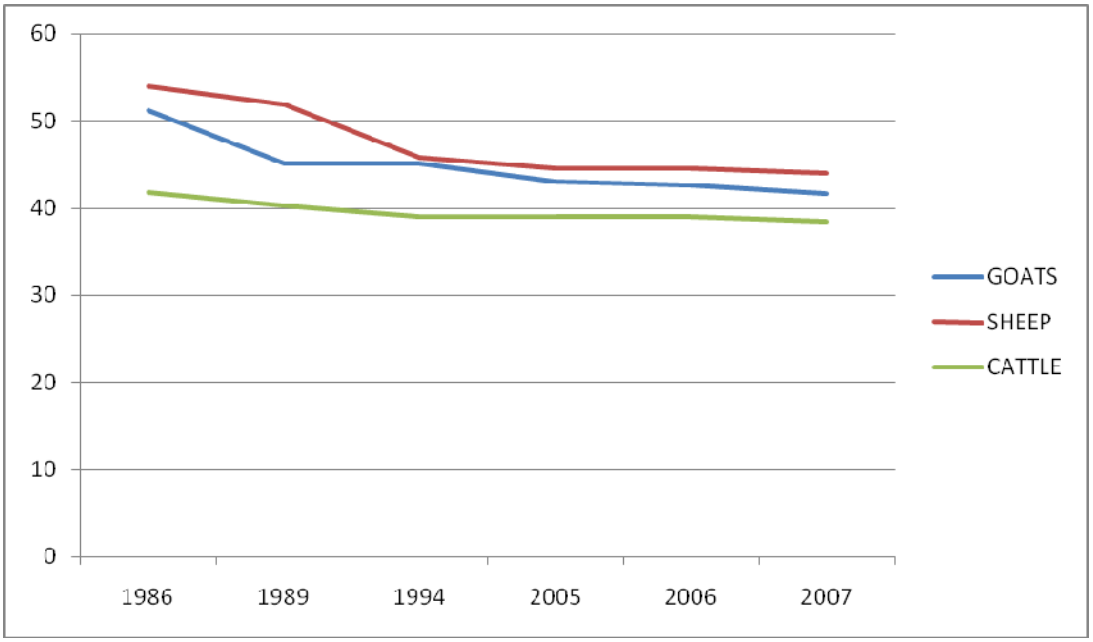


Figure 21 Percentage of herd as breeding females 1986 to 2007

Local government officials have reported damage or disturbance to wildlife habitat by livestock herds in a wide range of places. Particularly badly hit are Munkhkhairkhan and Baatarkhairkan in Khovd *aimag*, and Altai Taban Bogd in Bayan Olgii *aimag* where there are numerous livestock within National Parks.

2 Hunting for household use and for sale

A wide range of Mongolia's wild species of animals are hunted and population sizes and distributions are being reduced as a result (eg Wingard and Zahler 2006). The following species are among those being hunted: Argali, Ibex, Moose, Red Deer, Saiga, Musk Deer, Goitered Gazelle, Marmots, Mongolian Grayling, Osmans, Hare, Red Fox, Corsac Fox, Wild Ass, Wolf, Beaver, various species of wildfowl and their eggs, eggs of other species, owls, Altai Snowcock, and Brown Bear. Musk deer are hunted with dogs and snares.

Nests of various bird species are raided to provide eggs for traditional medicine, and Altai Snowcock and Willow Grouse (*Lagopus lagopus*) are also hunted for medicinal purposes and other galliformes and geese are hunted for meat. Many of the medicinal products are exported to China but the Altai Snowcock are for domestic consumption. The Snowcock are often poisoned with grain baits in large

numbers, adding a human health hazard, as the carcases are then sold on for human consumption, indeed consumption by invalids! The meat is thought to enhance healing of operation scars after operations and is even sold, frozen or dried, at or outside hospitals, sometimes through people on the hospital staff.

Marmots are hunted with guns or with gin traps at their burrow entrances, so that there is no selective cull of adults and no care for future productivity. In the Gobi Altai people have been found digging out every single marmot from the burrow system, leaving no marmots remaining and quickly exterminating the species locally for a short term profit (Tungalagtuya, pers comm., 2007). There is a lot of fishing too, much of it illegal. Potanin's Osman (*Oreoleuciscus potanini*) are harvested in great numbers from Achit Nuur: catch of five tons was permitted in 2008. Fishing from the Uvs and Bayan Olgii sides are regulated separately. Mongolian Grayling (*Thymallus brevirostris*) are harvested for domestic use.

Argali horns are also sought by commercial hunters for sale to China. Government estimates that 70-80 Argali are poached annually for medical or subsistence use (Zakharenka, 2008), but many believe this figure to be much higher. There has been a fall in the Argali population of 75%. Hunting Snow Leopard prey such as Ibex and Argali can have effects on the Snow Leopard population. Sport hunting of Argali and Ibex (see Section 4 below) is carried out without proper assessment of the population sizes, and in opposition to the wants of the local people.

Reliable data on illegal hunting are hard to find. Between 2004 and 2008, 187 wolves, 1,352 muskrats (an introduced species), 62 saiga, 20 snowcocks, and seven snow leopards were seized by the WWF funded 'Irves" Mobile Anti-Poaching Unit (MAPU) (Onoodor, 2008). One hundred and ten Snow Leopard pelts were seized between 1985 and 2000 and 17 were seized on the Russian border with Bayan Olgii in 2004 (Onoodor, 2006). The MAPU found a poacher, a Bayan-Olgii resident, with four pelts of snow leopard at Khovd market in March 2006 and reported eight poached in 2008. On 07 April, 2009 the MAPU, in collaboration with local police officers detained two Mongolian citizens who killed 7 Saigas in Shargyn Gobi on the eastern border of the Altai Landscape[23]. Red squirrels are hunted for their fur for export to China. The population size is small, as there is little forest in the Mongolian Altai and it is likely that hunting has depressed populations even further.

The laws that regulate hunting are not enforced adequately, if at all. This failure is often attributed to lack of staff and transport but there is another problem. Protected area staff, for example, accept marmot meat from hunters rather than report cases of illegal hunting, and there is evidence of collusion with law enforcement officials on a much more damaging and serious scale than this.

Hunting of foxes, otters and other species has long ceased to be commercially viable on the large scale that it once was. Thirty years ago there were government teams employed just to hunt animals and tens of thousands of pelts and fish were exported every year. In terms of animals killed per unit effort, it is no longer economic to be a full time hunter, but for the herder who has to be out on the grassland anyway to herd his or her livestock it is a matter of opportunistic hunting for little or no extra effort and this type of hunting leads inexorably to local extirpation driven by greed and selfishness. There is a market for the pelts and they are collected by middlemen who may take them to the *aimag* capital, for skinning and later export. Naked fox carcases are seen discarded on the streets in winter. There was a recent seizure of fox and other animal pelts being readied for export from Khovd to China (Onoodor, 2008).

Snow leopards are not only killed for sale: people still believe that the big cats pose a significant threat to their herding livelihoods through predation on livestock and kill to protect their livestock.

It no longer seems to be apparent to people or important to them, that foxes and wolves are predators with an important ecological role on the grassland in controlling the rodents and pikas that are blamed for taking too much grass. Removal of predators leading to changes in predator densities of the magnitude that has been achieved is likely to have had an enormous impact on prey population dynamics and may be reducing the carrying capacity of the land for livestock.

[23] http://www.edgeofexistence.org/edgeblog/?p=786

There are potential side-effects beyond livestock production too, in tourism. Evocative and satisfying as they may find fleeting glimpses of the rare Argali or Ibex on a rocky crag, the sight of foxes, otters and wolves moving about the grassland or the lake shore below their camp would really pull in those who enjoy wild animals in wild places. The Mongolian wilderness experience is rich in wide open spaces but poor in sightings of wild mammals for example, and this could easily be changed if decisions were made and followed through on.

3 Saker Falcon Trade

Saker Falcons are caught using decoy pigeons equipped with entangling traps, for export to the Middle East where they fetch a high price from falconers. This business is not part of the local economy. It appears to be conducted rather secretly and fails to give effective incentives to local people to care for their falcons, or to convince conservationists that it is sustainable. There is strong selection for juvenile female birds and the high numbers that are taken have led to severe reductions in the saker population. Official figures for the numbers exported have been around 250 per year, but there are a lot of animals taken unofficially too. Firm contracts to supply certain numbers of Saker Falcons are not based on a sound assessment of the population size and annual variations in numbers and breeding success.

4 Sport Hunting

Current sport hunting of argali and ibex under permit threatens the wild populations because the quotas are not based on sound data on population size, status, and trends. The number of licences issued each year by the Ministry for Nature, Environment and Tourism (MNET) is typically based on anecdotal data and vocal communications between the authorities and local herders. There are no statistically reliable and systematic data on population sizes, population dynamic and local use levels (Zakharenka, 2008). A total of 1,148 Argali trophies were exported between 1975 and 2007, with a peak of 110 in 2005. Currently about 80 licences are issued nationally per year. Management is weak or non-existent: wounded animals can easily be ignored in the figures when a hunter is allowed to take a second animal if a wounded one escapes, and there is evidence that this happens. People complain that the process of issuing licences is not carried out fairly or transparently.

Sport hunting is classified as hunting for special purposes under the law. Permits are allocated by the Ministry of Nature, Environment and Tourism to a number of outfitters, who then have to sign contracts with *aimag* governors, but most of the permits are traded between outfitters based on their market price and end up in the hands of a few experienced outfitters who actually organize the hunts.

Local bans such as in Uvs *aimag* have been effective in reducing sport hunting pressure within a certain area, but the hunters merely shift to other sites, and the MNET cooperates by issuing more permits in other *aimags*, so the hunting pressure elsewhere actually increases. For example, at least one Argali was shot under permit in or near Khustain Nuruu NP in 2008.

There are five sport hunting companies based in Bayan-Olgii under three parent or partner companies in Ulaanbaatar registered for hunting licenses. Another six hunting companies operate in Khovd *aimag*. It is hard to determine the actual numbers of Argali and Ibex taken in the Altai. Since 2000 sport hunters, mainly from the USA, shot a minimum of between three and five Argali per year in Sagil, Bokhmoron and Khovd soums of Uvs *aimag*. However the Uvs *aimag* government has succeeded in getting Argali hunting banned since 2006 and the ban was recently extended until 2009. since Quotas of 50 Argali and 200 Ibex permits have been announced for 2009. The official price for an Altai Argali licence is US$20,000, 10% of which is paid to the outfitter, but the average cost of a hunting safari to shoot an Argali is about US$50,000, so the outfitter receives up to US$32,000 to operate the safari, and very little of this money reaches the local level

The local people indeed often derive no benefit from sport hunting, and are therefore quick to join movements to ban it altogether, such as in Most and Tsetseg *sums* of Khovd *aimag*. Their core complaint is that money allocated to *sums* (20-30% of the trophy fee) under the Hunting Fee Law[24] is taken away from them under the Law on Public Sector Finance which decreases a *sum* government's annual budget allocation by the amount received from hunting fees. The result is no net gain for the

[24] Law on Hunting Resource Use Fees

community, no money for management activities mandated under the Law on Hunting, and indeed it is worse than that, because hunting revenues are paid much later than the annual budget allocation so the *sums* have to make do with less money to start with.

6 Plant collection

Many wild plants are harvested for domestic use, and for sale. Threats arise when the harvest is too high, and when the collection method is destructive. It is well known that harvesting of Altai Onion (*Allium altaicum*) should be done after it has flowered and seeded: nevertheless people regularly collect the bulbs before the plants have seeded, and this has led to the disappearance of the species from many parts of its range. Digging out of roots and bulbs on steep slopes leads to soil erosion too. The Garlic-flavoured Onion (*A. obliquum*) is now more or less restricted to one valley, but damage is occurring to that hillside.

Local people harvest juniper (*Juniperus sibirica*), locoweed (*Oxytropis.sp*), *Caragana* spp and *Eurotia ceratoiles* for fuel, abundantly and often destructively. In the south Saxaul is also taken. The medicinal plants, Snowlotus (*Saussurea involucrate*), *Valeriana officinalis*, liquorice (*Glycyrrhiza uralensis*), and the parasitic *Cynomorium songoricum* are harvested exhaustively to the point that the natural course of regeneration cannot match the harvesting volume. Other species collected include Alpine bistort (*Polyginum viviparum*), Sea Buckthorn, Blackcurrant (*Ribes nigrum*), Redcurrant (*R. rubrum*), Needle-shaped Gooseberry (*Grossularia acicularis*), Rose hips (*Rosa albertii*) and Bird Cherry (*Padus asiatica*).

7 Illegal cutting, forest management impacts and fire

The remaining forests are over-harvested unsustainably and mostly illegally to supply construction materials and fuel wood. Logging is subject to quotas established by MNET, and has recently been banned for forest user groups, but illegal logging still takes place. Data are hard to find, and some timber is imported from outside the region, but it seems clear that large numbers of trees are being felled to build fences around compounds for private houses and government buildings, and houses too, in Bayan Olgii *sum* centres in particular. Large amounts of firewood are also collected – both dead wood and live trees– particularly from the river valleys. Some firewood is also imported from outside the region.

Such harvesting pressure, combined with either too frequent fire or too infrequent fire regimes, and possibly the effects of climate changes have disrupted the natural disturbance regime under which these boreal forests have evolved over thousands of years and are leading to a retreat of the forest-steppe border in some areas. The natural fire regime of these forests is not known, but probably not more than once in 8-12 years on average for larch and *Pinus sylvestris*. For *Pinus sibirica* the average is around 150 years. Some forests are being burned by careless use of camp-fires or disposal of cigarettes, much more frequently than this: on the other hand some areas are over-protected from fires (possibly by heavy grazing) and when fires do break out in such areas they can easily kill whole stands.

8. Mining

There are 66 current mining licences held in the Altai landscape, and ca 29 exploration licences, and ca 277 applications for exploration licences (see Figure 5 for distribution). The major mines are listed in Tables 16 below. There are no overlaps of mining licences with protected areas, but there is considerable overlap of mining exploration licences with Important Bird Areas, and there are exploration licences right up against the borders of the protected areas. Four gold mines operate in the Turgen Uul area, near and within the buffer zone of the Turgen Uul SPA and one tungsten mine operates within the buffer zone of the Altai Taban Bogd NP. Forty five (68%) of the mining licences have not been implemented yet (see Table 14) so there is potential for substantial increase in mining even without any further approval of mining licences.

There is substantial coal mining within the Altai in Khovd and Uvs *aimags*, and there are plans to survey for oil in the Great Lakes Basin. Sand, gravel and chalk are excavated for building, construction and brick making.

Exploration and mining operations destroy vegetation cover and soil structure and, although agreements are made to restore the land, these agreements are not always kept, and in some cases the agreed restoration is in fact impossible. Sometimes deposits are left as security with local government, to be returned only after restoration has been completed, but in reality the amount of funds deposited can easily be forfeited by irresponsible companies.

Artisanal mining by private individuals occurs in a few spots over the landscape (see main text Section 2.8) and is likely to increase in the future.

Table 16 List of current mining licences with operational status

Site name	**Sum** ***Aimag***	**Mineral**	**Area (ha)**	**License issue date**	**Company**	**Operational?**
Zaisan salaa	Tarialan, Uvs	gold	105	1995	Khar tarvagatai	closed
Ikh Myangan	Tarialan, Uvs	coal	37	1998	khar tarvagatai	yes
Khar Tarvagatai	Tarialan, Uvs	coal	25	1998	Khar tarvagatai	not yet
Nuurst khotgoid	Bokhmurun,Uvs	coal	39	1999	Khotgor	not yet
Khorkhotyn adag	Omnogovi, Uvs	gold	101	2000	Datsan Trade	yes
Ulaan-Am	Tarialan, Uvs	gold	37	2000	Datsan Trade	yes
Ereenii gol	Turgen,Uvs	gold	185	2000	Gurvan gol holding	closed
Nuurst khotgoid	Bokhmurun,Uvs	coal	26	2000	Mentuyu	not yet
Burgastain goliin dood kheseg	Omnogovi,Uvs	gold	93	2001	Datsan Trade	not yet
Uchral	Tarialan, Uvs	gold	57	2001	Datsan Trade	not yet
Shanaga	Bokhmurun,Uvs	coal	25	2001	Khotgor shanaga	yes
Bugastai	Tarialan,Uvs	coal	56	2001	Datsan Trade	not yet
Shovgor Uul	Tarialan,Uvs	coal	62	2001	Datsan Trade	not yet
Burgastain gol	Turgen,Uvs	gold	160	2003	Monsib alt	closed
Nuurst khotgoid	Bokhmurun,Uvs	coal	29	2003	Erchim	yes
Khar Tarvagatai	Tarialan,Uvs	coal	14	2005	Khar tarvagatai	yes
Khar Tarvagatai	Tarialan,Uvs	coal	100	2005	Khar tarvagatai	yes
Zaisan salaa	Tarialan,Uvs	coal	381	2005	Khar tarvagatai	closed
Tsokhongiin Gol	Omnogovi,Uvs	gold	109	2006	Datsan Trade	not yet
Talyn salaa-1	Tarialan.Uvs	gold	97	2006	Ordos Trade	closed
Ulaan-Am-1	Tarialan, Uvs	gold	74	2006	Datsan Trade	yes
Namiryn Ekh	Tarialan, Uvs	coal	683	2006	Khar tarvagatai	yes
Burgastain Ekh	Tarialan, Uvs	coal	400	2006	Uurkhai	not yet
Khotgor	Bokhmurun,Uvs	coal	947	2007	Monros prom ugoli	not yet
Ulaan-Am-1	Tarialan, Uvs	gold	25	2008	Datsan Trade	not yet
Tsagaan Salaa	Bokhmurun,Uvs	gold	334	2008	Kherchimgold	not yet
Khotgor Urgutgul	Bokhmurun,Uvs	coal	78	2008	Khotgor	not yet
Shanaga	Bokhmurun,Uvs	coal	791	2009	Khotgor shanaga	not yet
Khushuut gol	Darvi,Khovd	coal	28	1998	MOENKO	not yet
Khundlungiin Khutul	Darvi, Khovd	coal	40	1999	MOENKO	not yet
Khundlungiin Gol	Darvi, Khovd	coal	54	2002	MOENKO	not yet
Khushuut	Darvi, Khovd	coal	45	2003	MOENKO	not yet
Khalzan Buregtei	Myangad, Khovd	rare metals	175	2004	Boshgo-Uul	not yet
Barlagyn golyn ord	Tsesteg, Khovd	gold	448	2005	Mongol-Alt	not yet
Tsagaan Shal	Myangad, Khovd	clay	28	2005	Odtse	not yet

Site name	Sum *Aimag*	Mineral	Area (ha)	License issue date	Company	Operational?
Sukhai	Bulgan, Khovd	gold	471	2005	Ouyakuanei	not yet
Gants mod	Uench, Khovd	gold	783	2006	Gatsuurt	not yet
Gants mod-1	Uench, Khovd	gold	364	2006	Gatsuurt	not yet
Khushuut khundlun	Darvi, Khovd	coal	208	2006	MOENKO	not yet
Khamar Davaa	Darvi.Khovd	coal	1754	2006	MOENKO	not yet
Ulziit	Darvi, Khovd	coal	486	2006	MOENKO	not yet
Ulziit	Darvi, Khovd	coal	39	2006	MOENKO	not yet
Tsagaan tolgoin raion	Myangad,Khovd	gold	24	2006	Uulyn Ekh	not yet
Arkhuren Uul	Myangad,Khovd	Rare metal	91	2001	Boshgo-Uul	not yet
Asgat	Nogoonnuur, B-O	silver	2	1996	Mongolrostsvetment	not yet
Khovd river	Tsengel, B-O	tungsten	48	1998	SS Mongolia	yes
Tsunkher	Nogoonnuur, B-O	gold	29	2001	Baruun Mongol Metall	not yet
Asgatyn ord	Nogoonnuur, B-O	silver	37	2002	Mongolrostsvetment	not yet
Ulaanuul	Nogoonnuur, B-O	tungsten	37	2003	Kainarvolfram	yes
Indert	Bulgan, B-O	gold	65	2003	Burkhit corporation	not yet
Tekh-Yamat	Altantsugts, B-O	gold	26	2003	Trade and Development Bank	not yet
Asgatyn umnukh uchastok	Tsagaannuur, B-O	mixed metal	390	2004	Mongolrostsvetment	not yet
Asgatyn khoid kheseg	Nogoonnuur, B-O	mixed metal	621	2004	Mongolrostsvetment	not yet
Ulaan Uulyn ord	Nogoonnuur, B-O	tungsten	300	2005	Kainarvolfram	not yet
Dulaan khar uul	Nogoonnuur, B-O	mixed metal	449	2006	Mentuyu	not yet
Khovd gol	Tsengel, B-O	tungsten	689	2006	Kainarvolfram	not yet
Ulaankhus	Ulaankhus, B-O	tungsten	841	2006	Kainarvolfram	yes
Yamaat	Altantsugts, B-O	gold	50	2006	Tuvshingarav	yes
Yamaat-1	Altantsugts, B-O	gold	521	2006	Tuvshingarav	not yet
Khuurai salaa	Bulgan, B-O	gold	334	2008	Burkhit corporation	closed
Buraat	Deluun, B-O	tungsten	354	2008	Drimlind	not yet
Khujirtyn am	Tugrug, G-A	coal	42	1999	Rio-Tinto Mongolia	not yet
Khujirt Bulag	Tugrug, G-A	coal	51	2002	Rio-Tinto Mongolia	not yet
Khujirt Bulag	Tugrug G-A	coal	27	2002	Rio-Tinto Mongolia	not yet
Ogtorgyn khudag	Tugrug G-A	coal	26	2003	Mandal-Altai Group	yes
Atsyn am	Tugrug G-A	coal	24	2005	Khukh Tashuu	yes
Khurdet	Tonkhil G-A	mica	33	2006	Khuriin ekh	not yet

9. Off road driving and multiple tracks

The chaotic sprawl of dirt tracks between *sums* and other destinations is widely acknowledged to be a major cause of vegetation loss, soil damage and erosion. Multi-tracking causes long-lasting damage, sometimes damage that can never be repaired. People drive off their current dirt track without any hesitation, often after getting lost, or when they think they might be heading in the wrong direction, They don't go back along the track they are on: they head off and form a new track that will be there for years, possibly for ever, and will probably be used, and deepened, by other drivers later. In 2001 it was estimated that multiple tracking had been responsible for 300,000 ha of lost pastureland over the previous ten years (ADB, 2004) land degradation in Mongolia . This is a relatively small amount taken as a percentage of the area of Mongolia but is 0.5% of Mongolia's productive land and an even

higher percentage of the best land that "attracts" vehicles. It constitutes significant loss of pastureland, and the problem is not taken seriously by drivers. Even drivers of donor project vehicles, who should know better, are seen racing along in parallel one on the track, the other making a new track beside.

10 Road construction

The planned major paved roads in the region have the potential to reduce the multiple tracking to some extent, but it is clear from experience elsewhere, including Mongolia, that more is needed, and that road construction brings its own problems. The first phase (up to Khovd) of the ADB funded Asian Highway 4 from the Chinese border west of Bulgan via Khovd *aimag* centre to Olgii and on to the Russian border is due to be completed by 2011 (see Figure 7). Approval of the stretch from Khovd to Olgii and on to the Russian border is due in 2010. There are two relevant ADB projects: the Western Regional Road Development Project for the main highway, and the Community Based Local Road Upgrading and Maintenance in the Western Region of Mongolia Project which deals with *sum* link roads. There is US$500,000 allocated for environmental improvements, including protected area institutional strengthening and training.

There are threats from paved roads in the construction methods: the ADB environmental assessment covers the risks of damage from excavation of construction materials. The risks to biodiversity of the opening up of the area to outside traffic from China are also of concern and should be addressed before the influx begins. Poaching at present is pretty bad: with the easing of access trade could become easier.

11 Water resource management

Water is failing to reach the lakes of the Great Lakes Basin partly because too much is being diverted and used by man on the way. Irrigation of pasture and arable land, wells for livestock and domestic use and dams for hydro-power all put together have reduced water flow, and soil damage has reduced the water holding capacity of the land. Some rivers have dried up altogether in recent years.

The problem has been recognized by government and already water user groups and river basin councils are being formed. The Buyant River and Khovd River councils have been particularly active under a collaborative agreement with the Swiss Agency for Development and Cooperation. These councils have addressed the sharing of water by cultivators in particular, in Khovd, Buyant and other *sums* of Khovd *Aimag*. Upstream diversions that take water from downstream neighbours, and the practice of going higher and higher upstream to dig a diversion have been addressed, and at least one water user group (Khovd sum, Khovd *aimag*) has decided to divide water rights equally, independent of land holding. This allows those who don't need so much water for their land to trade it with others and is far sighted in its equitable treatment of all members.

Hydropower plants have the advantage that they use renewable energy, with no green-house gas effect, but they change the natural flow regimes of rivers and streams and it is likely that some rivers have lost ecological flow beneath the dam. Environmental assessments are carried out for such projects but are not predicting the eventual problems. The Uench and Durgun dams (see Section 3.3) were subject to detailed environmental assessment before construction, but there are nevertheless concerns about impacts on the downstream flow being so great as to fail to maintain ecological flow at certain seasons, and, in the case of the Durgun dam, impacts on the upstream lake.

12 Inappropriate management interventions

Interventions intended to solve environmental problems or to conserve wild species do not always help and indeed can cause even more problems, and damage biodiversity. Natural ecosystems are complex and can rarely be manipulated by man through the simplistic solutions to perceived problems that he sometimes imagines possible. Proper consideration of the biology of perceived problems, or practicing of evidence-based conservation[25] is required in order to avoid exacerbating them.

[25] http://www.cebc.bangor.ac.uk/ for details of the Centre for Evidence based Conservation

12.1 Swarming grasshoppers control

Eclipopheps grasshoppers swarm periodically and consume vast amount of grass, to the horror of the herders in the Altai. The standard response, carried out in Uvs, Khovd and Bayan Olgii *aimags*, has been with chemical sprays, but the problem continues, and the sprays are not effective because they can never kill all the grasshoppers, and they may be adding to the problem in the long term by killing natural predators. Spraying is carried out even when there is no outbreak. There has been spraying in southern Khovd *aimag* in both 2007 and 2008. In 2006 one of the donor projects funded a misguided and short-lived scheme to combat grasshoppers with domestic chickens (UNDP, 2007).

There are about 11 species of *Eclipopheps*, eight of which occur in Mongolia. They are open country species, indicated by their high body index (width/height), so heavy grazing makes good habitat for them. Outbreaks occur periodically and it is not the same species each time. Batkhuyag (1995) found only one specimen of *E tarbinski* in his surveys during the early 1990's yet that species was the main one involved in outbreaks during the 1970's. Outbreaks in the early 1990's were of *E. bogdanovi* and *E. kerzhner.*

It is important to look at the underlying reasons for these outbreaks. There is evidence for increased grasshopper outbreaks in overgrazed areas which suggests that improved grazing management may be the best preventive measure in the medium and long term. If poisons are not used in the environment, and animals not killed, natural predators such as Rose Coloured Starlings (*Sturnus roseus*) and various birds of prey could begin to be effective in mitigating *Eclipopheps* outbreaks. Even simply collecting grasshoppers using hand tools could make significant reductions in numbers during outbreaks.

In eastern Mongolia chemical spraying to control Brandt's Vole (*Microtus brandti*), also considered a pasture pest has been suspended after it was demonstrated that it was not effective in maintaining pasture quality and was a hazard to other species, including man. Daurian Pika (*Ochotona dauurica*) is (probably wrongly) considered a pasture pest in Uvs *aimag*, but is not subjected to any form of chemical control, which is as it should be.

12.2 Forest moths control

There are a number of insects that are regarded as forest pests in Mongolia, chief among them the Gypsy Moth (*Lymantria dispar*) and the Siberian Moth (*Dendrolimus superans*). Aerial spraying with a commercial formulation of the microbial insecticide *Bacillus thuringiensis* var. *kurstaki* has been used against Siberian Moth , mainly in Uvs *aimag*, but the effort and the cost may not be worth it. The areas sprayed have mainly been outside the actual Altai landscape (Figure 2). Gypsy Moths are eaten by a wide range of other species, including insects, spiders, small mammals and birds, that would be more common under a good biodiversity conservation regime. . The cyclical nature of the outbreaks and the enormous areas over which they occur make control difficult and expensive.

The ecological processes involved in forest regeneration and succession are extremely complex and the forests and the moths have evolved together. The forest ecosystem as a whole will survive moth outbreaks even if regeneration takes a long time. Siberian Moth outbreaks play a fundamental disturbance role in Siberian forest ecology, together with fire. The relatively small areas of forest remaining in the Altai make the survival of individual patches more a matter of chance, particularly if fire follows Siberian Moth outbreaks. As always, more information is required, but it seems clear that there is no point in combating moth outbreaks if the aim is to conserve forest biodiversity. The Siberian Moth in particular is itself a fascinating animal, with a variable two to four year life cycle that has its caterpillars spending either one, two, or even three years curled up on the forest floor.

12.3 "Alternative Livelihoods"

Without proper environmental assessment well meaning attempts to reduce pressure on biodiversity through encouraging people to begin alternative or additional businesses can result either in no benefit for conservation or in clear damage to biodiversity. In particular, the belief that raising income levels alone will lead to an overall reduction in hunting or other damage to biodiversity is mistaken. In

the east of Mongolia increases in income contributed to the virtual extinction of the Marmot, as people were able to drive to the countryside and purchase skins on a wide scale. Certain people may change their behaviour, but interventions in the name of biodiversity conservation must look at all ramifications of proposed schemes. Development of economic activities that are dependent on the conservation of wild biodiversity must be subject to strict criteria. Biologicial systems are complex, and it is all too easy to start activities that have a detrimental impact on wild biodiversity.

Provision of milk processing facilities that encourage people to graze more livestock in a National Park, or planting fruit trees in dry zones using wells for irrigation, are examples of unsuitable initiatives advocated in the name of conservation that will have negative impacts on biodiversity.

12.4 Introduction of alien species

Great care must be taken in introducing alien species, particularly fish into the Altai lakes where such a valuable and as yet undocumented fish fauna exists. Muskrat have already been introduced. There is a danger too of introducing potentially damaging fungal endophytes in agricultural pasture improvement projects that bring in grass species from outside (see Bazely et al, 2007).

12.5 Cloud seeding

Cloud seeding with silver iodide does not lead to absolute increased rainfall (at best it might redistribute it, but it is pretty ineffective even at that), it is expensive, dangers of pollution have not been fully assessed, and it is a displacement activity that takes attention away from the real work of living in balance with the water resources available.

12.6 Salt and food for wild animals

Salt, hay and bran are put out routinely, at considerable expense, and with the general public encouraged to go to considerable efforts to ensure that Argali, Ibex and Altai Snowcock in their areas get their supplies. This is believed by many in authority and by the general public to be an important conservation action providing vital minerals and food for wild species. But no proper analyses have been carried out to determine whether the minerals in the rock salt (usually from a mine north of Uvs Lake) fill a deficit in the diets of the local ungulates, and there is insufficient data on the natural salt licks to justify this programme. The only useful function is to attract animals into view, and that is fine if it is not overdone. At some places there is a danger that herders who take in wildlife tourists are succeeding in changing the movement patterns of Argali so that they can show them to tourists more reliably: they put out salt for Argali to try to keep them in the area. If this is done again and again it could create a series of small local populations that have changed their movement patterns and become resident in a habituated or semi-domesticated state and actually reduce their body condition, survival rate and breeding rate. The bran put out is eaten by Altai Snowcock and regular feeding may attract poachers to the site.

We do not know what minerals the Argali or Ibex may be lacking so putting out raw salt is a crude measure to keep animals within an area, rather than providing an essential dietary component that is missing from their environment. There is no evidence that the Ibex, Argali and Altai Snowcock of the Altai mountains cannot obtain all the minerals they require without having supplements placed in their range. And the same applies to supplementary food. The famous Elk feeding program at Jackson Hole in the USA faced many problems, including disease transmission, degradation of habitat, loss of herd memory leading to effective domestication, and loss of interest from hunters because they did not perceive their trophy animals to be wild any more. There is a danger too that tourists will tire easily of seeing such animals, particularly as the pressure on other characteristic species of the area is not reduced.

13 Transboundary threats

Fires, livestock diseases, poaching and smuggling of wildlife are all blamed on neighbouring Russia and China, sometimes with good evidence and sometimes without.

The main constraint on conservation is not knowing what is happening exactly on the other side of the border, and not being consulted. The border fence being constructed by the Chinese along the Altai Taban Bogd National Park boundary is a barrier to the free movement of wildlife and its impacts should be evaluated. There is the potential for cross-border pollution through river flow, both into and out of Mongolia.

There are numerous meetings between protected area authorities on the Russian and Mongolian sides of the border, extremely few between Chinese and Mongolian authorities. Such meetings are useful, but have so far not led to systematic routine exchanges of information on local development projects that might have transboundary impacts on biodiversity. This is rarely cited as a need, but it is an important one.

14 Impact of climate change

Global climate change is having an impact already in Mongolia (Batima, 2006; Batima et al, 2007). There is evidence of a warming trend in annual mean temperature (Figure 21) and temperatures are predicted to rise and precipitation to fall in western Mongolia under various climate change scenarios (Batima et al, 2005). Modeling results, using predicted changes in net primary production (NPP) show major shifts in vegetative types by 2050 years with increases in desert steppe and mountain taiga habitat types. Snow cover, based on temperature data, is predicted to decrease. Pasture productivity, based on above ground biomass, is also predicted to decrease in steppe areas, with grassland health decreasing in all zones. Using this information predictions have been made that mean livestock weights will decrease and winter mortality will increase. And the damper higher altitude vegetation zones may shift toward the desert steppe type of vegetation, thus, jeopardizing the habitats of many typical wild species of the Altai.

For the whole country autumn and winter precipitation has increased by up to nine per cent, while spring and summer precipitation has decreased by up to 10 per cent, and the Altai has been categorised as very highly, or severely vulnerable to climate change (Batima, 2006). The risk is that certain species will have their current distributions reduced by changes in habitat and climate and that as a result of restrictions from other land uses no suitable new areas will become available. Protected areas may lose the vital habitat components that they now encompass. Clearly advance thinking and planning is required.

Current data show rises in temperature but no decrease in precipitation in the Altai, and some studies show a slight increase in precipitation. However, it is still predicted that by 2080, increases in evaporation of surface water will be ten times greater than increases in precipitation in the Altai. Water temperatures could increase 1.4^{o}C by 2020, 2.1^{o}C by 2050 and 3.0^{o}C by 2080, with a significant impact on aquatic biodiversity. Winters are expected to be milder, with more snowfall, while summers are expected to be hotter. Winter precipitation is expected to increase, and summer precipitation to increase in some areas and decrease in others. More important perhaps than mean temperatures, the mean heat wave duration has already increased in Mongolia, and the mean cold wave duration has decreased (Batima, 2006).

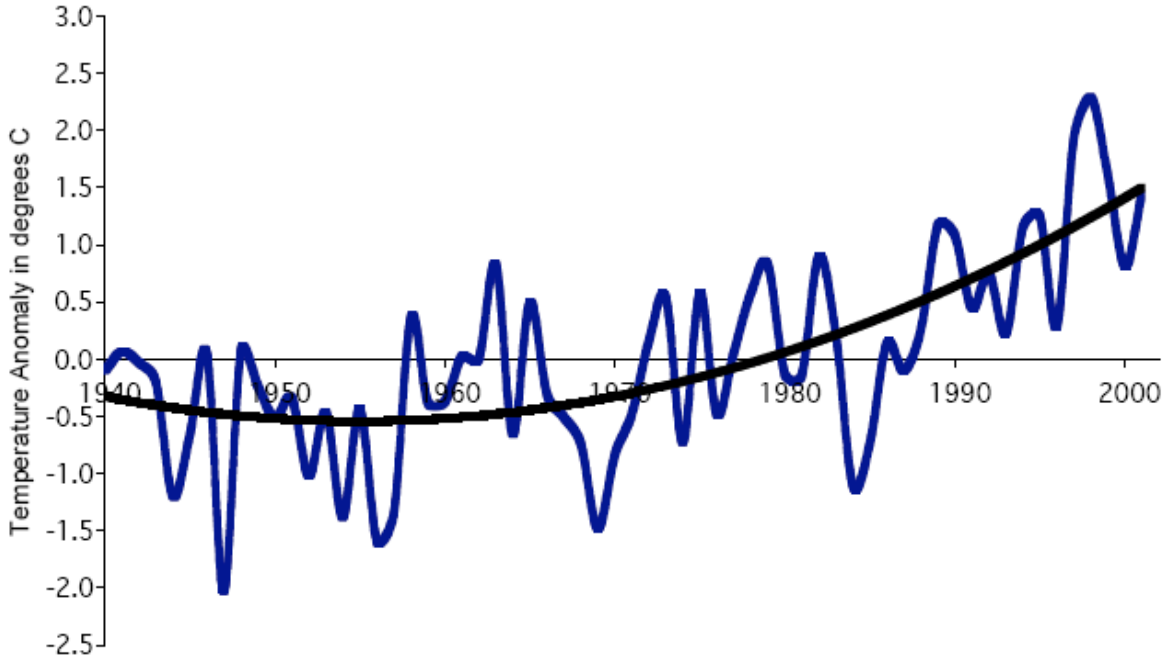


Figure 22 Mongolia mean annual temperature anomaly 1940-2002

The blue line is Normalized anomalies of air temperature.
The black line is second order Polynomial

Loss of snow cover and glaciers has been observed, and this is having an effect on river flow, and habitat distribution.3800 m Memtei peak used to have a permanent ice cap but it has not had for the last threeto four years. Ondorkhairkhan, 3,914 m, on the other hand, is still ice covered year round. Ice coverage of Kharkhiraa (3,200 m amsl) decreased by 37.5 % between 1940 and 2002, Turgen (3,965 m) by 21.4 % and Tsambagarav (4,208 m) by 31.9 %. Projected increases in temperatures indicate that 50m of ice thickness thick may melt from glaciers by 2040, 100m of thickness may disappear by 2060 and 150m of ice thickness may be gone from glaciers by 2099. Climate change projections indicate that this rapid melt will be a result of air temperatures in the Altai potentially increasing 5 ^{o}C by 2099 (Davaa et al 2007).

15 Cultivation

Cultivation of unsuitable land that is then subject to soil erosion, and wasteful cultivation practices that do not care for the land pose threats to soil conservation and thence to biodiversity. High inputs of fertilizer also add to the eutrophication of lakes already recorded (Sonninkhishig, 2009). Melon growing along the Buyant River near Khovd is reported to have been particularly wasteful in moving on from year to year to new plots, with no proper rotation, but such practices are now starting to be controlled by government (SDC, 2008).

16 Waste Management

Bad management of solid waste, toxic waste and organic waste has the potential to harm biodiversity, and the current safeguards are not sufficient to protect against such damage.

17 Tourism

If organized well tourism can help to improve the living standards of local people, but it is not always easy to avoid very uneven distribution of the benefits. Tourism also increases local and international awareness of the values of the local biodiversity. Bad planning can lead to damage to soil through off-road driving, including in protected areas, over-use of water leading to lowering of the water table, disturbance to wild animals leading to changes in behaviour and breeding success, increased risks of

fire, increased use of firewood, and water and soil pollution through poor waste disposal. Regulations should be developed early and applied to the establishment of all tourism operations.

Wildlife viewing tourism is still small scale but is expected to grow in the future, indeed is to be encouraged to grow, and it is vital that unplanned and uncoordinated tourist camps are not allowed to proliferate as they have done in Khovsgol and Terelj.

Sport hunting does pose a risk to wildlife, particularly as the only supposed benefit of sport hunting – the return of licence revenue to conservation – is not being realized. It is divisive too: the sight of victorious hunters celebrating a kill does not sit easily with the other conservation messages, or the religious teaching being seconded in the name of conservation.

Unforeseen impacts of commercialization of the Bayan Olgii Eagle festivals – there are two now, every October, and in 2008 there was one in Ulaanbaatar too – include increased pressure on the wild Golden Eagle population and on other wild birds of prey, and increased hunting of foxes and wolves and other prey as demonstrations both at the festivals and afterwards with tourists who are doing add-on tours after the festivals to see the eagle hunters flying their eagles at home.

There are also potential unforeseen impacts of wildlife viewing tourism if provisioning and salt licks become standard practice (see above Section 12.6)

Annex 6 Vertebrates of the Altai mountain landscape, with threat assessments and protection status

1. Mammals

	Common name	Scientific name	Regional assessment	Global assessment	CITES	CMS	Law on fauna Article 7	Decree of Mongolian government (Decree No 264, 2001)
	Sciuridae							
1	Grey marmot or Altai marmot	*Marmota baibacina*	Data Deficient	Least Concern				
2	Siberian marmot	*Marmota sibirica*	Endangered, A2ad	Least Concern				
3	Russian flying squirrel	*Pteromys volans*	Data Deficient	Near Threatened				
4	Eurasian red squirrel	*Sciurus vulgaris*	Near Threatened	Near Threatened				
5	Red-cheeked ground squirrel	*Spermophilus erythrogenys*	Least Concern	Least Concern				
6	Long-tailed ground squirrel	*Spermophilus undulatus*	Least Concern	Least Concern				
7	Siberian chipmunk	*Tamias sibiricus*	Least Concern	Least Concern				
	Castoridae							
8	Eurasian beaver	*Castor fiber*	Endangered, B1ab(iii)	Near Threatened			**Very rare**	
	Dipodidae							
9	Gobi jerboa	*Allactaga bullata*	Data Deficient	Near Threatened				

10	Siberian jerboa	*Allactaga sibirica*	Least Concern	Least Concern				
11	Five-toed pygmy jerboa	*Cardiocranius paradoxus*	Data Deficient	Vulnerable, A1c				
12	Northern three-toed jerboa	*Dipus sagitta*	Least Concern	Least Concern				
	Cricetidae							
13	Striped dwarf hamster	*Cricetulus barabensis*	Least Concern	Least Concern				
14	Long-tailed dwarf hamster	*Cricetulus longicaudatus*	Least Concern	Least Concern				
15	Campbell's hamster	*Phodopus campbelli*	Least Concern	Least Concern				
16	Muskrat	*Ondatra zibehicus*	Not applicable	Least Concern				
	Arvicolidae							
17	Gobi Altai mountain vole	*Alticola barakshin*	Data Deficient	Least Concern				
18	Large-eared vole	*Alticola macrotis*	Data Deficient	Least Concern				
19	Flat-headed vole	*Alticola strelzowi*	Data Deficient	Least Concern				
20	Tuva silver vole	*Alticola tuvinicus*	Data Deficient	Least Concern				
21	European water vole	*Arvicola terrestris*	Data Deficient	Least Concern				
22	Grey red-backed vole	*Clethrionomys rufocanus*	Least Concern	Least Concern				
23	Northern red-backed vole	*Clethrionomys rutilus*	Least Concern	Least Concern				
24	Common vole	*Microtus arvalis*	Data Deficient	Least Concern				
25	Narrow-headed vole	*Microtus gregalis*	Least Concern	Least Concern				

26	Lacustrine vole	*Microtus limnophilus*	Data Deficient	Least Concern				
27	Root vole	*Microtus oeconomus*	Least Concern	Least Concern				
	Muridae							
28	Korean field mouse	*Apodemus peninsulae*	Least Concern	Least Concern				
29	Eurasian harvest mouse	*Micromys minutus*	Data Deficient	Near Threatened				
	Gerbillidae							
30	Mid-day gerbil	*Meriones meridianus*	Least Concern	Least Concern				
	Ochotonidae							
31	Alpine pika	*Ochotona alpina*	Least Concern	Least Concern				
32	Daurian pika	*Ochotona dauurica*	Least Concern	Least Concern				
33	Pallas's pika	*Ochotona pallasii*	Least Concern	Least Concern				
	Leporidae							
34	Arctic hare	*Lepus timidus*	Least Concern	Least Concern				
35	Tolai hare	*Lepus tolai*	Least Concern	Not Evaluated				
	Erinaceomorpha							
36	Long-eared hedgehog	*Hemiechinus auritus*	Least Concern	Least Concern				
	Soricomorpha **Soricidae**							
37	Siberian shrew	*Crocidura sibirica*	Data Deficient	Least Concern				

38	Eurasian water shrew	*Neomys fodiens*	Least Concern	Least Concern				
39	Laxmann's shrew	*Sorex caecutiens*	Least Concern	Least Concern				
40	Least shrew	*Sorex minutissimus*	Data Deficient	Least Concern				
41	Tundra shrew	*Sorex tundrensis*	Data Deficient	Least Concern				
	Talpidae							
42	Siberian mole	*Talpa altaica*	Data Deficient	Least Concern				
	Chiroptera **Vespertilionidae**							
43	Gobi big brown bat	*Eptesicus gobiensis*	Least Concern	Least Concern				
44	Northern bat	*Eptesicus nilssonii*	Least Concern	Least Concern				
45	Savi's pipistrelle	*Hypsugo savii*	Data Deficient	Least Concern				
46	Daubenton's bat	*Myotis daubentonii*	Least Concern	Least Concern				
47	Whiskered bat	*Myotis mystacinus*	Least Concern	Least Concern				
48	Noctule	*Nyctalus noctula*	Data Deficient	Least Concern				
49	Brown long-eared bat	*Plecotus auritus*	Least Concern	Least Concern				
50	Grey long-eared bat	*Plecotus austriacus*	Data Deficient	Least Concern				
51	Particoloured bat	*Vespertilio murinus*	Least Concern	Least Concern				
	Carnivora **Felidae**							
52	Eurasian lynx	*Lynx lynx*	Near Threatened	Near Threatened				

53	Pallas's cat	*Otocolobus manul*	Near Threatened	Near Threatened	**II**			
54	Snow leopard	*Uncia uncia*	Endangered, C1	Endangered, C2a(i)	**I**	**I**	**Very rare**	
	Canidae							
55	Grey wolf	*Canis lupus*	Near Threatened	Least Concern	**II**			
56	Corsac fox	*Vulpes corsac*	Near Threatened	Least Concern				
57	Red fox	*Vulpes vulpes*	Near Threatened	Least Concern	**III**			
	Mustelidae							
58	Wolverine	*Gulo gulo*	Least Concern	Vulnerable, A2c				
59	Eurasian otter	*Lutra lutra*	Data Deficient	Near Threatened			**Very rare**	
60	Beech marten	*Martes foina*	Data Deficient	Least Concern	**III**			**Rare**
61	Sable	*Martes zibellina*	Vulnerable, A3cd	Least Concern				**Rare**
62	Eurasian badger	*Meles meles*	Least Concern	Least Concern				
63	Alpine weasel	*Mustela altaica*	Least Concern	Least Concern				
64	Stoat	*Mustela erminea*	Least Concern	Least Concern	**III**			
65	Steppe polecat	*Mustela eversmanni*	Least Concern	Least Concern				
66	Least weasel	*Mustela nivalis*	Least Concern	Least Concern				
67	Siberian weasel	*Mustela sibirica*	Least Concern	Least Concern				
	Ursidae							
68	Brown bear	*Ursus arctos*	Data Deficient	Least Concern	**II**			**Rare**

	Artiodactyla **Suidae**							
69	Wild boar	*Sus scrofa*	Near Threatened	Least Concern				**Rare**
	Bovidae							
70	Siberian ibex	*Capra sibirica*	Near Threatened	Least Concern				**Rare**
71	Goited gazelle	*Gazella subgutturosa*	Vulnerable, A3cde	Vulnerable, A2ad				
72	Argali	*Ovis ammon*	Endangered, A2acde, A3cde	Vulnerable, A2cde	**I**			**Rare**
73	Saiga antelope	*Saiga tatarica*	Endangered, A2acde	Critically Endangered A2a	**I**	**II**	**Very rare**	
	Moschidae							
74	Siberian musk deer	*Moschus moschiferus*	Endangered, A3d	Vulnerable, A1acd			**Very rare**	
	Cervidae							
75	Siberian roe deer	*Capreolus pygargus*	Least Concern	Least Concern				
76	Red deer	*Cervus elaphus*	Critically Endangered A2acd and A3d	Least Concern	**III**			**Rare**

2. All birds

	Common name	Scientific name	IUCN Global assessment	CITES	MCS	Legal status[26]	Regional distribution
	Gaviidae						
1.	Arctic loon, black-throated loon or black-throated diver	*Gavia arctica*	Least Concern				This species breeds in Tolbo, Khoton, Dayan, Achit, and Uureg lakes in the Mongol-Altai Mountain, Uvs and Great Lakes Depression; Khar, Khar-Us, Khyargas and Uvs lakes and rivers in their valleys (Fomin and Bold, 1991). It migrates through Khar-Us, Khar, Durgun, Khyargas, (Great Lakes Depression); Uvs lakes and Tes river (Uvs nuur Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
		Podicipedidae					
2.	Little grebe	*Podiceps ruficollis*	Least Concern				This species Vly breeds at the lakes of Great Lakes Depression. Migratory birds occur in Khar-Us, Khar, Durgun, and Khyargas lakes (Great Lakes Depression) (Gombobaatar *et al*., 2008).
3.	Black-necked grebe	*Podiceps nigricollis*	Least Concern				This species breeds in Khar-Us, Khar, Durgun lakes (Great Lakes Depression) (Fomin and Bold, 1991). It migrates through Khar-Us, Khar, Durgun, Hyargas, Airag, Khoton, Dayan, Tolbo lakes and Khovd, Buyant, Bulgan, Uyench, Bodonch, Barlag rivers (Mongol–Altai mountain and Great Lakes Depression); Uvs, Achit, Uureg lakes and Tes, Nariin, Sagil rivers (Uvs nuur Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
4.	Horned grebe or slovanian Grebe	*Podiceps auritus*	Least Concern				This species breeds in Khar-Us, Khar, Durgun, Hyargas, Khoton, Dayan, Tolbo lakes (Mongol–Altai mountain and Great Lakes Depression); Uvs, lakes and Tes river (Uvs nuur Depression) (Fomin and Bold, 1991). It migrates to Khar-Us, Khar, Durgun, Hyargas, Airag, Khoton, Dayan, Tolbo lakes and Khovd, Buyant, Bulgan, Uyench,

[26] **Mongolian Governmental Act No. 264 in 2001 and Mongolian law on fauna in 2000.**

							Bodonch, Barlag rivers (Mongol–Altai mountain and Great Lakes Depression); Uvs, Achit, Uureg lakes and Tes rivers (Uvs nuur Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
5.	Great crested grebe	*Podiceps cristatus*	Least Concern				This species breeds and migrates through Khar-Us, Khar, Durgun, Khyargas, (Great Lakes Depression); Uvs lakes and Tes river (Uvs nuur Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Pelecanidae						
6.	Dalmatian pelican or white pelican	*Pelecanus crispus*	Vulnerable,	I	I, II	V R	This species breeds at Khar-Us, Khar, and Durgun lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994). It migrates through Khar-Us, Khar, Durgun, Khyargas, Ereen, Taigam nuur (Great Lakes Depression); Uvs lake (Uvs nuur Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994; Braьnlich, pers. Comm.).
	Phalacrocoracidae						
7.	Great cormorant or cormorant	*Phalacrocorax carbo*	Least Concern				This species breeds at Khoton, Tolbo, Dayan, Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs lake and delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression); Tes river valley, Khar-Us, Khar, Khyargas, Durgun lakes and delta of Khovd River with reedbeds (Great Lakes Depression); It occurs in most lakes and rivers of Great Lakes and Uvs Lake Depressions on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Ardeidae						
8.	Great bittern, bittern	*Botaurus stellaris*	Least Concern			V	This species breeds at Uvs lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs depression); the lower part with dense reedbeds (Tes river valley); Khar-Us, Khar, Khyargas, Durgun lakes and delta of Khovd river with reedbeds (Great Lakes Depression); Bulgan river valley (Dzungariin Govi). It occurs in various wetlands with reedbeds Mongol-Altai (Fomin and Bold, 1991; Dawaa *et al*., 1994).
9.	Little bittern	*Ixobrychus minutus*	Least Concern				This species breeds at Khar-Us, Khar, Dцrgцn, Kyargas, and Airag lakes and at the delta of Khovd River with reedbeds (Great Lakes Depression). It migrates through Uvs lake and the delta of Tes river (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
10.	Black-crowned night heron	*Nycticorax nycticorax*	Least Concern				This is a considerably V migrant in Mongolia. It has been recorded in central and western parts of Mongolia.
11.	Great egret	*Egretta alba*	Least Concern			V	This species breeds and migrates at Uvs lake and delta of Tes, Torkholig rivers (Northern Uvs depression), the lower part of Tes river with dense reedbeds (Tes river valley), Khar-Us, Khar, Dцrgцn, Airag, Bayan lakes (Mahar hungui river) and the delta of Khovd river with reedbeds (Great Lakes Depression); Zavkhan river with reedbeds (Desert-steppe

							Depression of Zavkhan) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
12.	Grey heron	*Ardea cinerea*	Least Concern				This species breeds at Buyant and Khovd rivers and Khoton, Tolbo, Dayan, Achit, Uureg lakes (Mongol-Altai mountain range); Part of Khovd and Buhmцrцn rivers (small lakes and rivers) (Kharkhiraa and Turgen mountains); Uvs lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs depression); Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd river with reedbeds (Great Lakes Depression); It migrates in all wetlands in forest steppe, steppe, and Gobi desert, including oasis and excluding taiga and high mountains.
	Threskiornithidae						
13.	Black-headed ibis	*Threskiornis melanocephalus*	Near Threatened				Only a single bird has been observed at the lakes of the Great Lakes Depression (Tseveenmyadag and Bold, 2006).
14.							
15.	Eurasian spoonbil	*Platalea leucorodia*	Least Concern	II,		V	This species breeds at Uvs lake and the delta of Tes and Torkholig rivers (Northern Uvs depression); Bayan nuur (Altan els), Khar-Us, and Khar lakes (Great Lakes Depression). It migrates over Khovd rivers and Tolbo, Achit, Uureg lakes (Mongol-Altai mountain range); Uvs lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs depression); Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd river with reedbeds (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*. 1994).
	Ciconiidae						
16.	Black stork	*Ciconia nigra*	Least Concern	II		V	This species breeds in cliffs and trees near water with fishes, amphibians and other aquatic vertebrates and invertebrates in the valleys of Buyant, Bulgan, Khovd rivers and Khoton, Dund Nuur, Achit, Uureg lakes (Mongol-Altai mountain range); Uvs lake and delta of Tes and Torkholig rivers (Northern Uvs depression); Ulaan Uul, Khar Yamaat mountains in the region of Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and delta of Khovd river (Great Lakes Depression); Zavkhan and Hungui rivers (Desert-steppe Depression of Zavkhan); (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Phoenicopteridae						
17.	Greater flamingo	*Phoenicopterus roseus*	Least Concern	II			This species is distributed in the Khar Us Lake, Khovd province (MNE and JICA, 2001; Boldbaatar, 2001).
	Anatidae						

18.	Greylag goose	*Anser anser*	Least Concern				This species breeds in Achit, Uureg lakes (Mongol-Altai mountain range); Uvs lake and the delta of Tes and Torkholig rivers (Northern Uvs depression); Bayan and Baga Lakes (Altan Els), Khar-Us, Khar, Дүргүн, Khyargas, Airag lakes, Khomyn Khooloi, and the delta of Khovd river with reedbeds (Great Lakes Depression), Zavkhan river (Desert-steppe Depression of Zavkhan) Bulgan river valley (Dzungariin Govi) (Fomin and Bold, 1991; Dawaa et al. 1994). It migrates through breeding areas. A few individuals winter at Chono Kharaikh River and Terhiin Tsagaan Lake (Munkhtogtokh and Batbold, 1995; Bold *et al*., 1998; Gombobaatar, 2004).
19.	Bean goose	*Anser fabalis*	Least Concern				This species migrates through Buyant, Khovd rivers and Khoton, Dayan, Achit, Uureg lakes (Mongol-Altai mountain range); Khovd and Buhmүгүн rivers (Kharkhiraa and Turgen mountains); Uvs lake and delta of Tes, Nariin, Torkholig rivers (Northern Uvs depression); Khar-Us, Khar, Дүргүн, Khyargas, Airag lakes and the delta of Khovd river with reedbeds (Great Lakes Depression); Zavkhan and Hungui rivers (Desert-steppe Depression of Zavkhan); Bulgan river valley (Dzungariin Govi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
20.	Bar-headed goose	*Anser indicus*	Least Concern			V	This species breeds at Нүх lake (Munkhkhairkhan range), Дүгүү, Tolbo, Khoton, Khorgon, Dayan, Achit, Uureg lakes (Mongol-Altai mountain range); Khovd and Buhmүгүн rivers (Kharkhiraa and Turgen mountains); Uvs lake and delta of Tes, Nariin, Torkholig rivers (Northern Uvs depression); Khar-Us, Khar, Дүргүн, Khyargas, Airag lakes and Chono Kharaikh river (Great Lakes Depression); Zavkhan and Hungui rivers (Desert-steppe Depression of Zavkhan) Bulgan river valley (Dzungariin Govi). It migrates through breeding territories and Vly through Herlen, and Ulz river valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
21.	Swan goose	*Anser cygnoides*	Endangered		I	V	This species breeds at Uvs lake and delta of Tes river (Northern Uvs depression); Khar-Us, Khar, Дүргүн, Khyargas, Airag lakes (Great Lakes Depression); Zavkhan river (Desert-steppe Depression of Zavkhan) Bulgan river valley (Dzungariin Govi). It migrates through breeding territorie (Fomin and Bold, 1991; Dawaa et al., 1994).
22.	Mute swan	*Cygnus olor*	Least Concern			V	This species migrates through Khar-Us, Khar, Дүргүн, Khyargas, Airag lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
23.	Whooper swan	*Cygnus cygnus*	Least Concern			V V R	This species breeds at Tolbo, Achit, Uureg, Khoton, Khorgon lakes (Mongol-Altai mountain range); Dund nuur (Siilhem mountains); Uvs lake and delta of Tes, Torkholig rivers (Northern Uvs depression); Khar-Us, Khar, Дүргүн, Khyargas, Airag lakes and delta of Khovd river (Great Lakes Depression); Bayan nuur, Zavkhan river (Desert-steppe Depression of Zavkhan) Bulgan river valley (Dzungariin Govi). It migrates through breeding territories and (Fomin and Bold, 1991; Dawaa *et al*., 1994). It winters in Uvs,

							Khar-Us, Khar, Airag, Нцvsgцl, Terhiin Tsagaan lakes, Nogoon Khooloi, Yamyn Khooloi, Khomyn Khooloi, Chono Kharaikh, Zavkhan, Tatkhan Teel, *Sum* rivers (Berezovskii, 1881; Tugarinov, 1929; Dulamtseren, 1967; Munkhtogtokh and Batbold, 1995; Bold *et al*., 1998; Nyambayar, 2003; Gombobaatar, 2004).
24.	Ruddy shelduck	*Tadorna ferruginea*	Least Concern				This species breeds and migrates in/through almost all territories of the country except for taiga, steppe and desert steppe without water source, and alpine tundra (Fomin and Bold, 1991; Dawaa *et al*., 1994). Few birds winter in Khar-Us (Bold *et al*., 1998; Bold *et al*., 2000; Gombobaatar, 2004).
25.	Common shelduck	*Tadorna tadorna*	Least Concern				This species breeds at Uvs Lake and the delta of Tes River (Northern Uvs Depression); Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression); Zavkhan river (Desert-Steppe Depression in Zavkhan); Bulgan river valley (Dzungariin Gobi). It migrates through the breeding territories and especially at Great Lake Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
26.	Mallard	*Anas platyrhynchos*	Least Concern				This species breeds at Buyant , Khovd rivers and Khoton, Khorgon, Dцrцц, Tolbo, Dayan, Achit, Uureg lakes (Mongol-Altai Mountain Range); Khovd and Buhmцrцn rivers (Small lakes and rivers) (Kharkhiraa and Turgen mountains); Uvs lake and delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and delta of Khovd river (Great Lakes Depression); Zavkhan and Hungui rivers (Desert-Steppe Depression in Zavkhan); Bulgan river valley (Dzungariin Gobi). It migrates through these breeding territories (Fomin and Bold, 1991; Dawaa *et al*., 1994). This species winters in open waters of Khar-Us, Khar, Airag, Uvs, Terhiin Tsagaan lakes and Chonokharaikh, Orkhon, Zavkhan, Tatkhan Teel, Tuul rivers and Yamyn Khooloi Chono (Berezovskii, 1881; Munkhtogtokh and Batbold, 1995; Bold *et al*., 1998; Gombobaatar, 2004).
27.	Spot-billed duck	*Anas poecilorhyncha*	Least Concern				This species migrates through Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd river (Great Lakes Depression); Zavkhan river (Desert-Steppe Depression in Zavkhan) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
28.	Eurasian teal	*Anas crecca*	Least Concern				This species is found at Khovd river and Khoton, Khorgon, Tolbo, Dund lakes (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and delta of Khovd river (Great Lakes Depression); Zavkhan river (Desert-Steppe Depression in Zavkhan) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
29.	Falcated duck	*Anas falcata*	Near Threatened				This species breeds at Uvs lake and the delta of Tes and Torkholig rivers (Northern Uvs Depression). It migrates through the breeding territories (Fomin and Bold, 1991; Dawaa *et al*., 1994).

30.	Gadwall	*Anas strepera*	Least Concern				This species breeds at Khoton, Khorgon, Дµгцц, Tolbo, Dayan, Achit, Uureg lakes (Mongol-Altai Mountain Range); Khovd and Buhmцгцn river valleys (Kharkhiraa and Turgen mountains); Uvs lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дµгgцn, Khyargas, Airag lakes and the delta of Khovd river (Great Lakes Depression); Zavkhan river valley (Desert-Steppe Depression in Zavkhan); Bulgan river valley (Dzungariin Gobi). It migrates though the breeding areas. The main moulting areas are Khar-Us, Khar, Airag, Uvs lakes (Fomin and Bold, 1991; Dawaa *et al*., 1994).
31.	Eurasian wigeon	*Anas penelope*	Least Concern				This species breeds at Achit and Uureg lakes (Mongol-Altai Mountain Range); Uvs lake and delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дµгgцn lakes and delta of Khovd river (Great Lakes Depression). It migrates through these breeding areas and Buyant, Khovd rivers Khoton, Khorgon, Дµгцц, Tolbo lakes (Mongol-Altai Mountain Range); Khyargas, Airag lakes and delta of Khovd river (Great Lakes Depression); Zavkhan and Hungui rivers (Desert-Steppe Depression in Zavkhan); Bulgan river valley (Dzungariin Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
32.	Northern pintail	*Anas acuta*	Least Concern				This species breeds at Uvs lake and the delta of Tes river (Northern Uvs Depression); Khar-Us, Khar, Дµгgцn lakes and delta of Khovd river (Great Lakes Depression). It migrates through river valleys and lakes in the Mongol-Altai Mountain Range, Great Lakes Depression, Dzungariin Gobi. High concentrations of moulting occur in Achit lake (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
33.	Garganey	*Anas querquedula*	Least Concern				This species breeds at Khar-Us, Khar, Дµгgцn lakes (Great Lakes Depression). It migrates through the breeding areas and Uvs lake and Tes river, Bulgan river valley (Dzungariin Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
34.	Northern shoveler	*Anas clypeata*	Least Concern				This species breeds at Uvs lake and the delta of Tes, Torkholig river valleys (Northern Uvs Depression); Khar-Us, Khar, Дµгgцn, Khyargas, Airag lakes at the delta of Khovd river (Great Lakes Depression); Zavkhan river basin (Desert-Steppe Depression in Zavkhan). It migrates through the breeding areas and Bulgan river valley (Dzungariin Gobi). It moults at Khar-Us lake (Great Lake Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
35.	Red-crested pochard	*Netta rufina*	Least Concern				This species breeds at Achit lake (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дµгgцn, Khomyn Khooloi (Great Lakes Depression); Zavkhan river (Desert-Steppe Depression in Zavkhan) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
36.	Common pochard	*Aythya ferina*	Least Concern				This species breeds at Achit lake (Mongol-Altai Mountain Range); Uvs lake and delta of Tes river (Northern Uvs Depression); Khar-Us, Khar, Дµгgцn lakes, Khomyn Khooloi

							(Great Lakes Depression), Zavkhan river valley (Desert-Steppe Depression in Zavkhan). It migrates through the breeding areas and lakes in the Mongol-Altai Mountain Range, Great Lakes Depression. It moults in Achit Lake (Mongol-Altai Mountain Range), Uvs, Khar-Us, and Khar lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
37.	Ferruginous duck	*Aythya nyroca*	Near Threatened		I, II		This species is found at Bulgan Gol (Mongol-Altai Mountain Range), and Khar-Us lake (Great Lake Depression) on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
38.	Tufted duck	*Aythya fuligula*	Least Concern				This species breeds at the upper and lower regions of Khovd river, Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes river (Northern Uvs Depression); Zavkhan river valley (Desert-Steppe Depression in Zavkhan); Bulgan river valley (Dzungariin Gobi). It migrates through the breeding areas and from Mongolian-Altai to the eastern country border; from Darkhad Depression to Bulgan river (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994). Only a few birds Vly winter in Uvs lake Depression (Zabelin, 1996; Sumiya, 2002; Gombobaatar, 2004).
39.	Common goldeneye	*Bucephala clangula*	Least Concern				This species breeds at the delta of Tes, Torkholig rivers (Northern Uvs Depression). It migrates through the breeding areas and Khovd river and Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs, Khar-Us, Khar, Dцргцn lakes and delta of Khovd river (Great Lakes Depression); Zavkhan river (Desert-Steppe Depression in Zavkhan); Bulgan river valley (Dzungariin Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994). A few individuals winter in Khovd, Buyant, Tatkhan Teel, Chono Kharaikh, Zavkhan rivers and Uvs, Khar, Khar-Us lakes, Nogoon Khooloi,Yamyn Khooloi (Great Lakes Depression) (Berezovskii, 1881; Tugarinov, 1929; Kozlova, 1930; Munkhtogtokh and Batbold, 1995; Bold *et al*., 1998; Nyambayar, 2003; Gombobaatar, 2004).
40.	White-winged scoter	*Melanitta deglandi*	Least Concern				This species breeds at the upper part of Khovd river, Khoton, Khorgon lakes (Mongol-Altai Mountain Range). It migrates through the breeding areas and lakes and large rivers in the Mongol-Altai Mountain Range, Northern Uvs Depression, Tes river valley, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
41.	White-headed duck	*Oxyura leucocephala*	Endangered	II	I, II	V	This species breeds at Uvs lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Dцргцn lakes and the delta of Khovd river with reedbeds (Great Lakes Depression). It migrates through the breeding areas and Zavkhan river valley (Fomin and Bold, 1991; Dawaa *et al*., 1994). Martin Gilbert (Wildlife Conservation Society) counted a total of 51 individuals at Uvs nuur (Uvs province) on 14 September 2006 and 138 birds at Khar-Us Lake (Great Lakes Depression) on 22 September 2006 (Bгдunlich, 2006a).
42.	Smew	*Mergus albellus*	Least				This species migrates through Uvs lake and the delta of Tes, Torkholig rivers (Northern

			Concern				Uvs Depression); Khar-Us, Khar, Дөргөн, Khyargas, Airag lakes and delta of Khovd river (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994). Very few birds irregularly winter in Khomyn Khooloi (Great Lakes Depression) (Nyambayar, 2003).
43.	Common merganser	*Mergus merganser*	Least Concern				This species breeds at Khovd river and Khoton, Khorgon, Tolbo, Dayan, Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994). It winters in open waters in Uvs lake Depression, Yamyn Khooloi, Khomyn Khooloi, Khovd, Chono Kharaikh (Great Lakes Depression) (Molleson, 1896; Tugarinov, 1929; Bold, 1973; Zabelin, 1996; Nyambayar, 2003; Gombobaatar, 2004).
	Accipitridae						
44.	Osprey	*Pandion haliaetus*	Least Concern	II			This species breeds mostly in trees at Buyant, Khovd, Yolt, Sagsai, Sogoo, Bulgan river basins and Khoton, Khorgon, Dayan lake valleys (Mongol-Altai Mountain Range); Siilhem, Khovd and Buhмцгцн rivers (Kharkhiraa and Turgen mountains); the delta of Tes and Torkholig rivers (Northern Uvs Depression). It is found in the breeding areas and also valleys of rivers and lakes: Tes river, Great Lakes Depression on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994). This excludes alpine meadow, high altitudes, and taiga forest.
45.	Black kite	*Milvus migrans*	Least Concern	II			This species breeds in cliffs and trees covering all suitable nesting areas of the country. It migrates throughout Mongolia. It occurs in high numbers in urban areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
46.	Northern harrier	*Circus cyaneus*	Least Concern	II			This species migrates through open areas in Mongol-Altai Mountain Range, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
47.	Pallid harrier	*Circus macrourus*	Near Threatened	II			It passes through open countries from Mongol-Altai east to Great Lakes Depression, Desert-Steppe Depression in Zavkhan on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
48.	Montagu's harrier	*Circus pygargus*	Least Concern	II			This species is found in open areas of Uvs Lake and the delta of Tes, and Torkholig rivers (Northern Uvs Depression) on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
49.	Pied harrier	*Circus melanoleucos*	Least Concern	II			It occurs in the oasis of the Trans Altai Gobi (Fomin and Bold, 1991; Dawaa *et al*., 1994).
50.	Western marsh harrier	*Circus aeruginosus*	Least Concern	II			This species breeds on high, vegetated open areas in river and lake valleys in Buyant, Khovd rivers and Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дөргөн, Khyargas, Airag lakes and the delta of Khovd river with reedbeds (Great Lakes Depression). It migrates through these breeding areas and occurs in steppe and desert steppe on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).

51.	Northern goshawk	*Accipiter gentilis*	Least Concern	II			This species breeds in practically all forested areas in taiga, forest and forest steppe, and river valleys; particularly, the upper Khovd river (Mongol-Altai Mountain Range). It migrates through the breeding areas and Northern Uvs Depression, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
52.	Eurasian sparrowhawk	*Accipiter nisus*	Least Concern	II			This species breeds in forest and forest steppe at Buyant and Khovd rivers (Mongol-Altai Mountain Range); Tes with coniferous and deciduous forests (Tes river valley). It migrates throughout Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
53.	Rough-legged buzzard	*Buteo lagopus*	Least Concern	II			Tis species is a winter visitor to Great Lakes Depression valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
54.	Upland buzzard	*Buteo hemilasius*	Least Concern	II			This species breeds in forest steppe, mountain steppe, steppe, desert steppe and river valleys at Mongol-Altai, Gobi-Altai Mountain Range Great Lakes Depression. It occurs in the Trans Altai Gobi and neighbouring territories of Gobi-Altai on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
55.	Long-legged buzzard	*Buteo rufinus*	Least Concern	II			It was recently found at Gobi-Altai Mountain Range, and the northern Trans-Altai Gobi (Gombobaatar pers. comm.).
56.	Common buzzard	*Buteo buteo*	Least Concern	II			It occurs in breeding areas and also the Mongol-Altai Mountain Range, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
57.	Booted eagle	*Hieraaetus pennatus*	Least Concern	II			This species breeds from Khovd river to Bulgan river, Kharkhiraa and Turgen rivers (Mongol-Altai Mountain Range), possibly in Tes river basin (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
58.	Steppe eagle	*Aquila nipalensis*	Least Concern	II			This species breeds in forest steppe, mountain steppe, steppe, and desert steppe at the Mongol-Altai and Gobi-Altai mountain ranges (less than 2,500m above sea level), Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
59.	Greater spotted eagle	*Aquila clanga*	Vulnerable, C2a(ii)	II	I, II		It was observed in breeding territories and Great Lakes Depression on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
60.	Golden eagle	*Aquila chrysaetos*	Least Concern	II			This species breeds in high mountains, forest steppe, mountain steppe, steppe, and desert steppe at the Mongol-Altai and Gobi-Altai mountain ranges, Great Lakes Depression (mountain slopes, cliffs). It occurs in most areas of the country during non-breeding periods (Fomin and Bold, 1991; Dawaa *et al*., 1994).
61.	Pallas' fish eagle	*Haliaeetus leucoryphus*	Vulnerable, C2a(ii)	II	I		In Mongolia, during the breeding season, this species is found at Buyant, Khovd rivers and Achit, Uureg lakes (Mongol-Altai Mountain Range), from Uvs lake and the delta of Tes, Nariin, Torkholig rivers south to Khar-Us, Khar, Дцргцн lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
62.	White-tailed	*Haliaeetus*	Least	I	I,	V	This species breeds in forested areas and mountain massifs near water sources at Buyant

	eagle	*albicilla*	Concern		II		and Khovd rivers and Achit and Uureg lakes (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дөргөн, Khyargas, Airag lakes (Great Lakes Depression). It migrates through Valley of the Lakes, Bulgan river valley (Dzungariin Gobi) and Middle Khalkh Steppe areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
63.	Lammergeier	*Gypaetus barbatus*	Least Concern	II	II		This species breeds in mountain massifs at Mongol-Altai, Gobi-Altai Mountain Ranges east to Siilhem, Kharkhiraa and Turgen mountains; Great Lakes Depression (Jargalant and Bumbat Khairkhan, Altan Нөһii) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
64.	Egyptian vulture	*Neophron percnopterus*	Endangered, A2abcd+3bcd+4abcd	II			A single bird was recorded at Munkhkhairkhan mountian, Khovd on 24 May, 1996. (Bold and Boldbaatar, 1999; Bold and Mainjargal, 2006).
65.	Cinereous vulture	*Aegypius monachus*	Near Threatened	II			This species breeds in mountain massifs and slopes in high mountain, forest steppe, steppe, desert steppe and Gobi desert at Mongol-Altai, Gobi-Altai Mountain Ranges, Siilhem range, Kharkhiraa and Turgen mountains, Great Lakes Depression (Jargalant and Bumbat Khairkhan, Altan Нөһii) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
66.	Griffon vulture	*Gyps fulvus*	Least Concern	II			This species has been observed at Kharkhiraa Mountain and Bulgan river valley (Dzungariin Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994). It was recently recorded in Mongol-Altai.
67.	Himalayan vulture	*Gyps himalayensis*	Least Concern	II			This species has been recorded at Mongol-Altai Mountain Range (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Falconidae						
68.	Gyr falcon	*Falco rusticolus*	Least Concern	I		V	Records of this species in Mongolia are very doubtful. According to Dawaa *et al*., (1994), birds winter in the Altai and Khangai Mountain Range. (Tseveenmyadag, pers. comm.).
69.	Saker falcon	*Falco cherrug*	Endangered	II			This species breeds in high montains (less than 3,500 m above sea level), forest steppe, mountain steppe, steppe, desert steppe, Gobi Desert (trees, slopes) at Mongol-Altai, Gobi-Altai Mountain Range range, Great Lakes Depression (surrounding mountains). It can be found practically all over Mongolia, excluding wetlands, taiga, deep forest, sand dunes, and areas that lack nesting substrates in the Gobi desert. It migrates through all of the above mentioned areas (Fomin and Bold, 1991; Dawaa *et al*., 1994; Gombobaatar, 2006).
70.	Barbary falcon	*Falco pelegrinoides*	Least Concern	I			This species has been recorded near Airag Lake and Uvs *aimag* Zavkhan *Sum* (Fomin and Bold, 1991; Dawaa *et al*., 1994).
71.	Peregrine falcon	*Falco peregrinus*	Least Concern	I			This species migrates through Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994). S. Gombobaatar, D. Sumiya and E. Potapov observed a male passing food to a female near Ongotsny Ulaan, Khovd town.

72.	Eurasian hobby	*Falco subbuteo*	Least Concern	II			This species breeds in forest, forest steppe and forested river valleys at Achit, Uureg lake valleys (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression); coniferous and deciduous forests (Tes river valley); lower Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
73.	Merlin	*Falco columbarius*	Least Concern	II			This species breeds in forest, forest steppe, forested river valleys at Siilhem, Kharkhiraa and Turgen mountains; from Khovd river valleys to Uyench River; through Ih Bogd (Gobi-Altai); Tes River with coniferous and deciduous forests (Fomin and Bold, 1991; Dawaa *et al*., 1994).
74.	Lesser kestrel	*Falco naumanni*	Vulnerable,	II	I, II		This species breeds and migrates from Achit and Uureg lakes (Mongol-Altai Mountain Range) to the upper Bulgan river and Mцnh Khairkhan massif (less than 2,700m above sea level); Uvs lake depression and Tes River Valley (Fomin and Bold, 1991; Dawaa *et al*., 1994).
75.	Common kestrel	*Falco tinnunculus*	Least Concern	II			This species breeds and migrates in practically all areas in Mongolia, excluding wetlands, taiga, deep forest, high mountains exceeding 3,500m above sea level, unsuitable nesting areas in the Gobi Desert and steppe, and river valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Tetraonidae						
76.	Willow ptarmigan	*Lagopus lagopus*	Least Concern				This species breeds in the sub-alpine zone at Tavan Bogd, Siilhem, Altan-Hцhii, Tsast, Tsambagarav uul, Hцh Serh, Tsengel Khairkhan, Mцnh Khairkhan, Baatar Khairkhan (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
77.	Rock ptarmigan	*Lagopus muta*	Least Concern				This species breeds in the alpine and sub-alpine zones at Tavan Bogd, Siilhem, Turgen (Mongol-Altai Mountain Range); the alpine zone of Mongol-Altai (Yolt river valley) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
78.	Black grouse	*Lyrurus tetrix*	Least Concern				This species breeds in forested areas at Yolt river (Mongol-Altai Mountain Range); isolated territories at the delta of Torkholig river (Northern Uvs Depression) and Khan Hцhii; Tes river with coniferous and deciduous forests (Fomin and Bold, 1991; Dawaa *et al*., 1994).
79.	Black-billed capercaillie	*Tetrao parvirostris*	Least Concern				This species breeds in forested areas at Tes River and at the country border (western limit of distribution). Isolated populations exist at Khan Hцhii and Kharkhiraa mountains (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Phasianidae						
80.	Altai snowcock	*Tetraogallus altaicus*	Least Concern			V	This species breeds in mountains, at altitudes above 2,100-3,500m above sea level and Vly at elevations of 3,700 m. It is found in southern Siilgem and Turgen Mountain, south to all high mountains; Altanhцhii, Tsast Uul, Baatarkharkha, Sair Khaikhan (Tolbo lake),

							Khovd Mountain (Khongoryn nuruu), upper Khovd River, Мцнh Khairkhan massif; from Bulgan rivers to the lower part (Khaaz Mountain); east to Khasgt Khairkhan, Gichgenii nuruu (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
81.	Chukar	*Alectoris chukar*	Least Concern				This species breeds in mountains at Kharkhiraa and Turgen mountains, Uureg and Achit lakes (Mongol-Altai Mountain Range); all mountains and massifs at Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
82.	Daurian partridge	*Perdix dauuricae*	Least Concern				This species breeds in forest steppe, mountain steppe, steppe, desert steppe with rocky slopes and bushes, scrubs and river valleys at Mongol-Altai and Gobi-Altai (at elevations less than 2,000m above sea level, except for low vegetated slopes without bush); Great Lakes Depression (surrounding mountains). Altitudinal movement occurs in winter (Fomin and Bold, 1991; Dawaa *et al*., 1994).
83.	Common quail	*Coturnix coturnix*	Least Concern				This species breeds in high vegetated valleys at Achit Lake (the delta of Bokhmoron River) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
84.	Common pheasant	*Phasianus colchicus*	Least Concern			V R	It breeds in river valleys with willow trees and mountain slopes with tall bushes and scrubs at Khovd River Valley - from Цlgii town through southern Khar-Us Lake to Zereg Depression (Zereg sum); Achit Lake Valley (delta of Вцhмцгцn River) and Tes Lake and the delta of Tes and Torkholig rivers (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Gruidae						
85.	Common crane	*Grus grus*	Least Concern	II			This species breeds in valleys of lakes and rivers with tall vegetation and reedbeds at Achit and Uureg Lakes, delta Вцhмцгцn (Mongol-Altai Mountain Range); Uvs lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar lakes (Great Lakes Depression). It migrates through the breeding territories and Great Lakes Depression, Valley of the Lakes, Bulgan river valley (Dzungariin Gobi) (Kozlova, 1930; Fomin and Bold, 1991; Dawaa *et al*., 1994; Gombobaatar and Bold, 2002).
86.	White-naped crane	*Grus vipio*	Vulnerable, A2ce+3ce	I		V R	It breeds in open valleys of lakes and rivers with tall vegetation and reedbeds at Buyant River (Khovd river valley), Uvs Lake (Fomin and Bold, 1991; Dawaa *et al*., 1994).
87.	Demoiselle crane	*Anthropoides virgo*	Least Concern	II			This species breeds in forest, mountain, desert steppes and plains at the Mongol-Altai and Gobi-Altai (less than 2,200m above sea level), most areas of Great Lakes Depression. It migrates through the breeding areas and most open habitats of the country (except for taiga forest, alpine and subalpine zones of high mountains). Large flocks occur along steppe lakes and wheat fields on migration (Sushkin, 1938; Kozlova, 1930; Bold, 1969; Fomin and Bold, 1991; Dawaa *et al*., 1994; Gombobaatar and Bold, 2002).
	Rallidae						

88.	Water rail	*Rallus aquaticus*	Least Concern				This species is found in valleys of rivers and lakes with high vegetation and reedbeds at Tes River (Fomin and Bold, 1991).
89.	Spotted crake	*Porzana porzana*	Least Concern				This species has been recorded in Buyant (plantation in Khovd town on 31 May, 2006) (Brдunlich, 2006a) and Bulgan river valleys (Dzungar Gobi) on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
90.	Little crake	*Porzana parva*	Least Concern				This species breeds in reedbeds at Khar-Us lake (Great Lakes Depression) (Brдunlich, pers. comm. and Gombobaatar, pers. comm.).
91.	Baillon's crake	*Porzana pusilla*	Least Concern				This species breeds in valleys of lakes and rivers with reedbeds and high vegetation at Uvs lake and the delta of Tes and Torkholig rivers (Northern Uvs Depression), Khar-Us, Khar lakes and the delta of Khovd River with reedbeds (Great Lakes Depression). It migrates through the breeding areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
92.	Corn crake	*Crex crex*	Near Threatened				This species breeds in reedbeds at the Zelter river valley and Northern Uvs Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994). A single bird was found in a plantation at Khovd town on 31 May, 2006 (Brдunlich, 2006a).
93.	Common moorhen	*Gallinula chloropus*	Least Concern				It is present at the Bulgan River (Dzungaryn Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
94.	Common coot	*Fulica atra*	Least Concern				This species breeds in pools, lakes and ponds with reedbeds and tall vegetation cover at Achit and Uureg lakes (Mongol-Altai Mountain Range); Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd River with reedbeds (Great Lakes Depression). It migrates through the breeding areas and small steppe lakes, ponds and oasis (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Otididae						
95.	Great bustard	*Otis tarda*	Vulnerable, A3c	II	I, II	V	This species breeds in forest steppe, steppe, river valleys and fields at Khovd river valleys through the northern Mongol-Altai to northern Uvs Lake and Tes river valley; western most-Achit Lake. It migrates through the breeding range and Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
96.	Macqueen's bustard	*Chlamydotis macqueenii*	Vulnerable,	I	I, II	V R	This species breeds in desert steppe and desert with scattered bushes and scrubs at Northern Uvs Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Burhinidae						
97.	Eurasian stone-curlew	*Burhinus oedicnemus*	Least Concern				A single bird was found near Khar Us Lake, Khovd province (Great Lakes Depression) in June, 1993 (Tseveenmyadag and Bold, 2006).
	Charadriidae						

98.	Grey plover	*Pluvialis squatarola*	Least Concern				This species migrates through sandy and rocky shores and riversides in valleys of Uvs Lake and the delta of Tes and Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дүргцн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
99.	Pacific golden plover	*Pluvialis fulva*	Least Concern				Eastern Mongolia is one of the main stop-over sites for the species (Jeroen *et al*., 2005). It migrates through lakes and river valleys and dry steppe in Northern Uvs and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
100.	Little ringed plover	*Charadrius dubius*	Least Concern				This species breeds in open shores of rivers and lakes with gravel and sandy soils in the valleys of Achit, and Uureg lakes (Mongol-Altai Mountain Range) (except for high altitude areas); Khovd and Buhmцгцн rivers and small lakes; Uvs Lake and the delta of Tes, and Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar lakes and the delta of Khovd River Valley (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
101.	Kentish plover	*Charadrius alexandrinus*	Least Concern				This species breeds on open shores of rivers and lakes with gravel and mud flats near lakes in regions and valleys of Achit, and Uureg lakes (Mongol-Altai Mountain Range) (up to 2,600 m above sea level); Khovd and Buhmцгцн rivers and lakes; Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дүргцн lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
102.	Greater sand plover	*Charadrius leschenaultii*	Least Concern				This species breeds on open dry stoney steppe with clay soil and short vegetation in desert steppe and the Gobi desert in mountain regions and valleys of Achit, and Uureg lakes (Mongol-Altai Mountain Range); Uvs, Khar-Us, and Khar lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
103.	Oriental plover	*Charadrius veredus*	Least Concern				This species breeds in very dry open stoney steppe with short vegetation, sometimes sandy soils with sparse areas of tall grass and Caragana bushes in mountain steppe, desert steppe and transition zones between desert steppe and Gobi desert in Uvs Depression; Great Lakes Depression. It migrates through the breeding areas, lake shores and river banks in valleys of Uvs lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
104.	Eurasian dotterel	*Eudromias morinellus*	Least Concern				This species breeds in hilly, dry and rocky tundra, sometimes open tundra with low cover in high mountains in Tavan Bogd, Siilhem, Turgen mountains (Mongol-Altai Mountain Range). It migrates through the breeding areas, lake shores and river banks in Mongol-Altai and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
105.	Northern	*Vanellus vanellus*	Least				This species breeds in bogs, muds, marshes and wet meadows in valleys of lakes and

	lapwing		Concern				rivers in the Mongol-Altai Mountain Range and Great Lakes Depression. It passes through the breeding areas, steppe lake shores, river banks and oases in the Northern, Trans-Altai and Eastern Gobi on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
106.	Ruddy turnstone	*Arenaria interpres*	Least Concern				This species migrates over lake shores and river banks in valleys of Uvs Lake and the delta of Tes, Torkholig rivers, south to Khar-Us, Khar, Дµргµн lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
107.	Recurvirostridae						
108.	Black-winged stilt	*Himantopus himantopus*	Least Concern			V	This species breeds on shores, mud and grassy swamps near lakes and rivers in valleys of Uvs lake and the delta of Tes and Torkholig rivers (Northern Uvs Depression). It migrates through the breeding areas, wetlands in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
109.	Charadriidae						
110.	Pied avocet or avocet	*Recurvirostra avosetta*	Least Concern				This species breeds on sandy shores and muds, sometimes dry or boggy areas in valleys of Uvs Lake (Northern Uvs Depression); Khar-Us, Khar, Дµргµн, Khyargas lakes and the delta of Khovd River (Great Lakes Depression). It migrates through the breeding areas, lake shores, river banks and other wetlands in the Mongol-Altai Mountain Range (including Kharkhiraa and Turgen mountains) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Scolopacidae						
111.	Green sandpiper	*Tringa ochropus*	Least Concern				This species breeds in river shores and streamsides in mountain forest and forest steppe on Khovd River and Achit, and Uureg lakes (Mongol-Altai Mountain Range); Uvs Lake and the delta of Tes, and Torkholig rivers (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
112.	Wood sandpiper	*Tringa glareola*	Least Concern				It migrates through the breeding territories and almost all wetlands in the Mongol-Altai Mountain Range and Great Lakes Depression (including Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
113.	Common greenshank	*Tringa nebularia*	Least Concern				This species migrates across river banks, lake shores and other wetlands in valleys of rivers and lakes in the Mongol-Altai and Great Lakes Depression (including Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
114.	Common redshank	*Tringa totanus*	Least Concern				This species breeds in bogs, muds, marshes and wet meadows with hummocks, in river banks and lake shores: Khoton, Khorgon, Achit, Uureg lakes and Khovd River (Mongol-Altai Mountain Range); Khovd and Buhmцрцн rivers; small lakes and rivers in Kharkhiraa and Turgen mountains; Uvs, Khar-Us, Khar, Дµргµн, Khyargas, Airag lakes and Tes, Khovd rivers in Great Lakes Depression. It migrates through the breeding areas, lake

							shores and river banks in the Gobi-Altai Mountain Range, oases in the Trans-Altai Gobi, Northern Gobi and southern and western Eastern Gobi (Fomin and Bold, 1991; Dawaa *et al*., 1994).
115.	Spotted redshank	*Tringa erythropus*	Least Concern				This species migrates through rivers, lakes, ponds, oases and other types of wetland in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
116.	Marsh sandpiper	*Tringa stagnatilis*	Least Concern				This species breeds in swamps and pools with hummocks and dense grass in Tes river valley (Uvs Depression), some rivers and lakes in Kharkhiraa Mountain Range. It migrates through the breeding range, rivers, lakes, ponds, oases and other wetlands in Great Lakes Depression (Fomin and Bold, 1991; Dawaa et al., 1994).
117.	Common sandpiper	*Actitis hypoleucos*	Least Concern				This species breeds in rocky, sandy and thickety shores in rivers and lakes in mountain taiga forest, forest steppe and large river and lake valleys in the Mongol-Altai Mountain Range and Great Lakes Depression (including Northern Uvs Depression). It migrates through the breeding areas and all types of wetlands including oases in the Trans-Altai, Northern and Eastern Gobi (Fomin and Bold, 1991; Dawaa *et al*., 1994).
118.	Terek sandpiper	*Xenus cinereus*	Least Concern				This species occurs on lake shores, river banks and a variety of wetlands in the Mongol-Altai, Kharkhiraa and Turgen mountains and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
119.	Red-necked phalarope	*Phalaropus lobatus*	Least Concern				This species has been recorded on lake shores, river banks and other wetlands in the Mongol-Altai Mountain Range (except for alpine lakes and wetlands) and Great Lakes Depression on spring and autumn migrations (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Scolopacidae						
120.	Ruff	*Phalaropus pugnax*	Least Concern				This species breeds in bogs, marshes, pools and wet meadows with grass in valleys of Airag Lake. It migrates through the breeding areas and various wetlands in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994; Brдunlich, 2006a).
121.	Little stint	*Calidris minuta*	Least Concern				This species migrates through wetlands in mountain tundra, forest steppe, mountain steppe, desert steppe and Gobi desert from Uvs Lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
122.	Long-toed stint	*Calidris subminuta*	Least Concern				This species migrates across river banks and lake shores in valleys of Uvs Lake and the delta of Tes, Torkholig rivers, south to most lakes and rivers in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
123.	Red-necked stint	*Calidris ruficollis*	Least Concern				This species passes over lake shores, river banks and other types of wetland in Northern Uvs Depression, Great Lakes Depression, (Fomin and Bold, 1991; Dawaa *et al*., 1994).
124.	Temminck's stint	*Calidris temminckii*	Least Concern				This species migrates across banks, shores, muddy and boggy areas in valleys of rivers, lakes and oases in Great Lakes Depression. (Fomin and Bold, 1991; Dawaa *et al*., 1994).

125.	Curlew sandpiper	*Calidris ferruginea* Pontoppidan, 1763	Least Concern				This species migrates over river banks, lake shores and other wetlands in valleys of Uvs Lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дөргөн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
126.	Dunlin	*Calidris alpina* Linnaeus, 1758	Least Concern				This species is found on lake shores and river banks in valleys of Uvs Lake and the delta of Tes, and Torkholig rivers (Northern Uvs Depression); Khar-Us, Khar, Дөргөн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
127.	Sharp-tailed sandpiper	*Calidris acuminata*	Least Concern				This species migrates over banks and shores of rivers and lakes in Northern Uvs Depression and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
128.	Red knot	*Calidris canutus*	Least Concern				This species has been recorded on the shores Uvs Lake and lakes in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
129.	Sanderling	*Calidris alba*	Least Concern				This species is found on lake shores and river banks in valleys of Airag Lake (Mongol-Altai Mountain Range), Uvs Lake and Tes River (Great Lakes Depression) on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
130.	Broad-billed sandpiper	*Limicola falcinellus*	Least Concern				This species migrates across valleys of lakes and rivers in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
131.	Common snipe	*Gallinago gallinago*	Least Concern				This species breeds in swamps and bogs with hummocks and grasses, flooded wet meadows with short, sometimes high and dense vegetation in mountain forest, forest steppe and river valleys with old deciduous and mixed forests in Buyant, Khovd rivers and Achit Lake (Mongol-Altai Mountain Range); Uvs Lake and the delta of Tes, Torkholig rivers (Great Lakes Depression). It migrates through the breeding areas, lake shores, river banks and other wetlands in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
132.	Pintail snipe	*Gallinago stenura*	Least Concern				It migrates through the breeding areas, shores, banks, muds, marshes and swamps in valleys of lakes and rivers in the Mongol-Altai and Gobi-Altai Mountain Range (except for alpine or very highly elevated areas) and Great Lakes Depression on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
133.	Solitary snipe	*Gallinago solitaria*	Least Concern				This species breeds in boggy areas near springs and rivers and mountain slopes with dense sedges near wet meadows in alpine and subalpine zones in Khangai, Hentii and Нцvsgцl mountain ranges, possibly in Mongol-Altai Mountain Range. It migrates through the breeding territories, marshes, shores, banks, bogs, muds, swamps, pools, ponds and wet meadows in valleys of lakes and rivers in Mongol-Altai Mountain Range and Great Lakes Depression. Solitary individuals occur in winter in Tes, Khovd, Buyant River and Khar-Us, Khar lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).

134.	Eurasian woodcock	*Scolopax rusticola*	Least Concern				It occurs in the Bulgan river valley (Baruunkhurai Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
135.	Eurasian curlew	*Numenius arquata*	Least Concern				It migrates across lakes, open river valleys, lake shores, river banks and dry open steppe in Mongol-Altai (less than 2,200m above sea level) and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
136.	Whimbrel	*Numenius phaeopus*	Least Concern				This species migrates across river banks, lake shores and Vly across dry steppe in valleys of Uvs Lake and the delta of Tes, Torkholig rivers (Northern Uvs Depression), Khar-Us, Khar, Dцргцn, Khyargas, Airag lakes (Great Lakes Depression). (Fomin and Bold, 1991; Dawaa *et al*., 1994).
137.	Black-tailed godwit	*Limosa limosa*	Near Threatened				This species breeds in wet meadows, swamps, marshy-grassland and boggy areas in forest steppe and mountain steppe zones along valleys of Achit, Uureg lakes (Mongol-Altai Mountain Range), Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression). It migrates through the breeding areas and shores, banks, marshes, pools and wet grasslands in valleys of lakes and rivers in the Mongol-Altai (except for alpine, subalpine zones) and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
138.	Least Concern	*Limosa lapponica*					This species has been recorded on shores, banks, marshes, pools and wet grasslands in valleys of lakes and rivers in Northern Uvs and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
139.	Near Threatened	*Limnodromus semipalmatus*				V	This species breeds in marshy-grasslands and inaccessible bogs with hummocks and high vegetation in valleys of Airag Lake (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994). Three colonies of the species, totalling at least 57 adults were found at Airag nuur, Uvs province on 18 June 2006. One bird had an Australian leg-flag (Bгдunlich, 2006a).
	Stercorariida e						
140.		*Stercorarius pomarinus*	Least Concern				This species is considered vagrant. L.Tsevel and N.Darisuren (Natural History Museum, Mongolia) collected a single bird near Khar Lake, Khovd province (Great Lakes Depression) (Dawaa *et al*., 1994; Bold and Mainjargal, 2006).
	Laridae						
141.	Great black-headed	*Larus ichthyaetus*	Least Concern			V	This species breeds in large colonies, on shores and islands in large lakes with fish in Tolbo, Achit, Uureg Lakes (Mongol-Altai Mountain Range) and Uvs, Khar-Us, Khar, Khyargas lakes (Great Lakes Depression). It migrates through the breeding areas, large lakes and Vly dry steppe in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994). In June 2006, c. 1,500 pairs were found at Khyargas nuur, Uvs province

							(Brдunlich, 2006a).
142.	Relict gull	*Larus relictus*	Vulnerable, C2a(ii)	I	I,II	VR	It possibly breeds on lakes in Bulgan river valley (Baruunkhurai Depression or Dzungariin Gobi). It migrates through the breeding areas and Khar-Us, Khar, Dцrgцn lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
143.	Little gull	*Larus minutus*	Least Concern				This species breeds in colonies together with terns and other gulls, in lakes with overgrowth, old riverbeds and swampy lowlands on Achit Lake (Mongol-Altai Mountain Range). It is found on Uvs Lake (Great Lakes Depression) on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
144.	Black-headed gull	*Larus ridibundus*	Least Concern				This species breeds in colonies, near lakes, marshes, old riverbeds, densely vegetated areas near lakes, sometimes near reedbeds in valleys and regions containing lakes: Tolbo, Dayan, Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs, Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
145.	Brown-headed gull	*Larus brunnicephalus*	Least Concern				N.Tseveenmyadag (Mongolian Academy of Science), B.Nyambayar (Mongolian Academy of Science), Simba Chan (BirdLife International-Asia) and Ts.Munkhzul recorded three individuals together with a flock of black-headed gulls on the western shore of Uvs Lake, on 5 July, 2004 (Tseveenmyadag and Bold, 2006).
146.	Slender-billed gull	*Larus genei*	Least Concern				M.Stubbe, K.Uhlenhaut (Halle-Wittenberg University, Germany) and D.Sumiya (National University of Mongolia and Mongolian Ornithological Society) collected one bird near Uvs Lake, on 19 June, 1977 (Bold *et al*., 1980; Dawaa *et al*., 1994; Bold and Mainjargal, 2006).
147.	Mongolian gull	*Larus mongolicus*	Least Concern				This species breeds in large colonies, on cliffs on shores and banks, on islands in steppe lakes and rivers with reedbeds, and swampy lowland near lakes and rivers in valleys of lakes and rivers: Achit, Uureg and other lakes (Mongol-Altai Mountain Range); almost all lakes in Great Lakes Depression are suitable for breeding (Fomin and Bold, 1991; Dawaa *et al*., 1994).
148.	Common gull	*Larus canus*	Least Concern				This species breeds in small colonies, on islands in lakes: Uvs Lake (Northern Uvs Depression) and Khar-Us and Khar lakes (Great Lakes Depression). It migrates through valleys of Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression), Khar-Us, Khar, Dцrgцn, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
149.	Ross' gull	*Rhodostethia rosea*	Least Concern				An individual was recorded near Uvs Lake, Uvs province in August (Dawaa *et al*., 1994).
150.	Black tern	*Chlidonias niger*	Least Concern				This species breeds in colonies, on shores of islands and rivers with reeds or sedges on Uvs Lake (Sagil, Нцndlцn river valley). It migrates through Uvs Lake areas (breeding

							area) and valleys of Khar-Us, Khar, Dцргцн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
151.	White-winged tern	*Chlidonias leucopterus*	Least Concern				This species breeds in colonies, on shores of freshwater lakes and rivers with reeds and hummocks in valleys of Achit Lake (Mongol-Altai Mountain Range) and western Uvs Lake (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
152.	Whiskered tern	*Chlidonias hybridus*	Least Concern				This species breeds in colonies in thickets near rivers, lakes and pools in valleys of Uvs, Khar-Us, Khar lakes (Great Lakes Depression). It migrates through Uvs, Khar-Us, Khar, Dцргцн, Khyargas, Airag lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
153.	Gull-billed tern	*Gelochelidon nilotica*	Least Concern				This species breeds in colonies, on sandy islands, shores of saline soil with lichen vegetation in valleys of Uvs, Khar-Us, Khar, Dцргцн lakes (Great Lakes Depression). It migrates through Buyant, Khovd rivers and Tolbo, Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs, Khar-Us, Khar, Dцргцн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
154.	Caspian tern	*Hydroprogne caspia*	Least Concern				This species breeds in large colonies, on sandy beaches with sparse vegetation, islands in lakes and large rivers in valleys of Tolbo, Achit, Uureg lakes (Mongol-Altai Mountain Range) and Khar-Us, Khar lakes (Great Lakes Depression). It migrates through the breeding areas and Uvs Lake and the delta of Tes, Nariin, Torkholig rivers; Khar, Dцргцн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
155.	Common tern	*Sterna hirundo*	Least Concern				This species breeds on sandy beaches, on islands in rivers and lakes, boggy meadows and the delta of rivers with reeds in valleys of Buyant, Khovd rivers and Khoton, Khorgon, Tolbo, Dayan, Achit, Uureg lakes (Mongol-Altai Mountain Range); Uvs, Khar-Us, Khar lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
156.	Little tern	*Sterna albifrons*	Least Concern				This species breeds in small colonies and in pairs on sandy and pebbly beaches, islands and shores of rivers and lakes with fishes in valleys of Khar-Us, Khar lakes (Great Lakes Depression). It migrates through Uvs, Khar-Us, Khar, Dцргцн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Pteroclidae						
157.	Pallas' sandgrouse	*Syrrhaptes paradoxus*	Least Concern				This species breeds in open dry pebbly ground with short vegetation in steppe, desert steppe, and Gobi desert in Mongol-Altai and Gobi-Altai Mountain Ranges (except for high mountain areas and mountain valleys greater than 2,300 m above sea level) and Great

							Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
158.	Columbidae						
159.	Common wood pigeon	*Columba palumbus*	Least Concern				This species breeds in dense trees in deciduous, coniferous and mixed forest in river valleys and forest steppe in Tes River Valley, and north-western Uvs Lake (Great Lakes Depression). Birds were recorded in Khovd town during the migration period (Fomin and Bold, 1991; Dawaa *et al*., 1994).
160.	Pale-backed pigeon	*Columba eversmanni*	Vulnerable,				A.Bold (Mongolian Academy of Science) found a single bird near Telmen Lake, Zavkhan province on 1 June, 1998 and a second bird at Bulgan River, Khovd province (Bold and Mainjargal, 2006).
161.	Rock pigeon	*Columba livia*	Least Concern				This species breeds in cliffs, rock faces, caves, deserted buildings and other human-made substrates throughout Mongolia (except the alpine zone, dense taiga forest, Gobi desert and wetlands). Rock pigeons with typical plumage occur in remote areas such as Uyench River Valley (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
162.	Hill pigeon	*Columba rupestris*	Least Concern				This species breeds on rocky mountains, cliff faces, river banks and valleys with human settlements and wheat fields with suitable nesting substrates in Mongol-Altai- and Gobi-Altai Mountain Ranges (less than 3,000 m above sea level) and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
163.	Eurasian collared	*Streptopelia decaocto*	Least Concern				This species breeds in trees in river valleys and deciduous forest in Bulgan River Valley, Bulgan sum, Khovd (Baruunkhurai) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
164.	European turtle dove	*Streptopelia turtur*	Least Concern			V	This species breeds and winters in deciduous and mixed forest in forest steppe and Bulgan, Bodonch river valleys at Bulgan sum, Khovd province (Baruunkhurai) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
165.	Laughing dove	*Streptopelia senegalensis*	Least Concern				This species breeds and winters in deciduous and mixed forest in Bulgan River Valley, Bulgan sum, Khovd province (Baruunkhurai Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994) and in Buyant River Valley (Khovd town) on 29 November, 2006 (Вгдunlich, 2006a).
	Pteroclidae						
166.	Oriental turtle dove	*Streptopelia orientalis*	Least Concern				This species breeds in trees in deciduous and mixed forests in mountain taiga forest, forest steppe, and regions and valleys of Bulgan River (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
167.	Cuculidae						
168.	Common cuckoo	*Cuculus canorus*	Least Concern				This species breeds in coniferous, deciduous and mixed forests in mountain taiga forest, forest steppe, mountain slopes, valleys of lakes and rivers with trees and tall bushes: Mongol-Altai mountain ranges; Khovd and Buhmцгцn rivers, northern Turgen

							(Kharkhiraa and Turgen mountains); Tes, Nariin, Torkholig River (Northern Uvs Depression) and Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
169.	Oriental cuckoo	*Cuculus saturatus*	Least Concern				This species breeds in coniferous, deciduous and mixed forests in mountain taiga, forest steppe and river valleys in Buyant, Khovd rivers (Mongol-Altai Mountain Range); Buhmцrцn River with patched deciduous forest in northern Turgen (Kharkhiraa and Turgen mountains) and Tes River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Strigidae						
170.	Snowy owl	*Nyctea scandiaca*	Least Concern	II			This species is found in forest steppe, mountain steppe and river valleys in Uvs Lake Depression in the beginning of spring and winter (Fomin and Bold, 1991; Dawaa *et al*., 1994).
171.	Eurasian eagle-owl	*Bubo bubo*	Least Concern	II			This species breeds in rocky mountains, steppe hills with breaking rocks, lake shores with precipice and river banks, forested areas and river valleys in all natural zones and belts in the country except for wetlands and deserts without trees and rocks (Fomin and Bold, 1991; Dawaa *et al*., 1994).
172.	Long-eared owl	*Asio otus*	Least Concern	II			This species breeds in various types of forests including coniferous and mixed forests in mountain taiga forest, forest steppe, patched woodland in the steppe and valleys of lakes and rivers: Khoton, Khorgon, Achit lakes and Khovd and Bulgan rivers (Mongol-Altai Mountain Range) and north-western Uvs Lake and Tes River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
173.	Short-eared owl	*Asio flammeus*	Least Concern	II			This species breeds in open river valleys with low bush and scrub, bogs and marshes in Achit, and Uureg Lake valleys (Mongol-Altai Mountain Range) and Khar-Us, Khar lakes and Khovd, Tes river valleys (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
174.	Eurasian scops owl	*Otus scops*	Least Concern	II			This species breeds in deciduous and mixed forest in mountain taiga, forest steppe and valleys of Bulgan River (Mongol-Altai Mountain Range) and Tes River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
175.	Little owl	*Athene noctua*	Least Concern	II			This species nests in burrows, caves, precipice, cliff-cavities and -crevices, tree-holes, holes and cracks of deserted buildings in forest steppe, mountain steppe, desert steppe, Gobi desert and valleys of steppe rivers and lakes: Mongol-Altai and Gobi-Altai mountain ranges (except for alpine and subalpine zones and wet meadows) and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
176.	Northern hawk owl	*Surnia ulula*	Least Concern	II			This species breeds in mature coniferous and mixed forests in taiga, forest steppe and valleys of rivers and lakes in northern Uvs Lake (Fomin and Bold, 1991; Dawaa *et al*.,

							1994).
177.	Ural owl	*Strix uralensis*	Least Concern	II			This species breeds in coniferous and mixed forests in mountain taiga, forest steppe and valleys of lakes and rivers in Kharkhiraa and Turgen mountains (patched deciduous forest) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Caprimulgidae						
178.	European nightjar	*Caprimulgus europaeus*	Least Concern				This species breeds in mountain forest, forest steppe, thickets on edges of river valleys, desert steppe, mountain slopes with tall bushes, and open river valleys close to forest and mountain valleys with dry sandy soil and bushes in Achit Lake Valley (Mongol-Altai Mountain Range); Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Apodidae						
179.	White-throated needletail	*Hirundapus caudacutus*	Least Concern				It occurs in Great Lakes Depression on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
180.	Common swift	*Apus apus*	Least Concern				This species nests in colonies, in crevices of cliffs and rocks, under roofs of buildings, and tree holes in mountain forests, forest steppe, plains, desert steppe, river valleys, towns and villages in valleys of Achit, Uureg lakes (Mongol-Altai Mountain Range) and east to Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
181.	Fork-tailed swift	*Apus pacificus*	Least Concern				This species nests in colonies, in crevices and cracks of cliffs and rocks and under roofs of buildings in mountain forest, forest steppe, plains, desert steppe, river valleys, towns and villages in regions and valleys of Achit, Uureg lakes and Yolt, Khujirt rivers and mountains with altitudes 2,700 m above sea level (Mongol-Altai) and Uvs Lake and the delta of Tes, Nariin, Torkholig rivers, Khar-Us, Khar, Duргuн, Khyargas, Airag lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Alcedinidae						
182.	Common kingfisher	*Alcedo atthis*	Least Concern				This species breeds on river banks, lake shores, and streams with fishes in mountain forest, forest steppe and valleys of Achit Lake (Mongol-Altai Mountain Range) and Tes, Khovd, Buyant rivers (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Meropidae						
183.	European bee-eater	*Merops apiaster*	Least Concern				German and Mongolian biologists identified a single bird at Yarantai in Bulgan River, Khovd province (Dawaa *et al*., 1994). A second individual was observed at Dzungariin Gobi in May (Brдunlich, pers. comm.).
	Upupidae						

184.	Eurasian hoopoe	*Upupa epops*	Least Concern				This species nests in tree holes, crevices of cliffs and rocks, and cracks and crevices of man-made structures in high mountains, mountain taiga forest, forest steppe, plains, desert steppe, Gobi desert and river valleys in Mongol-Altai and Gobi-Altai mountain ranges (except for alpine, subalpine zones and wet meadows) and Great Lakes Depression (except for reedbeds and lakes) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Picidae						
185.	Eurasian wryneck	*Jynx torquilla*	Least Concern				This species nests in tree-holes and stumps in deciduous, coniferous and mixed forests in mountain taiga forest, forest steppe, river valleys and patched woodland in plains and in regions and valleys of Khoton, Khorgon lakes and Khovd River; Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range) and along Tes River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
186.	Grey-faced woodpecker	*Picus canus*	Least Concern				This species breeds in deciduous and mixed forests in mountain taiga, forest steppe and valleys of Torkholig and Tes rivers (Fomin and Bold, 1991; Dawaa *et al*., 1994).
187.	Black woodpecker	*Dryocopus martius*	Least Concern				This species breeds in deciduous and mixed forest in mountain taiga, forest steppe and river valleys: Yolt and Khovd rivers (Mongol-Altai Mountain Range) and Khandgait and Tes rivers (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
188.	Great spotted woodpecker	*Dendrocopos major*	Least Concern				This species breeds in coniferous, deciduous and mixed forest in mountain taiga, forest steppe and valleys of lakes and rivers: Yolt and Khovd rivers and Kharkhiraa and Turgen mountains (Mongol-Altai) and Tes River and north-western Uvs Lake (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994)
189.	White-backed woodpecker	*Dendrocopos leucotos*	Least Concern				This species breeds in coniferous, deciduous and mixed forest in mountain taiga, forest steppe and valleys of rivers and lakes: Achit Lake, Khovd, Bulgan, Uliastai rivers and Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
190.	Lesser spotted woodpecker	*Dendrocopos minor*	Least Concern				This species breeds in coniferous, deciduous and mixed forest in mountain taiga, forest steppe, gardens and valleys of rivers and lakes: Khovd River and Kharkhiraa and Turgen mountains (Mongol-Altai) and Tes River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
191.	Eurasian three-toed woodpecker	*Picoides tridactylus*	Least Concern				This species breeds in old coniferous and mixed forest in mountain taiga, forest steppe and valleys of lakes and rivers: Khovd, Khujirt, Bulgan rivers and Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range); Tes River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Hirundinidae						
192.	Sand martin	*Riparia riparia*	Least				This species breeds on river banks and lake shores with sandy precipice in valleys of lakes

			Concern				and rivers: Khovd River, Khoton, Khorgon lakes, Мцнh Khairkhan Mountain area (Bortyn Lake) (Mongol-Altai Mountain Range) (except for alpine and subalpine zones and wet meadows) and Uvs, Khar-Us, Khar, Дцргцн, Khyargas, Airag lakes, south to Zereg Valley (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
193.	Eurasian crag martin	*Ptyonoprogne rupestris*	Least Concern				This species breeds in caves and cavities in cliff-faces and high rocks in high mountain areas in Achit Lake Valley, Нцh Serh Mountain, from Khovd River to Bulgan river valleys; Мцnhkhaikhan, Kharkhiraa and Turgen mountains, Uyench, Bodonch, Tsenher river valleys (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
194.	Barn swallow	*Hirundo rustica*	Least Concern				This species nests under bridges, on roofs of buildings, cattle shelters and other man-made structures in forest steppe, mountain steppe, desert steppe and valleys of lakes and rivers: Achit Lake and Khovd River (Mongol-Altai Mountain Range) and Uvs Lake and the delta of Tes, Torkholig rivers, Ulaangom town, lower Khovd River, Khar-Us, Khar, Дцргцн, Khyargas, Airag lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
195.	Common house martin	*Delichon urbica*	Least Concern				This species breeds in cliffs, rock-faces and cavities, and man-made substrates in forest steppe, mountain steppe, desert steppe and valleys of rivers and lakes: Mongol-Altai Mountain Range and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Alaudidae						
196.	Greater short-toed lark	*Calandrella brachydactyla*	Least Concern				This species breeds in open short vegetated dry habitats with patches of tall grasses and bushes in mountain steppe, (Caragana steppe), valleys of rivers and lakes, and Vly the edges of forest steppe in Great Lakes Depression (Fomin and Bold, 1991 and Dawaa *et al*., 1994).
197.	Lesser short-toed lark	*Calandrella rufescens*	Least Concern				This species breeds in open arid habitats with short bush and sparsed tall grasses in mountain steppe including Caragana steppe, plains and depressions of rivers and lakes: Mongol-Altai and Gobi-Altai mountain ranges and valleys of Uvs, Khar-Us, Khar, Дцргцн, Khyargas, Airag lakes and Tes, Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
198.	Asian short-toed lark	*Calandrella cheleensis*	Least Concern				This species breeds in dry open habitats with tall sparsely vegetated sandy and saline soils in mountain steppe, desert steppe and valleys of lakes and rivers: Khovd River and Achit, Uureg lakes (Mongol-Altai Mountain Range) and Tes River and Uvs, Khar-Us, Khar, Дцргцн, Khyargas, Airag lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
199.	Mongolian	*Melanocorypha*	Least				This species breeds in sparsely vegetated open dry habitats with patched tall grass, dry

	lark	*mongolica*	Concern				valleys of rivers and lakes with tall grass and mountain valleys in steppe: Tes, Khovd rivers and Uvs, Khar-Us, Khar, Dцргцn, Khyargas, Airag lakes (Great Lakes Depression). It occurs in breeding areas and mountain valleys in Mongol-Altai and Gobi-Altai mountain ranges, Great Lakes Depression on seasonal movements in winter (Fomin and Bold, 1991; Dawaa *et al*., 1994).
200.	Black lark	*Melanocorypha yeltoniensis*	Least Concern				A single bird was found near Khar-Us Lake, Dцргцn sum, Khovd province on 14 February, 1980 (Piechocki *et al*., 1982; Dawaa *et al*., 1994).
201.	Horned lark	*Eremophila alpestris*	Least Concern				This species breeds in open habitats in high mountain (subalpine meadows and rocky mountains), forest steppe, plains, desert steppes, valleys of mountains, rivers and lakes almost all over Mongolia (except for alpine zone, dense taiga forest, wetlands and forested areas). It breeds in Mongol-Altai mountain ranges up to 3,500 m above sea level. It occurs in all natural zones and belts in Mongolia excluding alpine, taiga zones and forested areas on seasonal movements in winter (Fomin and Bold, 1991; Dawaa *et al*., 1994).
202.	Eurasian skylark	*Alauda arvensis*	Least Concern				This species breeds in dry open habitats near river and lake valleys, slightly wet meadows, and wheat fields in high mountain, forest steppe, mountain steppe, plains and valleys of Tolbo, Achit, Uureg lakes (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Motacillidae						
203.	Richard's pipit	*Anthus richardi*	Least Concern				This species breeds in open dry habitats on mountain slopes, edges of coniferous and mixed forests, mountain meadows and tall vegetated mountain valleys in high mountains, forest steppe, mountain steppe and valleys of Khovd River and Achit, Uureg lakes, south to Tsetseg Lake (Mongol-Altai Mountain Range) and Buhmцрцn and Tes rivers, south to Zereg Depression, Khar-Us, Khar, Dцргцn lakes and the delta of Khovd River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
204.	Blyth's pipit	*Anthus godlewskii*	Least Concern				This species breeds in open dry habitats with tall covers on mountain slopes, mountain meadows, mixed forest edges, meadows in river valleys and wheat fields in high mountains, forest steppe, mountain steppe and river valleys in Kharkhiraa, Turgen mountains, Мцnh Khairkhan massif, east to Khasagt Khairkhan and Alag Khairkhan Mountain (Mongol-Altai Mountain Range) and Tes and Khovd rivers (Great Lakes Depression) It migrates through the breeding areas and open habitats in the Bulgan River Valley (Baruunkhurai Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
205.	Tawny pipit	*Anthus campestris*	Least Concern				Tis species breeds in dry open country and hills; it is sometimes found in forest meadows and edges, and sandy open ground in Tolbo, Achit, Uureg lakes, from Khovd River (Khoton Lake) to southern Мцnh Khairkhan Mountain, east to Khasagt Khairkhan and Taishir, northern Baruunkhurai (Uyench River Valley) (Mongol-Altai Mountain Range);

							from Tes River Valley and Northern Uvs Depression to Mongol-Altai (Fomin and Bold, 1991; Dawaa *et al*., 1994).
206.	Tree pipit	*Anthus trivialis*	Least Concern				This species breeds along the edges of mixed forest and river valleys with deciduous forest and mountain steppe with patched woodland in Khovd River Valley, Kharkhiraa and Turgen mountains; from Khovd (Khoton, Khorgon, Dayan lakes) to Bulgan River (Mongol-Altai Mountain Range). It migrates through the breeding areas and open dry habitats in Great Lakes Depression, (Fomin and Bold, 1991; Dawaa *et al*., 1994).
207.	Olive-backed pipit	*Anthus hodgsoni* Richmond, 1907	Least Concern				This species breeds in deciduous and mixed forests in mountain forest taiga, forest steppe, and river valleys, Vly on mountain steppe with patched woodland in Tes River Valley (Great Lakes Depression). It migrates through the breeding areas and all natural zones and belts in Mongol-Altai and Gobi-Altai mountain ranges (except for alpine, subalpine zones and wet meadows) and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
208.	Water pipit	*Anthus spinoletta*	Least Concern				This species breeds in alpine and subalpine meadows and mountain tundra in Mongol-Altai- (up to 3,500 m above sea level). It migrates through Mongol-Altai mountain ranges and Baruunkhurai Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
209.	Yellow wagtail	*Motacilla flava*	Least Concern				This species breeds in meadows, grassy swamps, marshes, and forest bogs in high mountains, the edges of mountain taiga forest, forest steppe, lake and river valleys from Achit Lake south to Shargyn Gobi and Valley of the Lakes (Mongol-Altai Mountain Range and the valley) and from Uvs Lake, Tes, Nariin, Torkholig and other rivers to Shargyn Gobi (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
210.	Citrine wagtail	*Motacilla citreola*	Least Concern				This species breeds in wet meadows with hummocks, grassy swamps and marshes, open bogs in forest with low cover and short bushes, and soggy river banks in high mountains, mountain forest, forest steppe and valleys of lakes and rivers: in Altai Tavan Bogd massif, Tolbo Lake, Мцнh Khairkhan (up to 2,900 m above sea level), south-east to Ihes Lake and Мцсцn Turuut River (Mongol-Altai Mountain Range) and Tes River Valley, Northern Uvs Depression, Khar-Us, Khar, Дцргцn lakes and the delta of Khovd River, Zereg Depression and Shargyn Gobi (Great Lakes Depression). It migrates through the breeding areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
211.	Grey wagtail	*Motacilla cinerea*	Least Concern				This species breeds along banks of mountain rivers with rocks, freshwater lake-shores with trees, and river valleys in the edges of forest in high mountains, mountain taiga forest, forest steppe and mountain river valleys in Siilhem, Kharkhiraa and Turgen mountains, Мцнh Khairkhan (up to 2,500 m above sea level), Uvs Lake and the delta of Tes, Nariin, Torkholig rivers and Jargalant Khairkhan Mountain (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).

212.	White wagtail	*Motacilla alba*	Least Concern				This species breeds on wetlands, shores of rivers, lakes, ponds, and inhabited areas in high mountains, mountain forest, forest steppe, mountain steppe, desert steppe, river valleys, villages and towns in Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range); Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression) and Khar-Us, Khar lakes and the delta of Khovd River (Great Lakes Depression). It migrates through the breeding areas, open habitats and valleys of rivers and lakes in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
213.	Masked wagtail	*Motacilla personata*	Not Evaluated				It breeds in mountain meadows, river valleys with rocks in high mountains in Siilhem, Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range), east to Tonkhil and Tцgrцg sum, Tes River Valley. It migrates through the breeding areas and Mongol-Altai, and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Laniidae						
214.	Brown shrike	*Lanius cristatus*	Least Concern				This species breeds in open habitats with thickets, forest edges in mixed and coniferous forest, gardens and parks, scattered bushy habitats on mountain slopes, and tall bushes along river valleys in high mountains, mountain taiga forest, forest steppe, mountain steppe, desert steppe and river valleys in Мцnh Khairkhan Mountain (Khujirt gol), Buyant, Khovd rivers (Mongol-Altai Mountain Range); and Khovd, the delta of Tes, Nariin, Torkholig rivers and Uvs, Khar-Us, Khar lakes (Great Lakes Depression). It migrates through the breeding areas, open habitats with bushes, trees and rocky mountain slopes with bushes in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
215.	Rufous-tailed shrike	*Lanius isabellinus*	Least Concern				This species breeds in scattered tall bushy open habitats in mountain steppe and high mountain, tall dense thickets and dense bushes along river valleys and mountain valleys in steppe, bushy areas along the edges of mixed forest, and Saxaul forest in Gobi in different natural zones and belts (high mountain, mountain forest, forest steppe, mountain steppe, desert steppe, Gobi desert) and valleys of lakes and rivers: Buyant, Khovd rivers (Khoton Lake Valley), Achit Lake (Mongol-Altai Mountain Range); from Northern Uvs Depression, south to Mongol-Altai mountains (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
216.	Lesser grey shrike	*Lanius minor*	Least Concern				This species breeds in open habitats with scattered tall bushes in valleys of rivers and mountains near Bulgan sum, Khovd province (Bгдunlich, 2006a).
217.	Great grey shrike	*Lanius excubitor*	Least Concern				This species breeds in scattered open bushy habitats in high mountains and river valleys, tall bushes and elm trees in desert steppe and mountain valleys and saxaul trees in Gobi in Mongol-Altai and Gobi-Altai mountain ranges (alpine and subalpine zones and wet meadows); from Mongol-Altai to southern Shargyn Gobi and Northern Uvs Depression

							(Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Oriolidae						
218.	Eurasian golden oriole	*Oriolus oriolus*	Least Concern				This species breeds in deciduous and mixed forests in Zereg *sum* (from south-eastern Khar-Us Lake to the south-west region of the Lake). Several birds were seen at lower Khovd River Valley, Bayan Lake near Santmargad *sum* (Zavkhan Desert-Steppe Depression), Bodonch and Bulgan river basins (Baruunkhurai Depression or Dzungariin Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
219.	Sturnidae						
220.	Common starling	*Sturnus vulgaris*	Least Concern				This species breeds in deciduous and mixed forest in mountain forest near settlements and in river valleys: Buyant, Khovd River (Mongol-Altai Mountain Range and Great Lakes Depression). It migrates through the breeding areas and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
221.	Rosy starling	*Sturnus roseus*	Least Concern				This species breeds in dry open habitats with precipices, cliffs, heaps of rocks and buildings on settlements in Uyench, Buyant, Khovd River (Mongol-Altai Mountain Range) and Bulgan river valleys (Baruunkhurai Depression). Birds have been observed at Gobi-Altai Mountain Range, Northern Uvs Depression, Great Lakes Depression and the Gobi (Trans-Altai, Northern and Eastern Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Corvidae						
222.	Eurasian jay	*Garrulus glandarius*	Least Concern				It is found in valleys of Tes and Torkhilog rivers (Northern Uvs Depression) in summer (Fomin and Bold, 1991; Dawaa *et al*., 1994).
223.	Black-billed magpie	*Pica pica*	Least Concern				This species breeds in a variety of different habitats, with coniferous, deciduous, mixed forests, planted trees in high mountains, mountain taiga forest, forest steppe, mountain steppe; villages, towns and other settlements in desert steppe: Buyant, Khovd, Yolt, Sagsai river valleys and Kharkhiraa, Turgen and Mцnh Khairkhan mountains, east to Khasagt Khairkhan and Taishir mountains - up to 2,200 m above sea level (Mongol-Altai Mountain Range) and Uvs Lake and the delta of Tes, Nariin, Torkholig river valleys, Ulaangom and Khovd towns, Khar-Us, Khar, Dцrgцn lake valleys, Zereg Depression, Jargalant Khairkhan Mountain (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
224.	Mongolian ground jay	*Podoces hendersoni*	Least Concern				This species breeds in small saxaul trees or scattered tall bushes in mountain valleys and wide valleys of dried rivers with rocks in desert steppe and Gobi desert in Achit lake valley (Mongol-Altai Mountain Range) and western Khan Hцhii, south to Dцrgцn Lake (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
225.	Spotted	*Nucifraga*	Least				Birds have been identified in Mongol-Altai, Great Lakes Valley and Baruunkhurai

	nutcracker	*caryocatactes*	Concern				Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
226.	Red-billed chough	*Pyrrhocorax pyrrhocorax*	Least Concern				This species breeds in cliffs, crevices and caves in high mountains, forest steppe, mountain steppe, desert steppe and Gobi desert and river valleys: Baitag Bogd, Tahiin Shar Nuruu mountains (Mongol-Altai Mountain Range) and Siilhem Range, Kharkhiraa and Turgen mountains; Uvs Lake and Khar-Us, Khar, Дөргөн Lakes Valley (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
227.	Eurasian jackdaw	*Corvus monedula*	Least Concern				This species breeds in deciduous forests in mountain steppe and river valleys and plantations at settlements in Khovd River Valley to Цэлгэр town, Achit Lake Valley; from Мөнх Khairkhan to Bulgan and Uyench river valleys (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
228.	Daurian jackdaw	*Corvus dauuricus*	Least Concern				This species breeds in deciduous and mixed forests at the edges of mountain taiga forest, forest steppe, mountain steppe and river valleys: Khasagt Khairkhan and Taishir mountains (Mongol-Altai Mountain Range); Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression) and Khar-Us, Khar, Дөргөн lakes and the delta of Khovd River (Great Lakes Depression). It migrates through the breeding areas, dry open habitats and river valleys with forest in Great Lakes Depression, Zavkhan Desert-Steppe Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
229.	Rook	*Corvus frugilegus*	Least Concern				This species breeds in deciduous, coniferous and mixed forests in high mountain forest, mountain taiga forest, forest steppe, river valleys and patched woodland in steppe and planted trees near settlements in Buyant, Khovd and Yolt river valleys and Dayan Lake, Khasagt Khairkhan and Taishir mountains (Mongol-Altai Mountain Range) and Uvs Lake and the delta of Tes, Nariin, Torkholig river valleys (Northern Uvs Depression). It migrates through the breeding areas, open habitats and river valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
230.	Carrion crow	*Corvus corone*	Least Concern				This species breeds in deciduous, mixed and coniferous forests in high mountain forest, mountain taiga forest, forest steppe, river valleys and patched woodland in steppe and planted trees near settled areas in Mongol-Altai and Gobi-Altai Mountain Range (except for alpine, subalpine zones, and wet meadows) and forested areas in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
231.	Hooded crow	*Corvus cornix*	Not Evaluated				This species has been recorded in deciduous, mixed and coniferous forests and planted trees near settlements in Khovd and Buyant river valleys and Khovd town (Mongol Altai) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
232.	Common raven	*Corvus corax*	Least Concern				This species breeds in cliffs, rocks, precipice, trees, poles, pylons and other man-made substrates in almost all habitats of natural belts and zones and near settlements from Mongol-Altai Mountain Range to Buir Nuur-Khalkh Gol-Khyangan Sub-region; from

							Нцvsgцl Mountain Range to the Gobi desert (Trans-Altai and Eastern Gobi Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Cinclidae						
233.	White-throated dipper	*Cinclus cinclus*	Least Concern				This species breeds along the banks of clear, fast-flowing streams and rivers with rocky bottoms in mountains and Vly in valleys with permanent streams: Yolt, Buyant, Khovd rivers, south-east to Bulgan River (Mongol-Altai Mountain Range). It winters on open water in mountain rivers and lakes: Tes, Khovd, Buhmцrцn rivers (Mongol-Altai and Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Prunellidae						
234.	Alpine accentor	*Prunella collaris*	Least Concern				This species is found in overgrown bushes on dry rocky mountain slopes in alpine and subalpine zones in Нцh Serh, Tsast Uul, Altan-Нцhii, Kharkhiraa and Khasagt Khairkhan mountains (greater than 2,300 m above sea level) (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
235.	Rufous-streaked accentor	*Prunella himalayana*	Least Concern				This species breeds in alpine meadows, cliffs, rockslides and glacial moraines in alpine and subalpine zones (between 2,750-3,400 m above sea level) in Tavan Bogd Mountain massif, Tsast Uul, Мцnh Khairkhan, Aj Bogd, Alag Khairkhan mountains (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
236.	Brown accentor	*Prunella fulvescens*	Least Concern				This species breeds in overgrown mountain thickets on dry, rocky slopes in high mountains in Mongol-Altai and Gobi-Altai mountain ranges (up to 2,800 m above sea level); from Mongol-Altai, north to Northern Uvs Depression and Tes River Valley (Fomin and Bold, 1991; Dawaa *et al*., 1994).
237.	Siberian accentor	*Prunella montanella*	Least Concern				This species migrates and winters in mountains with cliff-faces, rocks and open dry desert steppe, mountain steppe and forest steppe in Mongol-Altai mountain ranges and rocky mountains in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
238.	Black-throated accentor	*Prunella atrogularis*	Least Concern				This species breeds in high mountain cliffs and rocks with bushes and thickets in Khovd and Yolt river valleys (Mongol-Altai Mountain Range). It has been recorded in Great Lakes Depression on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
239.	Mongolian accentor	*Prunella koslowi*	Least Concern				It is found in Khovd town (Western Mongolia) during the non-breeding period (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Sylviidae						
240.	Savi's warbler	*Locustella luscinioides*	Least Concern				This species breeds in thickets and dense growth in damp, swampy areas and Vly in reedbeds in valleys of Khar and Khar-Us Lake (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
241.	Pallas's grasshopper	*Locustella certhiola*	Least Concern				This species breeds in grassy meadows, marshes and swamps with bushes and rank growth in both dry and damp areas at the edge of mountain taiga forest, forest steppe, river valleys

	warbler						and Vly in reedy areas in valleys of Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression) and Khar-Us, Khar, Дµргµн lakes (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
242.	Common grasshopper warbler	*Locustella naevia*	Least Concern				This species breeds in rank vegetation, clumps of bushes, thickets and Vly in reedbeds in the valley of Achit Lake (Gobi-Altai Mountain Range). It has been recorded at Buyant River near Khovd town on migration (Fomin and Bold, 1991; Dawaa *et al*., 1994).
243.	Lanceolated warbler	*Locustella lanceolata*	Least Concern				This species breeds in grassy clumps, meadow undergrowth, reedbeds and tall covers in valleys of Tes River (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
244.	Paddyfield warbler	*Acrocephalus agricola*	Least Concern				This species breeds in reeds and dense vegetation in marshy areas, river banks and valleys of Achit Lake (Mongol-Altai Mountain Range), Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression) and Khar-Us, Khar, Дµргµн lakes (Great Lakes Depression). It migrates through the breeding areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
245.	Blyth's reed warbler	*Acrocephalus dumetorum*	Least Concern				This species breeds in thickets and reeds in forests and bushes and dense grasses in valleys of Uvs (Northern Uvs Depression), Khar-Us and Khar lakes (Great Lakes Depression) and Bulgan River (Baruunkhurai Depression or Dzungariin Gobi). It migrates through the breeding areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
246.	Great reed warbler	*Acrocephalus arundinaceus*	Least Concern				This species breeds in overgrown reeds and thickets or bushes near lakes, marshes, ponds, pools and rivers: Achit Lake (Mongol-Altai Mountain Range) and Uvs, Khar-Us, Khar, Дµргµн lakes and the delta of Khovd River (Great Lakes Depression). It migrates across the breeding ground, lakes with reedbeds, river valleys with tall bushes and dense vegetation and oases (Fomin and Bold, 1991; Dawaa *et al*., 1994).
247.	Booted warbler	*Hippolais caligata*	Least Concern				This species breeds in thickets at forest edges, in burnt-over forest areas, birch groves, wild rose bushes, sometimes in reeds, lower dense trees in open terrain in forest and forest steppe in Achit, Uureg lake valleys (Mongol-Altai Mountain Range); north-eastern Kharkhiraa Mountain; Uvs Lake and the delta of Tes, Nariin, Torkholig (Northern Uvs Depression), Tes (Great Lakes Depression) and Bulgan river valleys (Baruunkhurai Depression). It migrates across the breeding ground, valleys of rivers and lakes and oases (Fomin and Bold, 1991; Dawaa *et al*., 1994).
248.	Barred warbler	*Sylvia nisoria*	Least Concern				this species breeds in tall bushes, scrubs, thickets and scattered bushes in high mountain valleys, Vly in river valleys and at the edges of mountain forest in Khovd River and Achit lake valleys (Mongol-Altai Mountain Range); from the central region of Tes River Valley, the delta of Torkholig River, northern Uvs Lake, south to Jargalant Khairkhan Mountain and Zereg Depression (Great Lakes Depression); down to southern Shargyn Gobi; from

							southern Mongol-Altai Mountain Range to Baruunkhurai (Bulgan and Bodonch river valleys). It migrates through the breeding areas, open habitats with trees, tall bushes and oases (Fomin and Bold, 1991; Dawaa *et al*., 1994).
249.	Common whitethroat	*Sylvia communis*	Least Concern				This species breeds in thickets, bushes, scrubs and young deciduous trees in high mountains, at the edges of mountain taiga forest, forest steppe and river valleys: Buyant, Khovd, Yolt, Bulgan rivers, Kharkhiraa, Turgen and Khasagt Khairkhan mountains (Mongol-Altai Mountain Range) and Tes, Nariin, Torkholig rivers (Northern Uvs Depression and Great Lakes Depression). It migrates through the breeding and forested areas, river valleys and open steppe in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
250.	Lesser whitethroat	*Sylvia curruca*	Least Concern				This species breeds in a variety of bushes, scrubs, young trees and thickets in high mountains, at the edges of mountain taiga forest, forest steppe, patched woodland and valleys of rivers and lakes in Kharkhiraa and Turgen mountains, Khovd River and Achit Lake (Mongol-Altai Mountain Range) and Uvs Lake and the delta of Tes, Nariin, Torkholig rivers (Northern Uvs Depression). It migrates through the breeding areas, open habitats in river valleys and bushy areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
251.	Hume's whitethroat	*Sylvia althaea*	Least Concern				This species breeds in scattered bushes and scrubs on high mountain slopes and high altitude gullies in high mountains and highly elevated mountain steppe in Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range. It migrates through the breeding areas, across open habitats and river valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
252.	Asian desert warbler	*Sylvia nana*	Least Concern				This species breeds in dry open habitats with bushes and scrubs in caragana steppe, desert steppe and the Gobi desert in valleys of Achit Lake (Mongol-Altai Mountain Range); Northern Uvs Depression and Great Lakes Depression. It migrates through the breeding areas and dry open habitats in the Gobi. (Fomin and Bold, 1991; Dawaa *et al*., 1994).
253.	Willow warbler	*Phylloscopus trochilus*	Least Concern				It possibly nests Tes River Valley (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
254.	Common chiffchaff	*Phylloscopus collybita*	Least Concern				This species breeds in deciduous and mixed forests with overgrown thickets and bushes in mountain taiga forest, forest steppe and river valleys: Khovd and Yolt rivers (Mongol-Altai Mountain Range) and Tes, Torkholig rivers (Northern Uvs Depression). It migrates through the breeding areas, open dry habitats with bushes and trees in the Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
255.	Arctic warbler	*Phylloscopus borealis*	Least Concern				It migrates through the breeding areas, open habitats and river valleys in Mongol-Altai mountain ranges, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
256.	Greenish warbler	*Phylloscopus trochiloides*	Least Concern				This species breeds in deciduous and mixed forest with overgrown thickets and tall groves in high mountain taiga forest, forest steppe and river valleys: from Khovd to Yolt River,

							Мцнh Khairkhan massif, Khovd River and Achit Lake; Kharkhiraa, Turgen and Khasagt Khairkhan mountains (Mongol-Altai Mountain Range) and the delta of Tes and Torkholig rivers (Great Lakes Depression). It migrates through the nesting areas, dry open habitats, river valleys and forested areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
257.	Two-barred greenish warbler	*Phylloscopus plumbeitarsus*	Not Evaluated				It migrates through the nesting areas and according to field observations and the World Distribution Reference, it possibly migrates through Great Lakes Depression (Svensson, 1992; del Hoyo *et al*., 2006).
258.	Bright green warbler	*Phylloscopus nitidus*	Not Evaluated				It migrates through the breeding areas, open areas and valleys of Tes River, Uvs, Achit, and Uureg lakes (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
259.	Inornata warbler	*Phylloscopus inornatus*	Least Concern				This species breeds in deciduous, mixed forests in mountain taiga, forest steppe and river valleys: Uyench River, Kharkhiraa, Turgen and Khasagt Khairkhan mountains (Mongol-Altai Mountain Range) and Jarglant Khairkhan Mountain, Torkholig and Tes rivers (Great Lakes Depression). It migrates through the breeding ground, open habitats and river valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
260.	Hume's leaf warbler	*Phylloscopus humei*	Least Concern				It migrates through the breeding areas, mountain valleys with tall bushes, forested areas and dry open habitats in Mongol Altai mountain ranges and Great Lakes Depression (del Hoyo *et al*., 2006; Tseveenmyadag and Bold, 2006).
261.	Dusky warbler	*Phylloscopus fuscatus*	Least Concern				This species breeds in willow or other deciduous forest with thickets and bushes near taiga bogs and wet meadows in high mountain taiga forest, forest steppe and river valleys: Buyant, Khovd, Yolt, Tes rivers (Mongol-Altai Mountain Range) and Chono Kharaikh River to Khar-Us, Khar, Дцргцн lakes (Great Lakes Depression). It migrates through the breeding areas, open habitats and river valleys with bushes (Fomin and Bold, 1991; Dawaa *et al*., 1994).
262.	Sulphur-bellied warbler	*Phylloscopus griseolus*	Least Concern				This species breeds in deciduous and mixed forests on rocky mountain slopes with sparse vegetation, thickets and bushes: Khovd River to Bulgan River, across the main mountain range of the region, Мцнh Khairkhan, Нцh Serh massifs, surrounding mountains of Achit Lake; and Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range) and northern Uvs Lake, middle part of Tes River Valley (Great Lakes Depression). It migrates through the breeding areas, open habitats and river valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Muscicapidae						
263.	European pied flycatcher	*Ficedula hypoleuca*	Least Concern				A. Врдunlich (WWF) recorded a single bird near Tolbo nuur, Bayan-Цlgii province on 1 June, 2006. A. Врдunlich and Martin Gilbert (WCS) documented another bird in Khovd town, Khovd province on 22 September, 2006 (A. Врдunlich, unpubl.).

264.	Taiga flycatcher	*Ficedula albicilla*	Least Concern				This species breeds in deciduous and mixed forest with dense tall bushes and mature willow trees in mountain taiga forest, forest steppe and river valleys: upper Khovd River across Yolt River (Mongol-Altai Mountain Range). It migrates through the breeding areas, river valleys with deciduous forest and dry open habitats in Mongol-Altai mountain ranges and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
265.	Spotted flycatcher	*Muscicapa striata*	Least Concern				This species breeds in deciduous and mixed forest with dense bushes, fruit trees and old poplars in mountain forest, forest steppe and river valleys: from upper Khovd River through Bulgan rivers, east to Uyench River and to lower Bulgan River, possibly Khasagt Khairkhan (Mongol-Altai Mountain Range). It migrates through the breeding areas, along river valleys, patched woodland with tall vegetation, planted trees and open habitats in the Gobi-Altai Mountain Range and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
266.	Dark-sided flycatcher	*Muscicapa sibirica*	Least Concern				This species breeds in coniferous, deciduous and mixed forest with tall old trees and fruit trees in mountain taiga forest, forest steppe and valleys of lakes and rivers. It occurs at Tes and Torkholig rivers (Great Lakes Depression). It migrates through the breeding areas, along river valleys with patched woodland and tall vegetation, planted trees and open habitats in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
267.	Siberian stonechat	*Saxicola maura*	Least Concern				This species breeds in dry open habitats with low covers, meadows at the edges of mountain forest, forest steppe, mountain steppe and valleys of rivers and lakes: Khovd River, Achit Lake, Siilhem, Kharkhiraa and Turgen mountains; from Altai Tavan Bogd to Bulgan River, Мцнh Khairkhan massif and Khasagt Khairkhan mountains (Mongol-Altai Mountain Range) and northern Uvs Lake and the delta of Tes, Nariin, Torkholig rivers, Tes River, Khar-Us and Zereg Depression (Great Lakes Depression). It migrates through the breeding areas, open habitats with bushes and tall grass and dry steppe (Fomin and Bold, 1991; Dawaa *et al*., 1994).
268.	White-throated bushchat	*Saxicola insignis*	Vulnerable, C2a(ii)				This species breeds in wet meadows, mountain valleys with rocks near streams, mountain slopes with rocks and low vegetation in alpine and subalpine meadows in high mountains such as Tsast Uul, Нцh Serh, Мцнh Khairkhan, Khasagt Khairkhan, Siilhem mountains (Mongol-Altai Mountain Range) (greater than 2,600 metres above sea level). It migrates through the breeding areas, open habitats and river valleys with bushes and tall vegetation in Great Lakes Depression and Valley of the Lakes (Fomin and Bold, 1991; Dawaa *et al*., 1994).
269.	Northern wheatear	*Oenanthe oenanthe*	Least Concern				This species breeds in open, stony habitats with tall vegetation in high mountain, edge of mountain taiga forest, forest steppe and mountain slopes with breaking rocks in mountain steppe, desert steppe, open valleys of lakes and rivers; and settlements: Mongol-Altai

							Mountain main range, mostly 2,400-3,200 metres above sea level (up to 3,500 m), east to Khasagt Khairkhan, Khan Taishir mountains, and as far as Aj Bogd mountains (Mongol-Altai Mountain Range) and south to Tost Mountain; from Northern Mongol-Altai Mountain Range through Tes River Valley and the mountains surrounding Great Lakes Depression. It migrates through the breeding areas and dry open habitats (Fomin and Bold, 1991; Dawaa *et al*., 1994).
270.	Pied wheatear	*Oenanthe pleschanka*	Least Concern				This species breeds on mountain slopes with rocks and cliffs, dried river valleys with scattered bushes, rocky mountains with tall bushes in high mountain, on the edge of mountain taiga forest, forest steppe, mountain steppe, desert steppe and Gobi desert and settlements in Achit Lake Valley, through the southern range of the Mongol-Altai to Baruunkhurai Depression (Mongol-Altai Mountain Range) and all suitable habitats in Great Lakes Depression. It migrates through the breeding areas, open habitats with bushes and tall covers, along mountain slopes and open dry steppe (Fomin and Bold, 1991; Dawaa *et al*., 1994).
271.	Desert wheatear	*Oenanthe deserti*	Least Concern				This species breeds in dry open sandy habitats with scattered bushes, low vegetation and rocks in desert steppe, Gobi desert, valleys of mountains, rivers and lakes with desert habitats and herder camps, settlements in Achit Lake Valley (Mongol-Altai Mountain Range) and all suitable habitats in Great Lakes Depression. It migrates through open dry habitats with bushes and rocks in the breeding areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
272.	Isabelline wheatear	*Oenanthe isabellina*	Least Concern				This species breeds in dry open habitats with short vegetation and scattered low bushes, mountain slopes with small rocks and boulders in high mountain, the edge of taiga mountain forest, forest steppe, mountain steppe, (all types of steppe including Caragana steppe), desert steppe, valleys of rivers, lakes and settlements: Khovd River basin (2,200 metres above sea level), Мцнh Khairkhan massif, Khasagt Khairkhan and Taishir mountains (up to 2,600-3,000 metres above sea level) to Sharga Gobi (Mongol-Altai Mountain Range) and Northern Uvs Depression, Tes River Valley to Sharga Gobi Depression (Great Lakes Depression). It migrates through the breeding areas, open dry habitats and oases (Fomin and Bold, 1991; Dawaa *et al*., 1994).
273.	Rufous-tailed rock thrush	*Monticola saxatilis*	Least Concern				This species breeds on dry, rocky mountain slopes with sparse vegetation and high rocks and cliffs in high mountain, mountain taiga, forest steppe, mountain steppe, desert steppe and river valleys in the main range of the Mongol-Altai, east to Achit Lake and Yolt River valleys (Mongol-Altai Mountain Range) and Great Lakes Depression. It migrates through the breeding areas, mountain slopes and open habitats (Fomin and Bold, 1991; Dawaa *et al*., 1994).

274.	Common redstart	*Phoenicurus phoenicurus*	Least Concern				This species breeds in deciduous and mixed, sometimes coniferous forest with thickets and dense tall bushes in mountain taiga forest, forest steppe and valleys of lakes and rivers: Khovd River and Achit Lake, the main range of Mongol-Altai to upper Bulgan River, Khasagt Khairkhan and Khan Taishir mountains (Mongol-Altai Mountain Range) and Uvs Lake and Tes rivers (from Bayantes *sum* to mouth) (Great Lakes Depression). It migrates through the breeding areas, open habitats with trees and bushes in river valleys and forest steppe (Fomin and Bold, 1991; Dawaa *et al*., 1994).
275.	Black redstart	*Phoenicurus ochruros*	Least Concern				This species breeds in cliff crevices, rock cracks in high cliff-faces, rocks and boulders with scattered tall bushes and Vly on rocky slopes and cliffs along forest edges and river valleys in high mountains, desert steppe and mountains in the Gobi at altitudes of 3,000-3,200 metres above sea level (Mongol-Altai and Gobi-Altai mountain ranges) and rocky mountains in Uvs, Khar-Us lakes and Khovd, Tes rivers (Great Lakes Depression). It migrates through the breeding areas, rocky mountains with scattered bushes in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
276.	Rufous-backed redstart	*Phoenicurus erythronotus*	Least Concern				This species breeds in mountain coniferous and mixed forest with rocks and bushy overgrowth in mountain taiga forest, forest steppe and river valleys: Siilhem, Kharkhiraa and Turgen mountains and Mцnh Khairkhan massif, through the main mountain range of Mongol-Altai, Khovd River to Yolt River Valley and Khasagt Khairkhan Mountain (Mongol-Altai Mountain Range). Birds have been found in Uvs Lake and lower Torkholig River Valley during the breeding season. It migrates through the breeding areas, forested areas and open habitats with bushes in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
277.	Guldenstat's redstart	*Phoenicurus erythrogaster*	Least Concern				This species breeds in high alpine terrain with rocky slopes and tree lines near permanent snows in high mountains at altitudes of 2,900 and 3,000 metres above sea level in Tavan Bogd, Sair, Mцnh Khairkhan (3,500 metres altitude), Kharkhiraa, Turgen, Khasagt Khairkhan (2,600 metres altitude), Altan Hцhii (2,600 metres altitude), Jargalant Khairkhan massifs (2,400 - 3,500 metres altitude) (Mongol-Altai Mountain Range and Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
278.	Common nightingale	*Luscinia megarhynchos*	Least Concern				This species breeds and migrates in thin deciduous and mixed forest with thickets in Bulgan River Valley in Baruunkhurai Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
279.	Siberian rubythroat	*Luscinia calliope*	Least Concern				This species breeds in deciduous and mixed forests with tangled thickets and tall bushes in mountain taiga forest, forest steppe and river valleys: lower Torkholig River and northern Uvs Lake and Tes River (Great Lakes Depression). It migrates through the breeding areas, open dry steppe with bushes and tall grass, mountain slopes with rocks, river valleys with

							bushes and tall covers and settlements (Fomin and Bold, 1991; Dawaa *et al*., 1994).
280.	Bluethroat	*Luscinia svecica*	Least Concern				This species breeds in deciduous and mixed forests with overgrown thickets, near streams, rivers and lakes in mountain taiga forest, forest steppe and valleys of rivers and lakes: the main range of Mongol-Altai, east to Мцnh Khairkhan massif (2,700 metres above sea level) and Tavan Bogd Mountain (3,200 metres) (Mongol-Altai Mountain Range); Zereg Depression, lower Khovd River, through northern Uvs Lake (lower Torkholig River) and Tes River Valley (from upper to lower). It migrates through the breeding areas, valleys of rivers and lakes with deciduous forests with thickets and open dry steppe in the Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
281.	Orange-flanked bush robin	*Tarsiger cyanurus*	Least Concern				It migrates through the breeding areas, forested areas, valleys of rivers and lakes with trees and dense bushes in Mongol-Altai Mountain Range (river valleys) and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Turdidae						
282.	Eye-browed thrush	*Turdus obscurus*	Least Concern				It migrates through the breeding areas, forest and river valleys with fruit trees in Northern Uvs Depression and south to Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
283.	Red-throated thrush	*Turdus ruficollis*	Least Concern				This species breeds in mature coniferous, mixed and deciduous forest in high mountain, mountain taiga, forest steppe and valleys of rivers and lakes: Kharkhiraa, Turgen and Jargalant Khairkhan mountains (Mongol-Altai Mountain Range) and Tes, Torkholig rivers (Great Lakes Depression). It migrates through the breeding areas, forested areas with thickets and river valleys with fruit trees in Mongol-Altai and Gobi-Altai mountain ranges, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
284.	Black-throated thrush	*Turdus atrogularis*	Not Evaluated				This species breeds in woodland with deciduous forest in river valleys in the Mongol-Altai main range to upper Khovd and Yolt rivers; from Цlgii town to Achit Lake Valley and Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range) and northern Uvs Lake and lower Torkholig River Valley (Great Lakes Depression). It migrates through the breeding areas, dry open habitats with bushes and trees and river valleys with fruit trees in Mongol-Altai Mountain Range, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
285.	Naumann's thrush	*Turdus naumanni*	Least Concern				It migrates through various types of woods and thickets, valleys of rivers and lakes with fruit trees in Northern Uvs Depression, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
286.	Fieldfare	*Turdus pilaris*	Least Concern				This species breeds in a variety of forest types with thickets and bushes in forest mountain steppe and valleys of rivers and lakes: Lower Khovd and Torkholig rivers, northern Uvs Lake, Tes River (Northern Uvs Depression). It migrates through the breeding areas,

							forests with fruit trees in mountain steppe, river valleys and planted trees in Great Lakes Depression. It winters in forest with fruit trees in forest steppe, river valleys and planted trees in towns and villages (Fomin and Bold, 1991; Dawaa *et al*., 1994).
287.	Siberian thrush	*Turdus sibiricus*	Least Concern				It migrates through the breeding areas, river valleys with forest and open areas with tall bushes and scrubs in the Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
288.	Song thrush	*Turdus philomelos*	Least Concern				This species breeds in coniferous and mixed forest in Tes River Valley (from Bayantes *sum* to lower Tes River) (Northern Uvs Depression). It migrates across the breeding area, river valleys with tall bushes and fruit trees in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
289.	Mistle thrush	*Turdus viscivorus*	Least Concern				This species breeds in open woodlands in mountain taiga forest, forest steppe and valleys of upper Khovd River to upper Bulgan River, western Mцnh Khairkhan Mountain, Uliastai and Khujirt rivers (Mongol-Altai Mountain Range, Baruunkhurai). It migrates through the breeding areas, a variety of woodlands with bushes and scrubs, and river valleys with bushes in Mongol-Altai mountain ranges and Baruunkhurai Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
290.	Eurasian scaly thrush	*Zoothera dauma*	Least Concern				This species breeds in coniferous and mixed forest in dense taiga forest and river valleys of taiga in northern Uvs Lake, Torkholig River (Northern Uvs Depression). It migrates through the breeding areas, mountain slopes with rocks and bushes, river valleys with bushes and tall grass in open dry steppe, and cattle shelter and buildings at settlements (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Panuridae						
291.	Bearded parrotbill	*Panurus biarmicus*	Least Concern				This species breeds in dense tall reedbeds near pools, ponds, lakes and rivers in high mountains, the edge of mountain taiga forest, forest steppe, mountain steppe, oases and lakes in desert steppe and Gobi desert: Achit Lake Valley (Mongol-Altai Mountain Range) and Uvs, Khar-Us, Khar, Dцргцн lakes valley and Zereg Depression (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Aegithalidae						
292.	Long-tailed tit	*Aegithalos caudatus*	Least Concern				This species breeds and winters in mixed and deciduous forest in mountain taiga forest, forest steppe, and valleys of rivers and lakes: northern Uvs Lake (Torkholig River delta) and Tes River (Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Paridae						
293.	White-crowned penduline tit	*Remiz coronatus*	Least Concern				This species breeds in deciduous and mixed forest in mountain taiga forest, forest steppe and valleys of rivers and Vly on lakes: Khovd River and Achit Lake (Mongol-Altai Mountain Range). It migrates through the breeding areas, forested areas, high vegetated

							open habitats and mountain slopes with bushes in Great Lakes Depression, Mongol-Altai mountain ranges (Fomin and Bold, 1991; Dawaa *et al*., 1994).
294.	Marsh tit	*Parus palustris*	Least Concern				This species breeds and winters in coniferous, deciduous and mixed forest in mountain taiga, forest steppe, river valleys and patched woodland in mountains: Tes River (from Bayantes sum) to the country border (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
295.	Willow tit	*Parus montanus*	Least Concern				This species breeds and winters in coniferous, deciduous, and mixed forest in taiga, forest, forest steppe and river valleys: upper Khovd River to Yolt River Valley and southern Mцnh Khairkhan Mountain (Khujirt River Valley); Khasagt Kairkhan and northern Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range); northern Uvs Lake and Torkholig River delta and Tes River Valley (Northern Uvs Depression) and Bulgan River Valley (Baruunkhurai Depression). It is found in the Mongol-Altai Mountain Range and Great Lakes Depression in winter (Fomin and Bold, 1991; Dawaa *et al*., 1994).
296.	Coal tit	*Parus ater*	Least Concern				This species breeds mostly in coniferous and mixed forest in mountain taiga, forest steppe and river valleys: Kharkhiraa Mountain massif and Yolt River (Mongol-Altai Mountain Range) and Tes River basin (Bayantes *sum* to the country border) (Northern Uvs Depression). It winters in the breeding areas, mountain forest, woodland in river valleys and patched woodland in southern Mongol-Altai Mountain Range (Fomin and Bold, 1991; Dawaa *et al*., 1994).
297.	Azure tit	*Parus cyanus*	Least Concern				This species breeds mostly in deciduous and mixed forest in mountain taiga, forest steppe and river valleys: Khovd River, Achit, Uureg lakes and Kharkhiraa, Turgen mountains (Mongol-Altai Mountain Range); Uyench, Bodonch, Bulgan rivers (Baruunkhurai Depression); through the Mongol-Altai Mountain Range and Shargyn Gobi; Tes River valley (Northern Uvs Depression). It winters in the breeding areas, forested territories and woodlands in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
298.	Great tit	*Parus major*	Least Concern				This species breeds in deciduous and mixed forest in high mountain forest, mountain taiga, forest steppe and river valleys: from Цlgii town to lower Khovd; to Yolt River, Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range) and lower Torkholig and Tes River valleys (from Bayantes *sum* south) (Northern Uvs Depression). It winters in the breeding areas, natural forests and planted trees in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
299.	Turkestan tit	*Parus bokharensis*	Least Concern				This species breeds and winters in deciduous and mixed forest in Bulgan River valley (Baruunkhurai Depression or Dzungariin Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Sittidae						

300.	Eurasian nuthatch	*Sitta europaea*	Least Concern				This species breeds in large deciduous, mixed or coniferous trees in mountain taiga forest, forest steppe and patched woodland in river valleys: through Mongol-Altai Mountain Range, from lower Khovd to Bulgan River, Мцнh Khairkhan Mountain massif through the south-western ranges of the later massif; from Цlgii town to the lower part of Khovd River; Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range) and northern Uvs Lake, lower Torkholig and Tes rivers (from Bayantes, south) (Northern Uvs Depression). It winters in the breeding areas, natural forests, planted trees and gardens at settlements from Mongol-Altai Mountain Range across the Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
301.	Wallcreeper	*Tichodroma muraria*	Least Concern				This species breeds in high cliffs and rocks near springs and rivers in high mountains from Нцh Serh massif, Jargalant Khairkhan to upper Uyench, east to Gurvansaikhan Mountain (Mongol-Altai and Gobi-Altai Mountain ranges) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Certhiidae						
302.	Eurasian tree-creeper	*Certhia familiaris*	Least Concern				This species breeds in coniferous and mixed forest in high mountain forest, mountain taiga forest, forest steppe and river valleys: through the main range of Mongol-Altai, from upper Khovd River to Yolt River, Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range) and lower Torkholig and Tes rivers (Bayantes *sum* to the country border) (Northern Uvs Depression). It winters in the breeding areas and forested areas (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Passeridae						
303.	House sparrow	*Passer domesticus* (Linnaeus, 1758)	Least Concern				This species breeds in holes and crevices of man-made substrates at almost all settlements from Achit Lake Valley, south to Bulgan River Valley, through the mountain range (Mongol-Altai Mountain Range and Baruunkhurai Depression) and Northern Uvs Depression and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
304.	Eurasian tree sparrow	*Passer montanus* (Linnaeus, 1758)	Least Concern				This species breeds in holes in trees, under/in raptor nests and crevices and holes of man-made substrates in mountain forest, forest steppe, river valleys and settlements from Mongol-Altai Mountain Range to Khalkh River Valley; from Mongol-Altai south to Bulgan and Uyench River valleys (Baruunkhurai Depression); scarcely distributed in Mongol-Altai Mountain, Great Lakes Depression, Eastern Mongolian Plain and Gobi (Fomin and Bold, 1991; Dawaa *et al*., 1994).
305.	Saxaul sparrow	*Passer ammodendri* Gould, 1872	Least Concern				This species breeds in holes in Saxaul trees, raptor nests in Saxaul forest in Gobi, Vly in cattle shelter and nest boxes in Baruunkhurai Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
306.	Rock	*Petronia petronia*	Least				This species breeds in holes, crevices, caves and cracks of trees, rocks, cliff-faces, man-

	sparrow	(Linnaeus, 1766)	Concern				made substrates and the bottom of raptor nests in high mountain, the edges of mountain forest, forest steppe, mountain steppe, desert steppe, Gobi desert and river valleys: from Mongol-Altai Mountain Range (Siilhem Mountain, Achit Lake Valley, Нцн Serh, Jargalant Khairkhan, Мцnh Khairkhan mountains - up to 2,900 metres) northern Siilhem Mountain to lower Torkholig River, northern Uvs and Telmen lakes (Great Lakes Depression and Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
307.	White-winged snowfinch	*Montifringilla nivalis* (Linnaeus, 1766)	Least Concern				This species breeds in holes, crevices, caves and cracks in rocks, cliff-faces and Vly in man-made substrates in high mountain steppe and subalpine and alpine meadows with cliffs, rockslides and buildings: through southern Mongol-Altai Mountain Range, mountains near Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
308.	Small snowfinch	*Pyrgilauda davidiana*	Least Concern				This species breeds in rodent's burrows on the ground in arid steppe and mountain steppe and semi-desert with sparse vegetation in Tolbo, Achit, Uureg Lake valleys (Mongol-Altai Mountain Range); Tsast Uul Mountain Valley, from eastern Мцnh Khairkhan Mountain, east to Gurvansaikhan range and Tost Mountain valleys (Great Lakes Depression and Gobi-Altai Mountain Range) and Northern Uvs Depression. It is found in open dry steppe and mountain valleys (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Fringillidae						
309.	Chaffinch	*Fringilla coelebs*	Least Concern				This species breeds in woodlands in lower Torkholig River Valley (northern Uvs Lake). It migrates through woodlands and open dry steppe with bushes in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
310.	Brambling	*Fringilla montifringilla*	Least Concern				It migrates through the breeding areas, open dry steppe, mountain slopes with rocks and bushes and river valleys with deciduous and mature trees in Mongol-Altai and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
311.	Eurasian siskin	*Spinus spinus*	Least Concern				It migrates through the breeding areas, open dry habitats, mountain slopes with rocks and bushes, valleys of rivers and lakes with tall cover and mountain valleys in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
312.	European goldfinch	*Carduelis carduelis*	Least Concern				This species breeds in mixed and deciduous trees with bushes in valleys of Bulgan and Khovd rivers (Baruunkhurai Depression) and Torkholig River delta (Northern Uvs Depression - Great Lakes Valley). It migrates through the breeding areas, open dry habitats, valleys of rivers and lakes with tall cover and mountain slopes with rocks and bushes in Great Lakes Valley (Fomin and Bold, 1991; Dawaa *et al*., 1994).
313.	Grey-crowned goldfinch	*Carduelis caniceps*	Not Evaluated				This species breeds on the edges of woodland with relatively thick vegetation in mountain forest and river valleys: from Цlgii town to lower Khovd and lower Torkholig river valleys (northern Uvs Lake), Нцvsgцl region and Bulgan river basin (Baruunkhurai Depression). There is a lack of migration records within the country (Fomin and Bold,

							1991; Dawaa *et al*., 1994).
314.	European greenfinch	*Carduelis chloris*	Least Concern				A.Brдunlich (WWF) observed and documented a single bird in Khovd town as a first record of the species for Mongolia on 23 October, 2005. V.Holmgren (birdwatcher from Sweden) and A.Brдunlich found a single bird at the "Airport plantation" near Khovd town on 18 October 2006. The second record was less than two kilometres away from the first record (Brдunlich, 2006a).
315.	European linnet	*Acanthis cannabina*	Least Concern				This species breeds in areas with thick bushes in mountain forest, forest steppe and river valleys in Yolt River Valley, upper Khovd River to Bulgan River Basin (Mongol-Altai Mountain Range) and Torkholig River delta (northern Uvs Lake) (Great Lakes Depression). No records of migration are available within the country (Fomin and Bold, 1991; Dawaa *et al*., 1994).
316.	Eurasian twite	*Acanthis flavirostris*	Least Concern				This species breeds in thick bushy areas on mountain slopes with boulders and cliffs, dry open mountain steppe with sparse vegetation and scattered bushes; dry river valleys near mountain slopes with bushes: from Tavan Bogd and Siilhem mountains to Hurh Mountain (south-eastern Gobi-Altai Mountain Range) and Great Lakes Depression;. It is found in the breeding territories, dry open habitats near water, rocky mountain slopes and valleys of rivers and lakes with rocks and bushes (Fomin and Bold, 1991; Dawaa *et al*., 1994).
317.	Common redpoll	*Acanthis flammea*	Least Concern				It winters in open dry habitats with tall grass with seeds, river and lake valleys with bushes and thickets, mountain slopes with rocks and tall grass and the edge of forests in high mountains, forest steppe, desert steppe and mountains in the Gobi desert in Gobi-Altai-, Khangai-, Нцvsgцl and Hentii mountain ranges, Middle Khalkh and Mongol Daguur Steppe, Eastern Mongolian Plain, Buir Nuur-Khalkh Gol-Khyangan Sub-region and Baruunkhurai Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
318.	Arctic redpoll	*Acanthis hornemanni*	Least Concern				This species winters in open dry habitats with tall grass, river and lake valleys with bushes and thickets, mountain slopes with rocks and tall grass and at the edge of forests in Mongol-Altai (Khovd River Valley) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
319.	Plain mountain finch	*Leucosticte nemoricola*	Least Concern				This species breeds in alpine and subalpine meadows with cliff and rockslides in the high mountain zone in Tsagaan Shuvuut, Kharkhiraa, Turgen and Khan Нцhii mountains (greater than 2,500 metres above sea level) in Mongol-Altai Mountain Range. In winter it moves down the mountain slopes and valleys of the breeding areas (altitudinal movement) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
320.	Brandt's mountain finch	*Leucosticte brandti*	Least Concern				This species breeds and winters in upper, treeless zones of high mountains with cliffs, rockslides and crests of mountain ranges over 2,000 meters above sea level in massifs of Tavan Bogd, Siilhem (Mongol-Altai) to Gichigene range on the border of Gobi-Altai Mountain (Fomin and Bold, 1991; Dawaa *et al*., 1994).

321.	Asian rosy finch	*Leucosticte arctoa*	Least Concern				This species breeds in mountain tundra with rocks and cliffs in Kharkhiraa (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
322.	Mongolian finch	*Bucanetes mongolicus*	Least Concern				This species breeds in high mountain areas with rocks and cliffs and semi-arid scrubs, rocky mountain slopes near water and rocky tundra in mountains with bushes in high mountain, mountain steppe, desert steppe and Gobi desert: Achit and Uureg lake valleys (Mongol-Altai Mountain Range), Northern Uvs Depression and surrounding mountains in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
323.	Desert finch	*Rhodospiza obsoletus*	Least Concern				A.Brдunlich documented a single bird at Khovd town, Khovd province on 8 April, 2007 (Birding Mongolia, 2007).
324.	Common rosefinch	*Carpodacus erythrinus*	Least Concern				This species breeds in thickets and tall bushes, forest edges and mountain slopes with dense bushes in mountain taiga forest, forest steppe and valleys of rivers and lakes: from upper Khovd River to southern Mцnh Khairkhan, Kharkhiraa and Turgen mountains (up tp 2,400 metres above sea level); south to Khavtag Range and Baitag Bogd (Mongol-Altai Mountain Range) and lower Torkholig and Tes river valleys (Great Lakes Depression). It migrates through the breeding areas, open dry habitats, river valleys and mountain slopes with bushes and trees (Fomin and Bold, 1991; Dawaa *et al*., 1994).
325.	Pallas's rosefinch	*Carpodacus roseus*	Least Concern				This species breeds in the upper limits of mountain taiga forest in northern Kharkhiraa Mountain (up to 2,300 metres above sea level) (Mongol-Altai Mountain Range) and Tes River Valley between Bayantes and Tes *sum* (Great Lakes Depression). Wintering records exist in breeding areas and across river floodlands, birch groves, bushes and trees in Khasagt Khairkhan (Fomin and Bold, 1991; Dawaa *et al*., 1994).
326.	Red-mantled rosefinch	*Carpodacus rhodochlamys*	Least Concern				This species breeds in upper regions in forested mountains with overgrown deciduous thickets and dense tall bushes in subalpine meadows in Hцh Serh massif (Mongol-Altai Mountain Range). It is found in forested areas and open habitats near forest in Buyant River Valley (Mongol-Altai Mountain Range) on altitudinal movement and in winter (Fomin and Bold, 1991; Dawaa *et al*., 1994).
327.	Beautiful rosefinch	*Carpodacus pulcherrimus*	Least Concern				This species breeds on mountain slopes with juniper scrub near high rocks and cliffs and also streams in mountains in Tes River Valley at Bayantes *sum* region (Kharkhad Mountain Range) (Great Lakes Depression). It has been recorded in the breeding areas, on mountain slopes with juniper scrubs, thickets and dense bushes in Mongol-Altai and Gobi-Altai mountain ranges, mountains in Great Lakes Valley and Gobi mountains (Trans-Altai, Alashani and south-western Eastern Gobi) in winter (Fomin and Bold, 1991; Dawaa *et al*., 1994).
328.	Great rosefinch	*Carpodacus rubicilla*	Least Concern				This species breeds in alpine meadows with treeless mountain regions no lower than 2,000 meters above sea level in Kharkhiraa, Turgen Ranges and surrounding mountains of Achit

							Lake; Jargalant Khairkhan and Sutai mountains, south to mountains in upper Uyench and Bodonch river valleys (Mongol-Altai Mountain Range). It is found in the breeding areas and overgrown thickets of mountain river valleys in winter (during altitudinal movement) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
329.	Long-tailed rosefinch	*Uragus sibiricus*	Least Concern				This species breeds in forest floodlands and along lower mountain slopes with thickets in mountain taiga forest, forest steppe and river valleys: through Khovd River (from Achit Lake to the lower part of the river) (Mongol-Altai Mountain Range); lower Torkholig (northern Uvs Lake) and Tes rivers (from Bayantes *sum* to Northern Uvs Depression). It is found in the breeding areas, open habitats with tall grass and bushes in river valleys and mountain slopes in Great Lakes Depression on winter movement (Fomin and Bold, 1991; Dawaa *et al*., 1994).
330.	Pine grosbeak	*Pinicola enucleator*	Least Concern				This species breeds in mixed and deciduous woods with some pine and birch trees in mountain taiga forest, forest steppe and valleys of Yolt River and north-western Mongol-Altai to upper Khovd River (Mongol-Altai Mountain Range). Sightings exist from the breeding areas, forests in mountains and river valleys in Great Lakes Depression (Northern Uvs Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
331.	Common crossbill	*Loxia curvirostra*	Least Concern				This species breeds in coniferous and mixed forest in high mountain forest, mountain taiga forest, forest steppe, regions and valleys of Yolt and upper Khovd rivers, Tes River between Bayantes and Tes *sums* (Mongol-Altai Mountain Range) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
332.	Eurasian bullfinch	*Pyrrhula pyrrhula*	Least Concern				It winters in the breeding areas and moves down to river valleys with forest and the edge of forest and gardens at Tes River (Bayantes sum) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
333.	Eurasian hawfinch	*Coccothraustes coccothraustes*	Least Concern				It migrates through the breeding areas, forested areas in mountains, river valleys and open dry habitats with tall covers, mountain slopes with bushes, rocks and gardens at settlements in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
	Emberizidae						
334.	Pine bunting	*Emberiza leucocephalos*	Least Concern				This species breeds in coniferous and mixed forests with overgrown bushes and young dense trees at the edges of mountain taiga forest, forest steppe and river valleys: upper Khovd River to upper Bulgan River, Мцнh Khairkhan massif and Kharkhiraa and Turgen mountains (Mongol-Altai Mountain Range); lower Torkholig and Tes rivers (Bayantes sum) and northern Uvs Lake to the country border (Northern Uvs Depression-Great Lakes Depression). It migrates through the breeding areas, forested areas, river valleys with dense tall bushes and open dry habitats on mountain slopes with rocks and tall vegetation on Mongol-Altai Mountain, Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*.,

							1994).
335.	Rock bunting	*Emberiza cia*	Least Concern				This species breeds on steep ground, boulders, rocky open mountain slopes with tall grass, bushes, thickets and scattered trees, sometimes alpine meadows below the tree line in high mountains, mountain taiga forest and forest steppe in Mongol-Altai Mountain Range (north to 48O altitude)-Hцh Serh massif; south to Mцnh Khairkhan massif (up to 2,700 metres above sea level) and through Jargalant Khairkhan Mountain (1,900 to 2,200 metres above sea level). It migrates through the breeding areas, open dry habitats in mountain valleys with bushes, scattered trees, forested areas in mountain ranges and river valleys with tall bushes and deciduous trees in Gobi-Altai Mountain Range and Tes River Valley (Fomin and Bold, 1991; Dawaa *et al*., 1994).
336.	Godlewski's bunting	*Emberiza godlewskii*	Least Concern				It moves and migrates down to river valleys, steppe mountain slopes with rocks and tall bushes and open dry habitats with scattered tall bushes in Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
337.	Meadow bunting	*Emberiza cioides*	Least Concern				This species breeds possibly Ih Bogd, east to Hurh Mountain (Gobi-Altai Mountain Range). It winters in the breeding areas, dry mountain slopes with bushes and rocks in Gobi (Dzungar, Trans-Altai, northern Northern, Alashani and Eastern Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
338.	Common reed bunting	*Emberiza schoeniclus*	Least Concern				This species breeds in reeds, thickets and dense tall vegetated areas along banks of various bodies of water in valleys of Achit Lake (Mongol-Altai Mountain Range); northern Uvs, Khar-Us, Khar, Dцргцn, northern Khyargas, Baga Nuur lakes and lower Torkholig, Tes (delta), Zavkhan (Jargalant sum) rivers and Borogdil Els, Zereg Depression (Great Lakes Depression). It migrates across the breeding areas, reedbeds, edges of forest, young deciduous trees along river valleys and steppe mountain slopes with bushes (Fomin and Bold, 1991; Dawaa *et al*., 1994).
339.	Pallas's bunting	*Emberiza pallasi*	Least Concern				This species breeds in dry open habitats in steppe, reeds and overgrown thickets along riverbanks and lakes, dry mountain valleys with grass and mountain slopes with tall covers in forest steppe, mountain steppe, desert steppe, regions and valleys of mountains, rivers and lakes: upper Khovd River (Mongol-Altai Mountain Range) and Northern Uvs and Great Lakes Depression. It migrates through open habitats with bushes and tall grasses in mountain steppe and river valleys in the breeding areas; oases and mountains (Fomin and Bold, 1991; Dawaa *et al*., 1994).
340.	Little bunting	*Emberiza pusilla*	Least Concern				It migrates through Baruunkhurai Depression and Gobi (Trans-Altai, northern Northern, Alashani and northern Eastern Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
341.	Black-faced bunting	*Emberiza spodocephala*	Least Concern				It migrates through the breeding areas, forested areas, river valleys and dry open habitats with bushes in Great Lakes Depression (Boldbaatar, pers. comm.), Northern Uvs

							Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
342.	Yellow-breasted bunting	*Emberiza aureola*	Vulnerable A2acd+3cd+ 4acd				This species breeds in scattered willow or birch scrubs in wet meadows, shrubby areas and thickets on riverbanks and near streams, sparse growth of young forest, the edge of birch forest and forest clearings in mountain taiga forest, forest steppe and valleys of rivers and lakes: across the main range and Achit Lake Valley, Kharkhiraa and Turgen mountains, Khovd River (Mongol-Altai Mountain Range) and Northern Uvs Depression, Khar-Us, Khar, Dőrgőn lakes and Zereg Depression (Great Lakes Depression). It migrates across the breeding areas, river valleys and open habitats with bushes (Fomin and Bold, 1991; Dawaa *et al*., 1994).
343.	Ortolan bunting	*Emberiza hortulana*	Least Concern				This species breeds in open habitats with scrubs and sparse trees and in forest clearings at the edge of mountain forest, forest steppe and river valleys: from upper Khovd River through Bulgan River, east to Alag Lake and Southern Sharga Gobi, north to Kharkihraa and Turgen mountains and Achit Lake (Mongol-Altai Mountain Range); Tes River (from upper to lower), lower Torkholig River and Northern Uvs Lake (Great Lakes Depression). It migrates across the breeding areas, dry open country with short vegetation, dry scrubby areas, low rocky hills, mountains and river valleys in Mongol-Altai Mountain Range (Fomin and Bold, 1991; Dawaa *et al*., 1994).
344.	Grey-necked bunting	*Emberiza buchanani*	Least Concern				This species breeds on dry, rocky mountains slopes and rockslides with sparse vegetation in high mountain, mountain steppe and desert steppe from Mőnh Khairkhan massif to the eastern end of Gobi-Altai Mountain Range; north to Turgen Mountain and Khan Hőhii Range. It migrates through the breeding areas, dry open habitats with low bushes, mountain slopes with small bushes and rocky mountain slopes in Mongol-Altai Mountain Range (Fomin and Bold, 1991; Dawaa *et al*., 1994).
345.	Red-headed bunting	*Emberiza bruniceps*	Least Concern				This species breeds and migrates in dry open steppe in hills with thickets and scrubby areas in Bulgan and Uyench river valleys (Baruunkhurai Depression or Dzungariin Gobi) (Fomin and Bold, 1991; Dawaa *et al*., 1994).
346.	Lapland longspur	*Calcarius lapponicus*	Least Concern				This species winters and migrates across dry open habitats and mountain slopes in high mountains, at the edge of mountain forest, forest steppe, mountain steppe, desert steppe and river valleys in Mongol-Altai Mountain Range and Great Lakes Depression (Fomin and Bold, 1991; Dawaa *et al*., 1994).
347.	Snow bunting	*Plectrophenax nivalis*	Least Concern				This species winters and migrates across rocky tundra, cliffs along riverbanks, dry open habitats and mountain slopes in high mountains, the edge of mountain forest, forest steppe, mountain steppe, desert steppe and valleys of Bőhmőrőn and Sagsai rivers and Achit Lake (Boldbaatar, pers. comm.), Tes River and northern Uvs Lake, (Northern Uvs Depression and Great Lakes Depression) (Fomin and Bold, 1991; Dawaa *et al*., 1994).

3. Threatened birds only

	Common name	Scientific name	IUCN's Global status	CITES	CMS	Governmental Act No. 264 in 2001. Mongolian law on fauna
	Pelecanidae					
1.	Dalmatian pelican or white pelican	*Pelecanus crispus*	Vulnerable, A2ce+3ce	I	I, II	
	Ardeidae					
2.	Great bittern, bittern	*Botaurus stellaris*				Rare
3.	Great egret	*Egretta alba*				Rare
	Threskiornithidae					
4.	Eurasian spoonbill	*Platalea leucorodia*		II		Rare
	Ciconiidae					
5.	Black stork	*Ciconia nigra*		II		Rare
	Phoenicopteridae					
6.	Greater flamingo	*Phoenicopterus roseus*		II		
	Anatidae					
7.	Bar-headed goose	*Anser indicus*				Rare
8.	Swan goose	*Anser cygnoides*	Endangered, A2bcd+3bcd			Rare
9.	Mute swan	*Cygnus olor*				Rare
10.	Whooper swan	*Cygnus cygnus*				
11.	White-headed duck	*Oxyura leucocephala*	Endangered, A2bcde	II,		Rare
	Accipitridae					
12.	Osprey	*Pandion haliaetus*		II.		
13.	Black kite	*Milvus migrans*		II		
14.	Pallid harrier	*Circus macrourus*		II		
15.	Montagu's harrier	*Circus pygargus*		II		
16.	Pied harrier	*Circus melanoleucos*		II		

17.	Western marsh harrier	*Circus aeruginosus*		II		
18.	Northern goshawk	*Accipiter gentilis*		II		
19.	Eurasian sparrowhawk	*Accipiter nisus*		II		
20.	Rough-legged buzzard	*Buteo lagopus*		II		
21.	Upland buzzard	*Buteo hemilasius*		II		
22.	Long-legged buzzard	*Buteo rufinus*		II		
23.	Common buzzard	*Buteo buteo*		II		
24.	Booted eagle	*Hieraaetus pennatus*		II		
25.	Steppe eagle	*Aquila nipalensis*		II		
26.	Greater spotted eagle	*Aquila clanga*	Vulnerable, C2a(ii)	II		
27.	Golden eagle	*Aquila chrysaetos*		II		
28.	Pallas' fish eagle	*Haliaeetus leucoryphus*	Vulnerable, C2a(ii)	II		
29.	White-tailed eagle	*Haliaeetus albicilla*		I		
30.	Lammergeier	*Gypaetus barbatus*		II	II	
31.	Egyptian vulture	*Neophron percnopterus*	Endangered, A2abcd+3bcd+4abcd	II		
32.	Cinereous vulture	*Aegypius monachus*		II		
33.	Griffon vulture	*Gyps fulvus*		II		
34.	Himalayan vulture	*Gyps himalayensis*		II		
	Falconidae					
35.	Gyr falcon	*Falco rusticolus*		II,		Rare
36.	Saker falcon	*Falco cherrug*	Endangered, A2bcd+3bcd	II		
37.	Barbary falcon	*Falco pelegrinoides*		I		
38.	Peregrine falcon	*Falco peregrinus*		I		
39.	Eurasian hobby	*Falco subbuteo*		II		
40.	Merlin	*Falco columbarius*		II		
41.	Lesser kestrel	*Falco naumanni*	Vulnerable, A2bce+3bce	II		
42.	Common kestrel	*Falco tinnunculus*		II		
	Phasianidae					
43.	Altai snowcock	*Tetraogallus altaicus*				Rare
44.	Common pheasant	*Phasianus colchicus*				

	Gruidae					
45.	Common crane	*Grus grus*		II		
46.	White-naped crane	*Grus vipio*	Vulnerable, A2ce+3ce	I		Very Rare Mongolian Hunting Law, 2000.
47.	Demoiselle crane	*Anthropoides virgo*		II		
	Otididae					
48.	Great bustard	*Otis tarda*	Vulnerable, A3c	II		Rare
9.	Macqueen's bustard	*Chlamydotis macqueenii*	Vulnerable, A2bcd+3bcd	I		
	Recurvirostridae					
50.	Black-winged stilt	*Himantopus himantopus*				Rare
	Scolopacidae					
51.	Asian dowitcher	*Limnodromus semipalmatus*				Rare
	Laridae					
52.	Great black-headed	*Larus ichthyaetus*				
53.	Relict gull	*Larus relictus*	Vulnerable, C2a(ii)	I		Rare Mongolian Hunting Law, 2000.
	Columbidae					
54.	Pale-backed pigeon	*Columba eversmanni*	Vulnerable, A2bcd+3bcd			
55.	European turtle dove	*Streptopelia turtur*				Rare
	Strigidae					
56.	Snowy owl	*Nyctea scandiaca*		II		
57.	Eurasian eagle-owl	*Bubo bubo*		II		
58.	Long-eared owl	*Asio otus*		II		
59.	Short-eared owl	*Asio flammeus*		II		
60.	Eurasian scops owl	*Otus scops*		II		
61.	Little owl	*Athene noctua*		II		
62.	Northern hawk owl	*Surnia ulula*		II		
63.	Ural owl	*Strix uralensis*		II		
	Corvidae					
64.	Mongolian ground jay	*Podoces hendersoni*				

	Muscicapidae					
65.	White-throated bushchat	*Saxicola insignis*	Vulnerable, C2a(ii)			
	Paridae					
66.	White-crowned penduline tit	*Remiz coronatus*				
	Emberizidae					
67.	Yellow-breasted bunting	*Emberiza aureola*	Vulnerable A2acd+3cd+4acd			

Endangered -4
Vulnerable -11

4. Amphibians and Reptiles

Scientific name and common name	***IUCN Regional assessment***	***IUCN Global assessment***
Amphibia **Bufonidae**		
Bufo pewzowi Pewzow's toad	Vulnerable, B1ab(iii)	Least Concern
Reptilia **Agamidae**		
Laudakia stoliczkana Mongolian agama	Near Threatened	Not Evaluated
Phrynocephalus helioscopus Sunwatcher toadhead Agama	Not Applicable	Not Evaluated
Phrynocephalus versicolor Toad-headed agama	Least Concern	Not Evaluated
Lacertidae		
Eremias argus Mongolian racerunner	Least Concern	Not Evaluated
Eremias arguta Stepperunner	Data Deficient	Not Evaluated
Eremias multiocellata Multi-ocellated racerunner	Least Concern	Not Evaluated
Eremias przewalskii Gobi racerunner	Least Concern	Not Evaluated
Lacerta agilis Sand lizard	Not Applicable	Not Evaluated
Zootoca vivipara Viviparous lizard	Least Concern	Least Concern
Colubridae		
Elaphe dione Steppes ratsnake	Least Concern	Not Evaluated
Viperidae		
Gloydius halys Halys pit viper	Least Concern	Not Evaluated
Vipera berus	Vulnerable, D2	Not Evaluated

Northern viper		

5. Fish (under review[27])

Common name	Scientific name	IUCN Regional assessment	IUCN global assessment	Law on fauna Article 7
Cobitidae				
Siberian spiny loach	*Cobitis melanoleuca*	Least concern	Not evaluated	
Nemachelidae				
Stone loach	*Barbatula compressirostris*	(Least concern)	Not evaluated	
Cyprinidae				
Crucian carp	*Carassius carassius*	Not applicable	Not evaluated	
Irtysh gudgeon	*Gobio acutipinnatus*	Not applicable	Not evaluated	
Dzungarian dace	*Leuciscus dzungaricus*	Endangered,	Not evaluated	
Lake osman	*Oreoleuciscus angusticephalus*	Vulnerable	Vulnerable	
Potanin's osman	*Oreoleuciscus potanini*	Least concern	Not evaluated	
Common minnow	*Phoxinus ujmonensis*	Least concern	Not evaluated	
Tench	*Tinca tinca*	Not applicable	Not evaluated	Very rare
Thymallidae				
Arctic grayling	*Thymallus arcticus*	Near threatened	Not evaluated	
Mongolian grayling	*Thymallus brevirostris*	Vulnerable	Vulnerable	
Odontobutidae				
Perch	*Perca fluviatilis*	Least concern	Not evaluated	
SPECIES THAT COULD BE PRESENT				
Stone Loach	*Barbatula cobdonensis*		Not evaluated	
Lenok	*Brachymystax lenok*		Not evaluated	
Ide	*Leuciscus idus*	Near threatened	Not evaluated	
Roach	*Rutilus rutilus*	Least Concern	Not evaluated	
INTRODUCED SPECIES				
Whitefish	*Coregonus peled*			

[27] See Kottelat (2006)

Annex 7 *Aimag* environmental inspectors' reports of a) hunting impacts and b) livestock grazing impacts on wild species

a) Hunting

AIMAG	SUM	LOCALITY	OBSERVATIONS
Khovd	Most		Argali decreased by 90%
	Most	Jivershain khoo khulkh and Ekhen Khushuu	No ibex recorded in recent years
	Monkhkhairkhan	Khukh Nuur, Nariin Tsunkh, Shuurkhain Ekh	No Argali or Ibex recorded in recent years
Uvs	Khovd	Gol ekhen Zaag, Khaliun Bulag	No Argali, Altai Snowcock, or Marmots recorded in recent years
	Tsetseg		Steep reduction in sightings of Altai Snowcock
	Turgen	Suugin Shil, Ulaan Davaa	No moose recorded in recent years
	Turgen	Khavtsal	No argali recorded in recent years
	Ulaangom	Artsnii Gom	No Altai Snowcock recorded in recent years
	Bokhmoron	Tavan Khart	Mongolian gazelle regarded as extinct locally.
	Bokhmoron	Achit Lake area	Goitered Gazelle almost disappeared
Bayan Olgii		Khovd River basin	Beaver, re-introduced in in 1973 went extinct in 1990s.
		Khovd River basin, Lake Achit area, Nariin, Asgat and Bokhmoron River basins	Wild boar locally extinct or almost so
	Ulaankhus	Khuren Khairkhan	Snow Leopard no longer occurs
			No marmots recorded in recent years – originally distributed in good numbers over 80 per cent of the sum
	Deluun	Akunt, Rashaant and Ulagchin	Argali no longer use these areas
	Nogoonnnur		Drastic reduction in Altai Snowcock recorded Numbers of Argali, Snowleopard, Ibex, Manul , Fox and Hare also down sharply
Uvs	Tarialan	Aagaa, Khaidaa, Altan Khukh	Heavy hunting of Altai Snowcock
Khovd	Buyant, Myangad, Durgun	Nariin Gol, Baatar Valley, Kharnuurt	Hunting of Ibex, Saiga

b) Livestock grazing

AIMAG	SUM	LOCALITY	OBSERVATIONS
Uvs	Turgen	Shivert, Baruun salaa	Livestock overlap with Ibex and Red Deer grazing
	Sagil		Livestock overlap with Argali grazing
	Khovd		Livestock overlap with Ibex grazing
	Tarialan	Khaidaa, Aagaa	Livestock overlap with wild ungulate grazing
	Bukhmurun	Gunsai, Khukhsai	
Khovd	Monkhkhairkhan	Monkhkhairkhan Uul, Baatarkhairkhan Uul	Extensive recent influxes of livestock into Argali and Ibex grazing areas
	Tsetseg	Myangan Ugalzat	
Bayan Olgii		Siilkhem, Bayanzurkh, Khokh Serkh	Habitat for Ibex overrun by herders

Annex 8 Local protected areas in Mongolian Altai

Numbers refer to numbers on map in Figure 15

	Name	Level	Area km^2	Objective	*Aimag*	Soum	Year
1.	Angirlag	*Aimag*	214	Winter refuge pastureland between *aimags*	Bayan-Olgii	Deluun	2005
2.	Amar mountain, Khodoo Khar hill, Bogotgor mountain	*Aimag*	204	To protect virgin nature	Bayan-Olgii	Altantsogts, Bayannuur	1997
3.	Ikh and Baga khag lakes	*Aimag*	119	Special natural scenic view	Bayan-Olgii	Tsengel	1997
4.	Dund kungein nuruu	*Aimag*	162	To protect virgin nature	Bayan-Olgii	Tolbo	1997
5.	Khar takhir shar modny khadlan	*Aimag*	22	To protect virgin nature	Bayan-Olgii	Nogoonnuur	1997
6.	Khatuu bort, Tolbo lake	Sum	439	Sustainably use natural resources	Bayan-Olgii	Tolbo	2006
7.	Shar bureg	Sum	71	Sustainably use natural resources	Bayan-Olgii	Tolbo	2006
8.	Buga river valley	Sum	31	To protect virgin nature	Bayan-Olgii	Bugat	1997
9.	Shar tokhoi basin	Sum	0.8	Sustainably use natural resources	Bayan-Olgii	Buyant	1997
10.	Chichirtein spring	Sum	1.4	To protect source of spring water	Bayan-Olgii	Deluun	1996
11.	Gants modny spring	Sum	0.8	To protect source of spring water	Bayan-Olgii	Deluun	1996
12.	Turgen	Sum	0,2	To protect river basin	Bayan-Olgii	Sagsai	2006
13.	Maj aral	Sum	0.5	To protect plant and trees	Bayan-Olgii	Sagsai	2007
14.	Olon nastyn talbai	Sum	1.6	To vegetate arable land and prepare hay harvesting area	Bayan-Olgii	Sagsai	2006
15.	Shunkhat mountain	Sum	12	To protect virgin nature and rare plants	Khovd	Erdeneburen	2004

16.	Sutai mountain	*Aimag*	19	Special natural scenic view	Khovd	Darvi	2004
17.	Baatar nuruu	*Aimag*	100	Special natural scenic and cultural and historical importance	Khovd	Zereg	1995
18.	Altan khokhii mountain	*Aimag*	99	Rare animals, cultural and historical importance	Khovd	Myangad	1995
19.	Tsagaan tolgoi	*Aimag*	150	Rare animals, special natural scenic view	Khovd	Myangad	2005
20.	Zagiin am, Ulaan uzuur, Ih belchir	*Aimag*	205	Natural scenic view	Khovd	Uench	2006
21.	Myangan ugalzat	*Aimag*	226	Special natural scenic and cultural and historical importance	Khovd	Tsetseg	1995
22.	Ongogyn khodoo	*Aimag*	89	Cultural and historical importance, and tourism	Khovd	Bulgan	1995
23.	Yargait	Sum	100	Special natural scenic view	Uvs	Omnogobi	2006
24.	Gulzat 1	Sum	379	To protect animals and rare plants	Uvs	Sagil	2007
25.	Gulzat 2	Sum	538	To protect animals and rare plants	Uvs	Bokhmoron	2007
26.	Ogzom	Sum	223	Special natural scenic view	Uvs	Ulaangom	1994
27.	Goojuur	Sum	256	Special natural scenic view	Uvs	Khovd	1996
28.	Ezerleg	Sum	600	Argali	Bayan Olgii	Buyant	2007

Annex 9 Proposed protected areas

1. Proposed new state protected areas and extensions to existing ones

Protected area	*Aimag*	Sum	Category	Proposed year	Area km^2
Altan Khokhii	Uvs	Omnogobi	NR	2008-2012	228
	Khovd	Myangad	NR	2008-2012	613
Tsagaan Shuvuut	Extension		SPA	2008-2012	?
Turgen Uul	Extension		SPA	2008-2012	?
Uench Khavtsal	Khovd	Uench	SPA	2013-2016	383
Baatar khairkhan	Khovd	Zereg	NR	2013-2016	523
Tsengel khairkhan	Bayan-Olgii	Tsengel	NP	2013-2016	303
Semjit dukh mountain	Gobi-Altai	Tonkhi;	NR	2017-2020	811
Achit lake basin	Uvs	Bokhmurun, Khovd	NR	2017-2020	110
Sutai mountain	Khovd	Darvii	NR	2017-2020	765
Khatuugiin Ekhen Uul/Khungin Nuruu (Tolbo Lake)	Bayan Olgii	Tolbo	?	?	?

2. Proposed local protected areas

	Local protected area	*Aimag*	Soum	Category	Area (km^2)
1	Sair mountain	Bayan-Olgii	Tolbo	Special PA	191
1st stage 2009-2012					
5	Ochir khairkhan	Gobi-Altai	Togrog	NP	150
6	Tsagaan khairkhan	Gobi-Altai	Togrog	NP	221
2nd stage 2013-2016					
14	Shaazgai lake	Uvs	Khovd	NR	330
15	Gurvan khoroo mountain	Uvs	Tarialan	NP	102
16	Khajingin Nuruu	Khovd	Tsetseg sum	NR	142

Annex 10 *Sums* entirely or partially included in the Mongol Altai landscape

Listed as whole (no notation), approximately ½, approximately 1/3 and approximately 2/3

Govi-Altai
Bugat 1/3
Tonkhil 2/3
Togrog 1/3

Bayan-Olgii
All 14 *sums*

Khovd
Altai 1/3
Bulgan 1/2
Buyant 1/2
Darvi 1/3
Duut
Zereg 1/2
Mankhan 1/2
Most

Khovd (continued)
Monkhkhairkhan
Myangad 2/3
Erdeneburen 1/2
Uench 1/2
Tsetseg
Khovd 1/2

Uvs
Bokhmoron
Olgii 1/3
Omno gobi
Sagil 2/3
Tarialan 1/2
Turgen 2/3
Khovd
Ulaangom 1/2

Annex 11 Selected Agencies Active in areas relevant to biodiversity conservation in the Mongolian Altai

Adventist Development and Relief Agency	• The Micro Economic Development Program
Association pour le cheval de Przewalski	• Khomintal Takhi Reintroduction Project
German Development Service	• Development of renewable energy resources • Conservation and sustainable management of natural resources • Establishment of fiscal cadastre/land management in Mongolia
German Association for Technical Cooperation	• Various projects in protected area and buffer zone management, and forest management in Mongolia.
International Development Research Centre, Canada	• Sustainable Management of Common Natural Resources of Mongolia III phase closed • Collaborative Learning for Co-management of Natural Resources in Mongolia • Using Evaluation for CBNRM Capacity Development (Southeast Asia) • Active in Deluun sum, Bayan Olgii
Mercy Corps International & USAID	• With funding from USAID, Mercy Corps' Training, Advocacy and Networking project (TAN) • Support to local tourism entrepreneurs
New Zealand Nature Institute	• Initiative for People Centred Conservation
Swiss Agency for Development and Cooperation	• Coping with Desertification Project • "Support to Artisanal Mining in Mongolia" • "Ger to Ger' - Nomad Centered tourism project • Sustainable livestock management project • "Green gold" Pasture ecosystem management program
Soros Foundation	• Mining monitoring and responsible mining
The Asia Foundation	• Water quality monitoring using biological indicators • Mongolian Nature Protection Coalition (MNPC) • Responsible Mining Initiative
UNDP	• Local Government Support Programme Project • Strengthening the Disaster Mitigation and management system in Mongolia phase III, • Enterprise Mongolia, SME promotion program 2005-2008
UNDP – Dutch Government	• Sustainable Land Management Project • Environmental Governance project
UNDP – GEF	• Small Grants Program Mongolia • Protected Area Network strengthening project
US Peace Corps	• Small Business Development • Tourism website
Wildlife Conservation Society	• Eastern Steppe Living Landscapes Program • Wildlife Conservation Research • Wildlife Conservation Policy
World Bank	• Sustainable Livelihoods Project

	• Netherlands-Mongolia TF for Environmental Reform (RE) MNE • Sustainable Livelihoods Project II
World Vision	• Increasing herders livelihood project
WWF World Wide Fund for Nature	• Sustainable Water Management as a Climate Change Adaptation Strategy in Western Mongolia • Sustainable Development of Protected Areas in the Altai-Sayan Eco-region • Reducing Illegal Trade of Wildlife Products • Land of Snow Leopard • Species Conservation in Mongolia
Asian Development Bank	• Community-based local road upgrading and maintenance in western region of Mongolia • US$500,000 for protected area management alongside the Asian Highway 4 project

Annex 12 Legal protection for biodiversity in Mongolia

1. Protected Areas

The Mongolian Law on Special Protected Areas provides for four categories of state protected area: Strictly Protected Area (SPA), National Conservation Park (NP), Nature Reserve (NR) and Natural and Historical Monuments. There are now 70 state special protected areas in Mongolia, covering 21.58m ha, nearly 14% of the country.

SPAs and NPs are managed by a number of Protected Area Administrations under the umbrella of the Protected Area Administration Division, Ministry of Nature, Environment and Tourism. Nature Reserves and Monuments are managed by *aimag* or *sum* governments. The law also provides for "local protected areas".

Inner zoning is defined within SPAs and NPs as follows:

Strictly Protected Areas

(a) Pristine Zones, in which limited human intervention is permitted for protection activities, as well as non-intrusive research.
(b) Conservation Zones, in which are also permitted flora and fauna habitat enhancement and restoration following natural disasters.
(c) Limited-Use Zones, in which tourism, culling of wildlife, roads, buildings, traditional religious activities, forest cleaning and maintenance and collection of some plants and other natural resources for household purposes are allowed, subject to obtaining the proper permits.

National Conservation Parks

(a) Special Zones, set aside for research and conservation activities, including certain interventions, such as habitat enhancement and restoration following natural disasters.
(b) Travel and Tourism Zones, where tourism and fishing are allowed with the appropriate permission and with low environmental impact methods, as well as all the activities allowed in the Limited-Use Zone of Strictly Protected Areas.
(c) Limited-Use Zones, where, in addition to the above activities, traditional livestock grazing is allowed

There is also provision in the law for peripheral Buffer Zones to be defined by the MNET and local Khurals and designed to involve citizens in the protection of SPAs and NPs and the improvement of those citizens' living conditions. Buffer zones are established outside SPAs and NPs in order "to minimize, eliminate and prevent actual and potential adverse impacts to the protected areas, to increase public participation, to secure their livelihood and to establish requirements for the proper use of natural resources".

2 Animal species protection

The protection of wild animals falls under a number of different laws. The Law on Hunting (1995, revised 2000), which regulates, hunting, including quota setting, permits and fees, under three categories: commercial, subsistence, and special permission (Rare Species). There are summer close seasons for many species. Commercial exploitation requires an agreement in addition to a permit. Hunting quotas (maximum limits) are established for each *aimag* by the Ministry of Nature, Environment and Tourism, and each *aimag*'s Khural is responsible for setting maximum limits for individual *sums*. It is then up to the *sum* Khurals to set actual quotas up to these maxima. The Law on Hunting also controls keeping of animals in captivity and bans certain hunting methods, the taking of animals struggling against natural disasters, "unable to protect themselves," and those on their way to water or salt licks. Among the banned hunting practices are use of chemicals, electric shocks and explosives, pit traps, chasing animals in snow or ice, smoking out marmots, chasing animals with vehicles, and use of lights. Nets are not allowed to be used for household fishing, and there are restrictions on the types of firearms that can be used.

The Law on Fauna (2000) controls actions that damage wild animals and regulates conservation actions. It defines a category of Very Rare species that are only allowed to be hunted or caught for scientific purposes under special permission by the Ministry of Nature, Environment and Tourism.

Trade in Very Rare species and the sale of their body parts is prohibited and Environmental Impact Assessment and government agreement is required for establishment of large infrastructure, mining and mining exploration within the range of Very Rare species. The second category (Rare Species)[28] are defined as limited in terms of distribution and population size, and potentially in danger of extinction. They may be hunted only for special purposes, which include scientific, cultural or artistic purposes, and only with a permit obtainable for a fee from the Ministry for Nature, Environment and Tourism (MNET). Five Altai species fall into the Very Rare category and seven under the Rare category. Mongolians can hunt abundant animals for household purposes with a local government permit, and Very Rare and Rare species for special purposes with a special permit from the MNET. Non-Mongolians, however, require a special permit from the MNET for all species apart from abundant fish, for which they may obtain a permit locally.

The Law on Regulation on International Trade in Endangered Species (2002) regulates implementation of the CITES convention regarding trade in species listed in Appendixes of CITES. A steering committee and a scientific committee, both at the MNET implements CITES convention.

The Mongolian Law on Environmental Protection (1995, revised 2008) requires protection of natural resources, including wildlife, from adverse effects and ecological imbalance. There is a wide range of regulations and decrees addressing protection of wildlife, including plants (see Birdlife, 2008). All species that occur in Mongolia, even if they are migratory and spend only short periods in the country, are covered by the Law on Hunting and the Law on Environmental Protection. Since many of the bird species of Mongolia and some of the mammals are migratory, collaboration with the neighbouring states of the Russian Federation and the People's Republic of China is essential to give adequate protection to Mongolia's wildlife.

2 Legal protection for plant species

The Law on Forests regulates the protection, proper utilization and regeneration of forests, and The Law on Native Plants regulates protection and proper use of all plants other than cultivated and forest plants. Other measures are included in the Law on Environmental Protection and the Law on Regulation on International Trade in Endangered Species.

The Law on Natural Plants established a classification of plants according to rarity: Very Rare plants (Annex 20) include those plants that are in danger of extinction and cannot be harvested sustainably. They may be used only for scientific research with a permit from MNET. Rare plants are those with restricted distribution that are vulnerable to extinction but have some potential for sustainable harvesting. They may be used for household and research purposes with a permit from the *sum* governor, or for drug manufacture with a permit from the MNET.

Commercial exploitation of plants is prohibited in green zones, oases, within two km of rivers or lakes and in various other protected zones, but the actual boundaries of these areas have not yet been demarcated. Commercial use of plants is also prohibited within the ranges of Very Rare animals, in areas where vegetation is degraded or where there is sand movement and soil erosion. In order to protect plants on the Very Rare list, local *khural* is empowered to prohibit the use of land as pasture or hayfield for up to two years. All permits carry rules and permitted collection periods specific to the species and the location. The Law on Plant Use and Fees (1995) regulates payment for using native plants, and the Law on Plant Protection (2007) lays out requirements for protection of pasture and cultivated plants from disease, insect pest, rodent pest and weed plant infection.

3 Implementation of the laws

Wildlife management at the local level is the responsibility of State Inspectors and Rangers. They are responsible for the enforcement of all wildlife management with the assistance of the police and border patrols, and monitoring of the wildlife resources. State Inspectors have the power to impose

[28] Decree of Mongolian government, No 264, May 2001

administrative penalties on offenders and to confiscate weapons or other equipment, including vehicles. Rangers have recently been given such rights too. As a result of assessment by State Inspectors and Rangers, hunting can be suspended for certain species, areas can be taken under special protection, and quotas for foreign and local hunters can be increased or decreased. *Aimag*, *sum* and *bag* governors have certain rights to make decisions related to the protection and use of wildlife. Table 17 shows the numbers of rangers and inspectors according to *aimag*. The budget for the State Inspectors and Rangers comes from both central and local Government funds.

Table 17 **Numbers of State Inspectors and Rangers**

	Numbers of Environmental Inspectors	Numbers of Rangers
Uvs *Aimag*	23	26
Khovd *Aimag*	25	39
Bayan-Olgii *Aimag*	16	44

Annex 13 Ramsar Sites downstream from the Mongol Altai landscape.

Khar Us Nuur NP (3,214 km^2) Three lakes (Khar Us Nuur, Khar Nuur and Dorgon Nuur) provide habitat for a large number of breeding and migratory waterbirds, including the globally threatened Swan Goose, Ferruginous Duck, White-headed Duck and Relict Gull. Several endemic species of fish occur in these lakes. The lakes are also important for groundwater recharge of the area

Ayrag Nuur (4,500 km^2) A proposed National Park, this site provides exceptionally important breeding and resting sites for a variety of waterbirds and the only remaining place in Mongolia where the Dalmatian Pelican regularly comes to breed. Important too for groundwater recharge of the area.

Uvs Nuur and surrounding wetlands (5,850 km^2) The site includes and extends beyond the Uvs Lake SPA, it provides habitat for over 200 species of migratory waterbirds including the White-headed Duck (*Oxyura leucocephala*) and the globally threatened Swan Goose (*Anser cygnoides*). Also a Biosphere Reserve (1997) and World Heritage Site (2003)

Annex 14 Important Bird Areas in and near the Mongolian Altai landscape

IBA site	Description
MN001 Khoton-Khorgon Lakes Mountain *Aimag*(s): BAYAN-OLGII Criteria[29]: A1, A2, A3, A4i Area: 196 km^2	Fully protected by Altai Tavan Bogd National Park and located at the source of Khovd River in Tsengel soum. a series of freshwater lakes, of glacial origin by the Mongol Altai mountain range. Two Globally Threatened species are found at the site: Dalmatian Pelican Pelecanus crispus (VU) and Whitethroated Bushchat Saxicola insignis (VU). The site also supports bird communities characteristic of the Eurasian steppe and desert and Eurasian high montane biomes, as well as Mongolian Accentor Prunella koslowi.
MN002 Tsengel Khairkhan *Aimag*(s): BAYAN-OLGII Criteria: A1, A2, A3 Area: 527 km^2	The site includes Tsengel Khairkhan Mountain, the one of 13 high mountains with glaciers in Mongolia's Altai mountain range plus a cold-water mountain lake. One Globally Threatened species, Saker Falcon Falco cherrug (EN), is known from the site, as are several nationally threatened species, including The area supports a good example of the bird communities typical of the Eurasian high montane biome.
MN003 Dayan Lake *Aimag*(s): BAYAN-OLGII Criteria: A1, A2, A3, A4i Area: 135 km^2 Altitude: 2,232-2,671 m	Fully protected by Altai Tavan Bogd National Park. The IBA comprises Dayan Lake, the smaller Khar Lake to the southwest, and the area surrounding these two lakes. About 10 small rivers and springs flow into the lake, and only the Khatan River flows out, later merging into the Khovd River. Three Globally Threatened species occur in significant numbers: Saker Falcon Falco cherrug (EN); Lesser Kestrel Falco naumanni (VU); and White-throated Bushchat Saxicola insignis (VU, breeding). The site also supports assemblages of species restricted to the Eurasian steppe and desert and Eurasian high montane biomes.
MN005 Khokh Serkhiin Nuruu *Aimag*(s): BAYAN-OLGII, KHOVD Criteria: A1, A2, A3 Area: 745 km^2 Altitude: 2,100-3,775 m	high, snowcapped mountains, located in the centre of the Mongol Altai mountain range, on the border between Khovd and Bayan-Olgii *aimags*. Globally Threatened and Near Threatened species occurring at the site and a good example of the Eurasian high montane biome, and biome-restricted species
MN006 Tolbo Lake *Aimag*(s): BAYAN-OLGII Criteria: A1, A3, A4i Area: 163 km^2	a freshwater lake located in Tolbo soum, Bayan-Olgii *aimag*. important for two Globally Threatened species: Pallas's Fish-eagle Haliaeetus leucoryphus (VU); and Saker Falcon Falco cherrug (EN). The site supports assemblages of species restricted to the Eurasian steppe and desert and Eurasian high montane biomes. The site also supports at least 1% of the flyway populations of the following congregatory waterbird species: Great Cormorant Phalacrocorax carbo; Whooper Swan Cygnus cygnus; Bar-headed Goose Anser Indicus etc.

[29] **Criteria: A1. Globally threatened species: A2. Restricted-range species A3. Biome-restricted species: A4. Congregations**

IBA site	Description
MN007 Achit Lake *Aimag*(s): BAYAN-OLGII, UVS Criteria: A1, A3, A4i Area: 983	Partially protected by Deevel Aral Nature Reserve a shallow, tectonic lake, located at the boundary of Uvs and Bayan Olgii *aimags*. There are a variety of habitats from semi-desert habitat near the lake, through steppe habitat to meadows Globally Threatened species including Swan Goose Anser cygnoides (EN), Houbara Bustard Chlamydotis undulata (EN) etc. The site supports assemblages of species restricted to the Eurasian steppe and desert and Eurasian high montane biomes, and at least 1% of the flyway populations of Great Crested Grebe Podiceps cristatus and Ruddy Shelduck Tadorna ferruginea.
MN011 Uvsiin Khar Lake *Aimag*(s): UVS Criteria: A1, A4i Area: 136 km^2	A freshwater lake with abundant reed and tall grass habitat for breeding birds. Thousands of birds over-summer at the lake or pass through on migration. Globally Threatened and near threatened species occurring include White-headed Duck Oxyura leucocephala (EN), Falcated Duck Anas falcate (NT), Swan Goose Anser cygnoides (EN), Dalmatian Pelican Pelecanus crispus (VU) and Pallas's Fish-eagle Haliaeetus leucoryphus (VU). Nationally threatened species and Congregatory waterbirds that probably occur in numbers exceeding 1% of their flyway populations comprise Northern Pintail Anas acuta, Eurasian Wigeon A. penelope, Gadwall Anas strepera and Northern Lapwing Vanellus vanellus.
MN008 UUREG LAKE Area: 283 km^2 *Aimag*(s): UVS Criteria: A1, A3, A4i	Uureg Lake is situated in a tectonic, semidesert hollow located between Tsagaanshuvut and Turgen mountains of Sagil and Turgen *sums*. Globally Threatened species such as Swan Goose *Anser cygnoides* (EN), Pallas's Fish-eagle *Haliaeetus leucoryphus* (VU) and Lesser Kestrel *Falco naumanni* (VU) occur in the lake. The site supports species typical of the Eurasian steppe and desert and Eurasian high montane biomes. Ruddy Shelduck *Tadorna ferruginea* regularly occurs in numbers exceeding 1% of the fl yway population

IBAs nearest the Mongolian Altai landscape

IBA site name	Description
MN004 Bulgan River	Criteria: A1 Area: 327 km^2 Partially protected by Bulgan River Nature Reserve.
MN009 Uvs lake	Criteria: A1, A3, A4i, A4iii Area: 502 km^2 A large, shallow and very saline lake, important for migrating birds, waterfowl and seabirds. Partially protected by Uvs Lake Strictly Protected Area
MN013 Khongil	Criteria: A1 Area: 60 km^2
MN014 Khar Us Lake	Criteria: A1, A3, A4i, A4iii Area: 2,972 km^2 Partially protected by Khar Us Lake National Park
MN015 Jargalant Khairkhan Mountain	Criteria: A1, A2, A3 Area: 1,622 km^2 Partially protected by Khar Us Lake National Park

Annex 15 Assessment of Protected Area Management and Effectiveness

1. Zonation and Management Plans

Current zonation of protected areas is not providing sufficient protection, even on paper, to achieve the objectives of the protected area system. The SPA Pristine Zone and the NP Special Zone, loosely referred to as "core" zones are the only management zones that provide adequate legal protection, and these are generally small and often restricted to higher altitudes, so are not sufficiently representative of the habitats within the protected areas. Zonation schemes should better reflect ecological needs in relation to protected area purposes, such as the habitat requirements of wild species, for example.

Most protected areas do not have current management plans, and therefore even the objectives of the protected areas have not been elaborated clearly and used as targets for day to day management. Protected areas with stated objectives limited to protecting rare and endangered species are usually given very low priority by governments, as those species are viewed as adding nothing to the economy and costing money to maintain. Wider functions of protected areas should be emphasized as objectives, such as watershed protection, and regulation of the ecology of the grasslands and forests to meet the needs of local people and the nation. Downstream water users should be paying for upstream conservation measures for example. And tourism revenue should be shared with local residents in such a way that all benefit and therefore have an incentive to cooperate.

Some protected areas not zoned yet (see Table 8). There is a tendency to make the "core zones" rather small: the proposed scheme for Monkhkhairkhan NP was arrived at by defining three separate small patches where Argali, Ibex and Snow Leopards occur, that do not encroach on current livestock grazing areas. In effect areas not used by herders are to be declared Special Zone. So grazing pressure in the recently declared NP will not be reduced. Before zonation protected areas are deemed not to have core zones so grazing is not controlled even in what might become a core zone later. In 2007 there were a reported 90,000 head of livestock in Monkhkhairkhan *sum,* 30,000 of which grazed within the NP, and 150,000 livestock within Bulgan *sum* (Bayan Olgii *aimag*), 90,000 of which grazed within the NP. That was over 120,000 head of livestock (with a high proportion of goats) in the NP from those two *sums* alone.

The Chinese are offering to pave a road into the Altai Taban Bogd NP through the Special Zone. If this is done, the NP plans to get around the ban on roads in Special Zones by classifying a 100m strip along each side of the road as Limited Use Zone. This may be appropriate in some circumstances but roads have impacts beyond the immediate physical effects. They fragment habitats, they facilitate access and they create disturbance. So paving a road through a core zone could threaten the values of the protected area, and it is for that reason that the protection regime of the core zone was formulated.

2 Protected Area Staff

Environmental officers in the region comment that the Mongolian Law on Protected Areas is not implemented completely and that there are inconsistencies with other laws and overruling by *aimag* and *sum* governors. Protected areas are staffed and equipped at such a low level that it is impossible to carry out patrolling that covers all parts and the nearby settlements and herders with sufficient frequency to maintain effective oversight. It seems that much of the progress in limiting tree cutting has been through using peer pressure to embarrass those who continue to behave selfishly with common resources – a kind of community policing. The role of community elders is important here. The areas are so big that without cooperation of the people in this way illegal activities will never be controlled. Nevertheless, effective law enforcement by government is vital to show that government cares and will act to enforce the law. Without effective background support of the rule of law community conservation struggles to achieve results.

There are calls from protected area administrations for buildings to be constructed, usually far away from the protected areas themselves, in nearby settlements. It is important not to spend scarce funds on building elaborate headquarters away from the protected area and thus miss opportunities to establish more of an official presence (*ger* based perhaps) near or inside the boundaries at various points.

The Volunteer Ranger (VR) scheme appears to be very popular: ten have been appointed in Monkhkhairkhan NP and another ten are to be recruited there. The VRs have an interest, they say, in protecting nature, and are given contracts with the NP and the power to arrest people, but their legal status is not entirely clear, and it is always difficult to act like a policeman in an extremely small herder community consisting perhaps of four or five gers. The working relationships between protected area rangers, including volunteer rangers, rangers and environmental inspectors at *sum* and *aimag* levels, and border guards, and the ways that all of these groups interact with the police and the courts are not clear to the public, or even, in some cases to the officials themselves.

The rangers are the most important resource that the protected area administration have and yet are undervalued and underused. Most of them know the area and its flora and fauna extremely well, are interested in the work, and appear perfectly at home in bad or good weather in the mountains. The official PA Rangers are keen to improve their legal status to include privileges of "inspectors" that at present they lack. Most of the rangers do not have any transport provided, not even a horse, and many of them do not have uniforms or basic field equipment. Some use their own vehicles or their own horses: others have been assigned motorbikes, but with insufficient running costs, and the camping equipment they have (often from international projects) is inadequate for the conditions: they prefer their own deels to some of the project donated sleeping bags. Salaries (ca 180,000 togrogs[30]) are very low, working conditions are poor: most work from their own gers, and if they work from a *sum* centre the offices are usually cold in winter and poorly equipped. They make the most of this though, use maps enthusiastically and are always keen to learn new skills at courses and workshops.

Supervision

Although apparently interested in their jobs, lack of support from their seniors leads many rangers to lose enthusiasm and confidence, and to neglect their duties. Rangers often find it difficult to communicate with their parent administrations, especially those that report to administrations in the *aimag* capitals, and with border patrols and other rangers. The Altai Taban Bogd NP used to have a good radio communication system but it has broken down.

Rangers' livestock

Rangers are permitted to keep livestock within the protected areas: this adds to the pressure on the protected areas and makes it difficult for the rangers to set themselves apart from the people who they are trying to convince to stop or reduce grazing. And it is not just for subsistence needs: in Altai Taban Bogd NP the rangers even sell milk and meat (as whole, live animals) to the Border Patrol soldiers. Rangers keep livestock within one of the three SPAs and all five of the NPs in the Altai. In at least one case the ranger's family lives inside the PA with their livestock and the ranger himself is posted outside at one of the gates.

In the early days of the Khokh Serkh SPA and until seven or eight years ago the rangers lived without livestock in the mountains, inside the SPA. There was purpose built accommodation that is now unused and presumably in disrepair. Now they herd their livestock in addition to their work as rangers, and live in gers. The ranger in the *sum* centre, it appears, rarely goes to the SPA. In contrast most of the rangers in the Altai Tavan Bogd and the Siilkhem National Parks live in their respective protected areas, where almost all graze their own livestock.

3 Livestock grazing

Many different figures are quoted, but it is clear that there are too many livestock grazing inside the protected areas, and that the arrangements under which they are allowed to do so have to be changed. Schuerholz et al (2007) graded livestock grazing pressure on a 5 point scale from Extreme

[30] May 2009 Exchange rate 1USD = 1450 togrogs

(over twice the recommended carrying capacity) to None (No Livestock). For the eight Altai protected areas that they assessed, 6 (75%) fell in the Extreme Category and one in the next (Very High) category. In some cases existing laws are being broken, but in other cases the excessive grazing is within the law, and the only way to reduce grazing pressure is to implement a new zonation plan, or to change the permit system. Each summer, for example over 2,500 herding households, with over 300,000 livestock graze in the Altai Tavan Bogd NP, and more than 15,000 livestock remain for the winter (A Atai, pers comm., 2007). NP rangers view poaching[31] and illegal timber cutting as minor problems beside the threat of overgrazing and disturbance by so many domestic livestock herds.

Charges for grazing within the zones in which grazing is permitted are often very low, and applied per herder, rather than according to how many livestock are grazed and there is no legal limit on the numbers of livestock (or vehicles) that herders can bring with them.

There are many families living within protected areas in the Altai, most of them in contravention of the protected area regulations. A survey has shown soil damage from overgrazing of domestic livestock within protected areas on more than half of the total protected area grassland. This grazing extends to the Special Zones and the Pristine Zones. Although grazing is allowed under licence in the other zones under various conditions, some of those conditions are being broken. For example, grazing should be at the discretion of the protected area administration with responsibility for managing the area, but the rangers and directors are frequently overruled by local government officials. The length of time that herders can legally be given permission to stay in protected areas is ignored, for example, and orders made to allow grazing in protected areas during times of hardship such as drought and *dzud*, are not lifted after the emergency is over, thus extending the grazing pressure on the protected area indefinitely.

In Khokh Serkh 30,000 or more livestock graze the Limited Use Zone of the SPA during winter. They are sent from Deluun and other Bayan Olgii *sums*. This is customary movement pre-dating the establishment of the SPA. There is payment to be made now to the SPA but it is insignificant at 300 togrogs per herder no matter how many livestock he or she grazes. Private contracts are made with individual herders and official ones with *sum* governors. This winter grazing is incompatible with SPA objectives but the Director of the SPA appears powerless to oppose it.

In National Parks there is no legal limit to the numbers of livestock that can graze in the Tourism and Limited Use zones. The only requirement is that herders obtain a permit, but they are never refused one. They are required to sign a contract agreeing to graze their livestock in a specifed area and not to break the NP regulations, for example on hunting and tree felling. There is no charge for the permit and they may bring any number of vehicles with them: almost all households have at least one vehicle. A bridge was funded in 2007 (2 million togrogs) by a local Member of Parliament, to ease access by vehicle to some of the livestock grazing sites in the following year.

When herders are found grazing in the Special Zones or Pristine Zones they are liable to fines of 50,000 togrog, or the price of one goat, This is the fine per offence, irrespective of the number of animals in the herd. Infractions of the Special Zones appear to be increasing, as pasture quality deteriorates and timber availability is reduced in the Tourism and Limited Use Zones.

4 Hunting

With so many people living inside the protected areas it is inevitable that hunting takes place. Rangers report that large animal poaching[32] is relatively rare, although Marmot hunting (at present all Marmot hunting is illegal) is rife. Two Ibex were poached in Monkhkhairkhan NP in 2007 and the culprits were arrested and fined four million togrogs (USD2,700) per animal. Local rangers said that they were rich people and could pay easily. An Argali was poached in Khokh Serkh SPA in 2007 and the hunter was also fined four million togrogs.

[31] This depends on what species are considered. Argali poaching may be light, but the overall level of hunting of Marmots of small carnivores for example, is so high that whole areas are becoming depopulated. A recent otter survey at Dayan Nuur (see Footnote 14) for example, resulted in no sightings of Otters apart from one dead animal in a *ger,* and only two reported sightings by local people in the not too distant past.

[32] Ibex, Argali and Snow Leopard

There is sport hunting near to Khokh Serkh SPA and Argali and Ibex move between the hunting concession areas and the SPA. About seven Argali and 13 Ibex were shot on licence in the concession area between 2006 and 2007, and there was an illegal hunt within the SPA in August 2007 when a Spanish hunter was permitted to hunt an Argali after bidding US$60,000 for the right in an auction specially sanctioned by the Ministry of Nature and Environment (A Atai, pers comm., 2007).

5 Mining

See Section 2.8 of main text, Overlap is minimal but mineral exploration licences track the borders of protected areas exactly. Table 18 shows some examples of mining on or near the borders.

Table 18 Examples of mining within 20km of protected areas

Protected Areas	**Mining within 20km (most of these are much closer than 20km)**
Altai Tavan Bogd	2 two tungsten mines
Siilkhem	Asgat silver mine
Devel island	Lead, tin and tungsten
Munkh khairkhan	Gold mines (Bayan Olgii side)

6 Entrance fees and tourism

The entrance fee (for all National Parks) is 3,000 togrogs (ca US$2) for a foreign tourist (just 300 togrogs for a Mongolian) and this is an entrance fee without time limit, not a daily or nightly fee. Horses are rented to tourists by local herders for about 5,000 togrogs per day. For Strictly Protected Areas there are no fees and officially no tourism, although tourists do visit.

Because of the great natural beauty and the unique characteristics of the fauna and flora, the protected areas of the Mongolian Altai attract many domestic and international tourists. The protected area administrations provide tourists with information and tour services including eco-gers and local produce souvenirs at certain sites.

7. International border fence

The Chinese are building a fence along the border between the Altai Taban Bogd NP and the area leading to the Hanasi Nature Reserve on the Chinese side. This is bad transboundary protected area management, as it prevents free access to areas of habitat that may be important seasonally for large wild species. It is also said that the Chinese open stretches of the fence to let animals in during migration and then close the gaps behind them. The same is reported in Dornod *aimag* for Mongolian Gazelle (*Procapra guttorosa*).

Annex 16 Local people's attitudes towards biodiversity conservation

Draft summary report of the opinion survey conducted in eight *sums* in Khovd *aimag*
J. Uransaikhan
This report was summarized in English by J. Jargal Jamsranjav (Landcape Planning and Biodiversity Conservation National Consultant based on Uransaikhan's draft report
2009-05-01
Table and Figure numbers are separately numbered from those in the rest of this Strategy

SUMMARY

Overall, interviewees in 8 *sums* have positive attitudes towards wildlife and conservation. Local people already realized poaching, overuse of natural resource such as native trees and bushy plants and overuse of edible and medicinal plant and low quality pasture lead degradation of wildlife and its habitat. Majority of them already observed that wild animals has become rare. Locals also identified species such as Altai snow-cock, rock ptarmigan, willow ptarmigan, argali, ibex, snow leopard, marmot, wild boar and red deer are under crises to local extinction. Locals have high expectation from local government and central government. They wish local government to initiate conservation activities, regular public awareness events and improve responsibility of rangers and environmental inspectors. Majority of them think they have no bad impact or no impact to nature but others have bad impact. Survey shows local's opinion on big constraints towards conservation is bad enforcement of existing laws, week responsibility of rangers and environmental inspectors.

Introduction

Locals living in their home land for many generations have gained extensive knowledge on local flora and fauna, fluctuation of wildlife populations, underlying reason of this fluctuation, climatic events and climate changes.

This is necessary for conservationists, international conservation project officers and donors consider of local knowledge, their attitudes towards conservation and biodiversity, and incorporate their opinion and wishes into the both planning and implementing stages of conservation actions.
The opinion survey and public meetings in this report were conducted under the guidance of a co-leader of "Biodiversity conservation strategy for the Mongolian Altai mountain landscape" (BCSMAML) team which is a component of the project, "Community Based Conservation of Biological Diversity in the Mountain Landscape of Mongolian Altai-Sayan ecoregion". The project is implemented by the Government of Mongolia's Ministry of Nature, Environment and Tourism and UNDP.

The survey and public meetings were taken place from February 1 to February 17 in 2009. The objectives of questionnaires were the followings:

1. Organize public meeting in four *sums* with Altay-Sayan project operation (Altai, Must, Tsetseg, and Munkhkhairkhan) and in four *sums* without operation of Altai-Sayan project (Erdeneburen, Khovd, Myangad and Chandmani) to introduce project aim and activities and inform about development of BCSMAML and it's benefit.
2. Conduct interview survey to find out local people's attitude towards biodiversity, their knowledge about threats to biodiversity and their opinion on current status of natural resource and their suggestion or wish about conservation actions needed. *Sums* with project were compared against *sums* without project.

Through this opinion survey and public meetings, we collected necessary data (people's opinion of natural resource status, their attitudes towards conservation and biodiversity and their opinion and wishes about conservation actions required) for the development of BCSMAML and these information will be incorporated into the strategy.

Methods

Data on population size, livestock number and information related to the status of natural resource were asked from relevant officials in each *sums*.

Total of 20 questions were asked through interview survey and questionnaire survey (Questionnaire is in Appendix 1). Each interview was taken place in half hour. Questionnaire sheet was given to some people like school teacher, government officer and doctors and later completed sheets was collected. Questions were asked in informal manner from people like elderly, illiterate or someone who is busy doing something.

All interviewees are divided into two types such as *sum* centre dwellers and herders. *Sum* dwellers can be sorted by their affiliation such as:

- Park administration officers and rangers (if there is park exist)
- *Sum* governor's office or government officials
- School teachers
- Eco-club children
- Workers for hospital

Herders sorted by *bags* (smallest administrative unit in Mongolia).

Totally 718 people were interviewed from 8 *sums* in Khovd *aimag* (Table 1). We tried to interview equal number of people from each *sums*. In order words, distributing samples evenly by *sums* was prefered. It is proofed that out samples were evenly distributed (X^2_7=21.91, P>0.05). Therefore the data from each *sum* can be compared.

Table 1. Number of interviewed people compared against total number of people in each sum.

		Female	Male	Total	Female	Male	Total interviewees
1	Altai	1570	1627	3197	48	43	94
2	Must	1822	1786	3608	40	65	108
3	Tsetseg	1500	1250	2750	30	62	96
4	Munkhkhairkhan	1221	1235	2456	47	48	96
5	Chandmani	1582	1546	3128	31	46	83
6	Erdeneburen	1615	1765	3380	32	25	59
7	Khovd	1207	1205	2412	39	37	80
8	Myangad	1711	1778	3489	53	37	102
							718

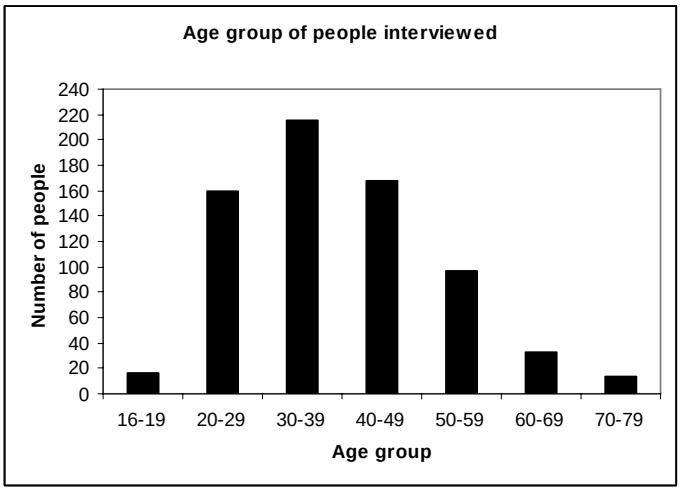
Herder group activities and environment conditions of each *sums* were asked from relevant officials and notes were taken.

Survey results

Age group

All interviewed people were divided by age group. Age groups 16-19 and 70-79 were minority. Relatively big number (30%) of people were interviewed from age group of 30-39. Almost equal number of people interviewed from age group 20-29 and 40-49 (Figure 1).

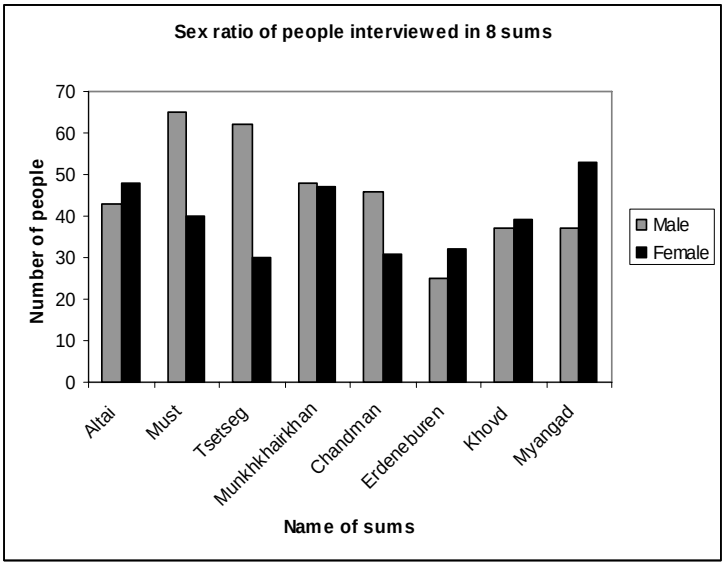
Figure 1. Age group



Sex ratio

Although there were 718 people interviewed, 683 of them gave complete answer. Out of that, 363 (53%) were male and 320 (47 %) were female. Figure 2 shows sex ratio of interviewee from each sum.

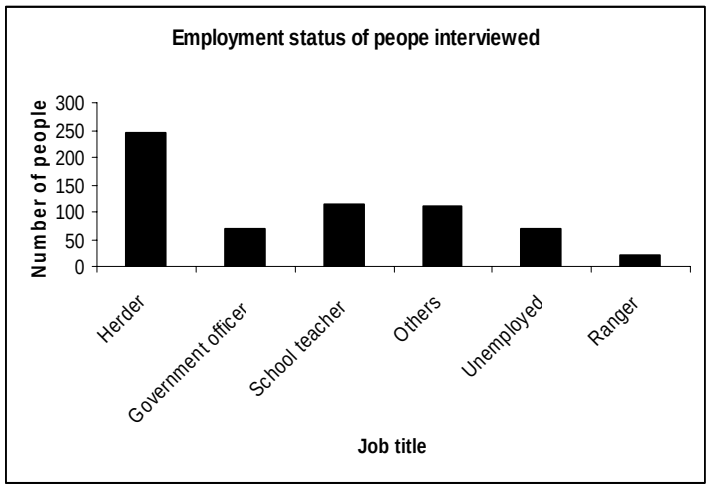
Figure 2. Sex ratio of people interviewed in 8 *sums*.



Occupation

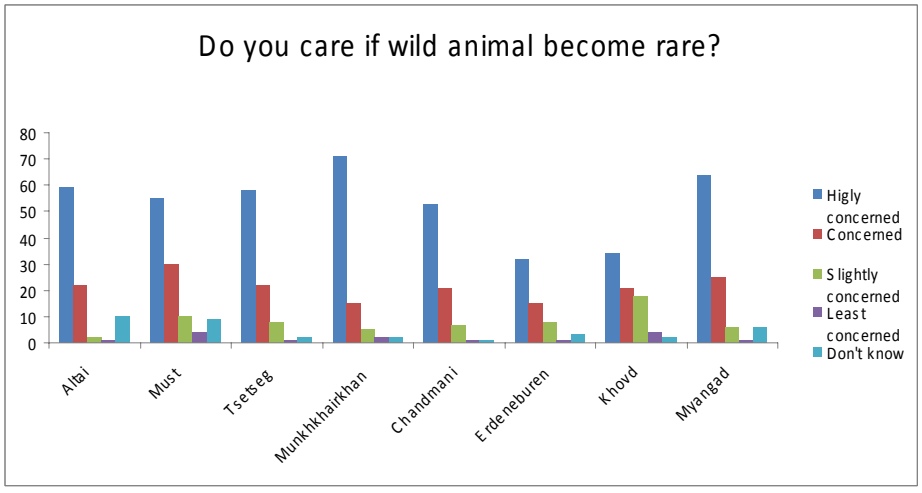
Majority of people who were interviewed were herders (39%). teachers and group called others (self employed, cook, doctor and meteorological monitorer and guard) were equal in number (18%). Also number of government officials and unemployed group were equal (11%). Rangers and conservation practioners were in minority group (3%) (Figure 3).

Figure 3. Employment status



Do you care or concern wild animal becoming rare?
Interviewee who said highly concerned, concerned and slightly concerned were majority. (Figure 4). Detailed answers from each *sums* are shown by following figure.

Figure 4. Number of people concern or not concern about wild animal



Do you concern if pasture productivity is getting decreased?

- 75% said highly concerned
- 18% concerned
- 4% slightly concerned
- 2% least concerned
- 1% don't know

How is the pasture yield in your area in recent years?
Followings are the answers:

- 55% getting extremely bad
- 39% getting very bad
- 5% getting bad
- 1% don't know

What kind of adverse conservation activities occur in your sum?
Most common adverse activity that described by local people in 8 *sums* was poaching (28%), the second common is issue was overuse of native trees, willows and bushy plants for fuel consumption (19%).
The third common issue was rubbish dumping and river pollution (15%)
Next one was conflict related to the pasture use (10%).
Others were defined by few people were:

- Abusing nature
- Collecting altay onion before the seed dispersal
- Rangers and environmental inspectors not doing their job
- Sport hunting (2%)
- Over collection of rare medicinal plants
- Accidental fire

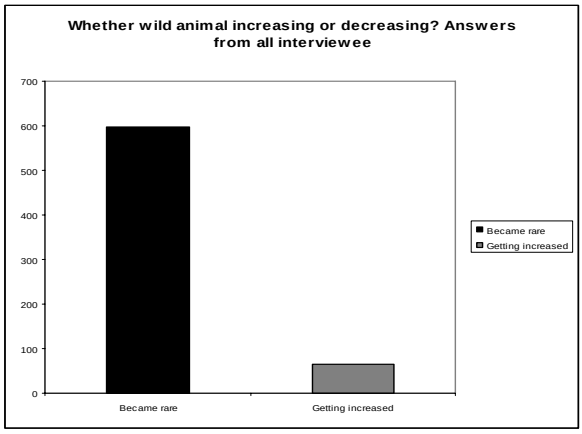
However, 3 per cent of interviewee said there is no adverse activities to nature occur and 1 per cent said they don't know.

What kind of adverse conservation activities occur in your sum? (Four *sums* no project)
38% over use of trees and bushy plants for fuel
26% Poaching
14% Rubbish dumping and river pollution
7 % Bad pasture management/conflict related to the pasture use
5 % abusing nature/bad attitude
2 % Mineral exploration without permission destroying land
1 % Rangers and environmental inspecors not doing their job
2 % Accidental fire
3 % No adverse actities
1 % collection of rare medicinal plant
1 % Don't know

What kind of adverse conservation activities occur in your sum? (Four *sums* with project)
28% Poaching
19% over use of plants for fuel use
15% Rubbish dumping and river pollution
10% Bad pasture management/conflict related to the pasture use
6 % Abusing nature/bad attitude
3% No adverse activies
3% Wild onion collection
2 % Mineral exploration without permission destroying land
2% Use of medicinal plant
2% Rangers and environmental inspectors not doing their job
2% Sport hunting
1% Accidental fire
1% Don't know
Most common adverse impact or activities are recognized by the local people was poaching, overuse of trees and bushes for fuel and rubbish dumping and river pollution.

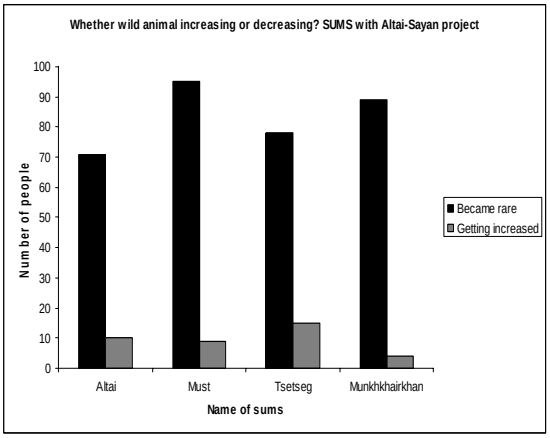
Whether the wild animal is decreasing or increasing?
90 per cent of total interviewee answered wild animal became rare and only 10 per cent think some particular species of wild animal is increasing.

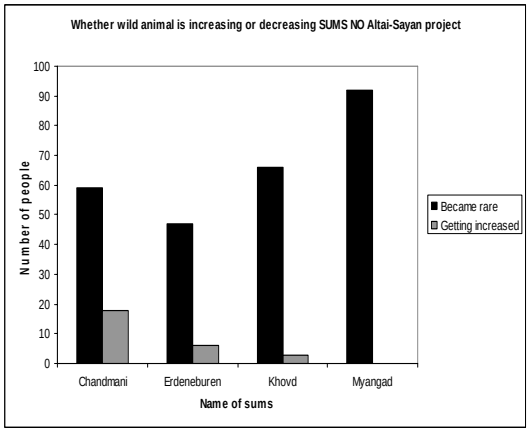
Figure 5. Answers from all participants



Following graphs compares answers from *sums* with project and *sums* have no projects.

Figure 6 and 7.





Why has wild animal became rare?

25 % poaching
21 % pasture yield become less
13 % natural hazards
12 % pasture overlap between wild animal
7 % sport hunting
3 % disease
3 % don't know

Why do you think wild animal has increased?

Answers were varied by *sums* among the relatively few said wild animal has increased. Interviewees said only particular species such as argali, ibex, wild ass (sourthern part of Tsetseg sum) and predator species has increased.

The underlying reason described was areas being designated as protected area, hunting ban and people's attitude towards wild animal became improved.

What species of birds has became rare in your sum?

Followings are answers sorted by the number of people.

469 Altai snow-cock
211 Rock ptarmigan
112 Willow ptarmigan
90 Goose
83 White Pelican
55 Pigeon
39 Owl
37 lammergeyer
33 Falcon
33 Swan
29 Eagle
28 Lark
28 Vulture
23 Red necked Pheasant
21 Water Fowl
15 Magpie
12 Shelduck
9 Crane
5 Duck/Teal
23 Don't know

What species of plant has became rare in your sum?

339 Pasture plants
213 Altai onion
201 All plans
180 Willow
150 Artemisia sp. Those are used as fuel. Bushy sage
114 Snow lotus
141 Cargana
54 Golden root
29 Saxaul tree
12 Balgana
5 Yargai
54 Zegs Clemintis
37 Artemisia frigida

65 Wild onion-Taana
63 Medicinal plants
27 Liquorices
14 Plantago
30 Sea buckthorn
27 Juniper
91 Trees and bushes
6 Poplar with multi-shaped leaf
25 Poplar-cotton wood tree

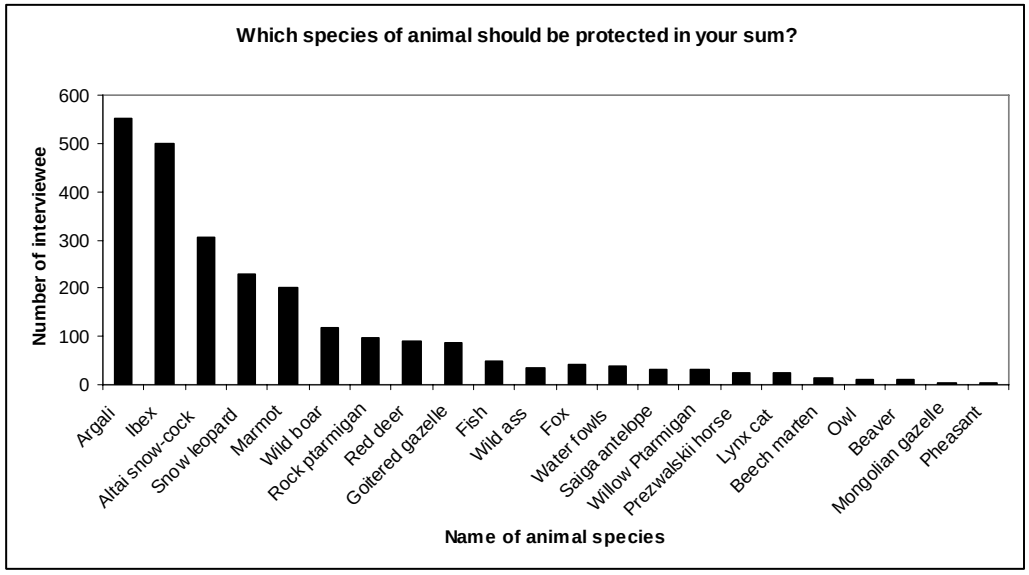
What species of game animals has became rare in your sum?

524 Argali
419 Ibex
153 Snow leopard
64 Red deer
45 Saiga antelope
84 Goited gazelle
182 Marmot
18 Lynx
147 Wild boar
16 Mongolian gazelle
8 Roe deer
17 Suusar
19 Wolf
36 Don't know
24 Beaver
64 Fox
19 Ground squarrel
42 Fish
16 Manul cat
5 Prezwalskii horse
10 Wild ass
40 hare
16 Musk rat

Which species 5 species of animal should be protected in your sum?

Majority of interviewees defined argali, ibex, Altai snow-cock, marmot, wild boar, rock Ptarmigan and Red deer need conservation actions. Figure 8 shows number of interviewees suggested the particular species of animals.

Figure 8 Number of interviewees against suggested species of animal



Argali, ibex, wild boar, marmot, Altai snow-cock, fish, saiga anelope, Goitered gazelle, snow leopard were commonly defined as conservation action needed species by the people in *sums* which have no project staff were. Whereas argali, ibex, snowleopard, marmot, altai-Snowcock, Red deer and fish were commonly defined by people who live in *sums* which has project.

Which 5 species of plants require conservation action in your sum?

Commonly defined species of plants that needed conservation action are Altai onion (335 people said), Willow tree (311), Snow lotus (208), cargana (196),
Artemisia sp-Those are used as fuel Bushy sage(184), Trees and bushes (178), Golden root (103), Medicinal plant (104) and Pasture plant(192) .

Is Altai-Sayan project operating in your *sums*? From 4 *sums* have Altai-Sayan project staff
85% yes.
15% no.

Is Altai-Sayan project operating in your *sums*? From 4 *sums* have no Altai-Sayan project staff
21 % yes
79 % no

What is the benefit of having Altai-Sayan project in your sum?
Questions was asked from 4 *sums* with project operation.
27 % it has good influence
22 % no benefit
20 % it improves people's attitude towards nature conservation
18 % people attended trainings to improve livelihood or conservation
9 % it supports nokhorlol
3 % project work closely with park adminisration
1 % rivers and wells are improved or repaired
Most of interviewees gave positive answer.

What impact has the project on nature conservation?
Questions was asked from 4 *sums* with project operation
32 % good impact
29 % no difference
23 % wild animals are being protected
6 % public awareness activities are increased
5 % trends of wildlife population has slightly increased
5 % poaching has decreased

Do you wish to have conservation project in your sum?
98% yes
2% no

What kind of conservation activities do wish your *sum* government organize?
Following answers were common.
1. Regular public awareness event,
2. initiate different conservation activities,
3. improve responsibility of rangers and environmental inspectors,
4. enforce laws, improve pasture management,
5. study and conserve rare wildlife,
6. implement conservation projects.

What kind of conservation activities do you wish central government should implement?
Improve budget in conservation or nature protection.
Support conservation projects or implement more conservation projects
Involve local people into nature conservation
Improve or enhance law on nature conservation
Improve rangers working condition and recruit more rangers
Enforce law
Designate more area as protected area.

What can you do to protect wild animal and plant or improve pasture and contribute nature conservation in general?
27 % live friendly to nature

19 % participate actively to the works organized by someone
19 % protect nature and publisize law on nature conservation
8 % Inform illegal activities
8 % tell younger generation about nature conservation and pass nature conservation tradition to younger generation
7 % Not dump rubbish
3 % Clean rivers and streams and protect it against pollution
2 % Join nukhurlul
1 % Keep livestock number under particular threshold. Raise livestocks which has high productivity (milk, meat or wool).

What impact do you think you have on nature and wildlife?
Almost half of the people said they have good impact and 35 % of them said they have no impact whereeas 15 % said they have bad impact. Rest of them said don't know.

What impact do you think others have ?
Almost half of he people said others have bad impact. About quarter of them said others have good impact and about rest quarters said others have no impact.

Annex 17 Biodiversity conservation planning at the landscape scale: an introduction to the concept

The concept of the landscape
The landscape approach is not something mysterious that has to be studied in class: it merely acknowledges that protected areas, although vital, will never be sufficient alone to conserve the biodiversity of the Altai, and that in order to achieve lasting results we must take into account biodiversity conservation considerations in the routine business of government, and in the day-to-day decision making and planning of natural resource users such as herder, miners and other developers. There are questions and answers that can clarify this near the end of this document. The landscape concept acknowledges too that people and their lifestyles have helped to shape the land itself.

Trade-offs
There are inevitably trade-offs between biodiversity protection, and human activities that are deleterious to biodiversity and ecological processes, particularly mining and infrastructure development. The Strategy will provide guidance here by identifying the key requirements in terms of land, vegetation, water, lack of disturbance, connections between habitat patches, hunting restrictions and their enforcement, and individual species protection measures. The Strategy will integrate use and protection, both inside and outside protected areas. It will also provide for watershed protection and other so-called "ecological services" to downstream ecosystems, in the Great Lakes Basin for example, by including biodiversity considerations in all decision making on what activities are carried out, and where, and when.

Transboundary conservation
International considerations are vital. The Altai Arc extends far into Russia, Kazakhstan and China and the strategy for Mongolia must include provision for cross-border exchange of information, and collaboration on data collection and land use decision making and planning.

Priority setting
In order to identify priority areas for conservation action, data on wild species, habitats, human activities, protected areas of various categories, and areas already designated as important habitat, on the one hand, and human distribution, activities, economic development plans, and exploration and mining licences on the other hand, will be analysed using GIS overlays. The concept of "landscape species" will be employed here to define the essential parts of the landscape that must be protected from a range of impacts, and in what ways they must be protected. The idea builds on the concept of an "umbrella species" – the Snow Leopard for example – whose habitat and other ecological requirements, if protected, would ensure the conservation of other species and vegetation types. It goes further, though, in defining a suite of species whose amalgamated requirements, if provided for, would protect the wild species and ecological processes of the whole landscape.

Public information
There will be an extensive public information and involvement process, and the project will build on earlier work with herders and herder groups to develop, with government, effective mechanisms for managing common property resources such as grasslands and forests, particularly in the priority conservation areas identified by the initial GIS analyses. There are

long established customary mechanisms to regulate grazing on public land but these have depended on high mobility, and have not coped well with the trend towards more settled lifestyles and with changes in the market – the market for cashmere for example. Government has begun to develop legislation for various community management models and many herder groups are finding their way into cooperative arrangements when the conditions are right. The Strategy will take into account what appear to be the basic requirements for a "community" or herder group to practice successful grazing management: distinct natural resource rights which the group has confidence in, close collaboration with regular meetings if possible, unambiguous rules, punishments for those who break the rules, and recourse to outside law enforcement and policing when necessary.

Government commitment

The project expects the newly elected *Aimag* Governors to adopt the Strategy, by mid-2009, as binding in their *aimag* development plans, and will be working with them within the next few months to include statements to this effect in their four-year plans.

Questions and Answers

What is a "landscape"?

1. A "landscape", in this context, is an area that includes two or more types of ecological communities, which roughly speaking means two or more different types of habitat with their constituent species. In the Altai mountains, we are dealing with many types of community.

2. The Altai "landscape" includes a mosaic of patches of different habitat types, so animals or plants that move between patches of their preferred habitat have to disperse over other habitat types. Many species range widely year round, or switch habitat types seasonally, and when their preferred routes between patches are blocked by a substantial obstruction like a road, or become degraded or disturbed in other ways, this can lead to higher death rates and decreased breeding success..

3. We refer to the land surrounding a species' preferred habitat patches as the "matrix", or the background over which movements between patches must take place. As habitats become increasingly fragmented into small patches, the nature of the "matrix" or intervening land influences the free movement and dispersal of animals and plants. If the distance to travel is short the habitat quality in the "matrix" is not so important, but if the distance to travel is great the quality of the "matrix" and the level of disturbance can limit dispersal quickly.

4. Landscapes are usually perceived as being large – but if the species under consideration are small, the landscape can also be small. The landscape for certain insects for example, may consist of a small patch of forest floor with isolated tree stumps, or even piles of animal dung. In the case of the Altai we are looking at the requirements of large, wide-ranging species such as the Snow Leopard and the Argali Sheep, so the scale is much greater.

5. Landscapes are also often perceived as substantially influenced by human activity. Again, this is not a necessary feature of a landscape but it is a common one – and

certainly a characteristic of the Altai where the impacts of pastoralism and hunting have been considerable.

Are Protected Areas sufficient to conserve biodiversity?

6. Well managed protected areas are vital components of biodiversity conservation strategies but they are not enough alone to meet the ecological needs of all species, especially wide-ranging and migratory species. They are patches of protection within the wider "matrix" of various levels of human use.

7. When human impacts were low there was not only relatively free movement for wide-ranging species between protected areas but many of these species were able to live in suitable habitat outside the protected areas too. Conservation planning on a small scale, within and around protected areas, in buffer zones for example, was a reasonable approach under those conditions.

8. However, the space and resources available for wild species outside protected areas have decreased as social and economic influences have driven over-exploitation of wildlife (both illegal and legal hunting and plant collection), grassland (over-stocking leading to over-grazing and grassland degradation) and forests (excessive felling for timber and firewood). Habitat types are becoming more and more fragmented into isolated patches sometimes widely separated by inhospitable areas ("the matrix") that are difficult for animals and plants to move across.

9. Also, as they are pushed into closer proximity humans and wildlife find themselves in more and more frequent conflict with each other: large predators may take more livestock or kill more humans, and large herbivores like elephants can destroy a field of rice or maize, for example, in a single night.

10. So, as human impacts have increased, and as our knowledge of the potential impacts of human activities in the future has increased, conservation planning has been extended to include the wider "landscape" – the whole assemblage of patches of different types of habitats including those shaped largely by humans.

How does conservation at the landscape scale differ from previous approaches?

11. Conservation **actions** have long included measures taken outside protected areas to limit grazing, hunting and tree-felling for example, and to prevent or mitigate environmental damage from mining, tourism, road construction and infrastructure development.

12. Conservation **planning** at the landscape scale differs in that it is done by first identifying the needs of wild species' and the needs and impacts of humans, and then analysing systematically the areas where overlap and conflicts occur, and finally developing widely agreed action programmes and any necessary policy changes.

13. In simple terms the objective is a landscape with land uses planned to provide for the needs of both people and wild species. There will be (a) a revised protected area system designed to take into account the needs of wild species and to cover all major habitats (b) areas set aside primarily for economic development with a properly

enforced system of environmental impact management, and (c) areas where human land use such as pastoralism, hunting and tourism for example, will co-exist with wild species' use of the same land.

14. The basic concept of zonation from economic use to strict protection is nothing new but regional planning in the past has usually been done without the careful process of analysis of how the requirements of wild species and humans can be accommodated within the "landscape"

15. In order to achieve good conservation planning (and good conservation results) at the landscape scale we use knowledge of wild species, their distribution, movements, food requirements and breeding behaviour, on the one hand, and the range and intensity of current and potential future threats to biodiversity from human activities on the other hand, to give us a framework under which to plan conservation actions to address the threats in the most important areas for biodiversity. This should allow us to maintain representative areas of important habitat types and provide for the needs of the wild species of the landscape.

16. It is this process that we are starting now for the Altai Mountain Landscape. The objective is to complete a widely accepted and clearly feasible plan by July 2009.

What are the boundaries of the Altai landscape?

17. The boundaries of our landscape, for planning purposes, will emerge from the initial analyses of habitat distribution and species requirements. We will analyse, using GIS, the landscape requirements of a selection of species, including wide-ranging ones, threatened ones, and those with very specific habitat requirements.

18. This "landscape" will cover parts of four *aimags*: Bayan Olgii, Uvs, Khovd and Govi Altai

19. Note that ecosystems downstream of the Altai Mountains, such as the Great Lakes Basin, are affected by ecological processes and human activities in the mountains, and we will have to consider these downstream impacts in our planning

20. The Altai are part of a massive range extending into Russia, China and Kazakhstan so land uses there are important considerations for our plan, and negotiations and exchange of information across borders are vital.

Who will implement the plan?

21. The Altai Mountains Biodiversity Conservation Strategy will be adopted as policy by the four *aimags* after approval at state government level. Local *sum* and *bag* governments will also carry out agreed actions under the plan, and there will be agreed roles for herder groups and NGOs too.

Annex 18 List of candidate "Landscape Species" with their assessment scores and associated conservation target

Candidate Landscape Species		Score	Conservation target
Saker falcon	*Falco cherrug*	40	Birds of Prey
Argali	*Ovis ammon*	37	Mountain Ungulates
Siberian marmot	*Marmota sibirica*	36	Rodent and lagomorph diversity
Caragana	*Caragana* spp	35	Collected Plants
Red Deer	*Cervus elaphus*	35	Forest animals
Grey wolf	*Canis lupus*	35	Carnivores
Snow Leopard	*Uncia uncia*	34	Carnivores
Altai onion	*Allium altaicum*	33	Collected Plants
Goited gazelle	*Gazella subgutturosa*	33	Collected Plants
Saiga antelope	*Saiga tatarica*	33	(Marginal)
Willow Grouse	*Lagopus lagopus*	33	Alpine Galliformes
Wild boar	*Sus scrofa*	31	Riparian Forest
Brown bear	*Ursus arctos*	31	Forest animals
Golden eagle	*Aquila chrysaeatos*	31	Carnivores
Altai marmot	*Marmota baibacina*	30	Rodent and lagomorph diversity
Altai Snow-cock	*Tetraogallus altaica*	30	Alpine Galliformes
River otter	*Lutra lutra*	29	Carnivores
Buckthorn	*Hippophae rhamnoides*	29	Riparian Forest
Rock Ptarmigan	*Lagopus muta*	27	Alpine Galliformes
White willow	*Salix ledebouriana*	27	Riparian Forest
Red Fox	*Vulpes vulpes*	27	Carnivores
Musk deer	*Moschus moschiferus*	26	Forest animals
Siberian Ibex	*Capra sibirica*	26	Mountain Ungulates
Eurasian beaver	*Castor fiber*	25	(Marginal)
Mongolian grayling	*Thymallus brevirostris*	25	Water quality and flow
Garlic flavored onion	*Alium oblicuum*	23.7	Collected Plants
White-throated Bush chat	*Saxicola insignis*	23	(Data deficient)
Common pheasant	*Phasianus colchicus*	22	Forest animals

Annex 19 Additional Research and Monitoring Requirements [33]

Some research and monitoring should be started immediately, but some will have to wait until after the full assessment of current knowledge and ongoing research has been completed at the planned Khovd international conference (Table 13 E016, and Annex 21 E016).

The problems being faced in solving the degradation of many of its grasslands and forests are complex and interrelated. A multidisciplinary approach incorporating the biophysical and social sciences is required in order to understand fully the causes and consequences of degradation and to develop adequate responses.

A well integrated research project that investigates the roles of and interactions between the different disturbances such as livestock grazing, fire, climate change (including melting of glaciers and loss of all round snow cover), multiple tracking, grasshopper swarming, marmot grazing, river diversions etc would be far more worthwhile than a number of uncoordinated investigations on short field trips with insufficient attention to sampling protocol. Adequate research planning and sampling methodology is vital. There is no point in carrying out research that produces results which are not replicable or statistically significant and are therefore not usable as a basis for management recommendations or decision making.

1. Altai Biodiversity Database

Data are required to allow biodiversity conservation to be taken into account during the routine business of government planning and decision making, and to allow greater public participation and transparency. Accurate and easily available data are essential for good policy development and implementation. Current information collection and management arrangements are too fragmented and not sufficiently rigorous to provide reliable support to decision makers in either non-governmental or governmental institutions.

Many kinds of information are required to conserve biodiversity and to manage the protected areas effectively, including data on ecological relationships, species distribution status and trends, human uses and changes in land use. New technology makes data management more and more productive. Geographic information systems (GIS) have greatly simplified data storage and analysis, map preparation, and updating information and graphics and it is now possible to share map-based data over the web interactively, with "hot" links on maps and dropdown checklists. The growing body of information on Mongolia's biodiversity can thus be made more useful.

2 Monitoring for biodiversity conservation

Develop a monitoring system that provides coherent data on key species and habitats in the Altai and shares them with decision makers in local government. There are many interesting things that could be monitored but monitoring biodiversity or socio-economic variables for the sake of monitoring is futile. Monitoring is only useful if the results of monitoring can be used to change or improve protective management of the ecosystem. There is no point in simply monitoring the demise of threatened biodiversity.

The system used should be sustainable in the long term at an affordable cost, and be capable of sharing data with decision makers and developers through smooth transfer of information to higher level databases (*aimag*, Mongolian Altai and Greater Altai). Data collection should be limited to a manageable number of indicator variables and indicator species. The objective of a monitoring programme is not only to measure and document changes but to explain why these changes occur. This requires determining associations or correlation, which in turn means that associated factors of habitat condition and human activity should be collected at the same time and that negative data (eg when a search was made but the species was not recorded) must be included in the analysis.

Monitoring should be limited to observations that can be acted upon in terms of planning, zoning, timing of activities, management measures, community conservation and law enforcement. Protected Area Administrations are pressured by local *sum* governors to permit grazing[34], and in practice they have limited

[33] Adapted from Laurie (2008)
[34] See Annex 15

influence on the numbers of livestock within the protected areas. Unless they have greater management authority the only point in carrying out monitoring is to support the case for changes in current practices. If protected area managers are unable to make and enforce decisions in line with the law then there is not only little point in monitoring but little point in operating sites as protected areas.

The Altai so large that making observations in only a few localities or transects will result in sampling bias. Great effort must be made to ensure that samples are representative of the whole area. Stratified sampling techniques should be used.

Local people should be involved in the monitoring programmes as much as possible, using simple techniques that can be repeated reliably to indicate trends.

2.1 Grassland health

Overgrazing is widely acknowledged as a major cause of land degradation that is slowly turning many areas into deserts that will not be able to support either wild or domestic ungulates. The Strategy aims to create stimuli and develop incentives for changes in grazing regimes that lead to reduced impacts of livestock on grassland and wild species. In order to assess the success of such interventions a reliable and consistent monitoring programme is required to measure changes in species diversity, basal cover, soil surface structure and productivity of rangeland. The UNDP Eastern Steppe Project and the UNDP Sustainable Grasslands Project (Batbold and Laurie, 2001; UNDP, 2008) provided some good assessments of the current methodology available and the Greengold project [35]is also working in this area. Researchers should develop and then establish a simple grassland health monitoring technique that can be operated by *sum* and *bag* level officials and by local herders themselves.

Satellite imagery to determine and monitor grassland health and/or productivity
Researchers will build on work already being done by NAMHEM and work done in connection with the Mongolian Gazelle migration. Normalized Difference Vegetation Index (NDVI) data should be analysed to determine whether it provides a useful measure of grassland productivity for conservation planning.

2.2 Water quality and quantity

There is a need for monitoring of water levels and water quality, in the rivers and lakes of the region. Water quality can be monitored relatively easily using biological indicators, as is now being pioneered under a Water Quality Monitoring programme organized by The Asia Foundation (2007)[36]. The programme uses benthic macroinvertebrates which are invertebrates (animals without backbones) large enough to see with the naked eye, that live on the benthos (stream or lake bottom). Benthic macroinvertebrates include insects, crustaceans, molluscs, leeches and worms of various kinds. They differ according to groups and species in their sensitivity to chemical pollution and silt load, so can be used to indicate whether a body of water is degraded or not. Some fish species are also recorded in the standard methodology developed under this programme.

This or similar methodology should be extended to cover key areas of the Mongolian Altai under the Strategy's monitoring programmes. In some cases simple analysis of pollutants and silt load are also required.

2.3 Standard wildlife monitoring programme

A standard simple wildlife monitoring protocol should be developed to examine trends in species abundance and human impacts – a common system to be used both within and outside protected areas. Costs should be kept down by using existing personnel – protected area rangers and specialists, *sum* and *aimag* rangers and inspectors, and representatives of herder groups with local natural resource rights.

3. Ecology and population dynamics of flagship species

For the main "flagship" species such as Argali (*Ovis ammon*), Ibex (*Capra sibirica*), Snow Leopard (*Uncia uncia*) reliable information is required on habitat condition and trends, in particular critical habitat such as

[35]http://www.sdc.mn/en/Home/Development_Cooperation/Ecological_Pastoral_Management
[36] See also www.mongolianriverresources.mn

breeding habitat, seasonal feeding habitat, and corridors linking essential habitat; movements and variability in movements between years; distribution and genetic exchange between populations; population dynamics and population trends, and causes of mortality (including poaching, legal hunting and fishing, disease).

First an overview is required of current information to fill in the gaps in our knowledge. Trends in habitat quality, distribution and population sizes will be investigated further through research on human induced causes of habitat degradation and mortality. In particular, data are required on overlap of grazing areas and on grazing competition between wild and domestic ungulates.

Information on what trade drives the poaching is also required. Data will be collected on uses, markets, middlemen and trade routes as this kind of information can suggest ways to reduce demand or improve enforcement.

Barry Rosenbaum of the University of Colorado in Denver, USA (email address: barry.rosenbaum@colorado.edu) is studying Argali in Bayan Olgii, and would be a useful collaborator. WWF is funding some work in Uvs (contact Mandakh in Bokhmoron *sum*. As the Argali and Ibex are important prey species of the Snow Leopard, work on Snow Leopard should also be closely coordinated with the work on Argali and Ibex.

Exact population sizes of Argali and Ibex are not as important as information on habitat condition, densities, movement patterns and population dynamics (including legal and illegal hunting mortality). We also need reliable data on domestic herd sizes and stocking rates and other uses made by local residents of the mountain ecosystems.

Mineral requirements of Argali and Ibex will also be investigated in the context of the widespread view that mineral supplementation is a conservation measure. Evidence of lack of minerals and lack of access to natural sources of minerals would be required to justify indiscriminate mineral supplementation as there are increased risks of disease transmission, and some of the supplementation appears to be designed to restrict Argali movements, possibly to the detriment of their health, in order to keep them in certain areas where tourists will pay to view them. Use of mineral licks, both natural and artificial, and the chemical composition of the licks, should be studied to determine the importance of mineral licks in the species' ecology and movement patterns and the impacts of artificial licks and food supplementation on Argali and Ibex movements, population structure and breeding success.

Many Argali and Ibex populations are in protected areas where they are not allowed to be hunted. Yet hunting still occurs. The extent of the illegal off-take will be estimated, in areas away from and near the international borders.

Joint surveys with Russia are required in order to understand the trends in the Siilkhem/ Sailiugemski/Khosh Agach Argali population.

Camera trapping has the potential to be effective in monitoring Snow Leopard populations if it is established as a long term programme with assured funding. There are Snow Leopard conservation organizations interested in doing this. Researchers could be asked to investigate the possibility that CCTV could be set up with wireless or cable links to transmit images to a visitor centre from where tourists could see images of Snow Leopards taken that season, or even live.

4. Altai Snowcock

The trade in Altai Snowcock may be growing, and unlike with the trade for some other species which are mainly exported, there is a sizeable domestic demand. Further information is required on the trade, and how it operates. An assessment of current status is also required. Field work to investigate Altai Snowcock distribution, including breeding sites, should also include assessment of other high mountain birds.

If it proves that the Altai Snowcock trade is significant double blind trials could be considered perhaps, to find out whether the meat has any more impact on healing time than chicken meat. The presentation might prove difficult as taste would have to be disguised. It would be a bit of a publicity stunt but it could be done rigorously if enough volunteers were found, and it would draw attention to a threat that can easily be addressed through removal of the demand, and to the importance of evidence based conclusions.

5. Musk Deer

Population size estimates require scrutiny. Distribution of occupied habitat is the most important thing we need to know for now. There will be links between this component and the study of commercial hunting (see below) particularly on the source of animals, the trade and the export routes to China or elsewhere.

6. Plant distribution and abundance

Several plant surveys have been carried out already. The first priority now is an overview, using current knowledge, of the main areas of importance for rare species of plants and species that are endangered or could be endangered in the future as a result of collection pressure or impacts on their habitats. More fieldwork will be carried out only after identification of key areas that require further investigation in the context of biodiversity conservation.

7. Grasshopper population dynamics and grassland health

Periodic outbreaks of swarming grasshoppers (*Eclipopheps* spp.) have severe impacts on livestock pasture in some areas. Research should focus on the underlying reasons for these outbreaks. There are about 11 species of *Eclipopheps*, eight of which occur in Mongolia. They are open country species (indicated by their high width:height ratio), so heavy grazing by livestock is expected to make good habitat for them. Outbreaks occur periodically and it is not the same species responsible each time. Reduction in the extent of overgrazing through better livestock management is a possible medium term approach to reducing damage from outbreaks (eg Onsager, 2000), Research should focus on grasshopper reproductive behaviour, reproductive success, feeding and swarming behaviour and which species are responsible for outbreaks. The hypothesis that there is a link between outbreak frequency and grassland health index should be tested.

8. Competition for habitat and forage between wild ungulates and livestock

The following are required:
a) reliable assessments of livestock numbers in areas across the current range of the Argali and Ibex,
b) information on normal patterns of range use adopted by livestock herders, so that grazing pressure on different parts of the range can be depicted on GIS systems
c) normal movement patterns of wild ungulates
d) analysis of the conditions that encourage or allow wild ungulates and domestic livestock to share grazing grounds
e) details of species and plant part selection by Argali and Ibex and the extent of overlap of grazing and browsing preferences with domestic livestock.

Some research on these topics has already been carried out. Existing data should first be collated and assessed to determine the gaps in required knowledge. The aim is to provide the information on grassland use patterns, combined with information on grassland health that is required for management of herds to achieve proper distribution, availability and quality of water, forage utilization, pasture rest and rotation, and at the same time provide for the needs of wild species.

9. Control and restoration of multiple vehicle tracks

Multiple tracks cause widespread, long-lasting, possibly permanent damage to the soil surface in fragile rangelands such as those we find in the western *aimags*. They comprise a significant loss of pasture land, but little research has been carried out to investigate the actual loss or to develop ways to restore the damaged land.

Research on this topic must be accompanied by public information campaigns to enforce road discipline and eliminate lax driving practices that for the sake of "saving" time, or even the ephemeral thrill of racing beside another vehicle, accumulate losses of pasture year by year. The destruction of grassland by vehicles is considerable, yet it should not be difficult to train drivers in a driving land ethic. The surroundings of *aimag* and *sum* centres are particularly badly affected, but multiple tracks linking *aimag* centres are also very damaging.

10. Endemic fishes of Western Mongolia

The fish fauna of western Mongolia is still poorly known (M Kottelat pers comm. 2008). First, many of the water bodies have not yet been surveyed: the brief 2006 survey discovered several species of Loaches and one species of Grayling new to science. Second, there is confusion in the interpretation of the collections that have been made. For example, the Osmans have been variously regarded as a single morphologically and ecologically variable species, or two distinct species (one in Khar and Khar Us Lakes, and the other in Uvs and the streams and lakes of the Gobi. It is now clear, from careful analysis of the literature and from morphological and molecular analysis following the 2006 survey, that there are several species, some unique to one lake or drainage, some shared between several lakes. The Osmans thus constitute what is called a species flock, a biological phenomenon not previously recognised in Mongolia.

The Western Mongolian fish species-flocks in an arid landscape are a unique biological phenomenon and require careful management. This is the most important feature of the aquatic biodiversity of Mongolia, with no parallel elsewhere in the world.

Further survey work is required to sample all habitats of each drainage and to obtain enough samples to obtain all the local 'types' and to compare the different 'types' of each lake with those of other lakes. Only then will we know the number of species, the characters distinguishing them and their distribution. This is basic information required for conservation planning and fisheries management in Western Mongolia.

Until now management was on the understanding that there is a simple community of a few wide-ranging and variable species, which is reasonably simple. The situation is drastically different now, with the documented presence of several Loach and Grayling species in the different drainages, and the recognition that the riverine Osmans include several species and that the larger lakes have several species of Osmans some endemic to a single lake, some endemic to a few lakes, some shared by all lakes. There have been proposals to transplant fish across drainage boundaries, and such proposals may arise again in the future. For full evaluation of such proposals, and avoidance of the dangers of introductions we need full knowledge of the species involved.

Maurice Kottelat (mkottelat@dplanet.ch) would be available to advise on and take part in this survey.

11. Impacts of wells, irrigation projects, dams and diversions

Examination of the biodiversity and economic impacts of well digging and renovation, dams, and water diversions done specifically for irrigation of pasture or plantations.

The wider implications of water use in the catchment will be considered with reference to the work currently being carried out on integrated river basin management in the Buyant River Basin in collaboration with the Swiss Agency for Cooperation and Development, and WWF.

12. The likely impacts of climate change on Altai Sayan biodiversity

Global climate change is having an impact already in Mongolia[37] (see Annex 5). Research is already underway through NAMHEM and MNU in collaboration with the Korean Polar Institute.

13. Protected Area Management

13.1 Zonation of protected areas

Current zonation of protected areas is not providing sufficient protection, even on paper, to achieve the objectives of the protected area system. Research should focus on the current zonation in two selected protected areas (Altai Tavan Bogd NP and Khokh Serkh SPA) and work with protected area staff, local herder groups and scientists to demarcate more representative zones under an overall management scheme in the wider landscape that provides for the needs of the local people.

[37] http://www.nlcap.net/fileadmin/NCAP/Resources/Mongolia_presentation_IPM08.pdf

13.2 Protection of low altitude areas

In addition to improving the representativeness of zonation schemes it will be necessary to add to the system of protected areas in order to protect sufficient low altitude habitat to achieve the aims of the Mongolia's protected area system. Research should investigate the effective protection status of protected areas and in particular the representativeness of different altitudinal zones within the protected area system. It will also identify areas that could be given official protection under the protected area network, or by local herder groups under co-management agreements with local government. A range of options, including protection during certain seasons only, will be assessed.

13.3 Duties and activities of protected area staff

In order to contribute effectively to capacity building and innovative law enforcement initiatives information is required on:

- current activities of protected area rangers, including volunteer rangers, and relationships between their activities and those of rangers and environmental inspectors at *sum* and *aimag* levels
- relationships with the police and the courts,
- the proportion of people arrested who go to court
- the conviction rate for people who do end up in court .
- relationships between transfrontier protected areas, and nature and degree of staff collaboration
- interactions between protected area staff and Mongolia Border Patrol soldiers.

13.4 Livestock grazing arrangements in protected areas on paper and in practice

Information is required on the arrangements (or lack of arrangements) under which livestock are grazed within protected areas. This includes seasonal and all year grazing by local herders, and livestock kept by protected area staff inside the protected areas. Many different figures are quoted, but it is clear that there are too many livestock grazing inside the protected areas, and that the arrangements under which they are allowed to do so have to be changed.
A survey of practices in all Mongolian Altai protected areas will provide the information required before new conservation agreements can be prepared.

14 Large scale cultivation, including plantations

Accurate data are required on actual and planned cultivation of arable crops, including cereals, melons and vegetables. Data are available but have to be collated together with information on water stress, loss of habitat and attraction of new species to areas under cultivation. The Buyant River Basin Integrated Water Resources Management component of the Swiss Agency for Development and Cooperation funded Coping With Desertification project has access to relevant data.

The links between Sea Buckthorn planting and biodiversity conservation are not convincing, and concerns have been raised about the use of well water and the diversion of surface water to irrigate Sea Buckthorn plantations. This diverts water away from other uses, and can lead to salinization . Hybrids and varieties are brought in from Russia and elsewhere, possibly posing risks to wild Sea Buckthorn. Data are required on the environmental and economic impacts of plantations. Mercy Corps International recently completed a value chain analysis of Sea Buckthorn in Uvs *aimag* (Murphy and Leland, 2008) and their report provides important baseline information. Research results could provide guidelines for environmentally sound Sea Buckthorn harvest, including both wild stands and plantations. Research should investigate water requirements, the genetic identity of the strains used, and the evolutionary and actual importance of Sea Buckthorn as food for wild birds (some resident birds feed on the frozen berries through the winter).

15. Economic Analysis – hunting and tourism

A study on the economic costs and benefits of use of wild species, including hunting and fishing fees and the issue of revenue return from central government to local conservation (mandated under Law on Hunting Fees and the Environmental Protection Fund). "Hundreds of thousands of dollars are generated by Argali trophy hunting each year, yet almost none of this money helps pay for wildlife law enforcement, despite written law to

help ensure that this happens" (Wingard and Zahler, 2006). Policy and implementation mechanisms that will return larger amounts of revenue to conservation on the ground or to allow revenue to be retained locally are required. Hunting fees are only part of the income generated: the outfitters generally charge high fees for travel and accommodation, including camping arrangements, and data on this are also required. Examples of return of income to local communities by hunting outfitters should be recorded. Data should also be collected on income from wildlife and wilderness related tourism, including the eagle festival in Bayan Olgii.

16. Impacts of Sport Hunting and Wildlife Viewing

Research on Ibex and Argali herds that are targeted for sport hunting in the Mongolian Altai should collect information on the dates, locations, numbers, sexes, ages, and sizes of the herds from which the animals have been taken. Data should also be collected on activities of the hunting companies in monitoring herds and their movements, how targets are chosen and the time spent by sport hunters in pursuit of their prey. Food supplementation and mineral links should be documented, with impacts on movements of animals assessed. There is some concern that provisioning can reduce animals' normal ranges, and increase their contact with each other and with domestic stock, with concomitant rise in risk of disease (see Annex 5).

The impact of the two year ban on hunting in Uvs *aimag* should be examined. There have been claims (A Atai, pers comm. 2007) that the hunting that would have taken place in Uvs *aimag* has merely been diverted to Khovd and Bayan Olgii *aimags* so increasing the hunting pressure in other *aimags*. The figures should be examined to test this hypothesis.

17. Characteristic mountain species - distribution and hunting pressure

Hunting of a wide range of species is a constant drain on populations of wild species in Mongolia, as has been well documented (eg Wingard and Zahler, 2006). Wild animals are rarely seen on field trips in the region. If species such as marmot, fox, wolf, otter were not hunted wildlife viewing would be much more than going out looking for argali on the peaks, and the attractiveness of the destination for tourists would be increased.

Wildlife tourism should not concentrate solely on the "flagship" species and ignore the plight of other species that depend on the same habitats and are subject to severe hunting pressures. Data are required on the legal and illegal harvest of other characteristic species of the Mongolian Altai and the market in their products.

Link with survey methodology developed for other areas. For example for experience with small mammal survey methodology in the Eastern Steppe talk with Ya. Adiya, Batbold, Batsaikhan, and the Wildlife Conservation Society in Ulaanbaatar.

18. Eagle and falcon

More information is needed on the impacts of the capture of falcons for export and the capture of eagles, and some falcons for hunting, particularly in Bayan Olgii.

A study will be planned to collect data on both the impacts of these activities on the populations of the species concerned (mainly Saker Falcon (*Falco cherrug*) and Golden Eagle (*Aquila chrysaetos*)) and also on the prey species such as foxes and hares hunted with the eagles each winter.

The Eagle Festival is a growing event, and increasing numbers of young foreign tourists are taking the opportunity to travel with eagle owners back to their homes to stay for extended periods and be shown how eagles are hunted. The potential impacts of this development should be investigated.

19. Timber use for construction

From casual observations it appears that timber is being used for building houses and for fencing, often in large quantities. There is a significant trade in fuelwood in winter in the *aimag* centres. And some of the use is profligate, with fences, for example, of thick logs placed right up against each other in fortress style, when much more modest constructions would be perfectly adequate.

Reliable data are required in order to assess the impacts on forests, and to record details of the route from forest to end-user. Rather than relying on official statistics the research team must seek first hand information, count

houses, count logs, interview officials, interview truck drivers, and must devise clever ways to cross check their estimates of offtake.

This study will estimate total timber consumption in selected *sums* using the same methodology as Erdenechuluun (2006) in her study of the legal and illegal wood supply in Mongolia. There appear to be disputes about the legal quotas too, with central government sometimes setting a higher timber quota than the *aimag* government wishes to see.

Based on the data collected, the details of the trade, the incentives and the alternatives. recommendations should be made on how to tackle excess use of timber and yet provide for the reasonable needs of local people.

20. Effects of mineral development

More and more mineral exploration and mining development can be expected over the coming year or two. It looks as if the Asgat silver deposits in Bayan Olgii will be the site of increased investment, several coal mines are in operation, often with Chinese labour, and there has been and still is exploration for gold, silver, copper and zinc in various combinations, at Tsambaragav, Yamaat and Khokh Adar for example.

For each location assessment is required of both environmental effects (including surface and groundwater effects and wildlife effects) and socio-economic effects (who benefits, who is employed, where does the resource go, costs/benefits to each stakeholder, loss of previous land use).

21. Border effects

Information is required on activities in neighbouring countries that will or might have impacts on biodiversity within Mongolia. Local development and hunting should be assessed. The impact of the fence along the Chinese international border on animal movements should be studied.

22. The value of biodiversity and protected areas to the economy

This is an analysis of the costs and benefits of biodiversity conservation in the Mongolian Altai, which should investigate all aspects of the values of protected areas to the economy, including watershed protection functions and other ecological services. Actual values and the cost-benefit ratio of making decisions that reflect those values should be estimated. When management costs are included it should be apparent to decision makers whether or not biodiversity should be valued for its economic contribution to the national economy.

This study should lay the foundation for policy work on finding ways of paying for the ecological services provided by biodiversity through fiscal means and positive and perverse incentives to change development activities and livelihoods. Quantifying the values and benefits of maintaining the biodiversity and ecosystem services of the Altai Sayan region should provide basic information to assist in trade-off decisions by government and the general public. The Millennium Assessment website provides good guidance on framework and methodology for this kind of assessment[38].

[38] About ecosystem services: http://www.millenniumassessment.org/documents/document.300.aspx.pdf
Ecosystem services valuation:
http://www.millenniumassessment.org/documents/document.300.aspx.pdf
Ecosystems and human wellbeing: a framework for assessment:
http://www.millenniumassessment.org/en/Framework.aspx

Annex 20 Very Rare and Rare Plants as defined under Mongolian Law

a) Very Rare plants of the Mongolian Altai mountains

There are 133 species of vascular plant listed as Very Rare in the Mongolian Law on Native Plants (April 1995). Thirty of them occur in the Mongolian Altai mountains.

	Scientific name	**Common Mongolian name**
1	*Arnica lljinii*	Ильиний аарниг
2	*Blebersteinia odora*	Анхилуун агранз
3	*Tulipa uniflora*	Ганцэцэгт алтанзул
4	*Junipus sabina*	Хонин арц
5	*Saussurea involucrate*	Вансэмбрүү Банздоо
6	*Nymphaea candida*	Цавцагаан бөлбөө
7	*Arnebia guttata*	Шар бэрээмэг
8	*Gentiana macrophylla*	Том навчит дэгд
9	*Abies sibirica*	Сибирь жодоо
10	*Clematia glauca*	Зэгэл зодоргоно
11	*Ephedra Fedtschenkoae*	Федченкогийн зээргэнэ
12	*Solidago dahurica*	Алтаргана илаархай
13	*Asterothamnus centrali-asiaticus*	Төв зийн Лавай
14	*Helichrysum arenarium*	Элсний Мөнхцэцэг
15	*Salvia deserta*	Цөлийн мүгваа
16	*Rhodiola Rosea*	Ягаан мүгэз
17	*Scheuchzeria Palustris*	Намгийн наангил
18	*Oxytropis acanthacea*	Шивүүрт ортууз
19	*Oxytropis fragifolia*	Хэврэг навчит ортууз
20	*Peganum harmala*	Эгэл өмхий өвс
21	*Rosa Kokanica*	Коканд нохойн хошуу
22	*Rosa laxa*	Сийрэг нохойн хушуу
23	*Allium obliquum*	Далиу сонгино, Сармисан сонгино
24	*Sanguisorba alpine*	Тагийн сөд
25	*Saxifraga hirculus*	Ямаан сэрдэг
26	*Phlomis oreophila*	Уулын туйпланцар
27	*Vincetoxicum sibiricum*	Сибирь ерөндгөнө
28	*Pedicularis altaica*	Алтайн хувилгана
29	*Pedicularis abrotsnofolia*	Шарилж навчит хувилгана
30	*Artemisia xanthochroa*	Шар шарилж

b) Rare plants in Mongolian Altai mountains

Decree No 153 of the Government of Mongolia (1995) approved 355 species of vascular plant as Rare Plants. Eighty four of these species occur in the Mongolian Altai mountains.

	Scientific names	**Common Mongolian name**
1	*Stellaria dichotoma*	Ацан ажигана
2	*Stellaria pulvinata*	Дэрэн ажигана
3	*Juniperus pseudosabina*	Хуурамч хонин арц
4	*Sausserea glacialis*	Мөсний Банздоо
5	*Sausserea Klementzii*	Клеменцийн банздоо
6	*Sausserea foliosa*	Навчирхаг банздоо
7	*Sausserea latifolia*	Өргөн навчит банздоо
8	*Dianthus Hoeltzeri*	Гельцерийн башир
9	*Thymus roseus*	Ягаан ганга
10	*Veronica perpusuilla*	Жижиг гандбадраа
11	*Veronica porphyriana*	Порфирийн гандбадраа
12	*Potentilla chrysantha*	Алтлаг цэцэгт гичгэнэ
13	*Potentilla imbricata*	Зүймэл гичгэнэ
14	*Potentilla regaliana*	Регелийн гичгэнэ
15	*Aulacospermum anomalum*	Гажиг гурив-үрт
16	*Scutellaria supina*	Навтгар гүүн хөх
17	*Scutellaria Paulsenii*	Паулсын гүүн хөх
18	*Phleum alpinum*	Тагийн дурваалиг
19	*Gentiana algida*	Цагаан дэгд
20	*Trollius altaicus*	Алтайн жамъянмядаг
21	*Herniaria glabra*	Гөлгөр ивэргэнэ
22	*Linum pallescens*	Цайвардуу маалинга
23	*Tanacetum tanacetoides*	Маралхай марал цэцэг
24	*Nepeta densiflora*	Бөөн цэцэгт мийн хумс
25	*Rhodiola algida*	Цагаан Мүгэз
26	*Stenocoelium athamantoides*	Атомасшуу нахимдаг
27	*Phragmites communis*	Эгэл нишэнгэ
28	*Moehringia umbrosa*	Сүүдрийн ойн цагаан
29	Oxytropis Gorbunovii	Горбуновын ортууз
30	*Oxytropis ladyginii*	Ладыгины ортууз
31	*Oxytropis Krylovii*	Крыловын ортууз
32	*Oxytropis tenuis*	Нарийн ортууз
33	*Oxytropis Saposhnikovii*	Сапожниковын ортууз
34	*Oxytropis sutaica*	Сутайн ортууз
35	*Oxytropis falcate*	Сэлмэн ортууз
36	*Krylovia eremophila*	Цөлийн өнчин цэрэв
37	*Lophanthus Krylovii*	Крыловын садагнагва
38	*Chorispora Bungeana*	Бүнгийн салаалгана
39	*Rosa Albertii*	Албертийн нохойн хошуу (Сарнай)
40	*Acanthophyllum pungens*	Шивүүрт сондуут
41	*Allium altaicum*	Алтайн сонгино
42	*Allium galanthum*	Цагаан цэцэгт сонгино
43	*Euphorbia alpine*	Тагийн сүүт өвс
44	*Plantago Komarovii*	Комаровын таван салаа
45	*Gypsophila cephalotes*	Бөөнцэцэгт тайр
46	*Achillea Ledebourii*	Ледербурын төлөгч өвс
47	*Ribes graveolens*	Анхилуун улаалзгана (Улаалгана)

48	*Carex leporina*	Туулайн улалж (Өлөн)
49	*Cortusa Brotheri*	Бротерусын улбуудай
50	*Draba altaica*	Алтайн хамбил
51	*Draba sibirica*	Сибирь хамбил
52	*Linaria hepatica*	Хүрэн хонин зажлуур
53	*Aconitum anthoroideum*	Ерөндөг хорс
54	*Leonurus panzerioides*	Нохойн хэл хотой
55	*Pedicularis dasystachys*	Бавгар түрүүт
56	*Pedicularis proboscidea*	Шөмбөгөр хувилгана
57	*Alchemilla Krylovii*	Крыловын хумилж (Хувилж)
58	*Astragalus altaicus*	Алтайн хунчир
59	*Astragalus Granitovii*	Гранитовын хумилж
60	*Astragalus Gregorii*	Грегорийн хунчир
61	*Astragalus danicus*	Дани хунчир
62	*Astragalus vulpinus*	Үнэгэн хунчир
63	*Pinus sibirica*	Сибирь нарс
64	*Elymus pamircus*	Памирь цагаан суль
65	*Elymus Fedtchenkoi*	Федченкогийн цагаан суль
66	*Carduus nutans*	Бөхөөн чонын өргөс
67	*Pyrethrum changaicum*	Хангайн шиваантиг
68	*Pyrethrum alatavicum*	Алатавын шиваантиг
69	*Pyrethrum pulchrum*	Дэгжин шиваантиг
70	*Goniolimon callicomum*	Ганган юлт (Чонын тавхай)
71	*Achillea asiatica*	Азийн төлөгч өвс
72	*Allium anisopodium*	Сарвуун сонгино
73	*Artemisia santolinifolia*	Хар шарилж
73	*Artemisia rutifolia*	Шаргал шарилж
75	*Astragalus mongolicus*	Монгол хунчир
76	*Ephedra sinica*	Нангиад зээргэнэ
77	*Gentiana barbata*	Сахалт дэгд
78	*Grossularia acicularis*	Өргөст тошлой (тошлог)
79	*Iris potaninii*	Потанинийн цахилдаг
80	*Lonicera altaica*	Алтайн далан хальс
81	*Oxytropis aciphylla*	Өргөст ортууз
82	*Polygonum viviparum*	Төллүүр тарна (Хурган мэхээр)
83	*Sedum aizoon*	Үлдэн могойн идээ
84	*Vincetoxicum sibiricum*	Сибирь ерөндгөнө

Annex 21 Action programmes according to type of action, and objectives

A. *Aimag* and *sum* government decrees, moratoria and other actions

0. General actions (Objectives 1-12)

A0.1 Increase *aimag* and *sum* budgets for environment and biodiversity.
By doing this give an example to central government and strengthen case for increased funding from the centre. This could be after a cost cutting exercise to identify waste in government expenditure. More efficient tax collection could also boost funds available.

A0.2 Lobby for increased funding from Central Government

A0.3 Pass supporting local legislation and impose local taxes too, as much as possible, rather than just waiting for central government action.

A0.4 Think about alternatives to established government positions

A0.5 Apply through normal channels for an increase in the staff complement

1. Actions to reduce hunting and plant collection (Objective 1)

A1.1 Declare and enforce moratorium on sport hunting in Khovd, Uvs, Bayan Olgii and Govi Altai until proper controls in place and guarantees that revenues will be returned to conservation.
Uvs has a three year hunting ban in place but the action must be region-wide : otherwise the hunting pressure simply shifts to the next *aimag*.

A1.2 Establish and enforce legal moratorium on all hunting licences for commercial or household purposes until proper monitoring and quota determination systems are in place
There is already a three year ban on marmot hunting in force, and this ban should be extended, until the population recovers. Similar bans to be introduced on all species for which licences are required.

A1.3 Declare and enforce a moratorium on capture of Saker Falcons until the business is opened up to public scrutiny and subject to proper environmental assessment and judicial review of its legality under the Convention on International Trade in Endangered Species (CITES)

A1.4 Pass local legislation through decrees or *aimag* regulations that allow arrests to be made for *possession* of illegally killed or collected wild animals and plants. At present poachers and middlemen are escaping arrest simply because they are not caught in the act of killing the animal or collecting the plant.

A1.5 Introduce taxes on selling fuel shrubs such as *Caragana* spp in the markets

A1.6 Provide subsidies for those who sell dung or processed dung bricks. Such initiatives are closely linked to the fuel wood and alternative energy initiatives and are dealt with together under A2 below.

2. Actions to reduce grazing pressures (Objective 2)

A2.1 Provide political and legal support for 2009 winter cull (see below under **Financial Incentives**)

A2.2 Give orders to *sum* governors not to request/force Strictly Protected Area managers to accept livestock for winter grazing

A2.3 Give orders to protected area managers not to issue any grazing permits in summer 2010.

3. Actions to stop loss of forest (Objective 3)

A3.1 Provide necessary support in terms of regulations, political will to bring illegal logging under control (See under *B Improvements in Law Enforcement*)

A3.2 Government to provide necessary support to make the forest "user group" schemes work.

A3.3 Clarify rights and duties of "user groups" who are given some kind of ownership rights

a. Be ready to solve problems and disputes
b. Take measures to solve problems that arise because user groups have to leave their forests to graze livestock elsewhere?

4. Actions to restore riparian forest (Objective 4)

A4.1 Order and facilitate the demonstrations under Financial Incentives below

5. Actions to maintain water quality and quantity (Objective 5)

A5.1 Heavily involve *aimag* officials in pilot work on water user groups and river basin councils for Buyant and Khovd River basins. Developing general management policy and planning on water resources is urgent.
Local decision on water use, water related issue should follow the integrated water resource management plan of river basin.

A5.2 Stress the transjurisdictional (cross *sum* and cross *aimag* border) collaboration on this work.

A5.3 Assign budget for transjurisdictional water management, consultation and actions.

A5.4 Provide legal backing to water user group working arrangements on limiting of diversions for irrigation

6. Actions to stop development causing damage to biodiversity (Objective 6)

A6.1 Tighten environmental assessment procedures. Judge the adequacy of environmental assessments independently and require them to be redone by the developer if found lacking.

A6.2 Strengthen requirements locally and lobby for national changes to requirements for environmental assessments for development projects which will affect protected areas

A6.3 Instruct environmental agencies to require environmental assessments for donor project activities.

A6.4 Ensure that environmental agencies are much more involved in projects run by donors

A6.5 Establish the practice of strategic environmental assessment in that the likely environmental (and social) impacts of development projects are assessed at the regional level over a planning period rather than on a case by case basis as they are conceived (See H6.1)

7. Actions to reduce off-road driving (Objective 7)

A7.1 Enable all supporting legislation for the new controls.

A7.2 Make public announcements for the new controls

A7.3 Require that fines are used for biodiversity conservation under the Strategy

8. Actions to establish evidence based biodiversity conservation (Objective 8)

A8.1 Institutionalize the functions of the *Aimag* Sustainable Development Councils.

These councils have not proved sustainable as project related organizations. The functions can best be institutionalized under the *Aimag* Industry, Infrastructure, and Environment Policy Coordination Divisions. It is essential that a group be formed that has oversight over environmental safeguards. Include perhaps Land Agency, Environment Agency and Protected Area Administation under the Policy Coordination Division.

A8.2 Discuss options and decide. Don't rely on projects to resource it. Do it all from government funds and give it real power

A8.3 Establish enforceable routine consideration of biodiversity conservation in *aimag*, *sum* and *bag* government decision making and planning with integration of this into the day to day business of government in all sectors through regulations

A8.4 Require *sum* plans for economic development to include biodiversity and environmental safeguards.

A8.5 All *sum* plans to be subject to expert review.

A8.6 Ensure that *sum* and *aimag* officials work more closely together.

9. Actions to introduce environmental accounting (Objective 9)

A9.1 Introduce unofficial (shadow) environmental accounting to *aimag* and *sum* accounting systems. The value of biological resources may be direct (used in consumption or production), indirect (support resources which have direct value) or non-use value (moral, aesthetic etc.). Development and management of resources often have major influences on biodiversity many of which are external to the market and thus are ignored in accounting systems. In order to calculate take into account the true value of biological resources and the environmental costs of development an alternative to traditional GDP is required, and there is an opportunity to introduce such as system in the Altai.

A9.2 Take necessary legal steps to introduce the system

A9.3 Seek funding to carry out training

10. Actions to establish well regulated wildlife tourism (Objective 10)

A10.1 Fill recently created positions of tourism officer at each *Aimag* Governor's office with well qualified individuals. This should be devoted to tourism, entirely, as part of the Environment and Tourism Department.

A10.2 Use whatever channels available to make changes to protected area entrance fees, increasing them and also making them time-dependent. At present entrance is until one leaves. It should be on a per day basis. Also charge higher fees for climbing snow peaks and visiting certain highly sensitive areas or wildlife populations.

A10.3 Establish concession system for tourism in protected areas, so that it is not the protected area administration that operates tours directly

A10.4 Establish no-vehicle zones in protected areas to stop damage from driving (see also under Objective 11)

11. Actions to improve protected area coverage & effectiveness (Objective 11)

A11.1 Increase interactions between protected area administrations and local government to facilitate improvement in protection regime.

12. Actions to secure financial resources and technical support (Objective 12)

Form partnerships with conservation organizations, universities and research institutions from inside and outside Mongolia. Many such organizations have funds and would be interested, but require

some encouragement and confidence that their work will be appreciated. Fears about political will and the risk of degazetting of valuable protected areas will decrease the scope for this kind of assistance. Personal approaches are useful

A12.1 Send out well informed letters/emails from *Aimag* Governors with reasonable proposals for joint work.

A12.2 Follow up with further letters/emails and replies to those that respond.

A12.3 Form equal partnerships with clear goals and ensure that arrangements are kept. Facilitate effective coordination between donors funding projects of any kind in the Altai.

A12.4 *Aimag* Governments insist on and organize joint donor (NGOs and multi/bilateral) project meetings at which environment and biodiversity considerations stressed and incorporated into activities and operating procedures. Environment Agency and Protected Areas Administrations attend.
Facilitate cross-sectoral consultations and coordination for donor funded projects in the Altai

A12.5 Insist on and organize coordination between projects and all relevant government departments to avoid compartmentalization. Nature conservation projects to consult with agricultural and infrastructure departments and vice-versa.

Strive to benefit more from donor projects in terms of progress towards the vision of the Strategy. Make more effort to find the right way for asking support from projects, not asking for support for objectives and activities outside the scope of the projects . That way ultimately leads to more respect and more support

A12.6 With existing projects already under implementation operate much tighter monitoring of activities and do not tolerate deviations from the objectives . This requires discipline. Environment Agencies to do the monitoring and to call regular meetings, not wait until visited by project staff.

A12.7 With new projects already approved and just starting, get involved right from the start, showing leadership and commitment to the project objectives and to measuring results. Be proactive from the start in workplanning and don't leave requests for inclusion of certain activities until the plans have all been done

A12.8 Don't let expectations rise unrealistically among the "project beneficiaries". Read all the documents early on and insist on translations from the donors from the very start. Listen to what can be learned from outside, and think how to adapt to local conditions.

A12.9 With new projects insist on being included at the project development stage and consider changing the way the projects are staffed to make the counterpart system work smoothly. Must get involved more proactively with projects in the preparation phase and push for what is going to work – don't leave it until later when it is often too late to change the project implementation arrangements. Get proper counterpart system, projects inside government offices, not stuck on the outside with what often viewed as over-privileged staff.

A12.10 Require routine reporting by donor projects with any impact on BD, to government, local NGOs and local people. Use this as an opportunity to advertize the Strategy.

B Improvements in law enforcement

0. General actions (Objectives 1-12)

B0.1 Implement laws assiduously. Be on top of the law – don't wait for it to be changed. Laws take a long time to change, so *aimag* and *sum* authorities should make sure they work within laws such as the Minerals Law to provide feedback on time in case of objections to licensing for example, and at the same time lobby for changes in the mechanisms where appropriate.

B0.2 Ensure that rangers wear suitable uniforms
Provide protected area rangers and *sum* rangers with uniforms that are completely different from army uniforms, to stress the difference between them. Make rangers proud to wear their uniforms

B0.3 Review the patrolling frequency and effectiveness of environmental inspectors and *sum* and protected area rangers

B0.4 Find ways to provide transport for inspectors/rangers/ Taake whatever action possible to increase frequency of getting staff out in the field. For example, use transport on all official journeys to the full to overcome transport shortages. And during project preparation require donor projects to provide transport on some occasions and for some purposes

B0.5 Scrutinize court decisions on environmental offences and address any discrepancies with the law

B0.6 Hold police, environmental inspectors and rangers accountable for their actions with respect to environmental offences.

B0.7 Increase supervision of inspectors and rangers, so that they feel more important.

B0.8 Increase spot checks at markets and at temporary roadside police checkpoints to see what is being sold and transported

B0.9 Ensure, through local regulations and orders if necessary, that arrests are made of those found in possession of prohibited wildlife and plant goods

B0.10 Strengthen border controls via Customs officers

B0.11 Monitor the implementation of international agreements and conventions and ensure that funds are available to carry out obligations under them. Budget for them.

B0.12 Make new agreements with adjacent countries to collaborate on in protection of biodiversity.

1. Actions to reduce hunting and plant collection (Objective 1)

B1.1 Facilitate the use of newly acquired state inspectors' rights, by rangers from Nature Environment and Tourism Units and Protected Area Administrations

B1.2 Create a state inspector's position at custom offices of border crossings

B1.3 Solicit reports from tourists and visitors about wildlife violations – establish and publicize a system

B1.4 Monitor and support and learn from the WWF poaching patrol projects such as IRBES patrol.

B1.5 Do more joint patrols, have government rangers always with the IRBES patrols?

B1.6 Work with WWF and other donors to establish more anti-poaching control forces (further developing the Irbes patrol model), and at the same time work to institutionalize these forces)

B1.7 Take steps to have more control over guns either banning them or taxing them more heavily and enforcing the tax collection well.

B1.8 Make a deliberate effort to involve police properly in wildlife law enforcement activities.

B1.9 Establish incentives and mechanisms for the public to supply information on poaching and other illegal activities

B1.10 Crack down on abuse of position by inspectors & rangers Put an end to officials using their position to extort marmots from herdsmen who have hunted them illegally, in return for not taking action. [Remember what happened in the Eastern Steppes where marmots are now pretty well extinct]. Take similar action to stop officials misusing their authority and giving the nature conservation agencies a bad reputation.

B1.11 Regulate *Caragana* and other fuel shrub collection in particular through spot checks at market, at collection points on the steppe and at temporary road-blocks.

B1.12 Strengthen border controls via Customs officers

2. Actions to reduce grazing pressures (Objective 2)

B2.1 Revise zonation to assign more of the protected areas to "core zone" status (zone of highest protection) and enforce zone regulations

B2.2 Control grazing in buffer zones as allowed under the law

B2.3 Lobby for strengthening of legal controls at centre

a. Identify what changes in national policy and legislation required to follow up on the local *aimag* measures already taken
b. Involve Altai members of parliament in Strategy actions and recommendations for changes in national policy and get their assistance in lobbying in Ulaanbaatar

3. Actions to stop loss of forest (Objective 3)

B3.1 Enforce legislation: stop all illegal timber collectionThis requires firm action and not just by the environmental inspectors. It requires political will and the cooperation of *aimag* governors, *sum* governors and members of parliament. Unless it is done the forests will disappear within a few years

B3.2 Pass regulations banning the use of logs/planks for solid fences around buildings.

B3.3 Root out corrupt practices surrounding permits for timber for house building

B3.4 Get full cooperation of the police and the courts in prosecutions

B3.5 Confiscate illegal timber from the holders and reward informants

5. Actions to maintain water quality and quantity (Objective 5)

B5.1 Support and implement water resource management plans for each river basin and enable water user groups and river basin councils to work effectively through improved regulations and enforcement.

6. Actions to stop development causing damage to biodiversity (Objective 6)

B6.1 Follow the law on mineral resources development. Make sure that *aimag* and *sum* environmental officers and governors respond within the prescribed time to proposals. Be proactive in checking the mining license applications and being ready with views and comments. Link to The Asia Foundation (TAF) Responsible Mining Initiative

B6.2 Local authority be more proactive in mining licensing. Get hold of the announcements. There is a system you just have to get on top of it. There is time to protest. Make sure you get within it and not moan afterwards that there was not enough time.

B6.3 Enforce penalties for those in breach of environmental assessment conditions

7. Actions to reduce off-road driving (Objective 7)

B7.1 Enforcement of off-road driving ban in *aimag* centres.
This is by way of demonstration, to show the results. At present people drive everywhere without discipline, cutting between buildings, driving in straight lines to the river from wherever they may leave the main road, showing in fact no consideration for the land or indeed for pedestrians or children playing on the bare ground between the buildings. By allocating parking places and making people walk from parking place to apartment or office the land will recover to some extent with on further action so that green vegetation grows between the buildings. This is the beginning of the process. After that the campaign spreads to the *sums* and beyond.

B7.2 Pass local regulations to require vehicles to follow traffic rules and stick to established vehicle routes within *aimag* centres

B7.3 Designate parking areas

B7.4 Fine offenders or impound their vehicles. Begin leniently, with warnings, but fine for brazen offences. Then start to tighten enforcement

B7.5 Extend the campaign to *sums* and beyond

B7.6 Link to Asian Highway 4 road building project and interest Asian Development Bank and contractors in the scheme.

B7.7 Pass local regulations to require vehicles to follow traffic rules and stick to established vehicle routes anywhere within the region

B7.8 Fine offenders or impound their vehicles. Begin leniently, with warnings, but fine for brazen offences. Then start to tighten enforcement

B7.9 Control mining roads. Some blame mining companies for multiple tracking. Mining companies commonly claim, with some justification, that they are responsible users of roads, and actually make efforts to stick to improved roads that they put in themselves. There is no doubt that better coordination is needed, however. Attention too to the requirements of heavy mining trucks as opposed to normal traffic, and to the fundamental impacts of merely opening up more areas to intensive use.

8. Actions to establish evidence based biodiversity conservation (Objective 8)

B8.1 Follow the legal procedures established for the *Aimag* Sustainable Development Councils to guide and control development taking biodiversity into consideration

10. Actions to establish well regulated wildlife tourism (Objective 10)

B10.1 Immediate action to control violation of laws by tourist operators

B10.2 Critical review of current legislation and proposals for review of standards.

B10.3 Enforce no-vehicle zones (see also under Objective 11) through self regulation by tour companies and external regulation by rangers

B10.4 Identify any loopholes in laws exploited by tour operators, and laws that unnecessarily restrict or penalize tour operators

11. Actions to improve protected area coverage & effectiveness (Objective 11)

B11,1 Expand the state and local protected area network to achieve representativeness of ecosystem types and full coverage of species: new protected areas, extensions to existing protected areas (see main text Section 5).

B11.2 Enforce the protected area regulations and additional decrees from the *aimag* governors

B11.3 Review the law enforcement record of each ranger and investigate

B11.4 Develop proposals for reviews of legislation at state level and communicate them to central government via *Aimag* Governors and MPs. Include legislation on artisanal mining, on pasture

C Public information and involvement.

0. General actions (Objectives 1-12)

C0.1 Increase access of the general public to information on biodiversity and environmental governance to make it easier for the public to hold government officials accountable for their decisions, and to encourage a real self-sustaining interest in the natural environment among the population

C0.2 Hold monthly meetings at each *aimag* centre with guest speakers on range of relevant biodiversity conservation topics.

C0.3 Purchase, equip and mobilize a vehicle as a mobile education unit travelling over the Altai to show films and present talks, plays and discussions to *sum* and *bag* residents on a range of biodiversity conservation topics

C0.4 Follow up with Khovd TV Environment Forum to establish weekly discussions on environment with novel approaches and participation of general public, agricultural experts, ecologists, business developers – and extend to the other *aimags*.

C0.5 Initiate *aimag* branches of the Ulaanbaatar Bird Club/Mongolian Ornithological Society recruiting in schools and at workplaces. Basic training in bird identification and encouraging a core of interested people to take up birdwatching as a hobby and to start doing surveys and bird lists locally. Extend this eventually to *sums*. Ulaanbaatar Bird Club/Mongolian Ornithological Society could do this with initial financial support from Altai Sayan Project. Take students from boarding dormitories out to watch birds. Just walk out, no need for a lot of transport. Do things out of school.

C0.6 Establish and expand conservation volunteer programmes and conservation societies, going beyond eco-clubs for children, to involve adults, encouraging an interest in, indeed a passion for, the natural environment especially among young people, and taking that passion beyond the poetical lyrics of love of the steppes to scientific knowledge and concrete action.

C0.7 Take people out on conservation actions such as fencing riparian forest and setting up and monitoring local nature reserve plots.

C0.8 Commission a striking film that is done for international release at very high quality, with innovative shooting techniques, using archive material and contrast black and white and colour. Interest a commercial TV company in cost sharing, and approach major donors too.

C0.9 Work with *aimag* and *sum* libraries to ensure that books and publications available on biodiversity conservation

C0.10 Database on the internet with all information on Altai biodiversity and biodiversity management. This to be used by general public, by developers and by government decision makers and will provide transparency on all development proposals – roads, mines, dams

C0.11 Publish high quality maps of the Altai landscape and surrounding areas and sell cheaply in all *aimag* and *sum* centres, subsidized if necessary to ensure quality and affordability.

C0.12 Involve local residents in long-term monitoring of biodiversity. This has many advantages. For example, it will improve their participation in species conservation, improve their knowledge and experience about local biodiversity and monitor population trends in an economically effective way

C0.13 Require routine press releases re arrests and court cases involving hunting and other environmental law infractions more transparent

C0.14 Establish “score cards” (eg as by Mongolian Nature Protection Coalition(2008)) as feedback on legislators’ performance in environmental governance.

1. Actions to reduce hunting and plant collection (Objective 1)

C1.1 Carry out a publicity campaign on the details, extent and total destructiveness of the Chinese Wildlife Trade. Translate, and publish in Mongolian the TRAFFIC (2007) Report on the Chinese Wildlife Trade. Distribute The Silent Steppe (Wingard and Zahler, 2006) more widely.

C1.2 Carry out a public information campaign in Ulaanbaatar to expose the damage being done to Altai Snowcock populations by people's fallacious beliefs in the medicinal value of eating its meat. Support it by chemical analyses and antibacterial properties of the dried meat compared with chicken meat for example. Warn also that there is a health risk to eating Altai Snowcock bought from poachers or middlemen because many of the birds are killed by poisoning.

C1.3 Use public information materials and dialogue to persuade people to refrain from taking prohibited species and to take other species in non-damaging ways under proper agreements

C1.4 Prepare information and advocacy materials for presentation by rangers, inspectors and protected area staff designed to stop illegal hunting of wildlife. Use innovative drawings in the materials

C1.5 Develop suitable audio-visual and theatre performances for the mobile education unit (see under *0 General Actions*)

2. Actions to reduce grazing pressures (Objective 2)

C2.1 Public information campaign to persuade the public of the need for the livestock reductions and tax rises Directly decreasing livestock numbers is complicated and controversial. Therefore, wide and intensive advertisement of the advantages of having fewer livestock in good condition over having huge herds of livestock which are losing productivity on deteriorating rangelands

Engage innovative public information experts to prepare publicity material and organize a campaign. TNC is possibility and it is within their mandate to do as part of their own mission. They have experience. Another possibility is Mongolian Independence Council. Drawings, theatre, films and done through a mobile education unit (see C0.3, C1.5.) Must explain the basics and do not talk down. There are those who dispute that the problem is overgrazing and want to blame climate change. But climate change is with us and if as seems likely, some of the deterioration in rangeland is due to rises in mean annual temperature this is all the more reason to control other stresses on the rangeland, and no reason to step back and do nothing.

C2.2 Stress the value of native breeds that are well adapted to local conditions.

4. Actions to restore riparian forest (Objective 4)

C4.1 Implement plan to maintain riparian forest and use for firewood, fruit, recreation and tourist campsites

C4.2 Interest people/officials from other sites in demonstrations of restoration, and get them to fund the process themselves.

C4.3 Invite herders to visit and look at the restoration (year 2)

C4.4 Persuade them of the benefits to local people in their home *sums* of starting similar schemes.

5. Actions to maintain water quality and quantity (Objective 5)

C5.1 Expand working systems to other places within the basins and to other basins

C5.2 Encourage follow up to livestock reductions such as improvement in disposal of dead livestock to prevent widespread decomposition in rivers

C5.3 Publicize sound cultivation practices

6. Actions to stop development causing damage to biodiversity (Objective 6)

C6.1 Publicize likely impacts on protected areas of mining in light of working group established by Prime Minister in 2009 to investigate how to change laws to allow mineral exploration in protected areas

7. Actions to reduce off-road driving (Objective 7)

C7.1 Massive public education campaign to demonstrate the problem and show how and why off-road driving is controlled elsewhere in the world
Take advantage of peer pressure. Take action at mountain worshiping ceremonies to reduce driving.

C7.2 Erect sufficient signposts in *aimag* centres to inform drivers adequately of the regulations and later outside *aimag* centres to help people find the way, and to define the approved routes between *sums*

9. Actions to introduce environmental accounting (Objective 9)

C9.1 Include environmental accounting in the public information programmes described under General Actions

10. Actions to establish well regulated wildlife tourism (Objective 10)

C10.1 Work with US Peace Corps on tourist websites for the Altai. Build on gokhovd.com concentrating on low impact yet profitable tourism. Other links too through Altai Sayan Project and the contractors for the tourism plan

C10.2 Promote domestic tourism to enrich knowledge of nature and biodiversity, to stimulate positive attitude towards wildlife and to support local economy

C10.3 Distribute tourist map

12. Actions to secure financial resources and technical support (Objective 12)

C12.1 Use the results of the projects as they become available. Publicize them. Stimulate interest in the objectives and the results

D. Staff, training, motivation, supervision and support

0. General actions (Objectives 1-12)

Strengthen government staff responsible for protection, environmental safeguards and planning is required in order to achieve most of the objectives. More staff are required, and they need to be better trained, more motivated, and more effectively supervised and supported. They must be proud to be doing their job and they should be supported in their law enforcement roles by authorities.

D0.1 Raise motivation and performance through supervision and support

D0.2 Work towards improving staff selection and adding to the staff complement in *aimag* and *sum* Land Agencies and Environment Agencies and in protected areas.

D0.3 Engage interns – recent graduates who are willing to work for work experience, both local graduates (Khovd University) and Ulaanbaatar graduates. Some graduates may be able to use a year as an intern as a way of collecting information for a master's or doctorate thesis. Take advantage of good people.

D0.4 Strengthen selection procedures. Avoid political appointments to the Protected Areas.

D0.5 Organize systematic pre-service and in-service training to ability, confidence and performance

D0.6 Ensure government staff able to comment critically on reports, proposals and environmental assessments. Government officials need the skills and confidence to comment critically on reports, on proposals, on environmental assessments. Without it they cannot do their jobs. Develop strategies to achieve this. They should be able to read a scientific report or proposal and tell the author what they think of it. For this, apart from anything else they require a good basic understanding of sampling theory and statistics

D0.7 Establish regular, institutionalized in-service training at Khovd University and independently

D0.8 Guide training under projects to focus on specific results and institutionalization of training. Think about the training that is done under projects – it can be used much better, as on-the-job training to produce specific results, with detailed training needs becoming clear throughout. Be much more involved in projects at the planning stage and make sure at that stage that training under projects contributes to institutionalization and concrete results within the life of the project.

D0.9 Avoid one-off training courses unless aims very specific

D0.10 Ensure quality of teachers and training

D0.11 Use internet to order books, get them translated.

D0.12 Guide book selection by donors who already send books (eg Anita Fahrni-Minear' s organization in Khovd, and others suchs as Wisconsin Books to Mongolia, The Asia Foundation, Swiss Agency for Development and Cooperation, The Asia Foundation and The Zorig Foundation), and ask them if they could search for certain titles, not just a random selection. It is a waste of money to ship some of the random selections

D0.13 Improve protected area and *sum* rangers' public image. Staff should be proud of their roles and sure of the support of their supervisors when they take enforcement action.

D0.14 Establish system under which supervisor's regularly patrol with rangers and ask about their work and results, observe performance and give suggestions for improvement

D0.15 Establish system under which government employees are held accountable for their actions or for their lack of action, for oversights and for deliberate dereliction of duty, whether in approving

activities with impacts on biodiversity, or engaging in corrupt practices to allow others to break the law with impunity.

6. Actions to stop development causing damage to biodiversity (Objective 6)

D6.1 Training and establishment of a system in the *aimags* to judge environmental assessments, enforce and monitor mitigation and restoration actions.

D6.2 Training on inclusion of biodiversity considerations into environmental assessments

D6.3 Training in enforcement and monitoring of mitigation and restoration actions

D6.4 Use Asian Highway 4 and link road projects as examples to train on the job in monitoring compliance and as learning demonstrations. The projects already have full environmental assessments that should now be referred to day to day when the work starts, showing professional and scientific approach to the contractors. (ASP)

8. Actions to establish evidence based biodiversity conservation (Objective 8)

D8.1 Use projects to help with the whole field of introducing the ideas of evidence-based conservation and how, when and where to apply environmental safeguards.

D8.2 Tackle barriers - partly education, partly attitude – most people require simple statistics and sampling knowledge and the ability to review proposals and report soundly

D8.3 Establishment of evidence based approach to biodiversity conservation: cessation of ineffective and potentially counterproductive management measures

D8.4 Stop ineffective and potentially counterproductive biodiversity management measures

9. Actions to introduce environmental accounting (Objective 9)

D9.1 Begin to interest staff in the concept by analysing case studies with assistance of donor funded projects already working in the Altai eg gold mining in protected areas vs long term protection, spraying for grasshoppers or moths cost benefit analysis, or costs of overgrazing in the future vs costs of reducing herd sizes now

10. Actions to establish well regulated wildlife tourism (Objective 10)

D10.1 Training courses in how to run small wildlife tour operations. Collaboration with Mercy Corps International who are already investigating assistance to tourism ventures in Khovd

D10.2 Train tourism officers in biodiversity conservation and costs, benefits and risks of eco-tourism

D10.3 Establish a licensing system for tourist wildlife guides with a training course, licences and certificates and encouragement of tourists to engage qualified and licensed guides. Proper training from Altai Sayan project

11. Actions to improve protected area coverage & effectiveness (Objective 11)

D11.1 Improve the performance of protected area staff in consultations: at least local people should not suffer because of the protected area and they should be compensated in some way for opportunities lost

D11.2 Recruit qualified staff according to transparent selection procedures (see D0.4)

D11.3 Provide transport and communication in accordance with performance criteria

12. Actions to secure financial resources and technical support (Objective 12)

D12.1 Encourage training activities to be directed always towards institutionalization of training, rather than one-off training courses that are repeated a few years later by new projects.

D12.2 Use the counterpart system: assign government officials to work full or part time on the projects in order to be more involved and learn more day to day.

E Research and monitoring,

0. General actions (Objectives 1-12)

Data are required to allow biodiversity conservation to be taken into account during the routine business of government planning and decision making, and to allow greater public participation and transparency. Accurate and easily available data are essential for good policy development and implementation. Gaps in information on the major components of biodiversity in the Altai are a major obstacle to biodiversity conservation, and current information collection and management arrangements are too fragmented and not sufficiently rigorous to provide reliable support to decision makers in either non-governmental or governmental institutions. Many kinds of information are required to conserve biodiversity and to manage the protected areas effectively, including data on ecological relationships, species distribution status and trends, human uses and changes in land use. Information on the status and utilisation of important natural resources is mostly insufficient to support detailed planning and lack of appreciation of biodiversity is hampering acceptance of the need for biodiversity conservation among the general public. A baseline of biodiversity information and a biological monitoring system are required so that reliable data are available to the full range of agencies that require them, and to the general public. The data will also be used by developers who wish to ensure that they stay within the law with respect to environmental and biodiversity conservation

Carry out baseline surveys of biodiversity – status, uses and threatsThis builds on what was done as a desk top exercise in preparation of the Strategy, identifying the most important survey work that should be done, and doing it.

E0.1 Plan series of field surveys of distribution and absolute or relative abundance, in collaboration with partners including Wildlife Conservation Society, and Zoological Society of London. Concentrate on providing management authorities with information that will assist in conserving vulnerable biodiversity and key natural resources. Cover vertebrates, invertebrates, plants and fungi. Give priority to endemic and threatened species of the Altai and Sayan Mountains and those species requiring protection at the landscape level (i.e. those occurring at low density and/or occupying large ranges).

E0.2 Carry out the surveys, with extensive involvement of local people and local universities and schools and research institutions. Use modern technology such as camera traps on large scale for surveys and monitoring.

E0.3 Plan more detailed surveys and studies to assess current overall use – legal and illegal – of important natural resources in the Altai and provide management with estimates of the level of off-take of natural resources that would be sustainable and safe limits on pollution levels.

E0.4 Carry out these follow-up surveys and desk work and interviews

Establish monitoring schemes to measure trends in biodiversity and environmental condition

E0.5 Identify indicators of threats to biodiversity that can be easily measured and monitor those indicators.

E0.6 Design monitoring system

E0.7 Use rangers to the full. Keep measurements simple but the protocols should be rigorously applied

E0.8 Train herders groups, who are committed to do conservation activities, in simple monitoring methods to measure biomass and vegetation cover in order to detect trends in health of pasture

E0.9 Monitor river and lake water quality and quantity (MSU, Asia Foundation, Altai Sayan project, Khovd University, WWF) Khovd University recently took delivery of water laboratory equipment through from a German University.

E0.10 Carry out species, grassland and forest monitoring surveys

E0.11 Establish Biodiversity Information System that can support entry of baseline assessment and monitoring data, simple data analysis, data downloads in a number of common formats, links to GIS to provide maps of global biodiversity hotspots, species distributions, habitats, threats (new roads and other infrastructure, mine locations, etc.) and links to Altai Biodiversity Information and GIS databases in neighbouring Russia and China.

E0.12 Study restoration of damaged land (only after the cause of the damage has been eliminated)

E0.13 Assess status of White-throated Bushchat

E0.14 Carry out fish species survey

E0.15 Guide further biodiversity research in the region by maintaining a list of priority research questions that need answering as funds become available and partnerships are formed (see Annex 20)

E0.16 Organize and hold an international conference on biodiversity of the Altai hosted by Khovd University (to be funded by Altai Sayan Project) . Include wide range of research and conservation organizations and individuals as well as representatives from agriculture, infrastructure, tourism and mining. A working conference with definite aims.

E0.17 Plan the conference in good time. Invitations should be distributed at least nine months before the conference will be held

E0.18 Aim to establish a baseline of current knowledge of biodiversity and threats to it in the Altai, performance of the various conservation initiatives attempted in four Altai countries, and solutions to current conservation problems.

1. Actions to reduce hunting and plant collection (Objective 1)

E1.1 Identify species for which detailed investigations required in order to combat illegal hunting and collection

E1.2 Conduct hunting/trade studies on the selected species as part of comprehensive research on conservation status and threats

E1.3 Assess biodiversity impacts of commercialization of the annual eagle festival in Bayan Olgii Beware of the impacts (on both wild eagles and wild prey species) of the trend towards young tourists being taken back to eagle hunters' *sums* after the Bayan Olgii Eagle Festival to see the eagles hunting. This is simply monitoring of impact: there may be none, or the overall conservation impact may be deemed positive.

E1.4 Carry out financial/environmental/social accounting audit for sport hunting vs wildlife tourism to demonstrate the long term costs and benefits of sport hunting on the one hand, and wildlife tourism on the other hand.

2. Actions to reduce grazing pressures (Objective 2)

E2.1 Consolidate and validate the various approaches to assessment of grazing capacities and rangeland health. Review the various methodologies in use, and establish standard for description of grazing capacities.

E2.2 Describe grazing capacities

E2.3 Look critically at feasibility of relying on herder groups doing nature conservation duties.

E2.4 Livestock population surveys in support of winter 2009 cull and subsequent monitoring

E2.5 Investigate how to limit absentee livestock owners through fiscal measures

3. Actions to stop loss of forest (Objective 3)

E3.1 Assess current forest areas and review forest management practices.
Combine an assessment of current forested areasand forest ecological functions with a review of protected status and effectiveness of protection regime, impacts of current forest management on forest regeneration, fire frequency, retreat or expansion of forest edge, and sustainable yield of timber and firewood.

E3.2 Assess current timber harvest and use.
Cover legality. sustainability, and how long will forests support the current rate of offtake. Also the local requirements for timber and the alternatives.

E3.3 Assess the fuel problem from fundamental principles and on a regional level.
What is the heating and cooking requirement ? How much comes from local forests / steppe now? How much longer will that last at current rate of use and growth? Be realistic. Include provision for timber harvest. What is the legal harvest? (Most of the forests are in PAs and harvested illegally). What are the alternatives? What are the immediate and potential costs of each alternative? Renewable energy? Biofuels (and introduction of specialized biofuels boilers that can make use of forest thinnings that have little or no current value. Dung? Dung bricks? Can the change to alternatives be managed and the use of forests/steppe stopped? All need careful calculation. Understand that plantation forests are not feasible in the Altai. There were sawmills in the Altai Taban Bogd until the 1990's but much of the forest has gone now.

4. Actions to restore riparian forest (Objective 4)

E4.1 Monitor the recovery of riparian vegetation where restoration attempted

5. Actions to maintain water quality and quantity (Objective 5)

E5.1 Monitor water quality and quantity

6. Actions to stop development causing damage to biodiversity (Objective 6)

E6.1 Investigate all overlaps of mining licences with protected areas and work to get them resolved.

E6.2 Commission economic assessment of the values of short term profit from mining vs long term benefits of intact ecosystem with respect to mining in an SPA – say Tsambaragav NP, and extend to other PAs as applicable.

7. Actions to reduce off-road driving (Objective 7)

E7.1 Study to monitor impacts of the bans, first in *aimag* centres and then in the region generally

8. Actions to establish evidence based biodiversity conservation (Objective 8)

E8.1 Demonstration of policy analysis using the evidence eg

a. Review grasshopper control through pesticide
b. Review current practices of salt licks and supplementary feeding for wild ungulates - risks of disease and changes in natural ranging behaviour (potentially a conservation risk).

E8.2 Ensure that international considerations are included always in information available and in decision making. Don't restrict transboundary work to the protected area people.

E8.3 Monitor the implementation of this strategy, both through impact indicators and tracking progress in completion of activities.

9. Actions to introduce environmental accounting (Objective 9)

E9.1 Collect information about similar initiatives elsewhere

10. Actions to establish well regulated wildlife tourism (Objective 10)

E10.1 Monitor compliance with new regime and impact on habitats and species

F. ENVIRONMENTAL ASSESSMENT

0. General actions (Objectives 1-12)

F0.1 Ensure that the ecoclubs are sound in their education on environmental and biodiversity conservation and not missing important aspects and opportunities.

1. Actions to reduce hunting and plant collection (Objective 1)

F1.1 Do not rush into funding, supporting or permitting cultivation programmes for wild species of plants or captive breeding of animals without careful assessment of economic and environmental impacts and analysis of whether such programmes will take any pressure off wild grown plants or animals in the wild. Do the necessary assessment first.

2. Actions to reduce grazing pressures (Objective 2)

F2.1 Do not allow projects to advocate alternative livelihoods that exploit renewable natural resources, when these natural resources are often under so much stress that the only sustainable use is zero. Alternative livelihoods will have to include work outside the livestock, hunting and forestry sectors.

F2.2 Subject all water point establishment to stringent environmental assessment. Additional water points have to be sited extremely carefully and only coordinated with reductions in numbers of livestock.

F2.3 Subject all proposals for intensification of livestock production to stringent environmental assessment and coordinate with reductions in numbers of livestock.

3. Actions to stop loss of forest (Objective 3)

F3.1 Provide expert guidance on forest management plans

F3.2 Do not support afforestation – planting in new areas. Look carefully at survival rates for tree planting

4. Actions to restore riparian forest (Objective 4)

F4.1 Carry out assessment of adverse impacts on biodiversity, in particular the impacts of fencing on movements of wild species

5. Actions to maintain water quality and quantity (Objective 5)

Establish sound cultivation practices

F5.1 Evaluate all cultivation projects and changes of crops for impacts on biodiversity

F5.2 Avoid cultivating land that is easily erodible.

F5.3 Plant native species shrubs hedges/lines of trees around cultivated plots

F5.4 Ensure sound rotation systems for vegetables and melons

F5.5 Introduce no-till cultivation for grains

F5.6 Introduce integrated pest management in preference to pesticides

F5.7 Use organic fertilizers (animal manure, compost) and minimize use of inorganic fertilizers

6. Actions to stop development causing damage to biodiversity (Objective 6)

F6.1 Follow up on all undertakings in the environmental assessments including restoration of gravel pits used for road construction

F6.2 Make sure that environmental assessments address not only immediate effects such as pollution, soil erosion and disturbance, but wider effects on the environment such as the impacts of increased ease of access to visitors to the Mongolian Altai from China and Russia and possible ribbon development (perhaps could encourage this as a way of spreading out grazing) along the highways.

F6.3 Review provisions in the environmental assessment of the Durgun dam and assess compliance.

F6.4 Subject all activities to environmental assessment
Environmental assessment should not be restricted to large infrastructure projects. Various attempts are being made, particularly under the aegis of donor projects and non-governmental organizations, to persuade herders to diversify the way they sell their produce or to take up alternative or additional livelihoods to boost incomes. Some of these initiatives pose clear threats to biodiversity. There should be environmental assessment of all development activities, including "alternative livelihood" projects with the stated aim of reducing impacts on biodiversity.

F6.5 Assess environmental assessments critically, requiring evidence and not just statements of the benefits, and monitor implementation and mitigation

F6.6 Monitor implementation and mitigation

8. Actions to establish evidence based biodiversity conservation (Objective 8)

F8.1 Use clear, evidence based approach to environmental assessment of all economic development, project activities, training courses, tourism operations etc

10. Actions to establish well regulated wildlife tourism (Objective 10)

F10.1 Carry out environmental assessment from all angles, of the measures introduced to regulate wildlife tourism.

G. FINANCIAL INCENTIVES

0. General actions (Objectives 1-12)

G0.1 Tax use of the images and names of Argali, Snow Leopard, Wolf (any colour, including Blue) and all other animals in all businesses in the Altai

G0.2 Promote production of locally made souvenirs and livestock products with publicity using the Altai Mountains "brand"

1. Actions to reduce hunting and plant collection (Objective 1)

G1.0 Pilot a sum-based scheme that distributes money for everyone in the *sum* if no animals are killed, the money to be distributed only when standard monitoring surveys show increase in frequency of sightings and signs of wildlife species and observations of plants *in situ*.

2. Actions to reduce grazing pressures (Objective 2)

Reduce numbers of livestock. Numbers are so high that it is essential to reduce livestock numbers immediately: a number of strategies should be used, including emphasis on quality rather than quantity in agricultural outputs – higher prices for higher quality produce from animals raised on higher quality range for example.

G2.1 A large livestock cull to be arranged before winter 2009 either by finding a buyer for the meat in China, Russia or Kazakhstan, with the government subsidizing the sale if necessary, or by the government buying the meat itself. Last winter the government subsidized the building up of goat numbers through a 5000 togrogs per head payment. Next winter the government should arrange incentives for people to sell their livestock. Even if it costs the government money now, it will be recouped in better range condition, improved water quality, reduced competition with wild species, and increased productivity of the remaining domestic herds. Make sure that goat hides and meat included in the purchase.

G2.2 Review livestock numbers following this voluntary reduction

G2.3 Winter 2010 take further measures, including regulations. tax incentives, contracts for supply of animals, to reduce herd sizes and set limits on species composition. Head taxes should be tiered beyond the current exemption for the first 20 sheep forage units. Goats should be taxed higher than other species to reflect higher damage on the rangeland. Herds larger than 250 should be taxed at punitive rates, and above 500 should be so high that no commercial profit possible. This should be done directly under *aimag* regulations and decrees.

G2.4 Act at *aimag* level to resist reduction or removal of head taxes for livestock, or establishing specific subsidies for goat husbandry. Where appropriate consider increasing taxes, particularly for large herds and not implementing (environmentally) perverse subsidies.

G2.5 Pursue commercial export contracts for meat and hides (including goats), negotiating on increased quality of meat that should be possible following reduction in herd size.

G2.6 Pursue government investment in a meat (including goats) processing plants,

G2.7 Take other market approaches to add value to livestock products including strengthening of veterinary service (Australian Government)

G2.8 If market approaches slow to develop, again use government funds to subsidize purchase of meat and hides

G2.9 Do not allow donor projects to supply funds in full for establishment of wells and other infrastructure: any financial support from donor projects should be minimal, to supplement majority funding from herder groups who will then be much more motivated to maintain the infrastructure.

3. Actions to stop loss of forest (Objective 3)

G3.1 Institute subsidies on renewable energy

G3.2 Taxes on firewood and shrubs

4. Actions to restore riparian forest (Objective 4)

Demonstration of restoration of willow, sea-buckthorn etc in riparian zones.

G4.1 Subsidize one or two demonstrations by supplying funds for a fence that is designed to let wildlife through or over but keep livestock out. Not always necessary to plant trees, if seedlings apparent. If planting necessary follow guidelines on local species. Watch the results of exclusion of grazing, tree cutting and shrub collection. Maintain fence carefully and ensure that people respect the boundaries.

G4.2 After the demonstration of increased growth of grass and regeneration of trees take the fence away after planning how to stop grazing by other means (a fence that is completely crossable by wildlife, or local people undertake to keep out livestock by herding). Regular visits to inspect, and enforce rules with fines or forfeit of livestock as penalties, or other group sanctions introduced within the local community. Grazing to be allowed under strict limitation and only after agreements all done and monitoring scheme in place. Use for firewood, fruit (Sea Buckthorn) collection, and campsites for tourists again with agreements .

5. Actions to maintain water quality and quantity (Objective 5)

G5.1 Work towards charging downstream water users for upstream communities' collaboration in maintaining water quality and quantity. The value of the mountains themselves as water gathering areas for the lower lakes should be incorporated into cross-*aimag* fiscal arrangements

G5.2 Through subsidies, taxes and other incentives, reduce wasteful use of land for cultivation

6. Actions to stop development causing damage to biodiversity (Objective 6)

G6.1 Seek cooperation from developers in conservation initiatives by providing financial incentives for good performance.

7. Actions to reduce off-road driving (Objective 7)

G7.1 Fines as above

G7.2 Rewards for *sums* and *aimag* blocks that show regeneration

9. Actions to introduce environmental accounting (Objective 9)

G9.1 Develop a system for upstream communities to charge ecosystem fees to downstream communities for ecological services such as protecting soil and water

10. Actions to establish well regulated wildlife tourism (Objective 10)

G10.1 Plan financial incentives for responsible wildlife tourism to replace sport hunting.

G10.2 A certification scheme for tour operators

G10.3 Small loans for clean, well-run tourist facilities in *aimag* centres and *sum* centres

G10.4 Design Altai tourism tax scheme for return of revenue direct to all residents.

G10.5 Facilitate links between local entrepreneurs and tourist clients

G10.6 Demonstrate how tourism can be a family business

11. Actions to improve protected area coverage & effectiveness (Objective 11)
G11.1 Increase fees and taxes from herders and others in limited use zones of protected areas.

H. PLANNING FOR BIODIVERSITY CONSERVATION

0. General actions (Objectives 1-12)

H0.1 Establish biodiversity conservation as an integral part of all local land use, pasture management and *aimag* and *sum* development plans

H0.2 Lobby central government for increased funding for enforcement

H0.3 Prepare and implement integrated species conservation plans for the Altai – begin with Snow Leopard, Beaver, Musk Deer building on work already done.

1. Actions to reduce hunting and plant collection (Objective 1)

H1.1 Build up alternative (to sport hunting) non-consumptive income from wildlife by proper planning and by providing incentives for responsible wildlife tourism. Persuade at least some of the public to refrain from hunting wildlife, so that natural ecological processes will be restored and tourists will see the full diversity of animals in the Altai, including foxes, martens, marmots etc and not focus solely on argali and ibex.

H1.2 Seek donor(s) for additional anti-poaching forces

2. Actions to reduce grazing pressures (Objective 2)

H2.1 Government provide full support for current project work with pasture user groups and herder groupsIndependently monitor all donor projects, request constant updates and reporting.

H2.2 Establish reduction in livestock numbers and keeping suitable species composition as one of the essential steps in achieving sustainable grazing schemes. Exclusion of grazers from other *sums*, rotational grazing, additional value for livestock products will all help, but without control of livestock numbers they will be insufficient.

3. Actions to stop loss of forest (Objective 3)

H3.1 Follow ecologically based forest management approach of the proposed MNET/World Bank Forest Landscapes Development and Conservation Project

That project will demonstrate approaches to natural forest and protected area management that enhance economic, social and environmental values. The Altai is not included in the project but the principles can be followed, and the Altai *aimags* should involve themselves via the MNET in learning about the approaches. The Altai have relatively little forest, but the management approaches can still be applied. "The objective of ecologically based forest management is to mimic through management practice the natural disturbance regime to recreate the historical ecological stand structure for each forest type. Management practices would include rehabilitation of depleted forests, thinning of overstocked forests and may involve the management of fire (wild and prescribed) to achieve the desired stand structure." If the project is not implemented the approaches should be implemented independently through other means, if necessary engaging advisers. In particular there will be a changed approach to fire management to avoid catastrophic burns, and emphasis will be on maintaining the natural regeneration process of natural stands, and not on plantations. Selective cutting in balance with growth so that timber and fuelwood can be supplied, but in much lower quantities than have been taken in the recent past. Careful planning of logging areas to avoid fragmentation of stands and to mimic natural processes. Avoid cutting certain types of trees, such as bottle shaped larch: they are not worth cutting because they are rotten inside, yet they can still contribute to soil conservation and the seed bank if left in place. Avoid taking trees always from the edge, just because it is easier: this practice ends up grinding away at the forest border and shrinking the size of forest patches.

Take scientific approach to tree planting activities: do not plant trees unless sure of high survival rate. It is a waste of resources to plant trees on dry steppe and see them die. Enrichment planting among natural stands is sometimes feasible. Fires occur naturally about every 10 years so there is a high probability of losing trees planted out together. Try increasing fire resilience by prescribed, cooler burns. Larch saplings need light, so there must either be fire or grazing to get rid of the grass.

H3.2 Pilot schemes to test solutions indicated under E3.3
Mainly renewable energy use probably. Possible demonstration of biofuels boilers depending on results of feasibility and environmental assessment

4. Actions to restore riparian forest (Objective 4)

H4.1 Plan how to maintain restored riparian forest in long term

5. Actions to maintain water quality and quantity (Objective 5)

H5.1 Incorporate biodiversity considerations into river basin management plans and water user group plans

6. Actions to stop development causing damage to biodiversity (Objective 6)

H6.1 Insist on strategic environmental assessments in preference to project by project, so that development is subject to regional controls that take into account other development .

8. Actions to establish evidence based biodiversity conservation (Objective 8)

H8.1 Prepare periodic revisions to this Strategy using the evidence of information gathered during monitoring and specific research (see E8.3)

9. Actions to introduce environmental accounting (Objective 9)

H9.1 Long term planning to demonstrate how environmental accounting can influence biodiversity conservation and economic development

10. Actions to establish well regulated wildlife tourism (Objective 10)

H10.1 A professionally prepared tourism plan. The plan will first evaluate current tourism and its impacts, set out an action programme, and then follow up immediately. Ideally a tourist company should be selected to do the whole thing, the review, the plan and the implementation. It should cover regional coordination, a set of possible circuits of tourist sites, transport routes, accommodation and food *en route*, no permanent structures for tourism in protected areas or important habitat for biodiversity

11. Actions to improve protected area coverage & effectiveness (Objective 11)

H11.1 Prepare management plans, including zonation plans for all protected areas. Core zones must be expanded to achieve adequate protection of ecosystems. Objectives should be clearly stated in the management plans and should include ecological functions and maintenance of ecological services as well as biodiversity protection functions.

H11.2 Change the category of some protected areas.

H11.3 Emphasize transboundary interactions and protected areas

H11.4 Select one or more protected areas for model management by an NGO willing to take over long term management completely

ACRONYMS

ADB	Asian Development Bank
ASP	Altai Sayan Biodiversity Project
CITES	Convention on Trade in Endangered Species (CITES).
DED	German Development Service
EBC	Evidence-Based Conservation
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GIS	Geographical Information Systems
IBA	Important Bird Area
IUCN	World Conservation Union
MAPU	Mobile Anti-Poaching Unit
MDG	Millennium Development Goal
MNE(T)	Ministry for Nature and the Environment and Tourism
NAMHEM	National Agency for Meteorology, Hydrology and Environmental Monitoring
NBAP	National Biodiversity Action Plan
NDVI	Normalized Difference Vegetation Index
NGO	Non Governmental Organization
NP	National Park
NR	Nature Reserve
PAA	Protected Area Administration
SPA	Strictly Protected Area
TAF	The Asia Foundation
UNDP	United Nations Development Programme
VR	Volunteer Ranger
WWF	World Wide Fund for Nature