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FILLING THE GAPS

to Protect the Biodiversity of Mongolia

Filling the Gaps to Protect the Biodiversity of Mongolia

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Authors	Chimed-Ochir B., Hertzman T., Batsaikhan N., Batbold D., Sanjmyatav D., Onon Yo. and Munkhchuluun B.
Language editing	Browne E.
Maps, tables and diagrams	Sanjmyatav D. and Chimeddorj B.
Report design and layout	WebGuru
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Front and back cover illustration	WWF Mongolia Programme Office
Copies available from	WWF Mongolia Programme Office
Contact information	Chimed- Ochir B., chimed@wwf.mn, Onon Yo., onon@wwf.mn, info@wwf.mn

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Throughout the entire process of Gap analysis, the team members were able to learn from each other in terms of new technical skills, which made the team cooperative and productive fueling with energy for accomplishment of the task with greater outcomes. Without the cooperation, dedication and energy of the team members and other stakeholders, obviously the Gap analysis would not have succeeded. We would like to wish all the best and the prosperity in our future cooperation.

The core value of biodiversity is the “provision of irreplaceable ecological service” for the mankind. As the ecology provides its service to the humanity throughout their lifetime as the eternal need, the initiatives and efforts towards conservation of nature and sustainable use of natural resources need to be reflected in the regulations as well as short and long terms planning in environment management.

For the last 50 years, the plummeting loss of natural resources and biological diversity are seen as the commencement of earth’s end by the scientists, consecutively world nations started taking consolidated measures in an attempt to seek the gateway and directions. Examples of this include UN Conference on Environment and Development, held in Rio-de-Janeiro in 1992, from where the world community recognized the rapidly decreasing biodiversity by ratifying the International Convention on Biological Diversity, to which Mongolia is a party to among other 190 countries. Mongolia made its proposal on the global summit to make the country with special status of biosphere. In order to link the statements in the convention with its national development policy, Government of Mongolia developed the National Program on Biodiversity in 1996 and National Program on Protected Areas in 1998 with approval of the State Great Khural (Parliament of Mongolia).

The optimal way of protecting the biodiversity, the special protected areas, were expanded from time to time currently reaching 14% of the entire territory of Mongolia. In case that the locally protected areas are added onto this figure, the overall size of protected area would obviously increase. Conversely, the existing network of PA cannot serve with its maximum use for protect the biodiversity as shown in the numerous surveys on amount and habitat of endangered, rare and common species.

Not only in Mongolia, but also entire world has continuously raised the amount of funding spent for protected areas and their management, yet the biodiversity loss has not been decreased considerably. What are the problems? Have we covered all necessary things in the protected area network? Have we done the management of protected areas efficiently and effectively? In order to tackle with these issues and reduce the biodiversity loss to greater extent, Article 7 of CBD approved the Programme of Work on Protected Areas. Member states, in compliance with the programme, are undertaking the actions to get the special areas into the protected area network, which is the optimal method of conserving the biodiversity in its natural habitat.

Mongolia has concluded the analysis on its scope of PA coverage (identifying to cover the representation of biodiversity) and the management of PA (covering financial, human resource and legal environments) through a complete Gap analysis.

The key value of this Gap analysis was on raising the important issues in the biodiversity conservation and making recommendations for further actions. In addition to this, Mongolian scientists were able to learn the internationally accepted methodology from their counterparts further enabling the domestic experts to conduct the similar analysis by mobilizing their own resources.

Findings and recommendations in this Gap analysis would serve as a vital guidance for reducing threats resulting in biodiversity loss and reflection on these findings in the short and long term plans would facilitate the improvement of PA management systems by creating the network covering the representative ecosystems, diversity of species, their movement and the enabling living environment.

Luimed Gansukh
Member of Parliament of Mongolia
Minister for Nature, Environment and Tourism

Key Conclusions and the Way Forward

The heritage of Mongolia is rich and contains a wide variety of cultural and biological heritage that create the country that we know today. The private sector, NGOs and individuals are contributing to development where economic growth and prosperity is combined with sustained preservation of the heritage. The unique birds and mammals, reptiles, insects and flowers all contribute to the beauty of Mongolia- making it a rich and varied country, appreciated far beyond its borders.
By ratifying the Convention on Biological Diversity (CBD), Mongolia has also taken on the responsibility of safeguarding its biological diversity and protecting the species that belong to and thrive in the Mongolian landscape. It is thereby not only the responsibility of Mongolia and its citizens to protect what is here. It is a global responsibility of the international community, of which Mongolia is part.

Biodiversity is at risk! Human and species have been living together for thousands of years, not always as good neighbors and many species have disappeared over time. However, the speed of disappearance is now higher than nature has ever experienced before and the risk of extinction of species and failure of ecosystems is paramount. It is the responsibility of all global citizens to protect the heritage, the species, the ecosystems and secure those ecological processes that continue to contribute to our common wellbeing. This is our heritage and this is our responsibility. This is also why the CBD was created and why Mongolia ratified the convention and why a Gap analysis has been conducted to assess the situation in Mongolia. This analysis aims to ascertain how well the current national system of Protected Areas (PAs) protects all the species included in Mongolian biodiversity. This analysis is done from an ecological and management perspective. The current report is the synthesis of a large number of reports by scientists and authorities, from dialogue and discussions in working groups and workshops contributing experience from many involved in or employed by the PA system.

The report is based on an analysis following international principles, designed within the CBD cooperation and international fora of scientists. All methods have been carefully adapted to the Mongolian context and performed by Mongolian experts. It is a Mongolian report.

Conclusions

There are positive signs, and there are negative and alarming ones. On the positive side, Mongolia has set aside large areas to be included in the PA network in an ambitious effort to protect biodiversity. The government and the authorities have established a legal and institutional framework and there are commitments from most relevant bodies to take positive action for preserving biodiversity and for the PA network. However, the situation requires urgent attention to prevent deterioration of what has been invested in the network and loss of the values the PA network was created to protect. The Gaps are numerous, sometimes deep and almost overwhelming. This report however shows the way forward and a structure to follow.
So what are the main Gaps? The current PA network and its management do not secure the protection of the biodiversity of Mongolia as:

• **Ecoregions** are not efficiently covered by current PAs

• **Ecosystems** are left with low protection, particularly in the more productive ecosystems

• **Species** are declining as ecological understanding does not guide their preservation

• The **management** of existing PAs is malfunctioning due to a lack of adequate financial and human resources

• PAs do not give sufficient protection as **protection levels** are too low and integrity is not respected

• The **staff of the PA system**, including MNET, do not have relevant professional training and lack incentives for improving performance

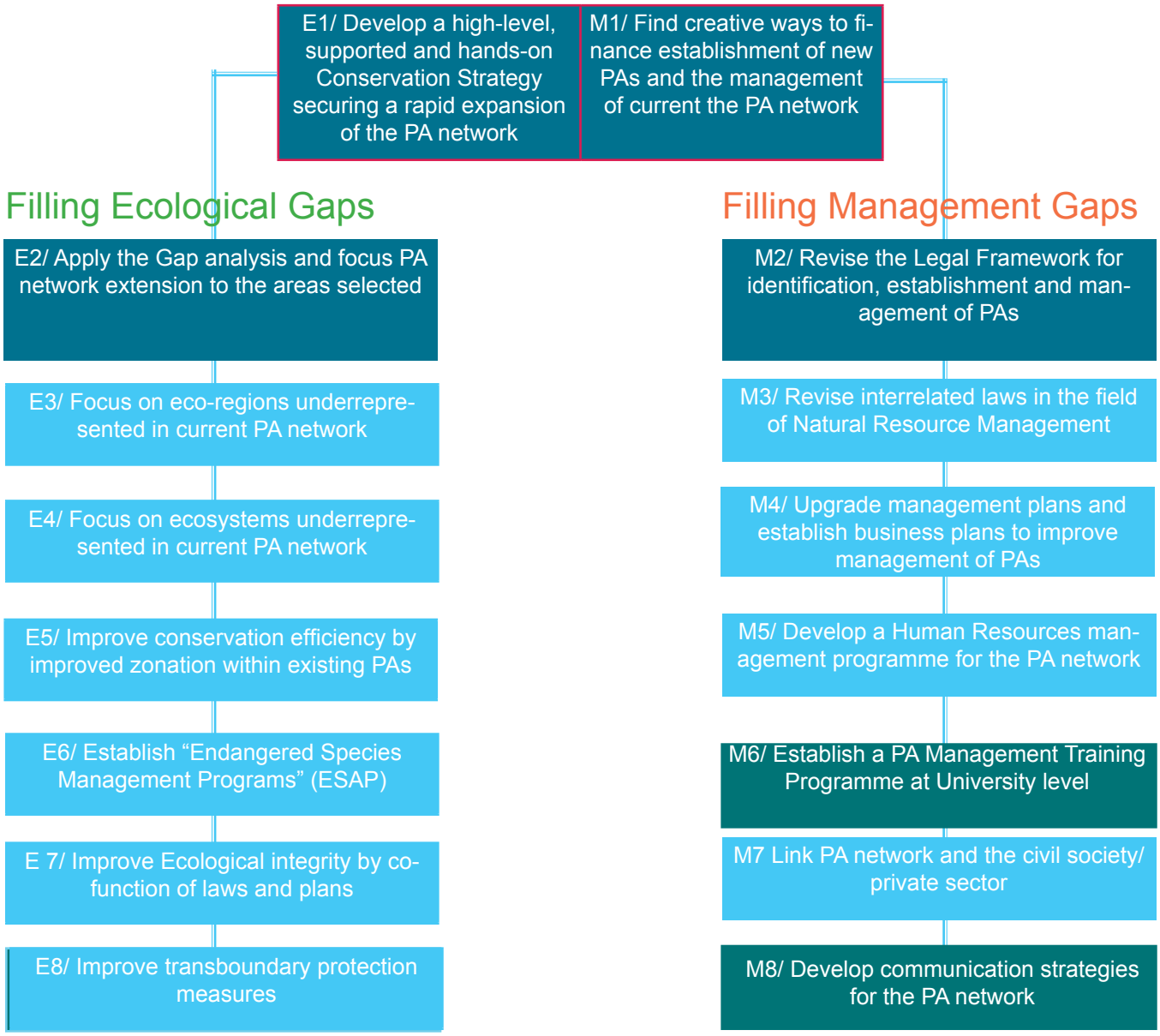
• Currently, **conservation efficiency is below acceptable** as modern management principles, including community cooperation, private sector involvement and conservation audits are not applied

To conclude, the situation is not only bad – it is deteriorating, thereby threatening key heritage values and the ecological identity of Mongolia.

The way forward

Below are the recommendations for action that summarize the outcomes of this Gap analysis. They are given three levels, all of which are urgent. The levels should be seen as more of a logical division than a division into higher or lower priority. They should be considered as constructive recommendations with which the current situation can be repaired and values recovered. Chapter 6 contains the justifications behind each recommendation and is founded on the findings described in Chapters 3 and 4 for the ecological analysis (E#) and Chapter 5 for the analysis related to management gaps (M#).

Roadmap for Biodiversity Conservation. The boxes framed in red should be seen as the most pertinent measures required to achieve national and international commitments for biological heritage and biodiversity conservation. Each measure is further described in Chapter 6.



The Gap analysis has shown that Mongolia has an extraordinary wealth of biodiversity and an outstanding heritage. However, the current situation of unclear political commitment, weak financial support and bad management threatens the biodiversity in a way that Mongolian commitment to international conventions as well as the unique biological heritage is seriously threatened. The recommendations above and in Chapter 6 outline a constructive way forward and provide Parliament, government and ministries the tools to act. They also give the donors, civil society and NGOs a map for necessary support.

CHAPTER 1 INTRODUCTION

Protected areas (PAs) have long been recognized as the key tool to combating biodiversity loss. Globally over 12 percent of terrestrial surface is currently assigned as PAs. Still we see an increasing loss of the world's biological heritage, the species. Clearly something is missing and many efforts have not yielded desired results. Biodiversity is suffering.

The most important value of biodiversity is to provide human beings with *ecological or ecosystem service*.

This service is based on the species present in and building the functions of the ecosystem. These functions can hardly be substituted by human interventions or other activities. Ecological services are perennial, they are timeless and certainly a necessity for the survival of mankind. The services are many and are for example linked to water management and supply, atmospheric pollution, purification and storage of carbon related to climate change and many others. The stability of the ecosystems is based on the diversity of species, thus declining diversity could lead to disfunction in services to the mankind.

Human health and biodiversity are linked and one key health issue associated with biodiversity is that of drug discovery and the availability of medicinal resources. This is not least pertinent in Eastern Asia where traditional medicine builds on the plant and animal species and their direct function for the human body.

Modern agriculture, livestock husbandry and traditional herding are dependent on biodiversity. Agriculture and livestock all derive from species found in the wild and genetic improvement in productivity and performance is still based on the presence of genetic diversity in the wild.

Business and industry are to a large extent based on ecosystems and biodiversity. A wide range of industrial materials such as building materials, fibres and oil are derived directly from biological resources.

Further research into utilizing materials from a wider variety of organisms is ongoing and will add functions and values to biodiversity. In addition and as a result of increasing understanding of human dependency on a healthy ecology, the loss of biodiversity is increasingly recognized as a significant risk factor in business development and thereby a threat to long term economic sustainability.

International background

It is estimated that the planet is losing species at a rate that is 100 or even 1000 times higher than the natural rate driven by evolution. This has caused increasing concern and it is now, beyond direct, local conservation activities, a global concern.

The UN conference on Environment and Development, the Earth Summit (1992), held in Rio de Janeiro, recognized loss of biodiversity as a global threat. The summit participants ratified the CBD, now signed by over 190 countries including Mongolia.

The CBD is perhaps the most obvious example of global engagement for biodiversity conservation and in 2004 established what is called the "Program of Work on Protected Areas". The program encourages member states to complete ecologically representative networks of PAs that will provide basic protection for all national biodiversity. To facilitate this, it is suggested that all governments conduct a Gap analysis. The purpose of this analysis is to identify where the current system falls short in protecting all species of the respective country. It is a comparison between the distribution of biodiversity and the status of protection/conservation within Mongolia.

The Gap analysis as defined by CBD, should answer questions related to two key areas:

The Ecology (Chapter 3)
Does the PA network contain the species and ecosystems represented in the area/country and does the network manage to sustain long-term survival of these species and the ecosystems they are dependent on?

The Management (Chapter 5)
Does the management of the existing PA network meet the needs to protect biodiversity in the long-term and in a cost effective way?

The Gap analysis should facilitate the development of an action plan on how to improve representativeness of species and ecosystems in the PA network and how to manage the areas to preserve the biodiversity sustainably.

Mongolia and its biodiversity

Mongolia was one of the early signatories to the CBD and developed ambitious targets for its implementation. One of the targets was the establishment of a PA network covering up to 30 percent of the country. Currently 14 percent is included in the national system of PAs. Another 10 percent is under local protection governance. Even so, the number of species in Mongolia is declining and it is generally accepted that the current PA network does not sufficiently protect the species included in the Mongolian heritage. Mongolia is rich in biodiversity and has many unique endemic species as part of the biological heritage. To date 143 species of mammals, 469 species of birds, 22 species of reptiles, 8 species of amphibians, 74 species of fishes and 3000 species of vascular plants have been identified in the country. The Mongolian Red List presenting the species that are under threat describes as many as 29 percent of mammal species as being threatened or endangered. The species are described further in Chapter 3.3

The species are dependent on and linked to specific ecological conditions. To analyse this situation in the current Gap study, four eco-regions (Chapter 3.1) and the nineteen ecosystems (Chapter 3.1, 3.2) have been studied. Mongolia carries a special responsibility for some of the species that are rarely found elsewhere in the world.

Finally, the situation for Mongolia's biodiversity is in many aspects alarming. At the same time, the entire cultural heritage has been highly linked to healthy ecosystems providing diversity of services to human cultures from the time of Hunnu's to current development of a market economy. The biodiversity of the deserts, the steppes and the forests was the basis for early Mongolian cultures. The biodiversity must therefore be seen as a biological and cultural heritage in need of preservation, but also the foundation for long-term economic and cultural development.

It is from this long-term perspective that the rationale of this Gap analysis must be viewed; as one means for more effective heritage preservation and sustained economic development. This Gap analysis provides a map for the road ahead. It shows how Mongolia can reach both the protection of its biological heritage and fulfil its international commitments.

Chapter 2 PROTECTED AREAS AND INTERNATIONAL COMMITMENTS

The dominating tool used to protect biodiversity is the establishment of PAs. Together, the ultimate solution is a network of PAs that covers all aspects of biodiversity from plants to birds and mammals. The networks shall be big enough to secure and sustain a diversity also within the species in order to conserve the species in a longer perspective.
Each country has its own system of protected areas with different names, protection levels and regulations. They are based on the different legal systems prevailing in respective country. Mongolia has a separate law for protected areas establishment and management and the first area protected is as old as from 1778 and is now covering around 14% of the country.
The international cooperation between countries has also led to a number of commitments from Mongolia. Ramsar Convention and UNESCO heritage are two examples. How well does Mongolia live up to those commitments?

2.1 Short History

Mongolia was probably one of the first countries in the world to realize the importance of conservation. In 1778, Mongolia created the Bogd Khan Mountain Reserve just outside Ulaanbaatar. The impact still remains and it is a valuable area in terms of biodiversity and recreation for the citizens of Ulaanbaatar.The values and the knowledge leading to the establishment of PAs have varied throughout the years with the ongoing development of scientific knowledge and increasing involvement of stakeholders. Since 1778 the PA system of Mongolia has developed into 61 protected areas (December 2009), covering 14 percent (21,9 million hectares) of the Mongolian territory (for a total list see Chapter 3.4). For the sake of clarity it should be noted that the most recent 4 PAs which were designated this January, 2010 covering a total area of about **650,360 ha**, were added to the network after this Gap analysis was conducted.

In the National Program on Protected Areas adopted by the Mongolian Parliament (1998), Mongolia set the goal of establishing a system of PAs that would cover 30 percent of the territory before 2015. The current Gap analysis report aims to contribute to this process, to build a foundation for the establishment of an effective PA system that preserves the nation's rich biological, ecological and cultural heritage.

in January 2010) that are legally protected under the Mongolian Law on Special Protected Areas (MLSPA). These are divided into four categories of protection. (See below). Strictly Protected Areas (SPA)represent the strongest level of protection, followed by National Parks (NP).

Nature Reserves are established for the purpose of ecological, biological, paleontological and geological conservation, and Natural Monuments are classified as natural and/or historical/cultural.

The Legal Framework of Mongolia has also designated rights and responsibilities to local authorities to establish and manage PAs at local level. Consequently, aimag and soum governments (the equivalent of county and municipality) have been given the authority to independently designate local PAs.

The total area of local PAs covers almost 10 percent of Mongolia (December 2009). Those local protected areas are NOT included in this analysis. The current information available about their status, biodiversity value and protection scheme is scattered and difficult to assess. The rationale for establishing some of the local PAs is rooted in the intention to stop exploitation of mineral resources rather than conserving biodiversity.

Network of Protected Areas (December 2009)

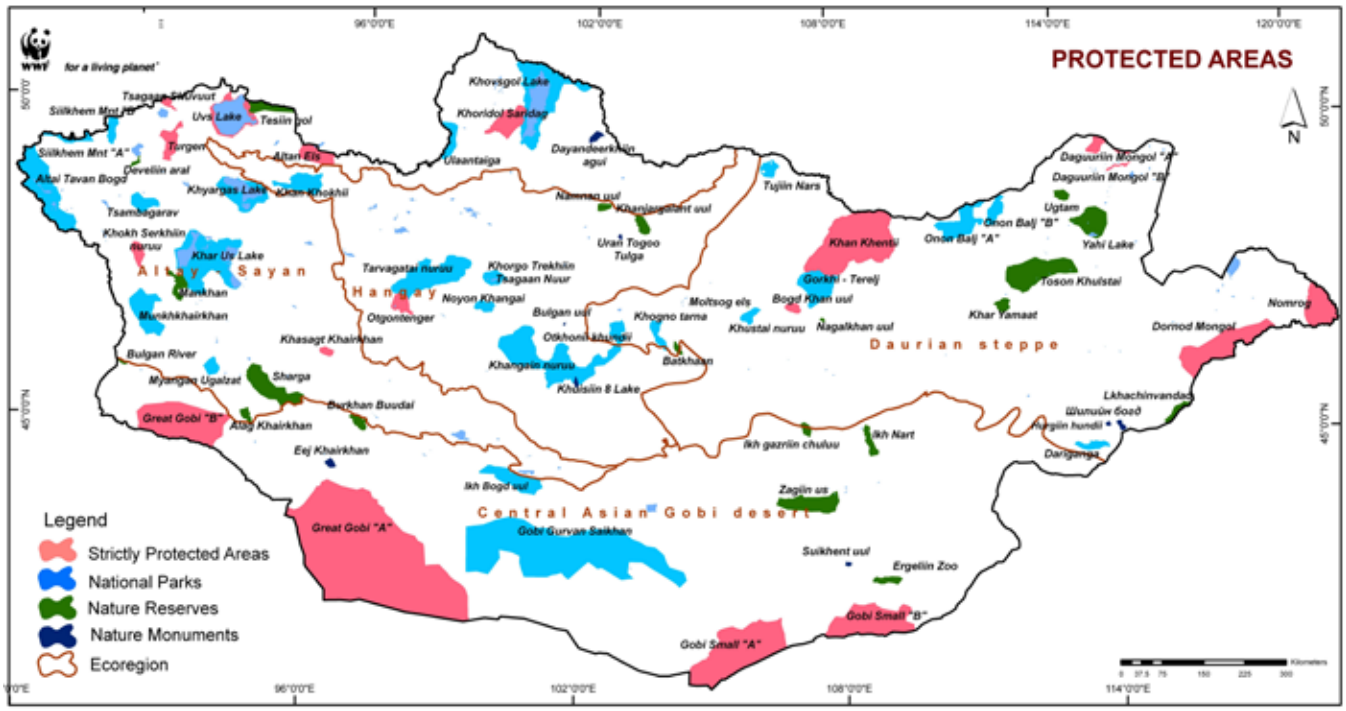
PA category	Deciding authority	Number of PAs	Area /ha/	Percent of Mongolia
Strictly Protected Area	Parliament	12	10,554,523	6.75
National Park	Parliament	22	9,229,905	5.9
Nature reserves	Parliament	19	2,006,270	1.28
Natural Monuments	Parliament	8	102,083	0.07
TOTAL		**67**	**21,892,781**	**14**

2.2 The Protected Area system

2.2.1 The Protected Area Network

Every country has its own legal framework for the selection and management of protected areas. The system of PAs in Mongolia contains 65 areas (plus the four PAs added

A deeper analysis on the value and function of the local PA network and how they contribute to biodiversity conservation is needed before making conclusions on their contribution to conservation. Based on such an analysis, an inclusion in the National PA network could well be a viable option for a rapid expansion of the PA network.



The local PAs could also play a substantial role as ecological corridors and buffer zones for and between established national PAs. It is worth noting that the figures on the numbers of PAs show a picture that is rather positive from an international perspective, large areas are under a protection scheme. However it is important to combine these figures with the information and conclusions in the chapter on Management (Chapter 5) for example, describing the efficacy of management and thereby actual fulfilment of conservation goals.

Pessimistic reports state that even if on paper 14.6 percent of Mongolia's total area falls under protection by law and the percentage of well functioning PAs in practice is as low as less than 2 percent.

2.2.2 Protection Levels

Mongolia has decided that each SPA or NP shall be allocated a differentiated protection level or "zoning" in accordance with modern conservation principles.

The effectiveness of conservation can therefore vary from one corner to the other of a specific protected area. In order to understand the protection efficiency of the current PA network, one needs to complement the map showing only the borders of SPAs with the map showing also the zoning into the 5 protection levels. The SPAs have the highest protection status in the Mongolian context. Within each SPA there are three designated regulation and management zones and are defined as:

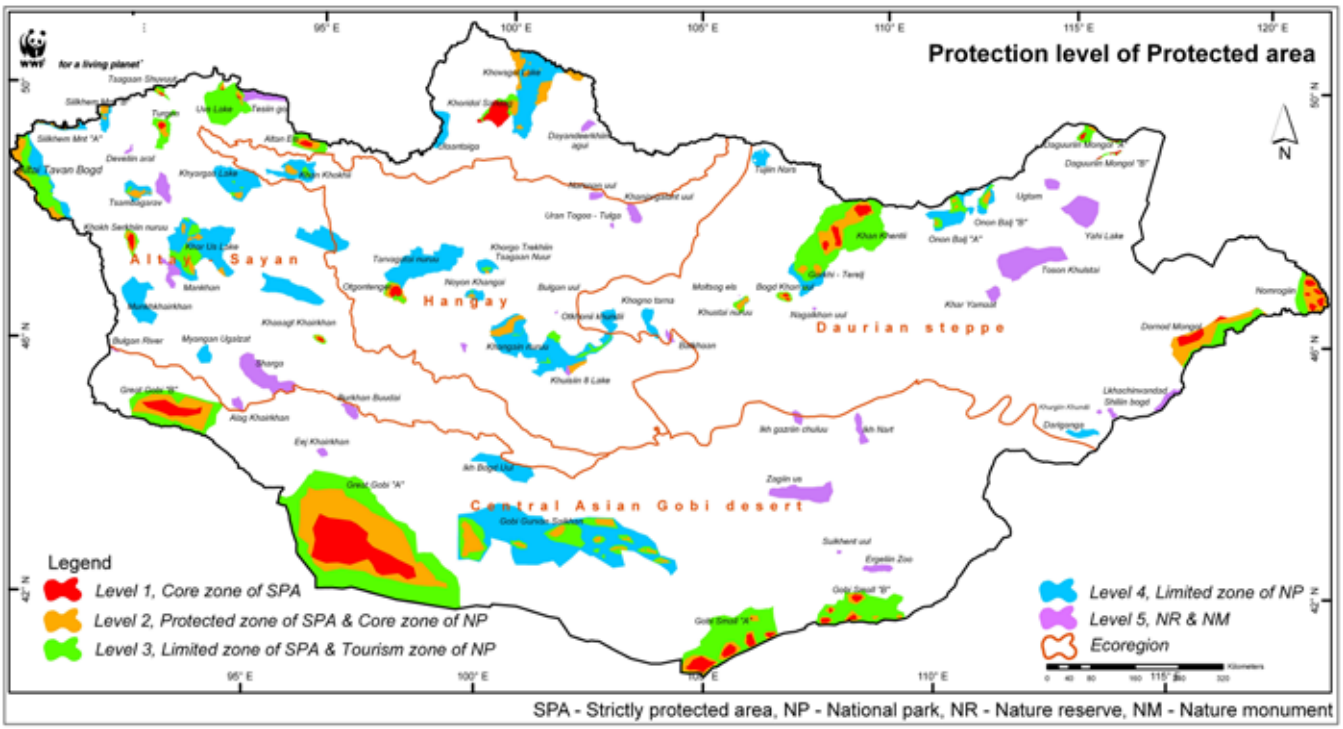
a)Pristine Zone,
b)Conservation Zone and
c)Limited Use Zone

The second level of protection is the NPs and within those the protection levels are named:

a) Special Zone,
b) Travel and Tourism Zone and
c) Limited Use Zone

In practice the regulations in the Special zone of the NPs is at the same level as in the Conservation zone of the SPA. The strength of the regulations is highest in pristine, special and conservation levels as is the enforcement in practice. The lower the level of protection, the less effective the conservation impact is.

Protection Levels in protected areas				
Protection Level	Category of protected area	Protection Zone	Area /ha/	Percent of Mongolian Territory
Level I	SPA	Pristine Zone	1,910725	1.2
Level II	SPA	Conservation Zone	3,140,599	2.0
	National Park	Special Zone	1,122,819	0.7
Level III	SPA	Limited Use Zone	5,827,444	3.7
	National Park	Travel and Tourism Zone	1,406,836	0.9
Level IV	National Park	Limited Use Zone	6,741,339	4.3
Level V	Nature Reserve	N/A	2,017,495	1.3
	National Monument	N/A	103,230	0.1



2.2.3 IUCN categories of protected areas

In every country protected areas are established and managed in accordance with the respective national legal framework. In response, the International Union for the Conservation of Nature (IUCN) has developed a typology that recognizes six different categories of management, with which the Mongolian PA system can be compared.

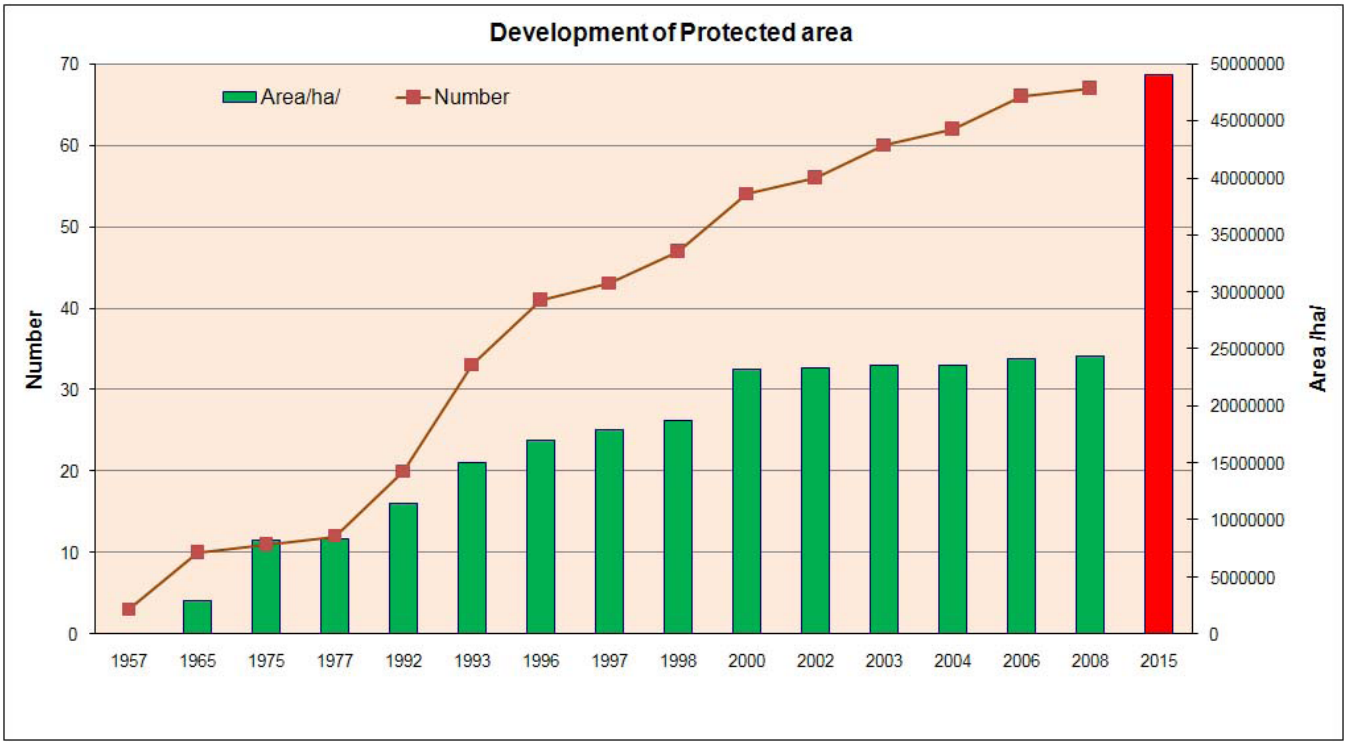
IUCN CATEGORY	PA CATEGORY AND PROTECTION LEVEL IN MONGOLIA
Ia: Strict nature reserve Strictly protected areas set aside to protect biodiversity and also geological/geomorphological features	Pristine zone of Strictly Protected Areas (SPA)
Ib: Wilderness area Large unmodified or slightly modified areas, retaining their natural character and influence	Conservation zone of SPA and Special zone of National Parks (NP)
II: National parks Large natural or semi-natural areas set aside to protect large-scale ecological processes … which also provide … spiritual, scientific, educational, recreational and visitor opportunities	Limited use zone of SPA and Tourism zone of NPs
III: Natural monument or feature Area set aside to protect a specific natural monument	Natural Monument (NM)
IV: Habitat/species management area Aims to protect particular species or habitats and management reflects this priority	Nature Reserve (NR)
V: Protected landscape/seascape Area, where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value.	Limited use zone of NP

2.3 National commitments

A number of reports and plans approved by the Mongolian Parliament or government have stated that the current PA network needs improvement in quantity (area, number) and in quality (management effectiveness). For example, both the Mongolian Millennium Development Goals (2000- 2015) and MDG-based Comprehensive National Development Strategy (2008) clearly state that the PA network needs to be expanded and that management of the existing PA network requires substantial upgrading. The documents vary in details on method and extent but in overall, there is a strong national commitment to increasing the number of protected areas substantially as well as to improving the management system so that conservation goals can be achieved.

2.3.1 National programme on PAs

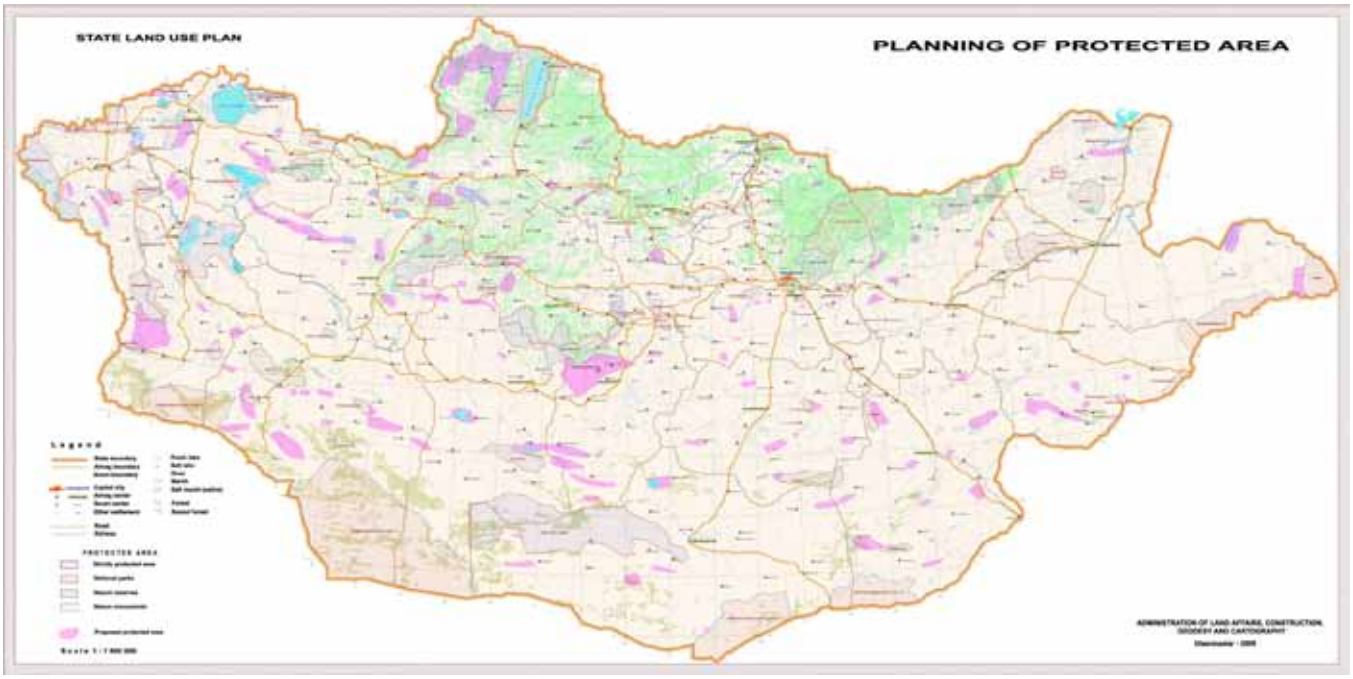
In 1998 the Parliament approved the National Programme on Protected Areas. The programme was developed in consultation between authorities and with support from key scientists and NGOs. The programme concluded that the target for the PA network was to increase the PA system to cover up to 30 percent of the national territory. The Programme also concluded that this should be fulfilled before 2030. As noted above, the PA system currently encompasses over 14 percent of the national territory. The total area of Local Protected Areas (LPA) covers around 10 percent of Mongolia, however, with a conservation value that is not specified and thereby not comparable on a national level.



2.3.2 National Master Plan for Land Use

The Master Plan for Land Use in Mongolia that had been approved by the government on December 24, 2003 provides the legal basis for the establishment of Protected Areas for the next 16-20 years.

The plan has marked 75 areas covering a total area of 24.5 million ha for inclusion in the PA network. If this plan is to be put into practice as planned, the total area of PAs in Mongolia will reach the 30 percent stated by the Parliament as a realistic goal by 2015.



2.4 International commitments

Biodiversity is a resource that is not restricted to administrative boundaries. Populations migrate or move across national borders either by land, as the Snow Leopard, or by air, as the White-naped Crane. An understanding of these migrations and the recognition of biological and genetic resources as common global goods has led to a number of international conventions. All of those conventions have been ratified by Mongolia, thereby supporting international cooperation and efforts but also leading to commitments from Mongolia as a nation.

2.4.1 Mongolia and CBD

In 1993 Mongolia joined the International Convention on Biological Diversity, the CBD. As a signatory of the convention, Mongolia is committed to generally conserving its biodiversity and in particular, establishing a system of PAs that includes representative examples of all biodiversity and ecosystems. In 1996, the government of Mongolia adopted the Mongolia Biodiversity Conservation Action Plan as a guide for authorities and stakeholders on how to fulfil CBD commitments.

The action plan recommended the designation of 85 sites as new PAs and to expand the boundaries of five already existing PAs. The action plan indicates an increase in PAs from 26 areas covering 8 percent of the country (in 1996) to a total of 117 sites covering approximately 18 percent of the country.

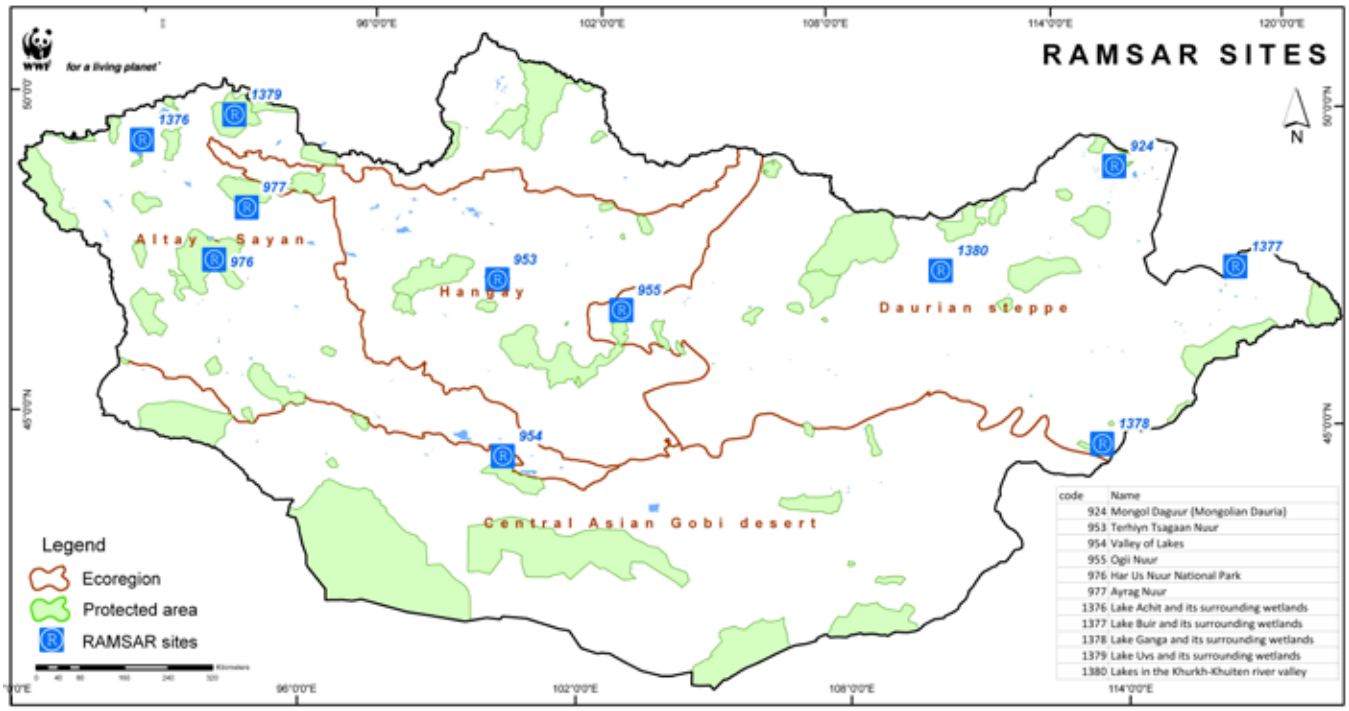
In 2007, a national workshop was organised jointly by MNET, WWF and GTZ which led to drafting of an Action Plan to implement the CBD PoWPA in Mongolia.

2.4.2 Mongolia and Ramsar Convention

In 1998 Mongolia signed the Convention of Wetlands of International Importance. To date, 11 areas (covering 1.395.963 hectares) have been designated as so called “Ramsar sites”. In order to fulfil its convention obligations, Mongolia must take active measures to protect those as PAs.

As a minimum, Mongolia has assured that the conservation values of these areas are not to be ‘under negative impact’ meaning that the values and functions should remain at least on the level as when signing Ramsar sites. According to recent studies, another 30 areas can be designated potential Ramsar sites as they fall in the category of ‘wetlands of international importance’. It is up to the government to report those areas to the Ramsar secretariat for inclusion in the convention.

The current situation in Mongolia is that ratification of an international convention automatically ensures the selected areas to be considered legally protected. There is therefore no need to take a separate decision on the establishment of NP or SPA. However, as described in Chapter 5 below, this is an administrative and legal shortcut that bypasses important processes such as the development of management plans and involvement/participation from local communities. It is questionable whether a Ramsar assignment is as respected and functional as the designation of an area as a SPA or a NP.

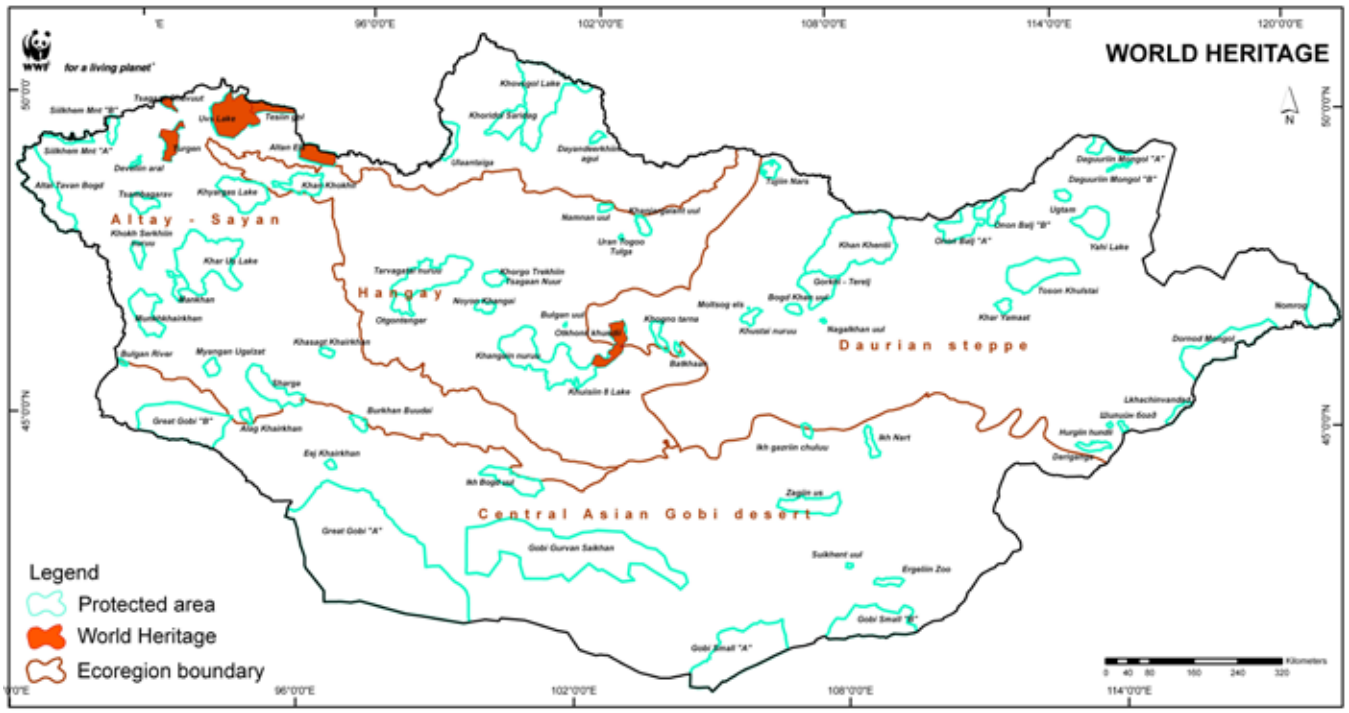


2.4.3 UNESCO Conventions

The United Nations (UN) organisation has established an international system for the selection and protection of areas with special value in regard to their natural and cultural importance.

There are two UNESCO-hosted international systems of globally recognised sites: the World Heritage and the Man and Biosphere Reserves, the latter often shortened to Biosphere Reserves. Mongolia has signed the World Heritage Convention and has thereby committed itself to legally protecting the sites designated by the government.

Since its commitment to the convention, the government of Mongolia has designated two areas as World Heritage Sites: the Uvs Lake has been selected for its natural heritage and the Orkhon Valley for its cultural heritage. Six areas (with a total of more than 6 mil-



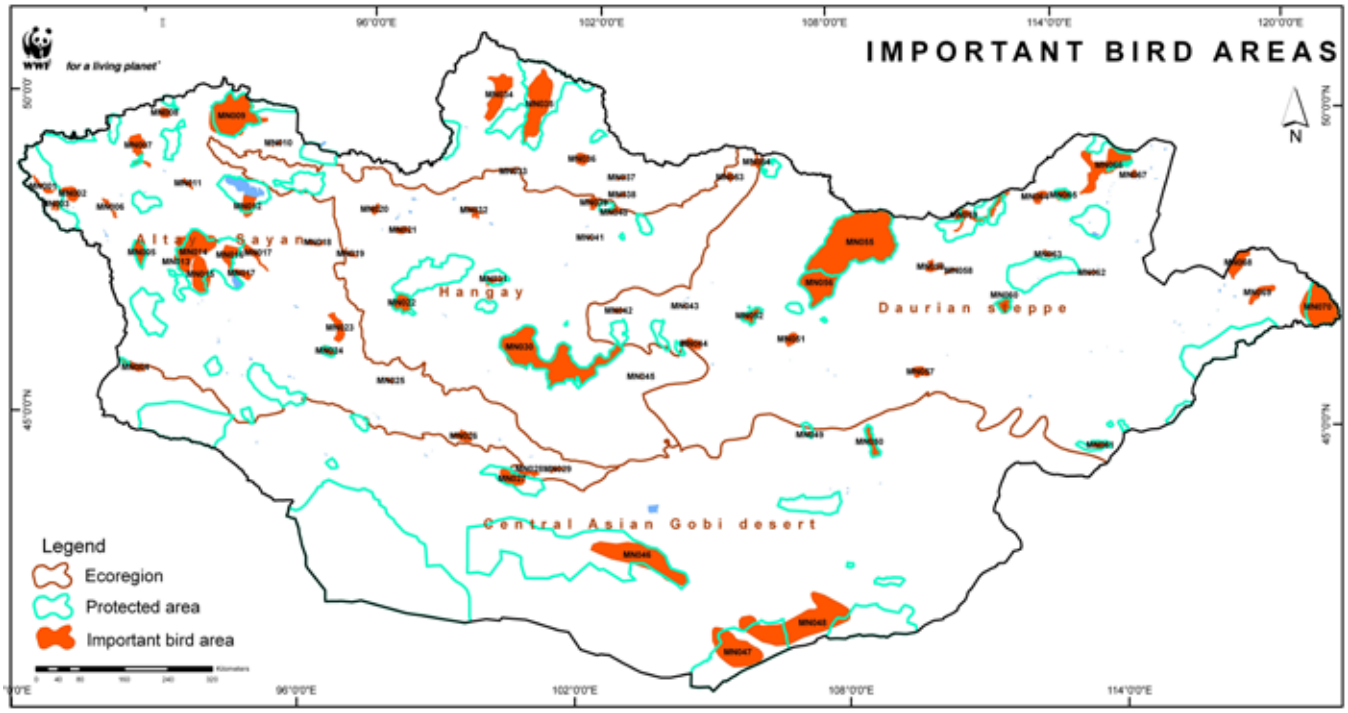
lion ha) have been declared Biosphere Reserves to date. The Great Gobi SPA was the first to be designated followed by the Bogd Khan Mountain SPA, Uvs Lake, Hustai Mountain, Dornod Mongol and Mongol Daguur.

Almost all of the World Heritage Sites and the Biosphere Reserves are part of the national PA network.

2.4.4 Important Bird Areas

The framework of Important Bird Areas (IBA) does not have the same recognition as the Ramsar sites that are supported by an international convention. IBA is however a globally developed system of assessing values related to birds, such as nesting sites, migration areas, presence of endemic species etc. Mongolia has contributed to the work of Birdlife International and has thereby supported the development of the criteria and the application of IBA in the Mongolian context.

The most recent study on IBAs (2009) identifies 70 areas in Mongolia as IBAs, which could thus qualify for inclusion in the national PA network. The defined area covers 8.358.313 ha (5 percent of Mongolia) of which 70 percent is already covered by PA regulation. There are however, 41 IBAs that currently lack any form of protection.



Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

	KEY FINDINGS	WAY FORWARD
Chapter 2-PA network	The national PA network of altogether 14 % does not meet the governmental goals of 30%. However, if the local PA network was included, almost 25 % of Mongolia would be under protection. A deeper analysis of the value and function of the local PA network and how they contribute to biodiversity conservation is required.	E1, E2 and M2
	The proportion of PAs under strict protection is low while large parts of PAs are still available for exploitation (grazing, tourist facilities) and causing increased pressure on core zones of PAs	E5, E7
	The possibility of establishing trans-boundary PAs has not been explored fully, bio-diversity respect no administrative borders, and this needs attention and action	E8
	International agreements, such as Ramsar and UNESCO World Heritage Sites, etc. need individual PA planning including management plans. In practice, the current system provides little or no protection	E1 and M2

The overall objective of the Convention on Biological Diversity (CBD) is to conserve the earth's species. Species however, are not spread evenly across the planet or even in Mongolia, but follow complex patterns of climate, soil, altitude and not least the inter-linkages with other species including of course, the mankind. In the past, it was believed that a legal document determining a species' protection status could help save an animal or a plant.

Now we understand that each species on earth is dependent on a diversity of conditions such as other species, vegetation patterns, population size and genetic diversity. Biodiversity conservation therefore has to work on a larger scale and endeavour to protect the systems in which the species are embedded.

This Gap analysis is divided into two main categories of analysis- one dealing with management effectiveness (Chapter 5) such as legal issues, integrity of PAs, human resources and the financial aspects of management. The other category of analysis is related to the ecological aspects. In this, we examine eco-regions, ecosystems and species, analyzing the effectiveness from an ecological representativeness point of view. In this chapter, we describe these analyses and the findings that emerged from that process. As a point of departure, this analysis begins with the fact that all regions and ecosystems need to be adequately covered if the biodiversity is to be sustained. Biodiversity concerns species and of course the ideal situation would have been a complete analysis on each species present in or visiting Mongolia during migration. However, this level of knowledge is simply not available, and therefore, it is assumed that the combination of analyses – being complementary- gives a sufficient picture of the current Gaps in the protection system.

3.1 Overview of Eco-regions and Ecosystems

3.1.1 The Eco-regions

An eco-region is defined as a "large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions". The boundaries of an eco-region are not fixed and clear, but rather encompass an area within which ecological and evolutionary processes interact in a similar pattern. This also means that specific species of plants or animals are likely to occur in the entire eco-region. Eco-regions can be rich in biodiversity –like coral reefs, while other regions host a much more limited number of species.

Eco-regions in Mongolia

Depending on which level of detail and which system of division, Mongolia can be divided into different numbers and patterns of eco-regions. Based on the international work presented above, one can conclude that there are 16 eco-regions existing within Mongolia. In 2002, WWF Mongolia conducted an assessment on the country's PA network and developed justifications for its necessary expansion. One of the achievements was that ecological and geographical regions were recognized as a basis for assessing the network of PAs. In this context it also became clear that some of the 16 eco-regions mentioned above can be amalgamated and reduced to 12 ecological and geographical regions.

The Global picture

Any division of nature into regions, systems, habitats or plant-association will inevitably lead to discussions and debate among scientists. Biology and conservation science is dynamically evolving and will continue doing so. However, at any given stage there is a need to make decisions based on best knowledge and practice available at a specific time. Recent research has concluded that the planet can be divided into 825 terrestrial , 426 freshwater and 229 coast and shelf marine eco-regions. To refine this system and make it more useful on a national and regional level, WWF has assessed these eco-regions and identified the Global 200. These represent the most biologically distinct terrestrial, freshwater, and marine eco-regions of the planet. This global assessment has been built in part through a series of assessments on regional level involving scientists and researchers with expertise in the local conditions and also analyzing the need for more urgent attention. Of those eco-regions, two are represented in Mongolia- the Altay-Sayan and the Daurian Steppe eco-regions (www.worldwildlife.org/ecoregions/).

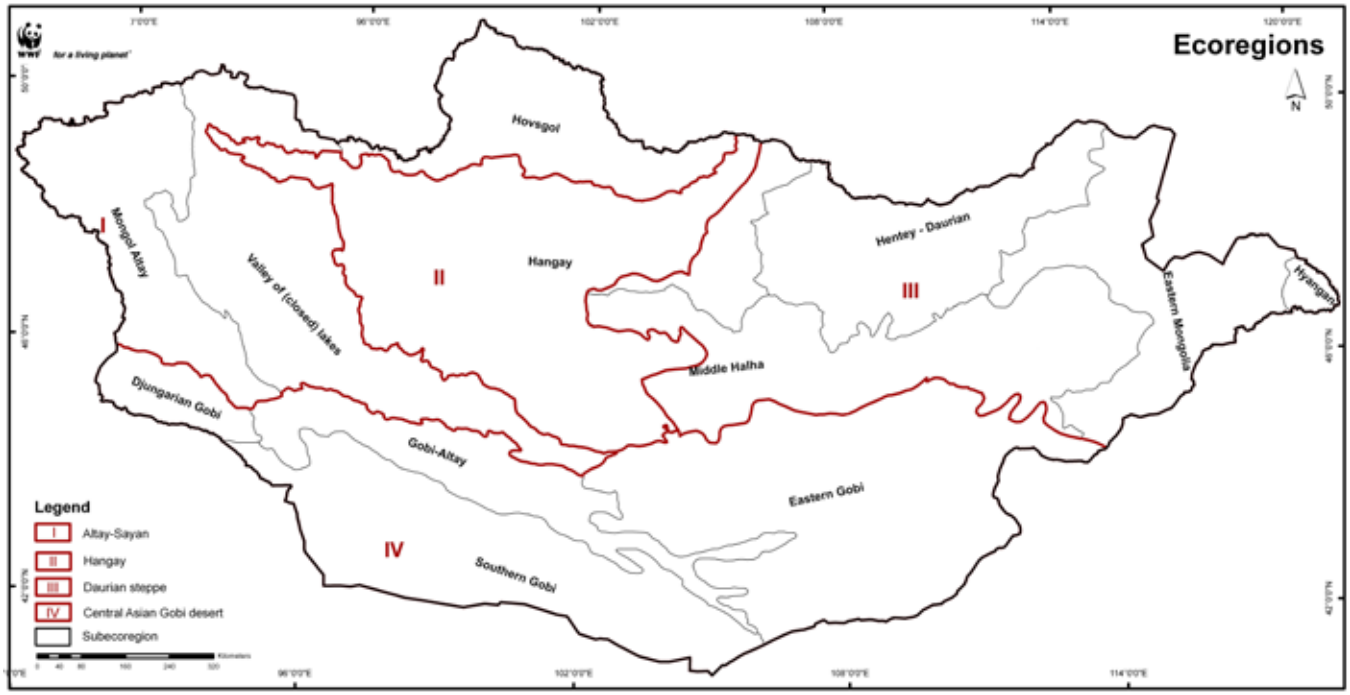
The boreal regions, deserts and high mountain areas are not as rich in diversity but often hold unique species and conditions, which occur nowhere else on earth, and therefore, risk being lost forever if they are not conserved.
By using analyses based on eco-regions we can increase the possibility that the full range of ecosystems and species is represented within national and regional conservation strategies. This, in turn, creates a foundation for more effective conservation efforts around the world, contributing to global biodiversity strategies and functioning biodiversity conservation in practice.

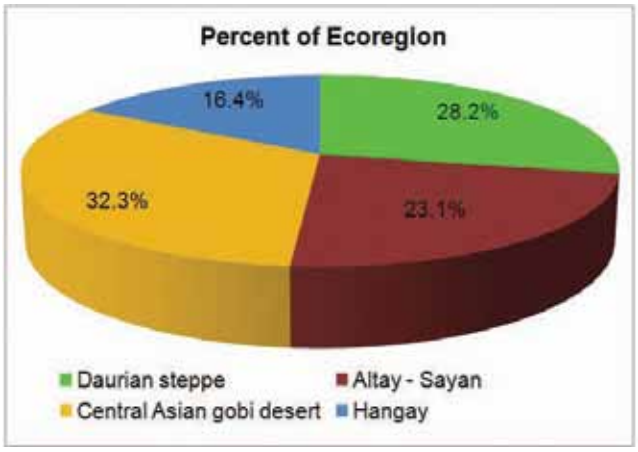
The experience of global conservation activities has revealed that breaking down nature into a very detailed system is not as effective when it comes to analysing and strategizing biodiversity conservation, as a broader system of systems or regions.

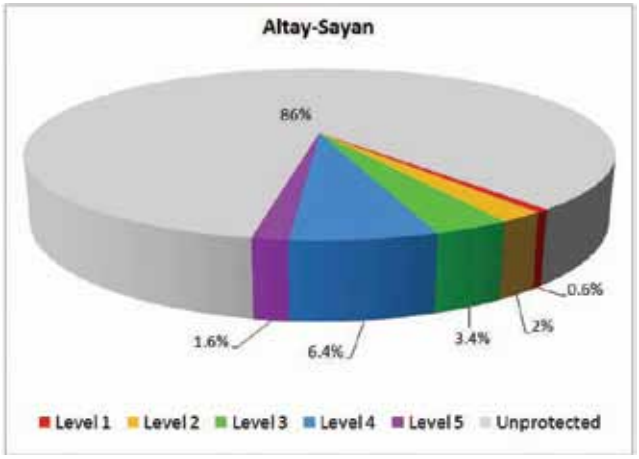
Therefore, for the purpose of this Gap analysis we have endeavoured to find, in close dialogue with Mongolian researchers and experts, an even broader system of ecologically recognisable eco-regions. This dialogue has concluded that Mongolia can be divided into 4 eco-regions for the purpose of this Gap analysis.

The different levels of regionalisation of the Mongolian landscape

Fine Grading		Medio Grading		Coarse Grading
WWF International system of eco-regions	Code (WWF)	Mongolian eco-regions, used for species habitat modelling (see Chapter on species below)	Nr. in map	The 4 eco-regions used in this report
Altay montane forest and forest steppe	PA0502	**Mongol Altay**	**1**	**Altay-Sayan**
Altay alpine meadow and tundra	PA1001			
Great Lakes Depression desert steppe	PA1316	**Valley of (closed) lakes** (Great Lakes Depression + Gobi lakes valley)	**5**	
Sayan intermontane steppe	PA0815	**Hovsgol**	**2**	
Sayan montane conifer forest	PA0519			
Sayan alpine meadow and tundra	PA1016			
Hangay Mountains coniferous forest	PA0512	**Hangay**	**3**	**Hangay**
Selenge-Orkhon forest steppe	PA0816			
Hangay Mountains alpine meadow	PA1007			
Trans-Baikal conifer forest	PA0609	**Hentiy-Daurian**	**4**	**Daurian Steppe**
Daurian forest steppe	PA0804			
Mongolian- Manchurian grassland	PA0813	**Eastern Mongolia**	**7**	
		Khyangan	**8**	
		Middle Khalkha	**6**	
Alashan Plateau semi-desert	PA1302	**Gobi-Altay** (part of PA1302 and part of PA1316)	9	**Central Asian Gobi Desert**
		Southern Gobi (part of PA1302)	11	
Eastern Gobi Desert steppe	PA1314	**Eastern Gobi** (most part of PA1314 and small part of PA1302)	12	
Gobi Lakes Valley desert steppe	PA1315	**Gobi Lakes** Valley and Great Lakes Depression amalgamated together in **Altay-Sayan above**	**5**	
Dzungarian Basin semi-desert	PA1317	**Dzungarian Gobi**	**10**	

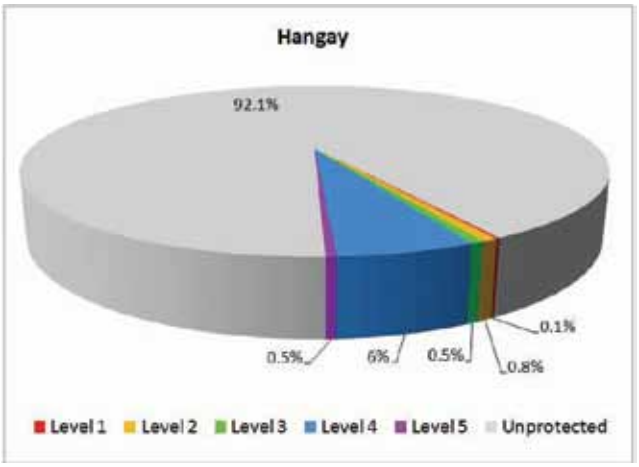


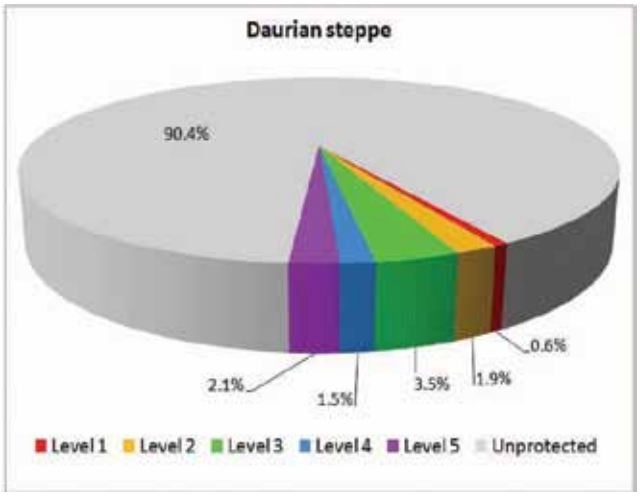


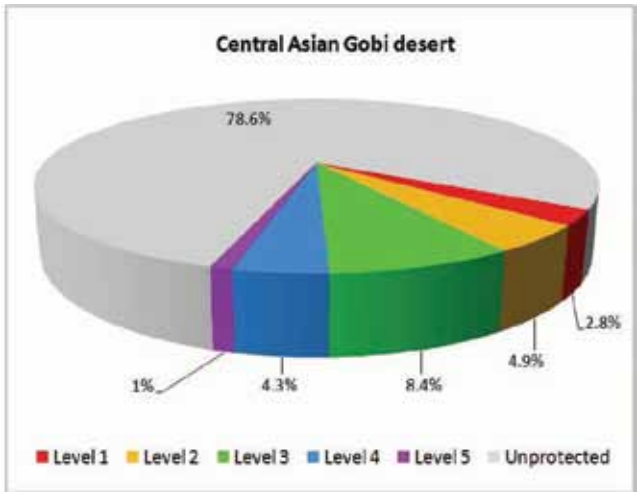


Current conservation status

The four eco-regions cover different portions of the Mongolian territory. Within the respective regions, the result of conservation work so far is quite varied, with two regions seriously lagging behind. The implication is of course that biodiversity typical for those two regions and dependent on the conservation in the respective region is not given enough attention. The Daurian Steppe and the Hangay eco-regions are allocated less than 10 percent territory under PA regulation. It should also be noted that the government's goal of including 30 percent of the territory under the PA network has not yet been achieved in any of the four regions, even if 20 percent of the Gobi Desert region is currently protected.







3.1.2 The Ecosystem

Ecosystems are often used to provide structure to the understanding of the varied ecological conditions prevailing in an area. Division of a project area, a landscape or a country can be done at different levels of detail from highly detailed, creating a diverse map, to the more simplified overview of the study area. For the sake of identifying the Gaps in the current PA system we have, after thorough discussions with key researchers and scientists, concluded to use a system of fifteen different, clearly recognizable matrix ecosystems and four patch ecosystems. The definition of these ecosystems has been guided by the distribution of vegetation communities and the biophysical conditions etc. One of the purposes of PAs is to guarantee the survival of the species- the biodiversity. The theory behind using ecosystems to analyze the Gaps is that with good coverage of a specific ecosystem within the PA system, the needs of the species and the biodiversity dependent on that ecosystem will also be included in the conservation process even if each of these many species are not analysed as such.

What does CBD say?

An ecosystem is a "dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit".

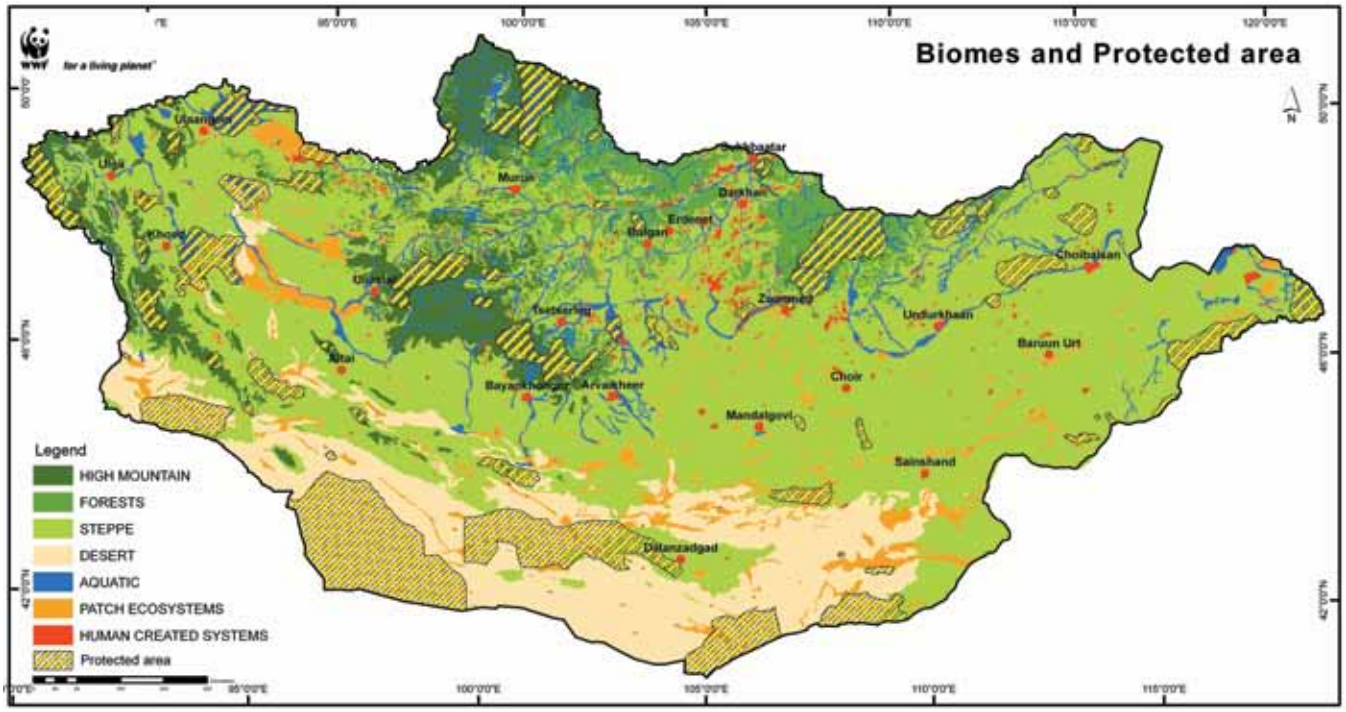
The selected ecosystems cover all altitudes from lowest points (Khukh Lake) to the highest mountain peak, the Tavanbogd Mountain in the Altay Mountains, as well as all levels of aridity from deserts in the Gobi to the great lakes such as Hovsgol Lake.

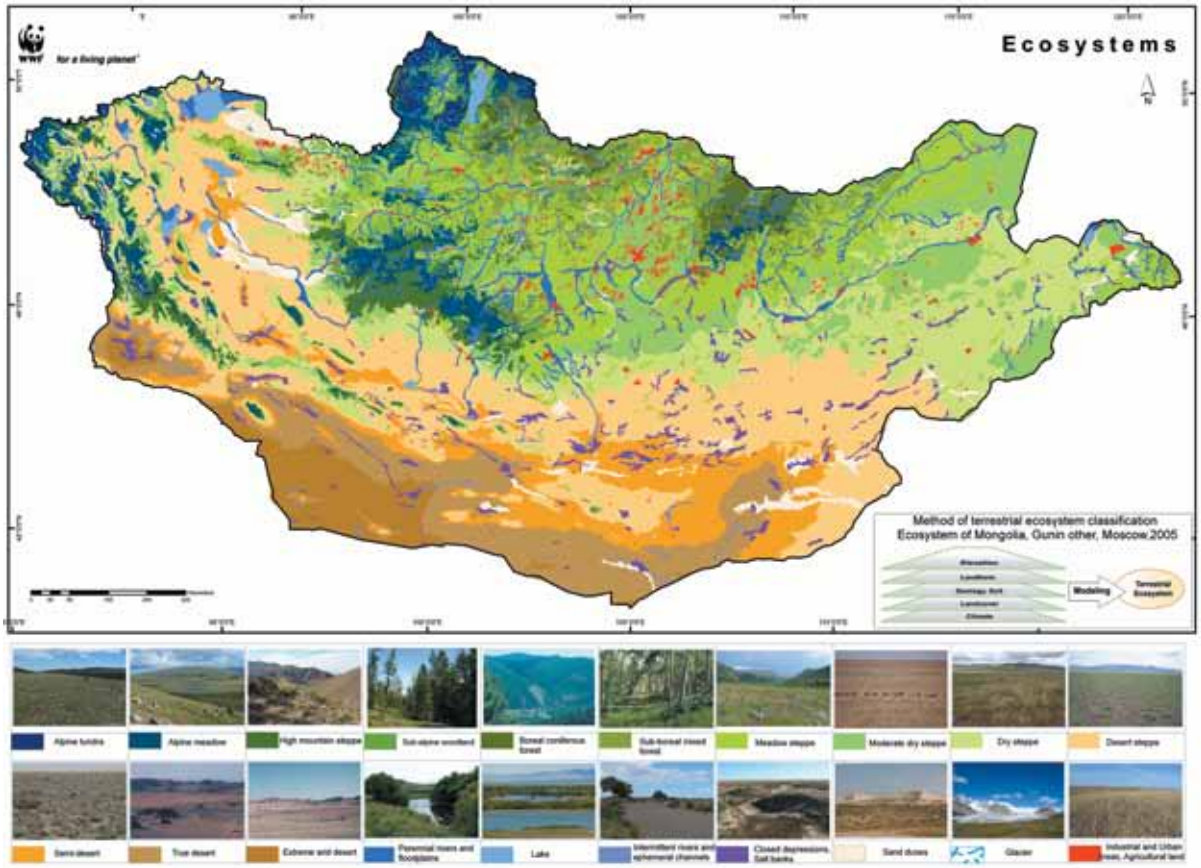
The system follows an internationally approved division and each ecosystem has a set of plant species contributing the foundation for the ecosystem. From a scientific point of view there might be alternative structures of ecosystems and each version has advantages and disadvantages and can be criticised or approved.

Matrix Ecosystems

As Mongolia is varied when it comes to physical factors like altitude, precipitation, soils and rocks, the map of ecosystems becomes a fascinating jigsaw puzzle. In accordance with the methodology, we have identified the ecosystems and their distribution in Mongolia by grouping the ecosystems from a map of 1:1.000.000 scale "Ecosystems of Mongolia" produced by P. D. Gunin and E.A. Vostokova in 1995. These ecosystems are called a Matrix Ecosystem as they cover relatively large areas and in a more coherent way than the patch ecosystem described below. These ecosystems create ecological landscapes. For the sake of a comprehensive overview, Mongolia and its matrix ecosystems have

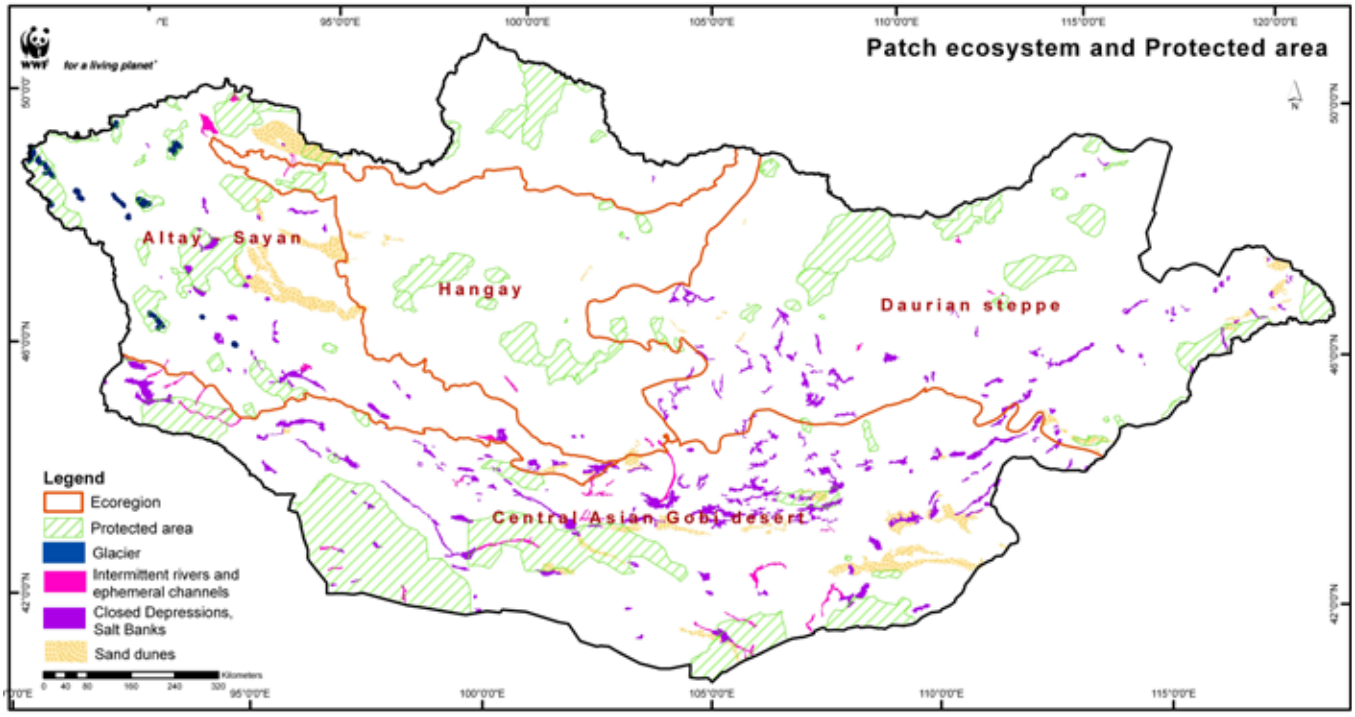
been divided into five biomes- the High Mountain, the Forests, the Steppe, the Desert and the Aquatic biomes. The various matrix ecosystems have an uneven distribution within the country and the areal extension of each ecosystem unit is of course different. The dominant ecosystems are the four different types of steppe ecosystems, each covering more than 10 percent and when combined, over half of the country.





Patch Ecosystems

Beyond the large-scale matrix ecosystems there is a group of ecosystems that occur in a more scattered pattern. These are called the Patch Ecosystem. The variety of the Mongolian landscape is often related to these patch ecosystems distributed in an irregular pattern across the country and especially in the southern part. These ecosystems are vital for biodiversity and we have decided to include them in this Gap analysis and analyse them separately. The four ecosystems might cover a relatively small portion of the landscape, but play a fundamental role in the ecology of the country.



Patch Ecosystem coverage and protection

Biomes	Ecosystem name	Area (ha)	Percent of Mongolia	Percent covered under PA network	Percent covered under highest level (Level 1, 2)
PATCH ECOSYSTEM	Intermittent rivers and ephemeral channels	586,282,7	0.37	26.67	11.73
	Closed Depressions, Salt Banks	3,463,984.5	2.20	9.03	1.38
	Sand dunes	3,314,182.3	2.10	13.08	3.33
	Glacier	94,907	0.06	79.39	33.24

© A.Atai Glacier in Altai Tavan Bogd

© N.Batsaikhan Dry River Bed in Eastern Gobi Desert

3.1.3 The Altay-Sayan Eco-region

Eco-region	Area in Mongolia Percentage of Mongolia	Percentage of eco-region under PA system
Altay-Sayan	364 307 km² 23.1 %	14 %

Location and General Description

The Altay-Sayan eco-region is the largest mountainous region in southern Siberia with snow caped high mountains, mountainous forest and forest steppes. At lower altitudes between the paramount mountains lie lakes, steppes and even drier desert steppes. The lakes are either saline, like Uvs Lake, or fresh water of which Har Us Lake is the best known. The location in the transition zone from Siberian boreal coniferous to Mongolian steppe makes this mountain complex and exceptionally rich in ecosystems and biodiversity.

The Altay-Sayan eco-region as a whole is vast and covers approximately 1 million km² shared between Russia (60%), Mongolia (30%) and China (5%). The Mongolian part of Altay-Sayan starts from the point at which Russia, China and Mongolia meet and runs along the Mongolian-Chinese border in a southeast-northwest direction and in an eastern direction along the Russian border until Hovsgol Lake and Lake Baikal. Although the Altay receives more precipitation in general than the other mountain ranges of Central Asia the Mongolian part of the Altay Mountains, lies in a rain shadow and is characterised by dry and open landscape often dominated by steppe ecosystems with only small patches of forest on the more moist northern slopes.

Compared to the Altay, the Eastern Sayan Mountains are more densely forested.

© N.Batsaikhan Har Us Lake at the Great Lakes Depression

Vegetation

The Altay Mountains are dominated by steppe ecosystems with patches of forested areas. Larch forests often mixed with cedar, grow in the upper watersheds of Khovd, Bulgan and Chigestei rivers. There are also areas covered by boreal coniferous forests while birch and poplar forests can be found in more humid areas.

Various types of forests are found in the Sayan part of the eco-region. Some are dominated by Larch *(Larix sibirica)* with some Pine *(Pinus silvestris)* and contain well-developed shrub and grass layers with *Betula nana* and *Rhododendron parviflorum*. Most of these forests are older than 150 years and are considered to be virgin forests. Other forested areas are dominated by *Abies sibirica* growing together with *Pinus sibirica* and *Picea obovata*, with *Sphagnum spp*. and lichens dominate the ground layer.
Numerous lakes in the Great Lakes Depression and the Gobi Valley Lakes such as Uvs Lake, Hyargas Lake, Har Us Lake, Sharga Lake characterize the lower altitudes. The combination of salt and freshwater lakes surrounded by wetland complexes and embedded in semi-desert and desert steppes and high mountains of the Hangay and Altay Mountain ranges form a highly unique and rich biodiversity.

The mountains in the west are characterized by alpine vegetation, subalpine shrubs giving way to meadows widely used for summer pastures. On higher levels the meadow veg-

etation gives way to mosses and bare rock and finally permanent snow and ice on the highest ridges.

Fauna

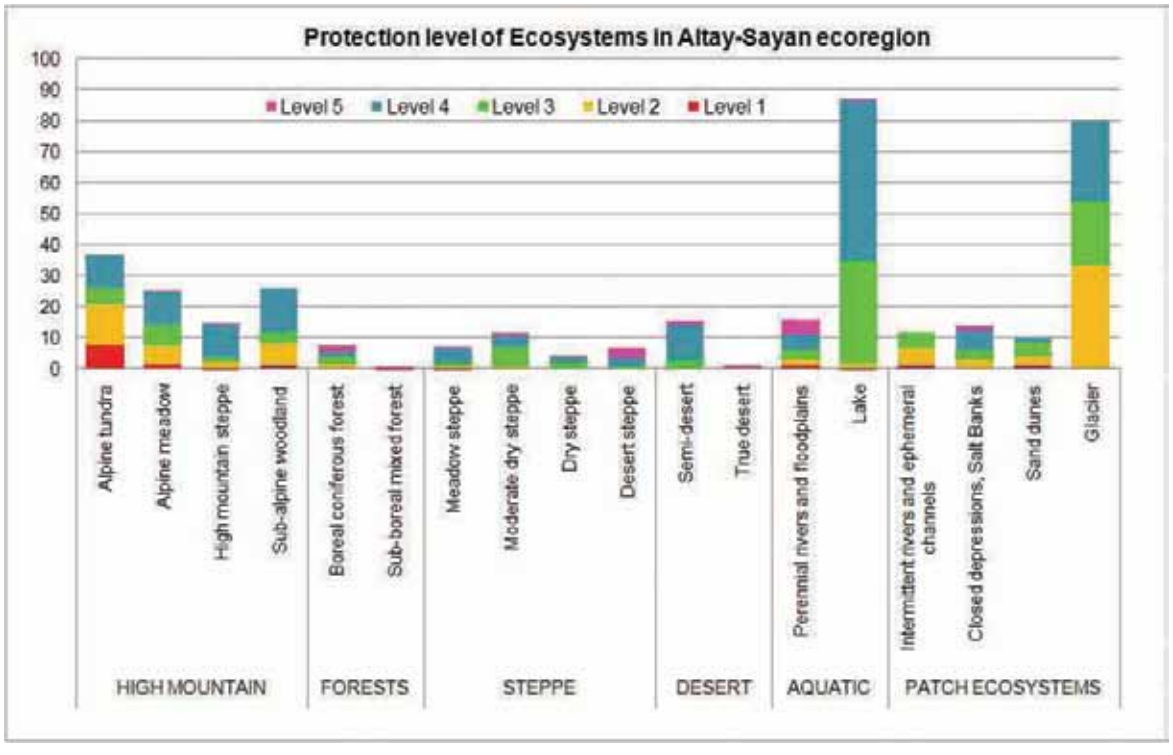
The Altay Argali, Snow Leopard, Siberian Ibex, and Altay Snowcock contribute to the uniqueness of the Mongolian Altay Mountains from both a national and international perspective. The more forested Sayan Mountains are characterised by species such as Reindeer, Eurasian Elk, Red Deer, and Musk Deer, while the desert steppe of the Great Lakes Depression is home to the Mongolian Saiga and Black-tailed or Goitered Gazelle. The lakes and marshes are key habitats for rich bird-fauna and are home to a number of endangered birds, including the Eurasian Spoonbill, Relict Gull and Dalmatian Pelican.

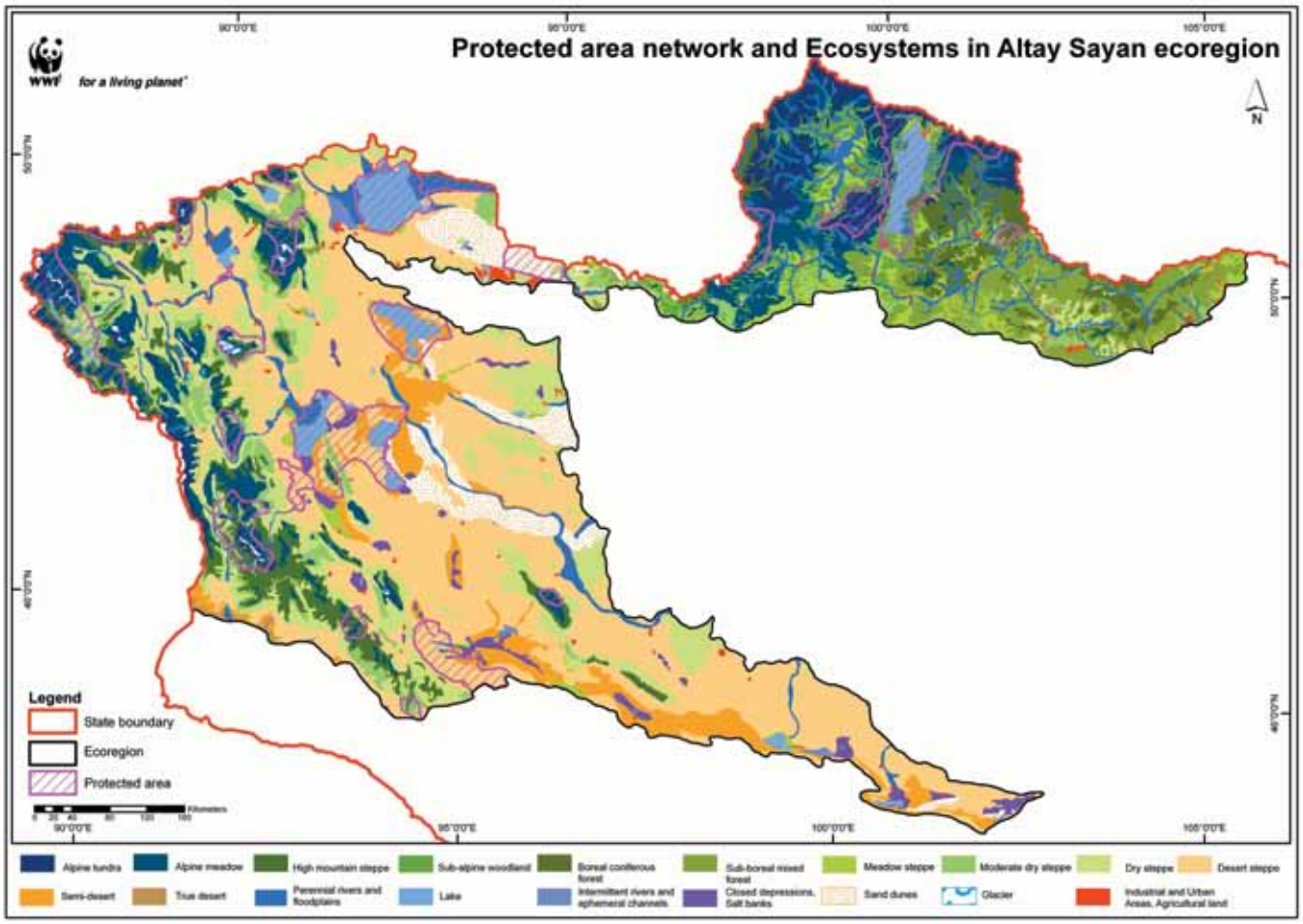
Ecosystems

This diverse and rich eco-region hosts a variety of ecosystems- there are 17 ecosystems identified in the region excluding only two of all the ecosystems found in Mongolia. Several of the endangered and key species in Mongolia such as Argali, Ibex and Snow Leopard are strongly linked to the High Mountain Steppe indicating the high conservation value of this ecosystem. Currently only 10 percent of the high Mountain Steppe is included in the PA network. This in combination with low protection levels leads to serious overgrazing and deteriorating habitats. Both the sub-boreal mixed forest and the desert steppe ecosystems represent high values from a biodiversity point of view. Less than 5 percent of these ecosystems are protected and the protection levels are generally set far too low to achieve reasonable conservation impact.

The region contains very important perennial rivers and floodplain ecosystems out of which only 10-15 percent are covered by the PA network. These ecosystems have been highly affected by human activity such as agricultural activities e.g. animal husbandry and farming but also hydropower development.

For the adequate conservation of the aquatic ecosystems and watersheds, combined efforts – both in increasing the PA network and more efficient land use planning and watershed management are required.





Types and Severity of Threats

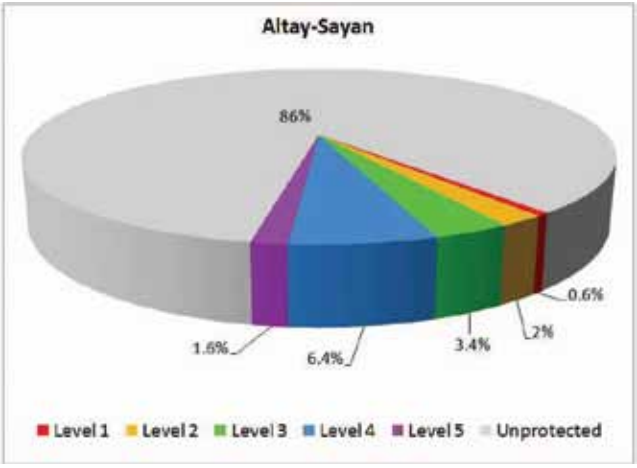
Overgrazing and overharvesting of biological resources (timber, wildlife) in Mongolian Altay and the Great Lakes Depression are strongly linked to poverty and limited livelihood options. Traditional herding practices have co-existed with rich biodiversity for thousands of years, while modern herding has lead to an increase of livestock and a concentration of settlements and water sources.

This in turn has caused overgrazing and complete degradation of grazing lands in some places. Further, the need for fuel wood has led to deforestation of floodplains and the scattered mountain forests. Recently established hydropower stations in the Chono kharaikh and Zavkhan Rivers have led to the destruction of natural flow regimes and even drying up of rivers and lakes that are included both in Ramsar sites and PA networks. This underlines the need for large scale watershed planning and implementation of sustainable water resource plans and practices.

© A.Delgermaa Taishir Hydro Power Plant

Conservation status

The Altay-Sayan eco-region is relatively well off when it comes to protection. As much as 14 percent is included in the PA network. However the weakness in the current setting is the relative number of restricted areas set aside with the highest protection level. This means that the effectiveness of the PA network is low.



Further, the map clearly shows that the limited areas with a high protection level are divided into small units, indicating fragmentation of habitats and weak integrity of the PA network.

Finally, the ecosystems protected in the Altay-Sayan are the ones representing low productivity ecosystems. Glaciers and Alpine tundra are well represented in the network while biodiversity linked to the grasslands and productive forests are less well off.

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

	KEY FINDINGS	WAY FORWARD
Chapter 3.1.3 Altay-Sayan Ecoregion	The Altay-Sayan eco-region is relatively well off, however allocation of PAs is still far from the government's goal of 30%.	E1, E2, E3
	Protection effectiveness is questionable as only a very small area is under protection level 1 and 2.	E5,
	More productive ecosystems are less represented in the current PA network than less productive ones requiring greater focus on the richer ecosystems.	E1, E 4,
	Conservation of biodiversity related to aquatic ecosystems requires effective watershed management as well as an extension of the PA network.	E1, E 7 M 3

3.1.4 The Hangay Eco-region

Eco-region	Area in Mongolia Percentage of Mongolia	Percentage of eco-region under PA system
Hangay	258 123 km² 16.4 %	7.9 %

© N.Batsaikhan Tarvagatai NP, Hangay Mountain Range

Location and General Description

The Hangay region consists of the Hangay mountain range and the Orkhon-Selenge forest steppe. The Hangay mountain range is located in the central part of Mongolia and stretches from northwest to southeast with an average altitude between 2500 – 3500 meters above sea level. The highest peak is Otgontenger reaching 4021 m above sea level. The mountain area is varied containing high mountain peaks, mountain meadows and boreal coniferious forests with larch or cedar. The forests in Hangay are generally sparse but play a key role in the watersheds supporting soil protection and water retention. The Orkhon-Selenge forest steppe lies in northern-central parts of Mongolia, between the steppe and the boreal coniferous forests and includes the Orkhon and Selenge river basins and surrounding forested mountains. The average altitude of the mountains is 1500-2000 m while the altitude in valleys is between 800-1200 m. The mountains in the Orkhon-Selenge river basins contain forest steppe and mountain dry steppe interspersed with forests. In the north-western parts of the region, where humidity/moisture is higher, the meadow steppe dominates while the drier southern and eastern parts are occupied by steppe vegetation.

Vegetation

Hangay forests are rich in species and over 1,200 plant species have been recorded in this region. Coniferous forests are found on the northern slopes of the region's mountains while the southern slopes are covered with steppe vegetation. Larch *(Larix sibirica)* is the dominant tree but in the open steppe, patches of forest with pine, particularly on sandy ground are found. In the Orkhon-Selenge area, the dry steppe vegetation covers about 88 percent of the total area and species such as *Stipa* and *Cleistogenes* grasses are present in large areas while herbs such as the *Cleistogenes gramineae* is found on higher altitudes. Another characteristic species of *Caragana* and *Stipa* genera distributed in small patches throughout the eco-region. A unique feature of this eco-region is small sandy areas with very distinct floral composition and trees such as *Ulmus pumila*, *Populus tremula* and *Padus asiatica*. In wetter areas, several willow species (*Salix pentandra, S. tenuifolia*) dominate the landscape.

Fauna

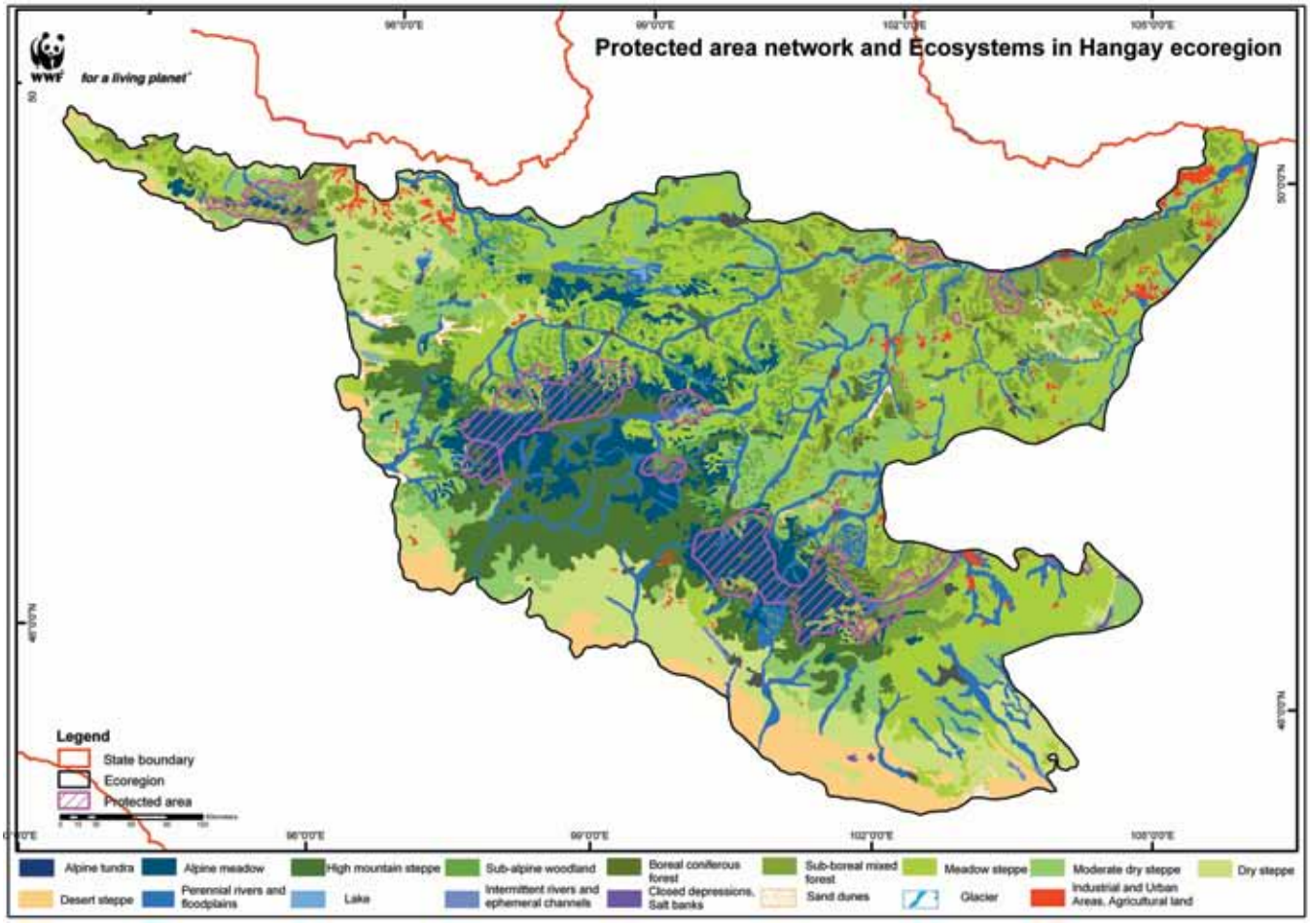
The steppe areas are rich in species diversity and are inhabited by numerous rodent species. The main representatives are Mountain Hare, Korean Field Mouse, Red Squirrel and Root Vole. Larch and cedar-larch forests types provide habitat for Red Deer, Siberian Roe Deer, Wild Boar, Siberian Chipmunk, Grey-sided Vole, Flying Squirrel and Wood Lemming and others. The steppe areas are inhabited by a number of rodent species such as Mongolian Marmot, Long-tailed Groundsquirrel and Brandt's Vole.

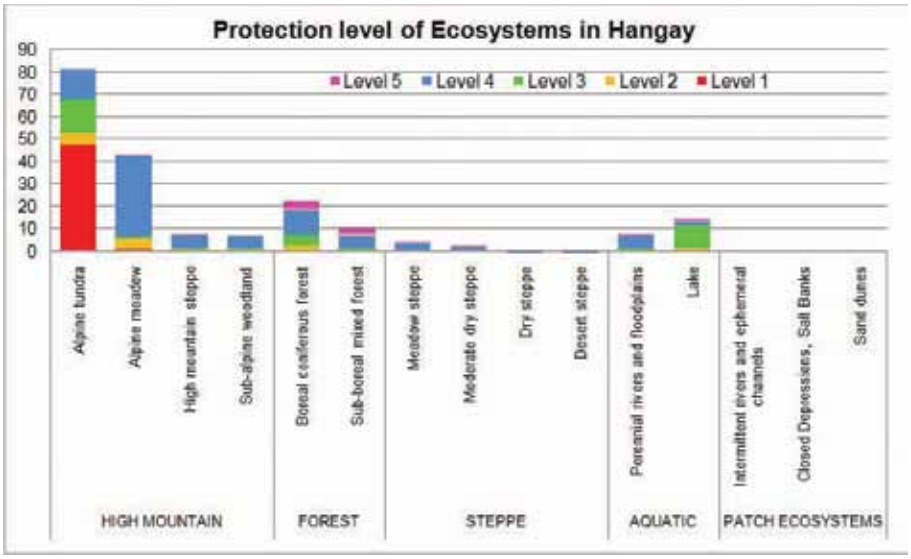
Ecosystems

This eco-region encompasses all 15 matrix ecosystems in Mongolia indicating a highly variable and diverse landscape types.
In this eco-region, over 80 percent of alpine

tundra is covered by the existing PA network and as much as 50 percent of these are protected within protection levels I and II. Also the boreal coniferous forest has a relatively high value of protection with 20 percent included in the existing PA network. However, as this ecosystem is regarded ecologically as the most important in the Hangay eco-region both the area and protection level will need upgrading.

Less than 7 percent of the sub-alpine woodland ecosystem is protected with level IV, which is inadequate for this ecosystem, unique to the central Hangay. The role of the forests in the context of water resource management should not be underestimated and the eco-region supports the most important fresh water resources in the country including the sources of Orkhon and Selenge





Rivers. An expansion of PAs, higher protection levels and integrated watershed management planning is required for effective conservation work. Currently, only about 8 percent of perennial rivers and floodplains are included in the existing PA network with generally low conservation categories. Increased dryness in recent years as a result of climate change further strengthens the argu-

ment for increased protection.
Currently, only 8 percent of the high mountain steppe ecosystem is included in the existing PA network. The ecosystem provides key grazing areas to rare and endangered species e.g. Argali Sheep, Mongolian Marmot, Altay Snowcock and Red Deer. Further, a number of rare and endangered species of plants and grasses are dependent on this ecosystem. Expansion of conserved areas and upgrading of current protection levels is required to fill the Gaps identified.
Another example of the imbalance between ecosystem distribution and protection coverage is the meadow steppe, which is the main productive ecosystem in the eco-region. Only 5 percent of it is included in the PA network.

Types and Severity of Threats

From ancient times, the Hangay mountain range and Orkhon-Selenge river basin have been used by nomads for traditional livestock grazing. Recent development has led to increased livestock populations and thereby serious overgrazing especially in densely populated areas.

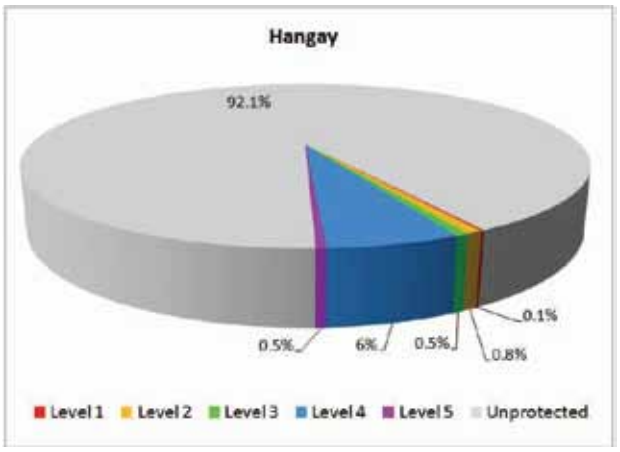
Being an important area for agriculture development, the Orkhon-Selenge basin have impacted on both land use and watershed management. The Hangay eco-region is densely populated compared to other areas of Mongolia.

Rural people have migrated here searching for better livelihoods linked to agriculture, urban development and good infrastructure. This migration has increased during the last two decades and has caused a number of threats to biodiversity, such as overgrazing, forest fires, illegal logging and mining.

Conservation aspects

The Eco-region is surprisingly underrepresented in the PA network with as low as 7.9 percent covered by any form of SPA protection. What makes the picture even worse is that the protection levels established are not on a high enough level to protect the conservation values of the limited PA network.

Only 0.1 percent of Hangay is under the highest protection level and requires urgent attention.



Finally, the ecosystems protected in the Hangay are the ones representing a low productivity while biodiversity linked to the more productive ecosystems is even less considered.

© L.Davaabayar Sub-alpine Woodland in Hovsgol region

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

	KEY FINDINGS	WAY FORWARD
Chapter 3.1.4 Hangay Eco-region	Hangay is seriously underrepresented in the PA network	E 1, E 2, E 3 and M 2
	Protection levels in the few PAs is not nearly strong enough to protect the biodiversity values	E 5, M 2
	Ecosystems with high productivity and human presence e.g. Orkhon-Selenge area as well as ecosystems like the mixed deciduous forest and the meadow steppe are also underrepresented	E 1, E 7
	Upper watersheds of rivers are well represented in the PA network but measures are required further downstream	E 1 M 3

3.1.5 The Daurian Steppe Eco-region

Eco-region	Area in Mongolia Percentage of Mongolia	Percentage of eco-region under PA system
Daurian steppe	444 548 km² 28.2 %	9.6 %

© N.Batsaikhan Mongol Daurian Steppe

Location and General Description

The Daurian steppe is one of the few remaining extensive grasslands where wildlife and domestic livestock co-occupy the landscape. Warm and productive during summer, cold and windblown during winter, this eco-region supports a diverse grassland community. The region consists of 3 different sub-regions: Trans-Baikal conifer forest, Daurian forest steppe and Mongol-Manchurian grassland.

The Trans-Baikal conifer forest covers an area which stretches from Baikal Lake in the west to the confluence of the Shilka and Argun rivers in Russia. Only a small part of this forested region is found in Mongolia in the Hentiy Mountains.

The higher altitudes contain tundra at the top of the mountains, larch-pine forests at a lower elevation and on the northern slopes. Permafrost prevails over wide areas.

The Daurian forest steppe covers marginal branches of the Hentiy Mountain Range. The average altitude reaches 1400-1800 m while the mean altitude of valleys is 1100-1200 m. Forest types found in the Daurian forest steppe include Siberian larch forest, mixed forests of birch-pine and birch-larch as well as birch and shrub forests.

The Mongol-Manchurian grassland (mainly in Mongolia and China) includes more than a million square kilometres of temperate grasslands on the inland side of Manchuria's coastal mountain ranges and river basins. To the west, the desert regions of southern Mongolia replace the steppe.

Much of the eco-region consists of nearly flat or rolling hills landscape. The average elevation throughout the eco-region is 1,000 to 1,300m above sea level. Lakes and wetlands occupy the lower lying areas giving the

landscape a high level of diversity, including habitats for a wide variety of migratory birds.
The climate of the region is temperate with mean temperatures in January below –20 degrees of Celcius despite comparatively low latitude. The annual precipitation is low, on average 150 to 200 mm, and concentrated to a weak summer monsoon.

Vegetation

The mountains in the north and northeast support dense forest cover with deciduous broadleaf forests dominated by Mongolian oak or a mixture of species that include poplar *(Populus davidiana, P. suaveolens),* birch and willow *(Salix rorida).*

Shrubs include members of the heath family *(Rhododendron macromulata, R. Dahurica, and Vaccinium vitis-idaea)* and wild rosemary *(Ledum palustre)*. Higher on the mountainside the forests are dominated by spruce *(Picea obovata, P. microsperma)*, Daurian Larch *(Larix dahurica),* and Siberian Pine *(Pinus sylvestris).*

The dominant grasses in the open steppe habitat include different grasses such as *Stipa baicalensis, S. capillata, S. grandis*, *Festuca ovina*, *Aneurolepidium chinense, Filifolium sibiricum*, *Cleistogenes squarrosa* and *Phragmites communis* in the wetter areas along rivers and lakes. The transition area of grasslands and the Gobi Desert habitat in the south and south-west have substantially lower productivity. Dominant species here include *Ranunculus cymbalaria*.

© N.Batsaikhan Typical grass steppe vegetation

© B.Batkhuyag White-naped Crane

Fauna

The region has given its name to various animal species including the Daurian Hedgehog, and the following birds: the Asian Brown Flycatcher, Daurian Jackdaw, Daurian Partridge, Daurian Redstart, Daurian Starling, Daurian Shrike and Red-rumped Swallow. The common name of the famous Daurian Larch *(Larix dahurica)* as well as that of the Daurian Buckthorn *(Rhamnus davurica)* highlights the ecological uniqueness of the area.

Among the key species selected for this Gap analysis (see Chapter 3.3) are the Mongolian Gazelle and the Mongolian Marmot belonging to the grassland habitats while species such as Eurasian Elk *(Moose)* and the Red Deer are more closely linked to the forested areas in the north and north east.

Marshes and reed beds provide a breeding habitat for the Great-crested Grebe, White-naped Crane and Relict Gull.

On the adjoining grassland plains the Great Bustard and Oriental Plover find suitable habitat for breeding. Further, there are as many as six species of Crane recorded in Daurian Steppe, which in itself is unique globally. Finally rare birds, such as the Steppe Eagle and the Asian Dowitcher can be found here and Saker Falcon is considered a key species of the steppe.

The river basin floodplain meadow and meadow steppe ecosystems provide important stopover and breeding points for glob-

ally endangered cranes and geese.

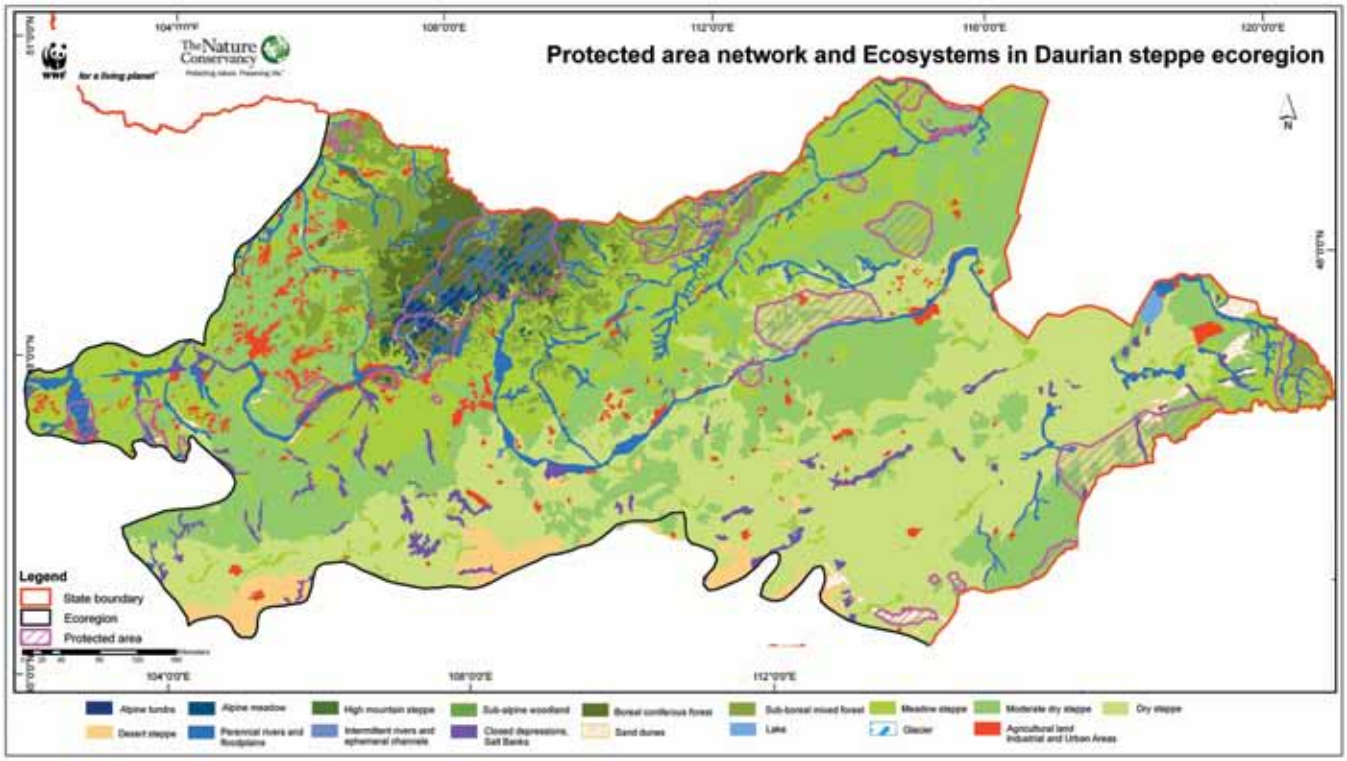
Among the key species selected for this study are the Great Bustard and the wetland related species White-naped Crane *(Grus vipio)* and Siberian Crane *(Grus leucogeranus)*.

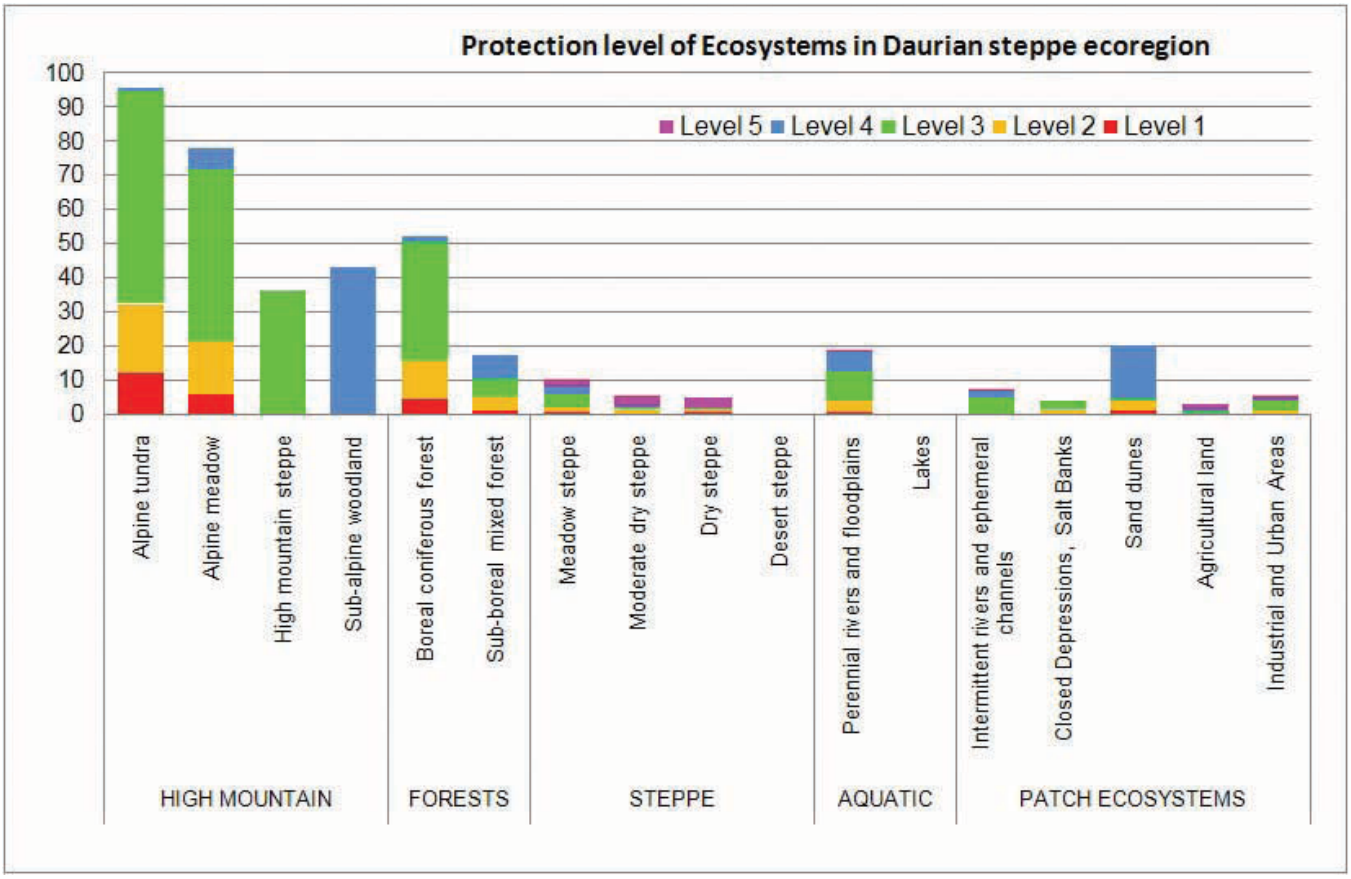
The river and lakes are also inhabited by a number of fish species, for example the rivers of the Onon river basin support a number of fish species e.g., Khadary White-fish, Amur bitterling *(Rhodeus Sericeus)*, Amur Pike *(Esox)*, Amur Ide, and Amur Sturgeon *(Acipenser Schrenckii)* with very limited distribution and high conservation value.

Ecosystem representativeness

The Daurian Steppe eco-region is diverse as evidenced by the distribution and presence of the matrix ecosystem selected for this analysis. The map below shows that all ecosystems identified for Mongolia are represented – although some with very small patches.

© N. Batsaikhan Tashgai Tavan Lake





The widespread ecosystems e.g. alpine tundra, tundra, alpine meadow, and sub-alpine woodland, mountain boreal coniferous forest, high mountain woodland, and high mountain steppe are adequately protected and included in the existing PA network.

The version of the sub-boreal mixed forest ecosystem present in this ecoregion is rich in biodiversity not least when it comes to mammals such as forest ungulates. Expansion of the PA network in this ecosystem would therefore yield high benefits in terms of biodiversity.

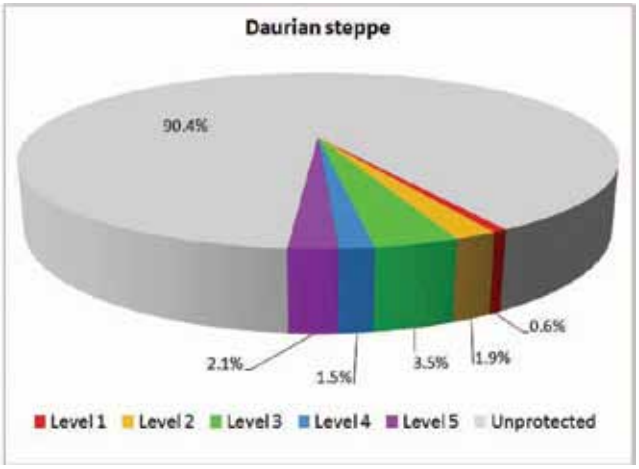
Further, the biodiversity represented in the rivers and lakes of the Daurian Steppe are both rich and in several cases unique-the Daurian Pearl Oyster is found almost only here. This wealth of biodiversity motivates particularly high conservation ambitions for these ecosystems. Currently, less than 20 percent of these ecosystems are under protection and often with a protection level that is too low. There is also need for a set of measures concerning integrated watershed management and improved land use practices in order to secure the integrity of the PA network.

The dry and moderate dry steppe as well as the closed depressions and salt banks are key ecosystems for the Mongolian Gazelles. These ecosystems represent the least protected in the region, which means that in order to viably protect populations of the Mongolian Gazelle there is need for a substantial expansion of the PA network focusing on these ecosystems, especially their critical habitats such as breeding grounds.

Types and Severity of Threats

In the face of the large-scale destruction of the world's grassland habitat, the Eastern Steppe region of Mongolia stands out as one of the best remaining examples of relatively intact temperate grasslands in the world. At the same time the Daurian Steppe belongs to those that is considered to be highly vulnerable under current climate change conditions. In recent years, the number of goats raised on the grasslands has increased considerably

due to the high prices for cashmere wool. Goats eat a wider range of plant species than sheep, and they forage more aggressively. This has contributed to serious degradation of the grasslands in vast areas.
Wetland habitats (many brackish or saline) exist throughout these grasslands, and many offer important bird-breeding habitat. Threats to these areas include degradation through grazing, excessive hunting and over-fishing. Additional threats are imposed by mining and oil extraction and associated infrastructure development.



Conservation status

For millennia, grasslands have supported unique ecological and cultural diversity that is dependent on expansive and un-fragmented areas. To survive in these rich, yet harsh landscapes, wildlife as well as people and their livestock must be able to thrive together moving with the natural rhythm of the seasons in order to find grass and water. But today nearly half of the world's grasslands have been destroyed and roads, railway lines, power lines and urban development have fragmented much of what remains. Indeed, grasslands are one of the most threatened and the least protected of major terrestrial habitats globally. Effective conservation of biodiversity is achieved without consideration of political or administrative boundaries. The purpose of this study was to examine the degree to which Mongolia has protected its grasslands biodiversity. However, a transboundary process of protecting these grasslands would probably generate high, resource effective conservation values.
The current Gap analysis show that the government's goal to include 30 percent of the territory in the PA networks far from being achieved in this eco-region. As this is a landscape where grazing is the main land use, it is also obvious that the lower protection levels do not ensure sufficient conservation results and the relatively low, and in many cases highly fragmented proportion of virgin and core zones of PAs only protects a marginal amount of what is in need of protection. Only 2.5 percent of the Daurian Steppe is included within the two highest protection levels of SPA and NP.

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 3.1.5 Daurian Steppe Eco-region	KEY FINDINGS	WAY FORWARD
	Ecosystems and habitats in the eco-region have generally a high conservation value including a number of key species of mammals and birds	E1
	The Daurian Steppe is seriously underrepresented in the current PA network	E1, E2, E3
	Protection levels in the few PAs are vastly inadequate to protect the biodiversity values and integrity of PAs	E5, E7, M2
	Conservation values related to aquatic habitats and their species require greater attention in future PA network extension	E1, E 7, E 8
	Migratory animals, such as Mongolian Gazelle require widespread PAs combined with high protection levels. The population exists along the Chinese border, where transboundary conservation measures would be beneficial.	E1, E6 and E8

3.1.6 The Central Asian Gobi Desert Eco-region

Eco-region	Area in Mongolia Percentage of Mongolia	Percentage of eco-region under PA system
Central Asian Gobi Desert	5,084,556 km^2 32.3 %	21.4 %

Location and General Description

Moving from Siberia toward the south, one encounters increasingly arid landscapes. Beyond the Altay, Hangay and Hentiy mountain ranges, the dry steppes gives way to the Central Asian Deserts, or so-called Gobi Deserts. Central Asian Gobi Deserts consist of three different sub-regions namely:

The Dzungarian Gobi Desert includes the desert basin lying between the Altay Mountains on the north and the Tian Shan range on the south and extends into the south-western corner of Mongolia. Because it is exposed in this way to the climatic influences of Siberia, the Dzungarian has colder temperatures and more precipitation than the enclosed basins to the south.

The Alashan plateau extends from the Tibetan Plateau northward into the Gobi Altay mountain range in Mongolia and exhibits flora and fauna typical of the semi-desert and desert of Central Asia. Desert steppe plant species are found primarily at higher elevations, and saxaul forests occur on lower elevation along the dry river beds and sandy surfaces.

The Eastern Gobi Desert extends from the Inner Mongolian Plateau (China) northward into Mongolia. Vegetation tends to be homogenous across vast areas of the Eastern Gobi Desert and distinct from the vegetation of grasslands to the east and deserts to the west. It consists of drought-resistant shrubs and thinly distributed low grasses.

© B.Chimeddorj

Durgun Steppe

Vegetation

The specific biodiversity characteristic of the Central Asian Desert includes highly endemic species and a large number of endangered species, well adapted to the dry desert conditions.

In the Eastern Gobi Desert the dominant shrubs include two Caragana species *(C. Bungei and C. leucocephala)*, *Salsola passerina*, *Artemisia sp.*, *Potaninia mongolica*, and *Nitraria sibirica*. Low grasses include needle grass *(Stipa gobica and S. glareosa)* and bridlegrass.

In the Dzungarian Gobi Desert vegetation consists of a thin scrub *(Anabasis brevifolia)* and dwarf woodland dominated by saxaul bush and the gymnosperm *Ephedra przewalskii*.

One of important and interesting ecosystem and vegetation types in the deserts is the oasis, found in closed depressions and along the dry riverbeds. Underground rivers or aquifers reach the surface naturally and produce enough water for lush vegetation and are an ideal habitat for large mammals.

Fauna

The mammals characteristic of the Central Asian Deserts are the Asiatic Wild Ass, Goitered Gazelles, Bactrian Camel and the Gobi Bear, a sub-species of the Brown Bear. Reptiles found in this region are endemic to

Central Asia and include the Plate-tailed Gecko, Gobi Naked-toed Gecko and Sand Boa.

Mountainous areas in the northern part of this region support populations of Snow Leopards, Ibex and the Argali.

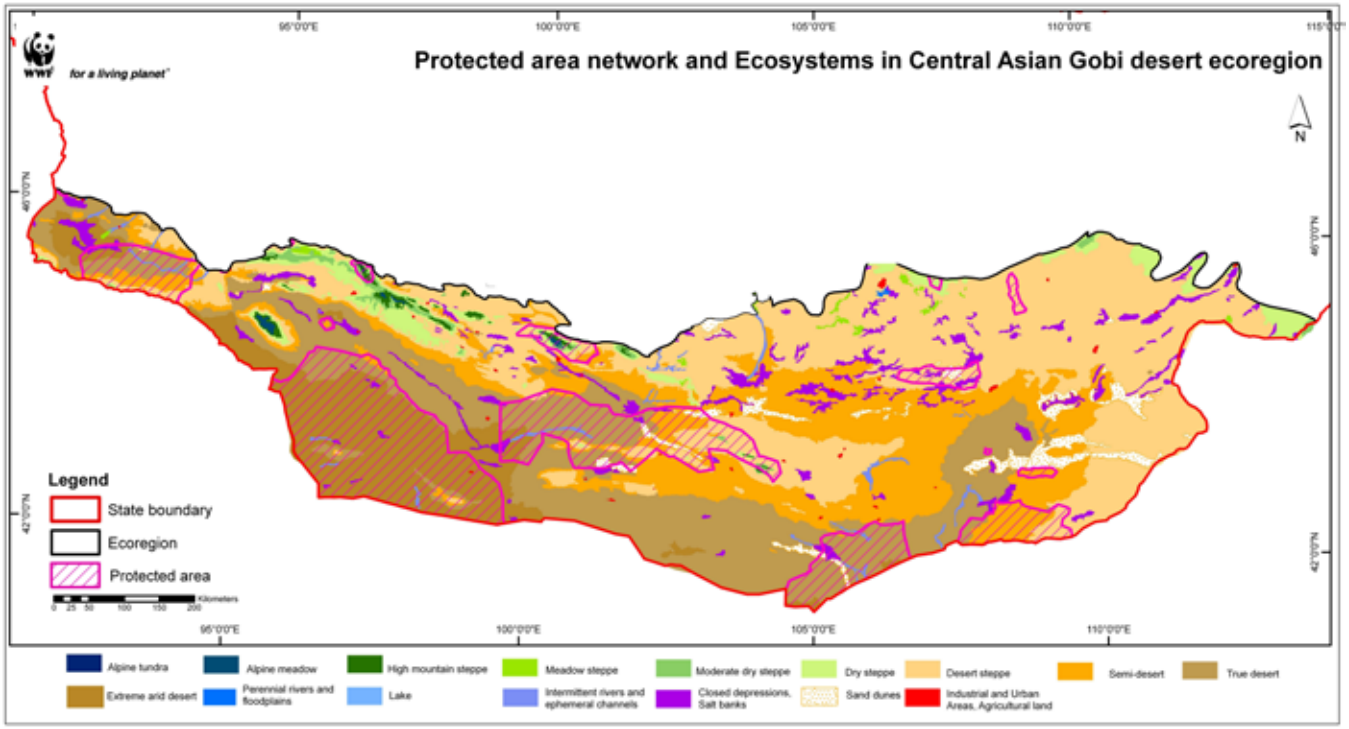
Birds characteristic of the deserts include Houbara Bustard, Pallas' Sandgrouse, Henderson's Ground Jay, Greater Plover, Mongolian Desert Finch, Chukar, Lammergeier and the Cinereous Vulture.

Ecosystems

There are a total of 15 matrix ecosystems identified in the Central Asian Gobi Desert eco-region. For more details on selection and description of the ecosystems, see Chapter 3.2. The Intermittent river and ephemeral channel ecosystem is well protected by the current PA system. However, there are some specific areas that still require attention. One of those is the ephemeral channel ecosystem in Galbyn Gobi and Ooshyn Gobi dominated by elm *(Ulmus pumila)* and that is a key refugee area for a wide variety of species including endangered predator bird species.

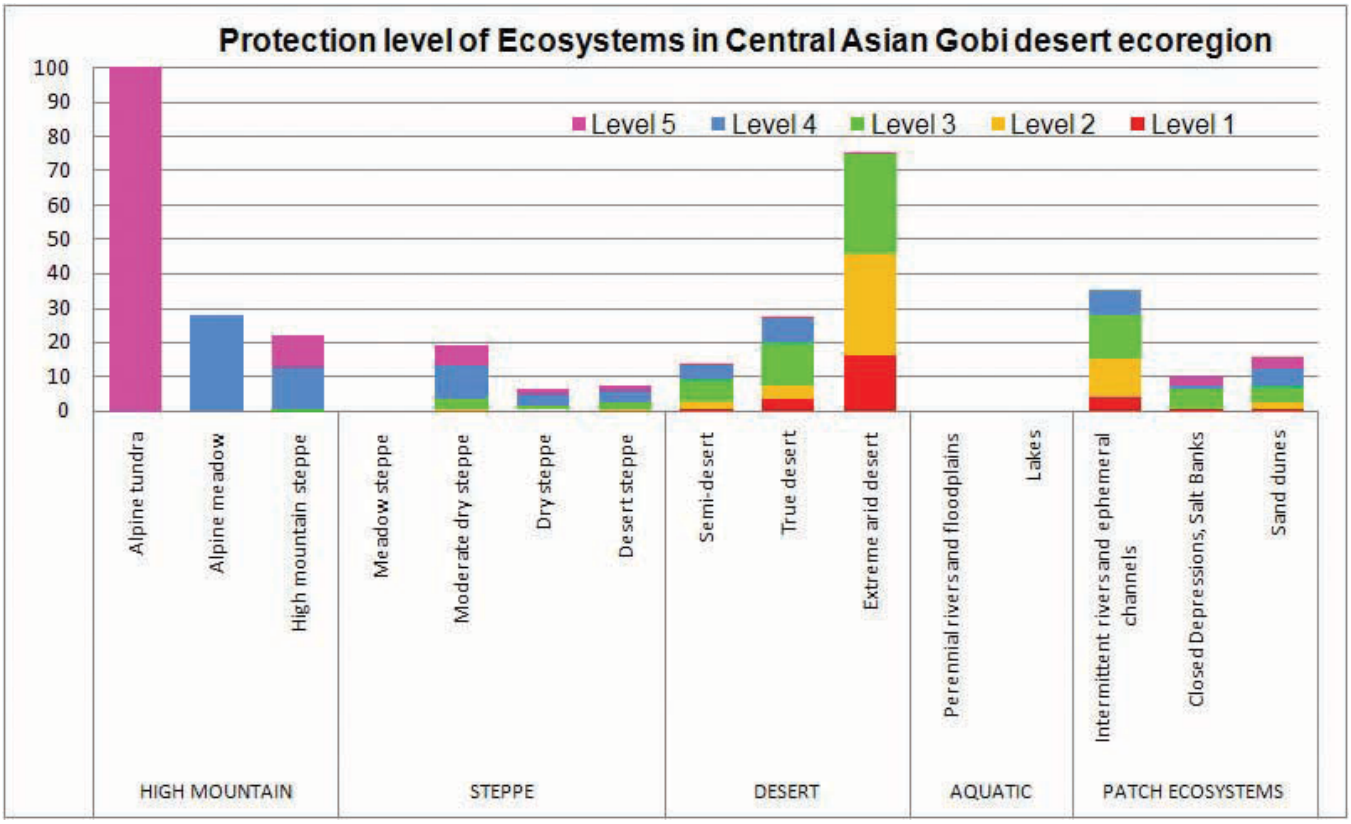
The PA network covers 30 percent of alpine meadow and sub-alpine woodland that are found in small patches in the Gobi Altay mountain range. Increased dryness of the surrounding deserts as a result of climate change, has increased the value of these ecosystems in providing habitat and refugee for a number of species. This is an example of how climate change currently influences the ecology of the landscape. The PA system must be adapted to meet those current and future changes and create wider protected areas, buffering increased dryness and thereby sustaining biodiversity.

The semi-desert ecosystem, a transition ecosystem from desert steppe to true desert, harbours representative species of both ecosystems and is thus rich in biodiversity. It is also a key habitat of several large ungulates such as the Asiatic Wild Ass, Bactrian Camel, Goitered Gazelle and Mongolian Gazelle. Further, it is the northernmost outpost of endemic and relict plant species representing the Central Asian Desert. These biodiversity aspects motivate an increase in current PA coverage (just over 10 percent now) and general upgrade of current protection levels.



Types and Severity of Threats

In general, human activities have had less impact on the Mongolian part of the Central Asian Desert, the Gobi, than the Chinese part of the desert. The Mongolian Gobi therefore supports a richer biodiversity.



In Mongolia, threats to biodiversity in the region include uncontrolled motor-vehicle use and high concentration of people and domestic livestock around scarce natural water sources, oases. These areas are critical to the survival of both resident and migratory wildlife populations.

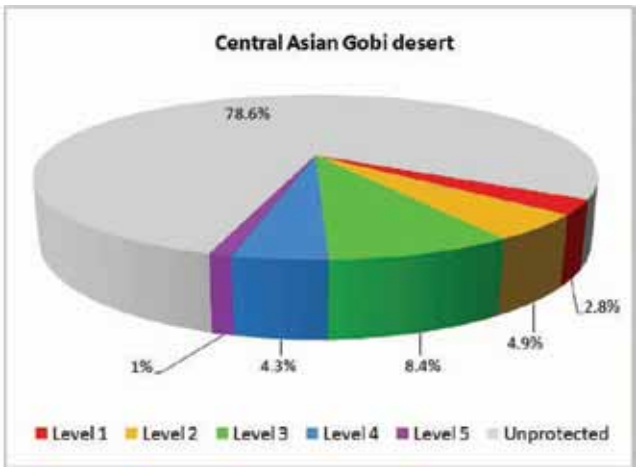
Overgrazing and the resulting desertification caused by an increased number of goats is also one of the major threats that is made even more severe as climate change causes rising temperatures and increased aridness. Increased mining activities (copper, coal and gold) along the Mongolian-Chinese border and the associated infrastructure development will also have serious impacts and will lead to habitat fragmentation and isolation of populations. It will also force migrating ungulates, like the Asiatic Wild Ass to find new migration routes.

Conservation aspects

This eco-region has the highest percentage of PA coverage and also boasts some of the best-designed PAs. The PA network covers over 20 percent of the eco-region and 30 percent of this is under two highest levels of protection.

It should, however, be noted that the government's goal of 30 percent PA coverage has still not been achieved. Further, as noted above, the fauna in this eco-region has developed a pattern of migration and adaption to dryness and scarce water availability. This means that in order to protect these species, there is great need to set aside a large portion of land for protection. These PAs must cover all aspects of the habitat needs of migrating species during the entire annual cycle. Of special concern is the need for access to open water sources such as oases. The PA network must be complemented by

wise land use, mining leases and watershed planning in order to sustain the viability of the populations of migrating animals.



Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 3.1.6 Central Asian Gobi Desert Eco-region	KEY FINDINGS	WAY FORWARD
	This eco-region contains the highest portion (21,4%) of protected areas in the country, even if the government's goal of 30% is not yet fully reached.	E1, E3
	Protection levels in some protected areas should be raised in order to reach set conservation goals	E5, E7
	Migratory animals, such as the Bactrian Camel require widespread PAs combined with high protection levels. The population exists along the Chinese border where trans-boundary conservation measures would be beneficial.	E1, E6 and E8

Chapter 3.2
Ecosystems Representativeness

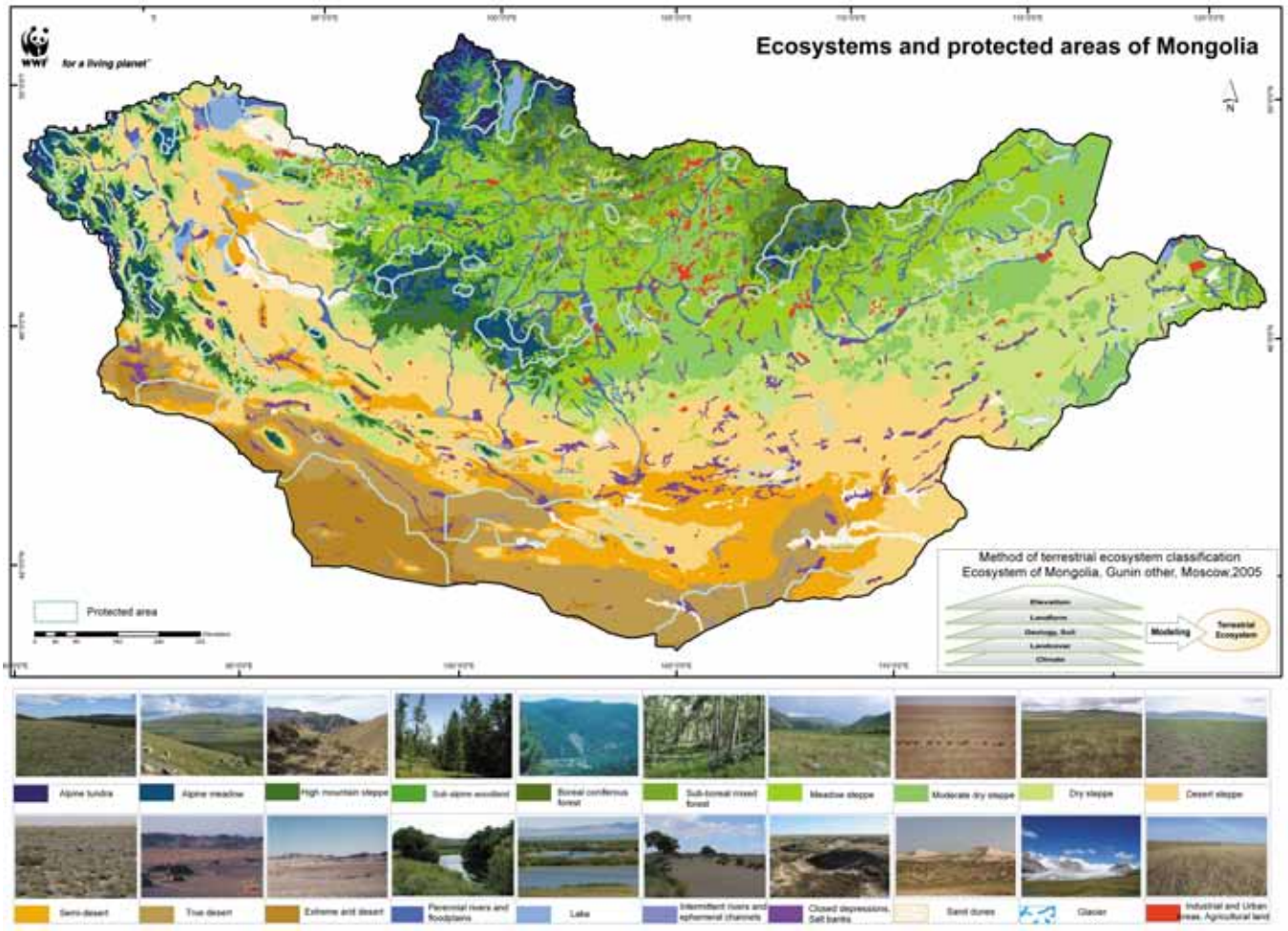
In the chapters above, each eco-region and the ecosystems have been analyzed and conclusions have been made based on scientific data and GIS based information. In this chapter, we summarize the ecosystem analyses from a national and regional perspective, creating a nationwide picture of weaknesses and strengths in the current network of PAs in Mongolia.

The Protected Areas and the Ecosystems

The presence of the 15 matrix and 4 patch ecosystems in the existing PA network has been analysed within the Gap analysis. The PAs contain a very different variety of ecosystems and biodiversity.

Some PAs cover as many as 11 ecosystems (Altay Tavan Bogd as an example) while others are placed in a more homogenous landscape covering only one single ecosystem (like Nagalkhan mountain).
The matrix below provides important information for the Gap analysis. For example, it clearly shows that some ecosystems are underrepresented in the current PA network. This includes **Boreal coniferous forest**, **Intermittent Rivers and ephemeral channels, Closed Depressions and Salt Banks** which are present only in a few PAs. The same is true for the two driest types of deserts.

However, if the information in the table below is read together with what is stated in the next table, one finds that the few PAs cover vast portions of these desert types.



	Protected Areas	# of protected ecosystem representatio	High Mountain				Forests		Steppe				Desert			Aquatic		Patch ecosystem				
			Alpine Tundra	Alpine meadow	High mountain steppe	Sub alpine woodland	Boreal coniferous forest	Sub-boreal mixed forest	Meadow steppe	Moderate dry steppe	Dry steppe	Desert steppe	Semi-desert	True desert	Extreme arid desert	Perennial rivers and floodplains	Lake	Intermittent rivers and ephemeral channels	Closed Depressions, Salt Banks	Sand dunes	Glacier
SPA	Altan Els	5						■			■					■				■	
	Bogdhan Mountain	6		■			■	■	■							■					
	Small Gobi	11										■	■	■	■			■	■	■	
	Great Gobi	9								■	■	■	■	■	■			■	■		
	Daguur Mongol 'À'	4							■	■						■	■				
	Dornod Mongol	7							■	■	■					■		■	■	■	
	Numrug	3						■	■							■					
	Otgontenger	6	■	■	■					■						■	■				
	Turgen mountain	8	■	■	■	■		■		■	■										■
	Uvs Lake	6							■			■	■			■	■	■			
	Hoh Serh Nuruu	5	■	■	■					■	■										
	Han Hentiy	7	■	■	■		■	■	■							■					
	Hasagt Hairhan mountain	3		■	■						■										
	Horidol Saridag	5	■	■		■			■							■					
	Tsagaan Shuvuut mountain	4	■	■		■				■											
	Number of SPAs in which ecosystem is included		6	8	5	3	2	5	7	7	6	3	3	2	2	9	3	4	3	3	1
NP	Altay Tavan Bogd	11	■	■	■	■	■		■	■	■					■	■				■
	Gobi Gurvan Saihan	11			■					■	■	■	■	■	■			■	■	■	
	Gorhi – Terelj	6	■	■			■	■	■							■					
	Dariganga	3									■									■	
	Ih Bogd Mountain	7		■	■					■	■	■	■						■		
	Munh-Hairhan mountain	8	■	■	■				■	■	■					■					■
	Myangan Ugalzat	4		■	■						■	■									
	Noyon hangay	4		■	■	■										■					
	Onon Balj 'À'	4						■	■							■		■			
	Orhon Valley	5						■	■	■						■					
	Siilhemiin Nuruu	6	■	■	■						■	■									■
	Tarvagatay Nuruu	7	■	■	■	■		■	■							■					
	Tujiin Nars	5				■		■	■	■											
	Ulaantaiga	3		■		■										■					
	Hovsgol Lake	10	■	■	■	■	■	■	■							■	■				
	Hogni Tarna	6						■	■	■						■				■	
	Hangay Nuruu	8		■	■	■	■	■	■	■						■					
	Hanhohii	8		■	■		■	■	■	■	■					■					
	Har Us Lake	11		■	■				■	■	■	■	■			■	■		■	■	
	Horgo Terhiin Tsagaan Lake	8		■	■	■			■	■						■	■				
	Hustain Nuruu	5						■	■	■						■					
	Hyargas Lake	5							■			■	■				■			■	
	Tsambagarav	7	■	■	■					■	■	■									■
	Number of NPs in which ecosystem is included		7	15	14	8	5	10	15	13	10	7	4	1	1	15	5	2	3	5	4
	TOTAL		13	23	19	11	7	15	22	20	16	10	7	3	3	24	8	6	6	8	5

The representativity of ecosystems in PA network

The key question in this part of the Gap analysis related to how well the ecosystems in Mongolia are covered within the PA network and if there are any structural weaknesses in the current patterns of PAs and their ecosystems. The table below gives the foundation for the analysis.

Ecosystem coverage and protection

Bioms	Ecosystem name	Area (ha)	Percent of Mongolia	Percent covered under PA network	Percent covered under highest level (Level 1, 2)
HIGH MOUNTAIN	Alpine tundra	1.626.075.2	1.03	40.73	22.13
	Alpine meadow	5.464.041.4	3.47	34.80	7.26
	High mountain steppe	4.129.235.3	2.62	11.14	1.50
	Sub-alpine woodland	2.335.709.5	1.48	15.62	4.31
FOREST	Boreal coniferous forest	2.785.863.5	1.77	31.42	8.80
	Sub-boreal mixed forest	6.738.795.1	4.27	9.96	2.04
STEPPE	Meadow steppe	16.678.504.5	10.58	7.62	1.19
	Moderate dry steppe	17.183.523.8	10.90	5.39	0.99
	Dry steppe	23.222.677.3	14.73	4.24	0.93
	Desert steppe	30.293.371.9	19.21	6.56	0.29
DESERT	Semi-desert	11.641.030.5	7.38	13.91	2.51
	True desert	12.101.045.5	7.67	27.25	7.29
	Extreme arid desert	55.969.44.9	3.55	74.18	45.17
AQUATIC	Perennial rivers and floodplains	7.052.707.9	4.47	13.94	2.59
	Lake	1.288.128.5	0.82	79.02	1.86
PATCH ECOSYSTEM	Intermittent rivers and ephemeral channels	586.282.7	0.37	26.67	11.73
	Closed Depressions, Salt Banks	3.463.984.5	2.20	9.03	1.38
	Sand dunes	3.314.182.3	2.10	13.08	3.33
	Glacier	94.907	0.06	79.39	33.24

This information reveals that the ecosystems with limited human activity such as extremely dry desert and alpine tundra have a high coverage of protection.

The glaciers patch ecosystem is almost entirely within the protection network.

On the other hand, biomes and ecosystems with more intensive human presence, currently have a very low level of protection probably due to problems related with dialogue and forging agreements with local communities. The entire group of various steppe ecosystems belongs to those underprotected. One can further conclude that the protection has so far focused on ecosystems that are less common while ecosystems with wider national distribution are not given the same attention. This also means that what is typical for Mongolia is less protected than what is atypical. This in turn also implies that positive impact on biodiversity conservation is directed at exclusive species than on the species that are still common and linked to the wide grasslands of the country.

The risk the country runs is that the steppe ecosystems are not given attention leading to decreasing ecological quality of the remaining steppe, fragmentation of the good habitats and finally, a serious decrease among species linked to and fundamental for the functioning of these ecosystems.

The table also shows an interesting discrepancy between protection level and intensity of human use of the ecosystems. Glaciers and extreme arid desert, where human pressure is by nature low, are covered by the PA network to a very high extent. The protection levels established for those PAs shows that they include more of two highest levels than in any other ecosystem. Contrary to this picture, the steppe ecosystems are not only underrepresented. The protection levels used have allocated much smaller portion of two highest protection levels. To summary, this means that when a high protection level is needed (as human influence is high), the authorities have established few PAs and with a low protection level. Where human interest is low, more territory is covered by PAs and with the most intensive protection levels.

The forest ecosystems are relatively rather well protected from a national perspective. However, when looking into regional patterns, (see also Chapter 3.1.2 and 3.5.2) it is clear that the Hangay eco-region has lower protection priority and therefore requires an upgraded network of PAs. So even if forests seem to be well off, the regional analysis shows that biodiversity linked to forests in Hangay is at greater risk than forest dependent species in other regions.

It should finally be noted that ecosystem groups, where Mongolia as a country has a special responsibility, such as the Daurian Steppe and the Hangay forests, are still being protected to a level far below the governmental goal of including 30 percent of the country in the PA network.

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 3.2 Ecosystems and the Protected Area Network	KEY FINDINGS	WAY FORWARD
	The overall Mongolian ambition for PA coverage (30%) is not met in most ecosystems.	E 1, M 2
	Ecosystems at high altitude and with low productivity are relatively well protected while ecosystems at low altitude and higher productivity have been given less allocation in the current PA network	E 1, M 2
	Nationwide, the Steppe and Forest matrix ecosystem and the Closed Depressions patch ecosystems require the highest attention if great biodiversity losses are to be avoided in the future.	E 1, E 2
	The role of the patch ecosystem in creating a diversity of habitats within the matrix ecosystems means that they play a key ecological role in supporting the function of the surrounding ecosystems	E 1, E 2
	The transition ecosystems between biomes have higher conservation values as they contain elements from different ecosystems. These ecosystems have a relatively low presence in the PA network	E 1, E 2
	The use of the protection levels does not reflect the needs for protection. This means that where human use is intensive e.g. the productive ecosystems have the lowest protection levels. This results in very low conservation effectiveness.	E1, E6, E8, M 2

Chapter 3.3
Species and their Potential Habitats

In this chapter we have carried out an analysis on the finest level- that is species. This would be the ultimate level of analysis, if it was possible to cover all species of Mongolia. However, such a level of detail would create problems due to the volume of information. In addition, current knowledge for each species is not deep enough to make such a complicated analysis useful. Instead, we have selected a number of species as key representatives of each of the 4 eco-regions. The main criteria for selection were not only vulnerability or presence on the Mongolian Red List, but also the ecological function in the ecosystem and the population trends.

The following criteria were considered:

• Distribution patterns
(Species on the edge of its distribution area, uneven distribution, limited distribution range, scattered or fragmented distribution, need of widespread habitats for viable population)

• Conservation status
(E.g. the species listed by IUCN, listed on CITES against international trade or on the Convention on Migratory Species Conservation (CMS) and/or the Mongolian Red Book or species protected by Mongolian laws)

• Threatened species
(E.g. threatened with potential extinction or endangered species at international and regional levels)

• Status in the ecosystem
(E.g. endemic, indicator, key or umbrella species)

• Population status
(E.g. the population of a species has decreased substantially during the last decade)

• Vulnerability
(E.g. species dependent on threatened ecosystems for migration or reproduction, or species in small populations)

• Representative species
(E.g. species representative of an eco-region or an ecosystem)

• Global importance
(E.g. where Mongolia carries a special responsibility to protect a species)

Based on the above mentioned criteria, a set of species or communities were selected for each eco-region. These species can be seen

© D.Tseveenravdan Snow Leopard

as the selected “representatives of the biodiversity” in the respective eco-region. Based on the presence, non-presence and potential habitat of those species, it was possible to create a better understanding on what the Gaps are in the current PA system.

It should also be noted that mapping at this fine filter level has its weaknesses. The first weakness is the restricted availability of reliable field observations. This is a common problem in Mongolia and within the PA system as such (see Chapter 5 on Management Gaps). The country area is enormous and human settlements are often scarce.

Further, the populations of species are often low by nature and the number of observing and reporting field biologists is limited.

This means that for the mapping within the Gap analysis, it was necessary to create a system of maps reflecting the potential habitats and distribution of the selected species rather than documented presence.

For each selected species, the known distribution was described in terms of ecosystem, landscape, elevation, vegetation and soil. Based on this combination of field observations and scientific reports, we were able to create a map for each of the 38 species and 9 plant communities showing the potential distribution.

The methodology used made it possible to combine the maps of potential habitats with the current map of the PA network, thus illustrating the relationship between potential habitats of the key species and the existing PA network. By putting the maps together as layers we could also develop images indicating the areas where most potential habitats were found, thus giving direction to future PA network expansion targeting areas with high likelihood of protecting a varied and rich biodiversity.

3.3.1 Key Species in the Altay-Sayan Eco-region

The Altay-Sayan eco-region is the largest of the Mongolian eco-regions and covers as much as 364307.2 km² of mountains, forests and desert steppe. The distribution is from Hovsgol in the north to the western paramount mountains and down towards the Gobi Desert in the south. The biodiversity is rich, including endemic species such as Mongolian Saiga and highly vulnerable species, for example the Siberian Musk Deer.

Key Species selected

The following species from this region were selected as key species for the Gap analysis. Individual maps were developed for each of the species and communities. Two of the species, namely Mongolian Saiga and Snow Leopard are described in detail as examples of information collected and analyzed as well as the potential habitat mapped in order to support the Gap analysis.

Areas/sizes and conservation of potential habitats of representative species and communities in Altay-Sayan eco-region

#	Names of representative species selected in ecoregion	Selection criteria	Percentage of potential habitats in the eco-region	Percentage of potential habitats in the existing PA network	Percentage of PA under protection level 1 and 2
		Mammals			
1	Mongolian Saiga (*Saiga borealis mongolica*)	• Decreasing population • Limited distribution • Endemic to Mongolia • Critically endangered species • Listed in CITES Appendix II	15.1	8.3	0.1
2	Snow Leopard (*Panthera uncia*)	• Decreasing population • Limited distribution • Globally rare • Wide ranging individuals • Endangered species • Listed in CITES Appendix I and CMS Appendix I	12.8	22.7	9.2
3	Argali Sheep (*Ovis ammon*)	• Decreasing population • Wide ranging individuals • Near threatened species • Listed in CITES Appendix II • Listed as rare in the Mongolian Red Book	9.3	13.3	2.6
4	Eurasian Beaver (*Castor fiber birulai*)	• Decreasing population • Endemic subspecies • Limited distribution • Near threatened species • Disjunctive species • Listed in CITES Appendix I	4.7	19.1	4.2

5	Reindeer (*Rangifer tarandus*)	• Decreasing population • Limited distribution • Least concern species • Disjunctive distribution	1.9	22.3	11.1
6	Siberian Musk Deer (*Moschus moschiferus*)	• Decreasing population • Limited distribution • Disjunctive species • Vulnerable species	6.6	20.1	7.6
Birds					
7	Houbara Bustard (*Chlamydotis macqueenii*)	• Decreasing population • Limited distribution • Vulnerable species • Listed in CITES Appendix I and CMS Appendix I	7.7	8.6	0
8	Dalmatian Pelican (*Pelecanus crispus*)	• Decreasing population • Limited distribution • Vulnerable species • Listed in CITES Appendix I and CMS Appendix I	1.6	87.1	3.5
9	Altay Snowcock (*Tetraogallus Altaycus*)	• Decreasing population • Limited distribution • Least concern species • Listed in the Mongolian Red Book	13.6	19.4	6.7
Plant Associations					
10	*Stellaria pulvinata* dominated high mountain steppe	• Limited distribution to Mongol Altay eco-region • *Stellaria pulvinata* endemic to Mongol Altay • Decrease in growth rate and eatable species due to climate change and livestock grazing	3.6	14.4	1.6
11	*Chenopodium frutescens* dominated desert	• Limited distribution: only in Great Lakes Depression • Endemic association • Fruticose goosefoot (*Chenopodium frutescens*) and *Asterothamnus heteropappoides*, sub-endemic species • *Gueldenstaedtia monophylla* sub-endemic and disjunctive species	40.7	8.4	0.6
Plants					
12	Rhododendron (*Rhododendron ledebourii*)	• Limited distribution • Threatening • Endemic species	3.3	14.7	4
13	Sea-buckthorn (*Hippophae rhamnoides*)	• Disjunctive distribution • Decreasing natural population • Genetic diversity decreasing	4.1	18.2	2.8
14	Siberian Fir (*Abies sibirica*)	• Limited distribution • Disjunctive distribution • Potential decrease due to climate change caused increasing dryness	0.6	1.2	0

Mongolian Saiga

Saiga borealis mongolica

© B.Chimeddorj Mongolian Saiga

Distribution

The natural habitats of the Mongolian Saiga are under pressure from increasing numbers of livestock causing severe overgrazing. The availability of water is also decreasing. These factors make the population more vulnerable to the harsh winters and droughts. The last 50 years have seen over 10 severe winters and the Saiga populations around Hyargas Lake, Durgun desert steppe plain and Huisiin Gobi have decreased drastically. The current range of the Mongolian Saiga is only 20 percent of its original range. There are currently two separated or fragmented populations in Shargiin Gobi, Huisiin Gobi, Durgun desert steppe plain and the Mankhan area.

Habitat linkages

The Mongolian Saiga is the flagship species of the desert steppe in the Great Lake Depression. Its suitable habitat includes Sharga and Khuisiin Gobi and is closely linked to the feather grass (*Stipa* spp.) communities on the plain desert steppe. The Mongolian Saiga avoids habitats like mountains and uneven/rocky areas.

Population trends

Population sizes in Sharga and Khuisiin Gobi are rapidly changing. According to field surveys there were about 5,000 heads recorded in 2000. During the drought and following heavy winter in 2001 the population decreased dramatically. However, it recovered slowly and has reached 3,200 in 2008. Similar trends are shown for the small population in Mankhan that has decreased from about 200 in 1975 to only 15 heads in 2007. These numbers are now so low that the genetic diversity is reduced to a level where the viability of the population is at risk.

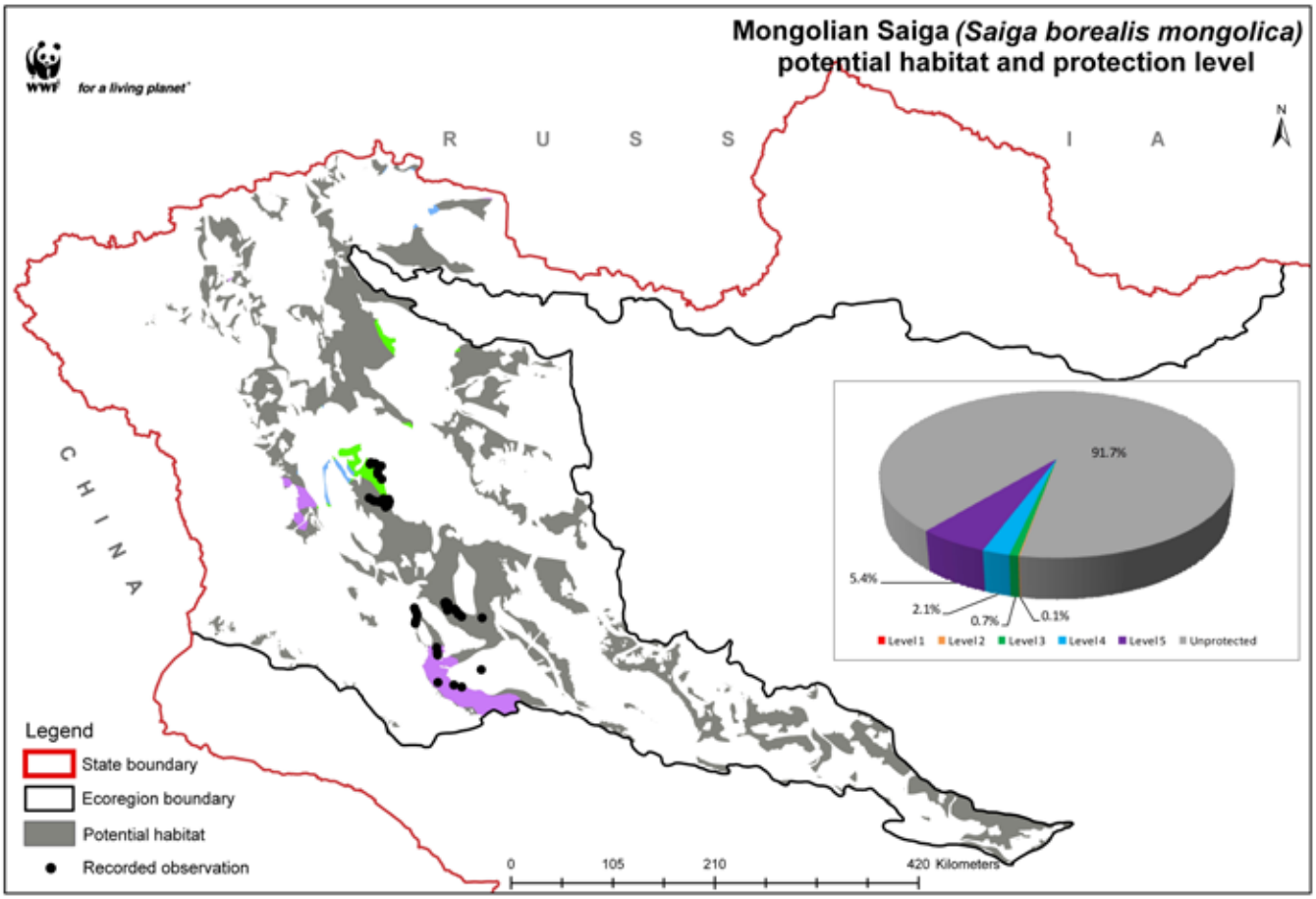
Causes of scarcity/rarity

Illegal hunting and competition with domestic livestock for habitat are major threats caused by human presence. Together with harsh natural conditions, including frequent periods with increased frequency of drought and dzud, this causes decline in population levels.

International and regional conservation

According to IUCN, the Mongolian Saiga is considered to be a critically endangered species. The species is also listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Mongolian Laws on Fauna and Hunting legally protect the Saiga and hunting is prohibited. The latest version of the Mongolian Red Book lists the Mongolian Saiga as a very rare species.

© Ts.Buyanbat Mongolian Saiga in its habitat



Snow Leopard

Panthera uncia

© D.Tseveenravdan

Snow Leopard

Distribution

The population density is higher in Mongol Altay and Gobi Altay mountains, but generally lower in Hangay and Hovsgol mountains. Potential distribution areas are wide-ranging, but the population is fragmented. Globally, the Snow Leopard is also present in Central Asia mountain areas.

Habitat linkages

The suitable habitats of the species include high mountainous rocky, steep, cliffy slopes, narrow passes, ravines, and alpine parts of the Mongol Altay and Gobi Altay. In the Hangay mountains, the main habitats are related to the mountain range including mountain steppe dominated by grass and shrubs. The Snow Leopard shares suitable habitat with some rare/endangered species, such as the ibex, marmot, Argali and Altay Snowcock, which are its main prey. Thus, it is regarded as an umbrella species in high mountainous areas. The Snow Leopard is an example of an animal requiring a vast area to sustain viable populations.

Population trends

The total population in Mongolia was estimated to be about 1,000 individuals in 1990. A similar census indicated the population was 500-1000 individuals in 2000.

Causes of scarcity/rarity

The number of livestock has increased significantly leading to expansion of areas

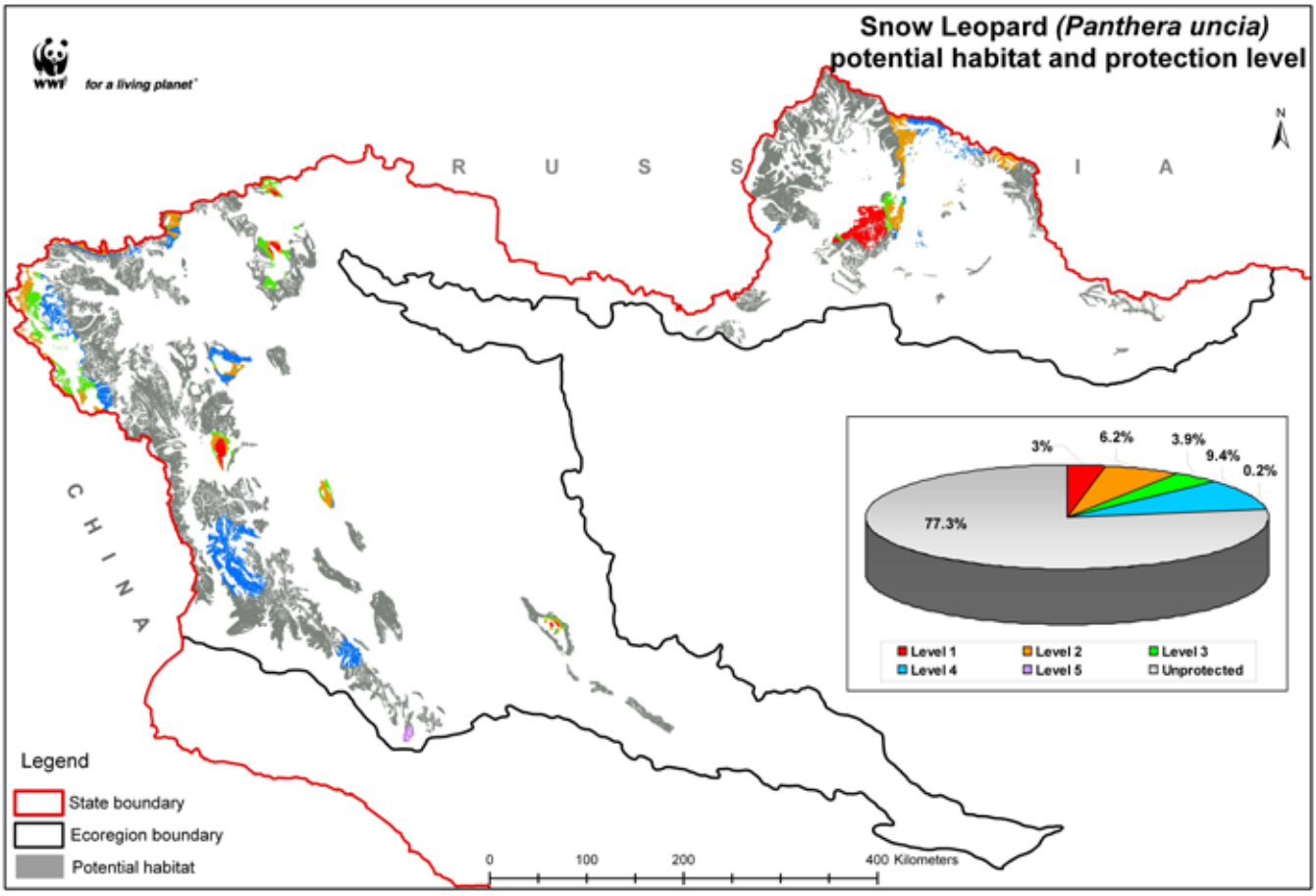
with severe overgrazing also in mountainous areas. As a result, the populations of the prey species of the Snow Leopard such as Ibex, Argali, Marmot and Snowcock have decreased. This has caused stress to the population of Snow Leopard forcing them to predate domestic livestock. This in turn, is a cause of retaliation killing and illegal hunting. Poaching is also a threat to the Snow Leopard.

Conservation aspects

According to the international (IUCN, 2004) and regional (IUCN, 2006) assessments, the Snow Leopard is listed as an endangered species. The Snow Leopard is further listed in Appendix I of the CITES and is legally protected by the Mongolian Laws on Fauna and Hunting, and hunting is prohibited. The Snow Leopard is included as "very rare" in the Mongolian Red Book.

Altay-Sayan. The Mongolian Saiga is a representative of more desert steppe dominated south, while the Snow Leopard and the Altay Snowcock are predominantly in the higher mountain areas. The forests in the northern part host stands of Siberian Fir and populations of Reindeer. The *Stellaria pulvinata* vegetation-association is representative of the high mountain steppe. This means that when using the different key species as layers in a GIS based analysis we also cover the key ecosystems in the eco-region (table 3.5.1). It should also be noted that several of the species selected, currently have a very limited distribution and the map showing the potential habitat can, if wrongly read, give too optimistic a picture of the real situation.

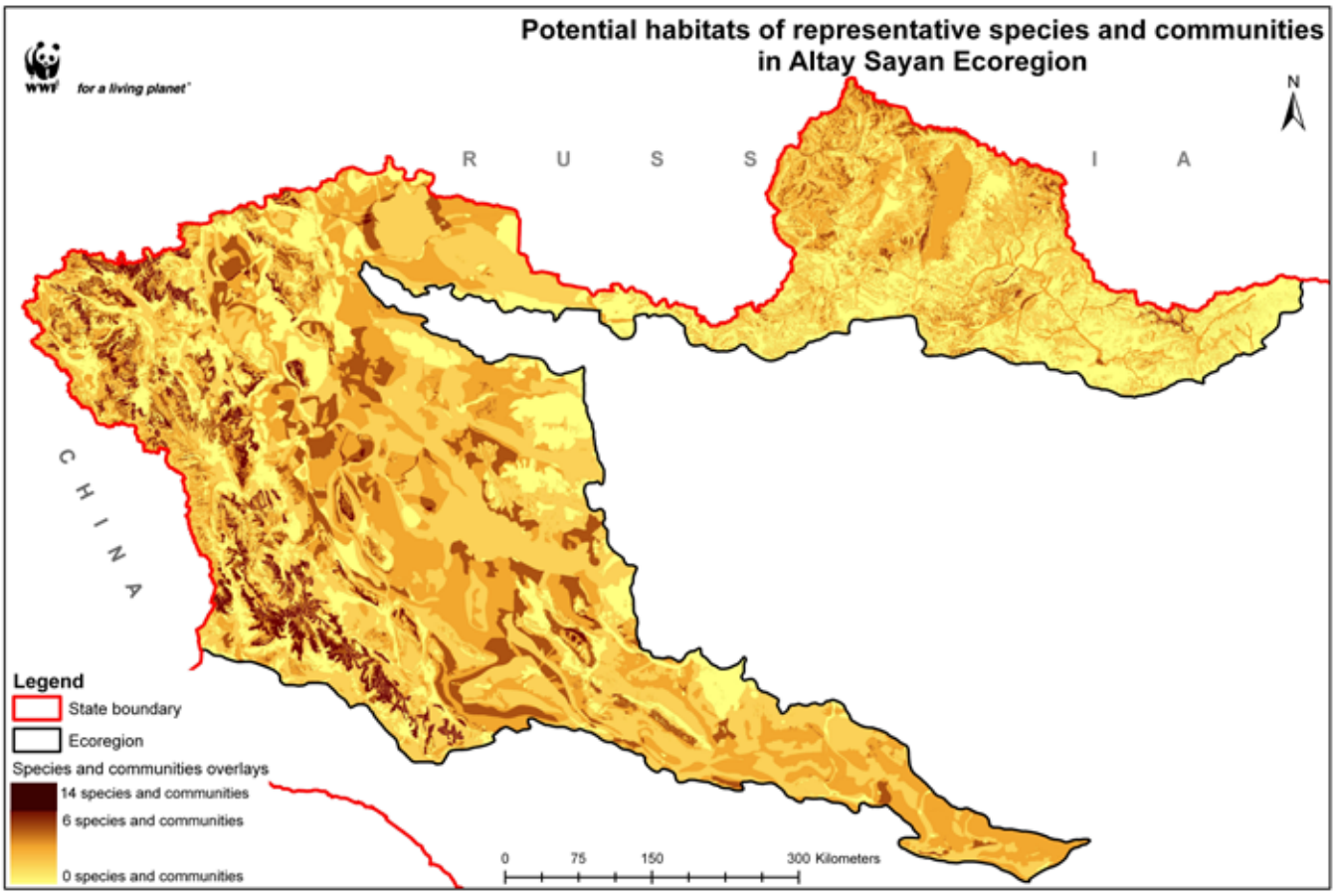
Species such as the Mongolian Saiga, Reindeer, Snow Leopard have in reality very small populations either in small areas of



Potential habitats

The set of selected species covers different habitats, ecosystems and sub-regions of the

the region (such as the Mongolian Saiga) or are scattered in fragmented population (such as the Snow Leopard). Below is the map,



produced as layer maps, over the Altay-Sayan eco-region showing the potential habitats for the respective species. When combined, the pattern indicates where a future conservation measure would have the greatest potential to cover a broad variety of species. These maps are therefore one of several tools used to conclude the present Gaps in the PA network and the focus for future engagement. It also describes how effective or ineffective, the current system of PAs is covering the biodiversity rich areas of the eco-region.

From this map, it is obvious that some areas stand out as potential focus areas for biodiversity conservation. These areas are where most maps show potential habitat areas.

Some of the key areas are:

- **Myangan Ugalzat Mountain**
- **Baatar Hayrhan Mountain**
- **Altan Huhiy Mountain**
- **Tolbo Lake, Siilhem Mountain,**
- **Achit Lake**
- **Tsagaan River,**
- **Hasagt Hayrhan Mountain, Sharga Gobi**
- **Han Tayshir Mountain**
- **Hogshin Uur River, Toj River**
- **Tengis River upstream**

Species requiring attention

However, there are also some key species that require special attention. Those are:

Reindeer *(Rangifer tarandus)*

The population has been drastically reduced due to poaching and inadequate conservation of their habitats, despite 22.3 percent of potential habitat under the PA network. Thus, expansion of the PA network and particularly, an improved protection level and enforcement are required.

Snow Leopard *(Panthera uncia)*

The existing PA network covers over 20 percent of potential habitat. The population is however still threatened, indicating that the current PA network is not sufficient in area or enforcement. If up to 30 percent was protected, a number of other key species would benefit, such as Argali and the Pulvi-

nate forbs-bunchgrass.

Mongolian Saiga
(Saiga borealis mongolica)
and Macqueen's Bustard
(Chlamydotis macqueenii)

The potential habitats of those two species, representative of the desert steppes in the south, are inadequately protected and only 10 percent is under the PA network and most with a low protection level.

Siberian Fir
(Abies sibirica)

Only fragments of this species' potential habitat are under protection, again indicating the low representativeness of forest ecosystem in the current PA network.

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 3.3.1 Species in the Altay-Sayan Eco-region	KEY FINDINGS	WAY FORWARD
	The potential habitats for selected species are protected to a level below 20% i.e. below the level of the government's commitment	E 1
	Siberian Fir, being a threatened species, has a potential habitat that is only covered by up to 1.8 % in the current PA network, requiring extra attention	E 1, E 6
	Species distributed only in the Altay-Sayan such as Mongolian Saiga, Reindeer, Beaver and Argali (the Altay sub-species) need support by an improved protection level within the PAs	E 1, E 5, E 6
	Areas such as Myangan Ugalzat Mountain, Baatar Hayrhan Mountain, Altan Huhiy Mountain, Tolbo Lake, Siilhem Mountain, Achit Lake, Tsagaan River, Hasagt Hayrhan Mountain, Sharga Gobi, Han Tayshir Mountain, Hogshin Uur River, Toj River, Tengis River upstream will achieve high biodiversity output if included in the PA networks	E 2

3.3.2 Key Species in the Hangay Eco-region

The Hangay eco-region is the smallest of the Mongolian eco-regions and covers only 258123.2 km². It contains mountains, and forests and is situated in the central part of the country. The biodiversity includes endemic species such as the Hangay's Lady Mantle and species considered endangered as for example Red Deer.

Species selected

The following species of the Hangay eco-region were selected for the Gap analysis:

#	Names of representative species selected in ecoregion	Selection criteria	Percentage of potential habitats in the ecoregion	Percentage of potential habitats in the existing PA network	Percentage of PA under protection level 1 and 2
		Mammals			
1	Red Deer (*Cervus elaphus*)	• Decreasing population • Limited distribution • Least concern species	11.8	19.4	2.5
2	Siberian Marmot (*Marmota sibirica)*	• Decreasing population • Limited distribution • Endangered species	59.0	3.4	0.3
		Birds			
3	Black Stork (*Ciconia nigra*)	• Decreasing population • Limited distribution • Least concern species • Listed in the CITES Appendix I and CMS Appendix II.	10.7	4.3	0.3
		Plant Associations			
4	*Kobresia* spp. dominated alpine meadow	• Limited distribution • Decreasing due to Climate change Decreasing due to overgrazing	6.4	4.3	0.3
5	*Carex* spp. dominated alpine bog meadow	• Limited distribution • Decreasing due to increasing dryness caused by climate change	1.1	22.9	3.7
		Plants			
6	Tibetan Lancea (*Lancea tibetica*)	• Limited distribution • Relict • Threatened due to changing environment	1.1	22.3	1.4
7	Hangay Lady's Mantle (*Alchemilla changayca*)	• Limited distribution • Endemic • Rare within its distribution areas	5.7	40.2	2.7
8	Mongolian adonis (*Adonis mongolica*)	• Endemic • Relict • Threatened due to changing environment	4.3	2.3	0

Maps showing the potential distribution were developed for all the species and associations above in order to support the Gap analysis. The maps expose the potential distribution of the respective species or associations within this eco-region. One of the species and one association are showing below as examples of the information collected and processed in order to support the Gap analysis.

Red Deer

(Cervus elaphus)

© D.Usukhjargal Red Deer

Distribution

The Red Deer is found in the northern part of the Mongol Altay Mountain forests, Hovsgol and Hentiy boreal coniferous forests, most of the Hangay mountain range, Han Hokhii Mountain, Ikh Hyangan, the Gobi Altayn mountain forests and the rocky forest stands of Batkhaan, Hugnukhaan and Hustai National Park area.

Habitat

The Red Deer inhabits open areas rather than dense boreal conniferous forests. It prefers habitats on the mountain slopes that have sparse or little forests such as sparse Larch or mixed forests with Birch, Poplar and Pine as well as river grove/thickets, with open areas in between. In some areas, the species is found in the open mountain steppe with Elm tree and even sand dunes and rocky mountains with shrubs.

The Red Deer is dependent on patches of salty marshes within its distribution area.

Population

Red Deer populations were recorded as 130, 000 in 1986 with a dramatic reduction to only 8, 000-10, 000 in 2004. This decrease means that the population has been reduced by 92 percent in less than 20 years. In other parts of the world, the species numbers have in fact increased.

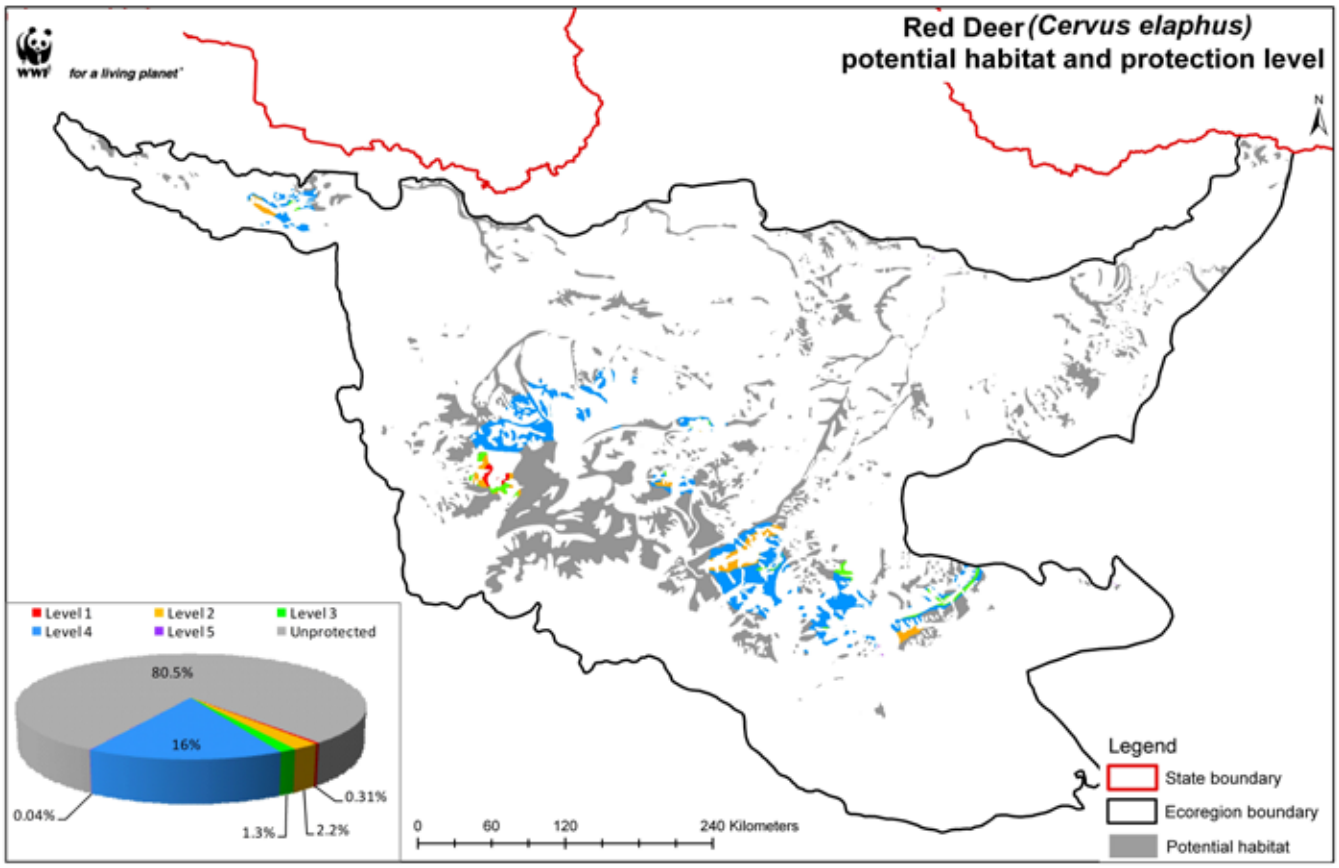
Causes of scarcity/rarity

The main cause of population decrease is illegal hunting with the purpose of using its antlers and velvet horns and female tails for oriental medicine. There is also much habitat destruction through illegal logging and mining leading to limitations in population size. Additionally, forest fires also seriously contribute to habitat deterioration and population decrease.

International and regional assessment

The Red Deer is listed as of “least concern” by the international IUCN assessment. However, on a regional level, it is considered critically endangered. This means that the Red Deer in Mongolia is on the edge of its distribution area and therefore requires extra attention. The Red Deer is legally protected by the Mongolian Laws on Fauna and Hunting and hunting is prohibited.

© D.Usukhjargal Red Deer herd in Hustai NP



Sedgegrass dominated Alpine Bog Meadow

Distribution
The plant association is found mostly in the northern Hangay Mountains. In central Hangay the association is found, however more rarely, in high mountain valleys.

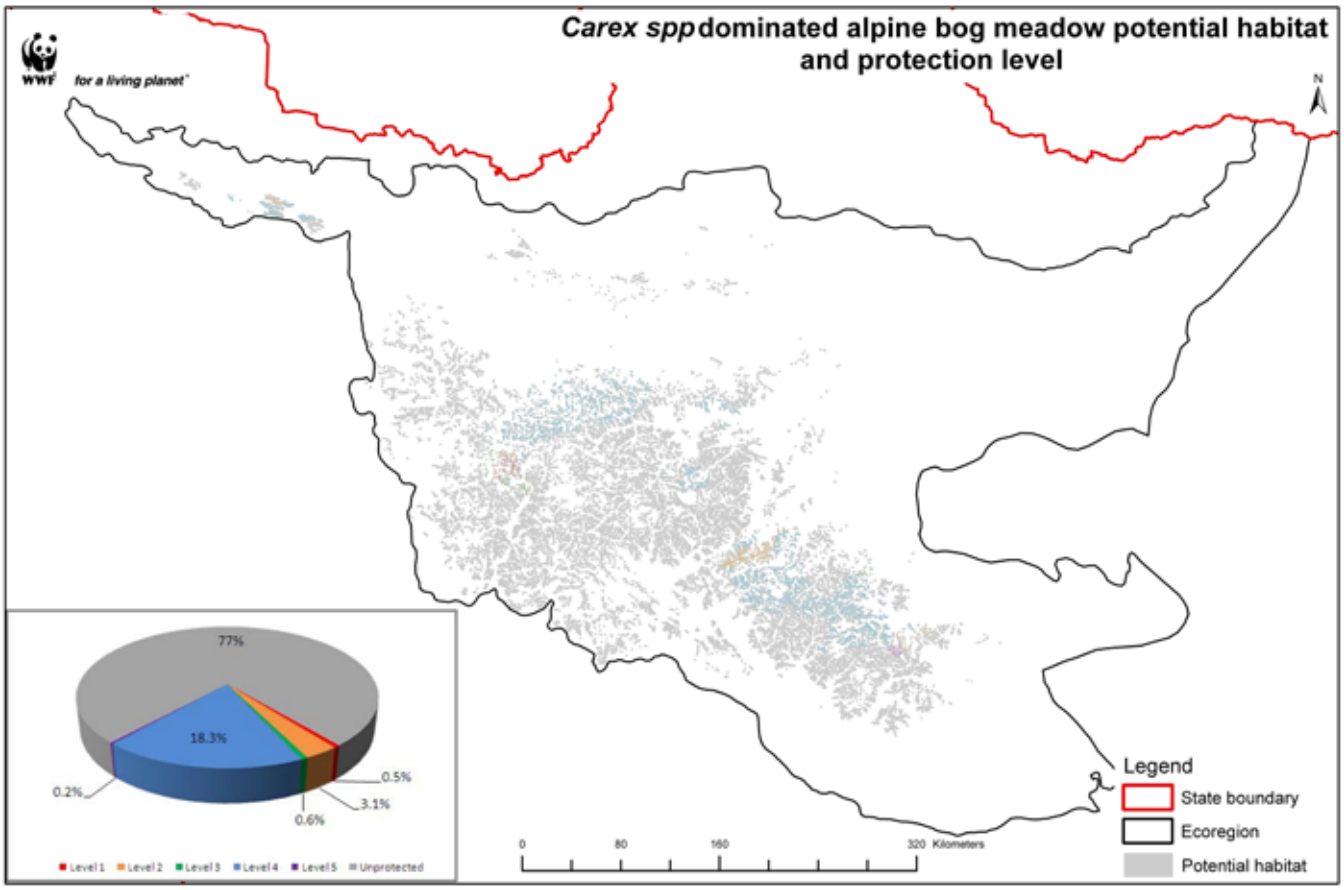
Environment
The association is linked to wet, rocky areas within mountain meadow ecosystems. It is often supported by loose powder-like soils in high mountain zones (2400-2500 m above sea level).

Plant Community Composition
The plant community includes a number of characteristic species such as:

- *Carex microglochin*
- *Carex parva*
- *Carex orbicularis*
- *Carex ensifolia*
- *Eriophorum humile*
- *Eriophorum polystachyon*
- *Eriophorum komarovii*
- *Eriophorum brachyantherum*
- *Allium schoenoprasum*
- *Lagotis integrifolia*

Causes of scarcity/rarity
The main cause is overgrazing with associated dryness in high mountain area. Due to scarcity of water and poor pasture conditions, the herders are using more frequently high mountain meadows as summer pasture, which creates pressure on this ecosystem.

International and regional conservation
Carex parva being one of dominant species in the community, is listed as “very rare” in the Mongolian Red Book.



Potential habitats

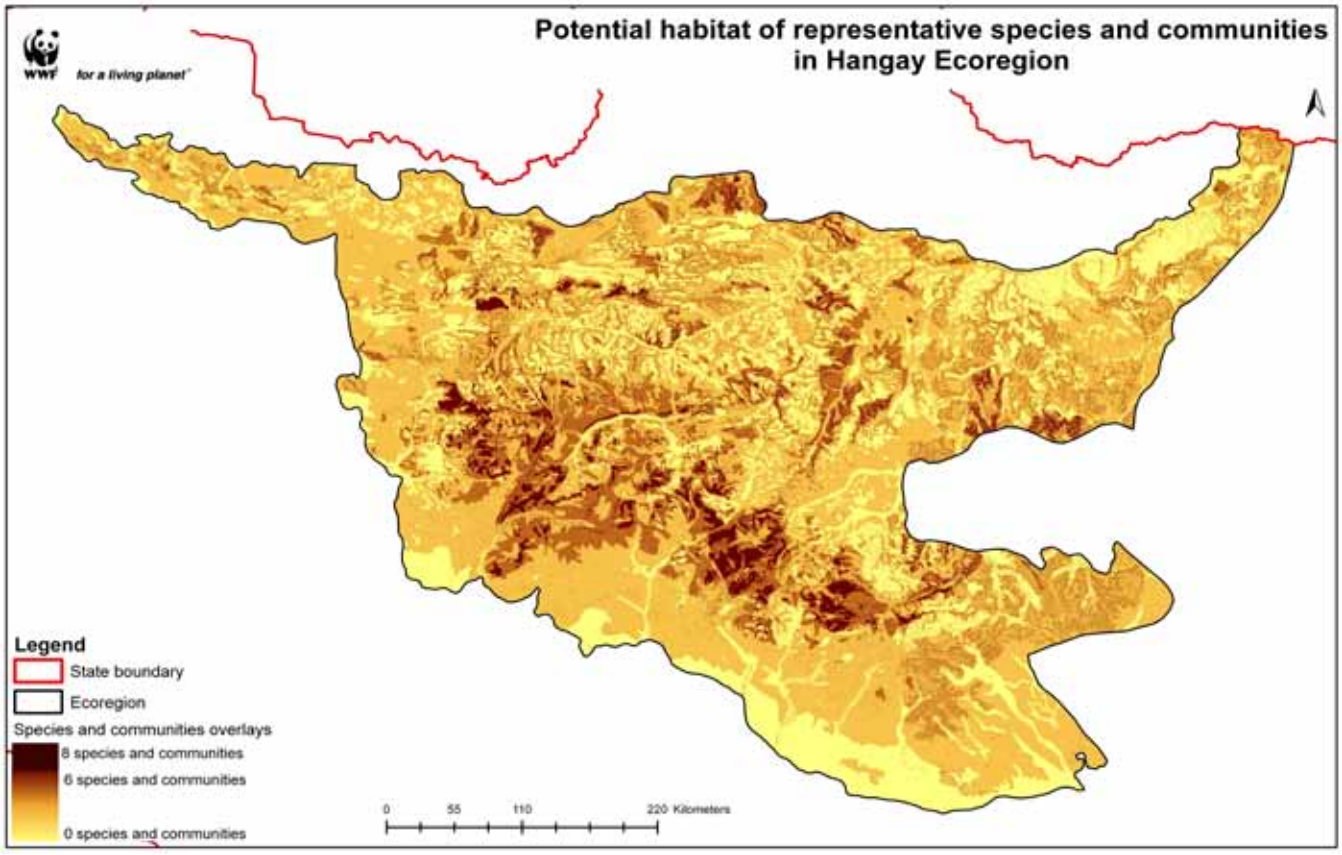
The analysis of the selected species gives a number of indications guiding future conservation work. The table above shows that some species, like the Siberian Marmot found in the open grasslands, has enormous areas of potential habitats but that a very low percentage of these are included in the current PA network.

The same can be said for the Black Stork found in forests as its key nesting site. Other species indicate dependency to ecosystems that are very limited in their distribution, such as the Tibetian Lancea and the Alpine Bog Meadows on peat dominated soils at high altitudes. As a general comment, it should also be noted that the Hangay eco-region has relatively few rare and endangered species and that the overall PA network is substantially lower than in other eco-regions (as mentioned in Chapter 3.1 above). The map below shows the Hangay eco-region in which the potential habitats for the respective species have been mapped and produced as layer maps. As mentioned above, the map does NOT show where a specific animal is present today, but the maps give an indication of where biodiversity will respond most strongly to the establishment of a PA (table 3.5.2).

The key areas for general biodiversity conservation priorities are shown in the map.

- **Hangay Mountain Range** (including Dalin Tsagaan Asga Mountain, Untaa Yamaat Mountain, Ih Elst Mountain, Bugat Mountain)
- **Bulnay Mountain Range** (including Teel Mountain, Sangiyn Dalay Lake, Bust Lake)
- **Ulaagchin Har Lake**

The map above shows a clear pattern that the few established PAs are mainly covering areas where either several key species have no potential habitat or where biodiversity in general is low. This means that in order to preserve the highest diversity, conservation focus should be on the areas aforementioned. In general, the habitat conservation measures above will require complementary



measures to protect some of the species. The Black Stork requires a combination of habitats for viable and sustained populations.

Old forests with tall trees are required to secure nesting sites while floodplains and river canyons are necessary feeding grounds and thus, only one of those habitats will not be enough. It is also an example of a species where an international transboundary conservation strategy could benefit population size.

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 3.3.2 Species in the Khangai Eco-region	KEY FINDINGS	THE WAY FORWARD
	The percentage of potential habitats for the selected species is generally below the government's goal of 30%	E 1, M 2
	The potential habitat of some species such as the Siberian Marmot and Black Stork is as low under 5% and with a low protection level and will require targeted input	E 1 , M 2
	The network of PAs is scattered, fragmented and with low protection levels requiring extensive measures to secure populations of species with wide ranging distribution such as the Red Deer	E 1, M 2
	Some species such as the Black Stork would benefit from species-oriented management planning	E 6
	Areas such as Hangay Mountain Range (including Dalin Tsagaan Asga Mountain, Untaa Yamaat Mountain, Ih Elst Mountain, Bugat Mountain), Bulnay Mountain Range (including Teel Mountain, Sangiyn Dalay Lake, Bust Lake) and Ulaagchin Har Lake will achieve high biodiversity output if included in the PA network.	E 2

3.3.3 Key Species in the Daurian steppe Eco-region

The Daurian eco-region is the largest of the Mongolian eco-regions and covers almost 450, 000 km². It contains mountains in the north, but the dominating feature is the wide rolling grasslands placed in the eastern part of Mongolia. The biodiversity includes species that are highly vulnerable and endangered, for example a number of crane species including the White-naped Crane.

Species selected

The following species of the Daurian eco-region were selected for the Gap analysis:

#	Names of representative species selected in ecoregion	Selection criteria	Percentage of potential habitats in the ecoregion	Percentage of potential habitats in the existing PA network	Percentage of PA under protection level 1 and 2
		Mammals			
1	Gray Wolf (*Canis lupus*)	• Sharply declining species in Mongolia • Least concern species • Listed in the CITES Appendix II	99.8	9.6	2.4
2	Mongolian Gazelle (*Procapra gutturosa*)	• Sharply declining species in Mongolia • Least concern species • Listed in the CMS Appendix II	56.1	5.4	1.4
3	Eurasian Elk (*Alces alces*)	• Declining species • Limited distribution • Disjunct species • Least concern species • Listed as very rare species in the Mongolian Red Book	4.8	51.2	19
4	Red Deer (*Cervus elaphus*)	• Declining species • Limited distribution • Least concern species	11.8	30.4	9.2
5	Mongolian Marmot (*Marmota sibirica*)	• Declining species • Limited distribution • Endangered species	72.2	6.0	1.4
		Birds			
6	White-napped Crane (*Grus vipio*)	• Declining species • Limited distribution • Globally rare • Vulnerable species • Very rare species in the of Mongolian Red Book	12.0	10.7	2.1
7	Siberian Crane (*Grus leucogeranus*)	• Declining species • Very limited distribution • Globally rare • Critically endangered species • Listed as very rare species in the Mongolian Red Book	7.8	1.8	0.2

8	Saker Falcon (*Falco cherrug*)	• Declining species • Globally rare • Endangered species • Listed in the CMS Appendix II	18.8	6.9	0.8
9	Great Bustard (*Otis tarda*)	• Declining species • Very limited distribution • Globally rare • Vulnerable species • Listed in the CITES Appendix II and CMS) Appendix I • Listed as rare species in the Mongolian Red Book	53.11	5.9	1.1
10	Swan Goose (*Anser cygnoides*)	• Declining species • Vulnerable species • Listed in the CMS Appendix I • Listed as rare species in the Mongolian Red Book	5.6	10.2	1.1

Association maps were developed for all species, exposing the potential distribution of these within the Daurian Steppe eco-region. Below two of the species are shown, giving examples of information collected and analyzed in order to support the Gap analysis. Similar information is available for all selected species.

Mongolian Gazelle

(Procapra gutturosa)

© B.Lkhagvasuren Mongolian Gazelle

Distribution

The main distribution covers eastern Mongolia and adjacent areas of Russia and China. Smaller populations are also found in central and western Mongolia. There are indicators of expansion in a north-west direction from the current distribution area. The Mongolian Gazelle migrates constantly over wide areas.

Habitat

It inhabits the rolling hills, dry and moderate dry steppes of eastern Mongolia. It is strongly connected to *Stipa* spp. feather grass dominated ecosystems within which it is seen as a positive indicator of ecosystem health. It is also considered to contribute to plant diversity with a positive interrelationship between the grazing of the Gazelle and wellbeing of a diversity of other species.

© A.Sichting Mongolian Gazelle herd in its habitat

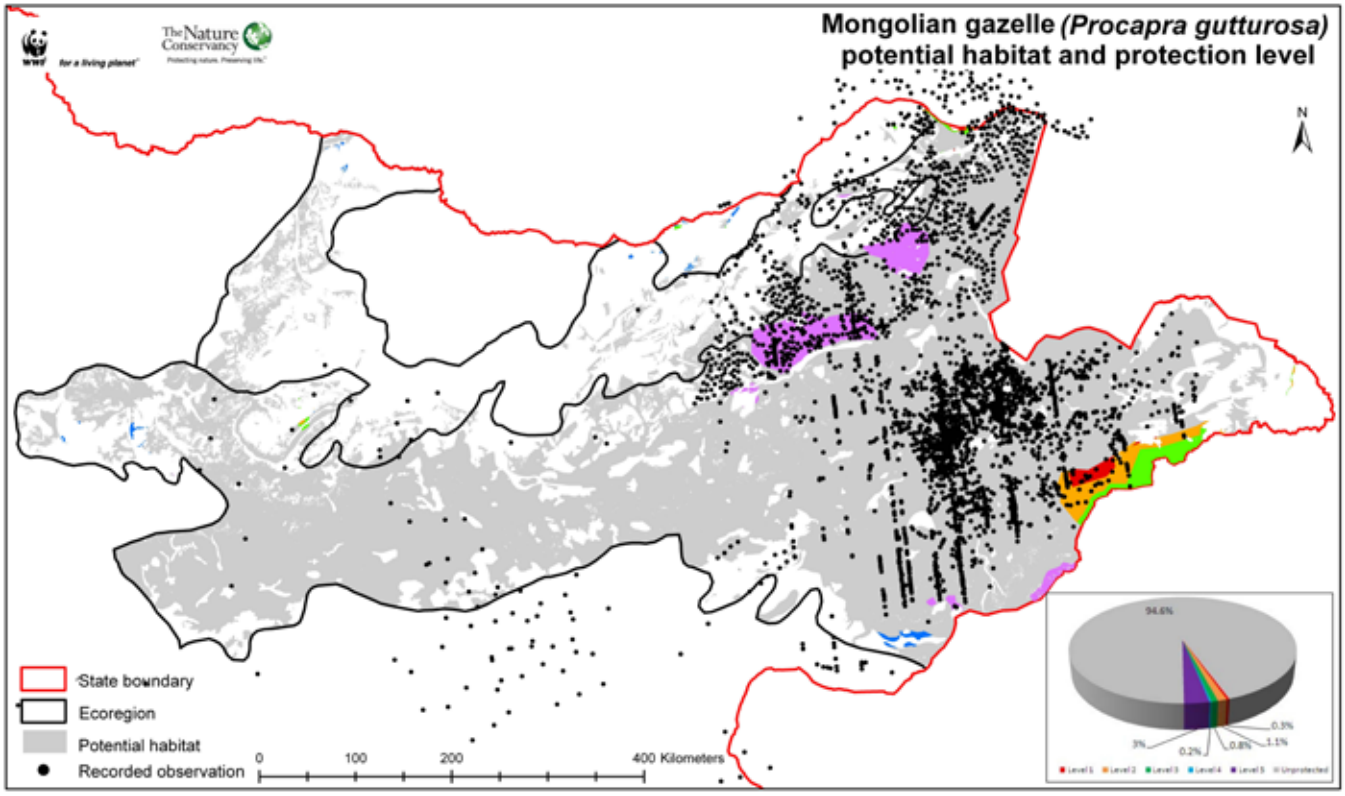
Population

Population estimates over the last 10 years have ranged from 400,000 to 2,700,000. The species is subject to strong population fluctuations and current surveys indicate a population of roughly 1 million.

Causes of scarcity/rarity

Illegal hunting (in addition to the legal har-

vest) is an increasing threat. Former tight control of hunting has weakened during the last decade and annual harvesting is difficult to estimate. The Mongolian Gazelle is harvested for meat and hides. The Ulaanbaatar-Beijing railway is double-fenced and has effectively cut off the smaller populations from the core population in eastern Mongolia and this has led to fragmentation and an isolated population that will have long term impact on the species.



International and regional assessment

The species is characterised as of Least Concern (IUCN) although population trends are very uncertain.

White-naped Crane

(Grus vipio)

© B.Batkhuyag White-naped Crane

Distribution

The White-naped Crane breeds in the Daurian Steppe and adjacent areas along the border between Russia, Mongolia and China. It migrates to its wintering grounds in the Yangtze basin in China, and to southern Kyushu in Japan.

Habitats

It breeds in the wet forest-steppe zone, in grassland marshes, wet sedge-meadows and reed beds. The habitats are placed in wide river valleys, along lakes and in upland wetlands. In winter, it migrates out of Mongolia and is dependent on shallow freshwater lakes, farmland and occasionally coastal flats.

Population

The population is estimated to be around 6,500 individuals out of which, half winters in China and the other half in Korea and Japan. The population is estimated to be declining.

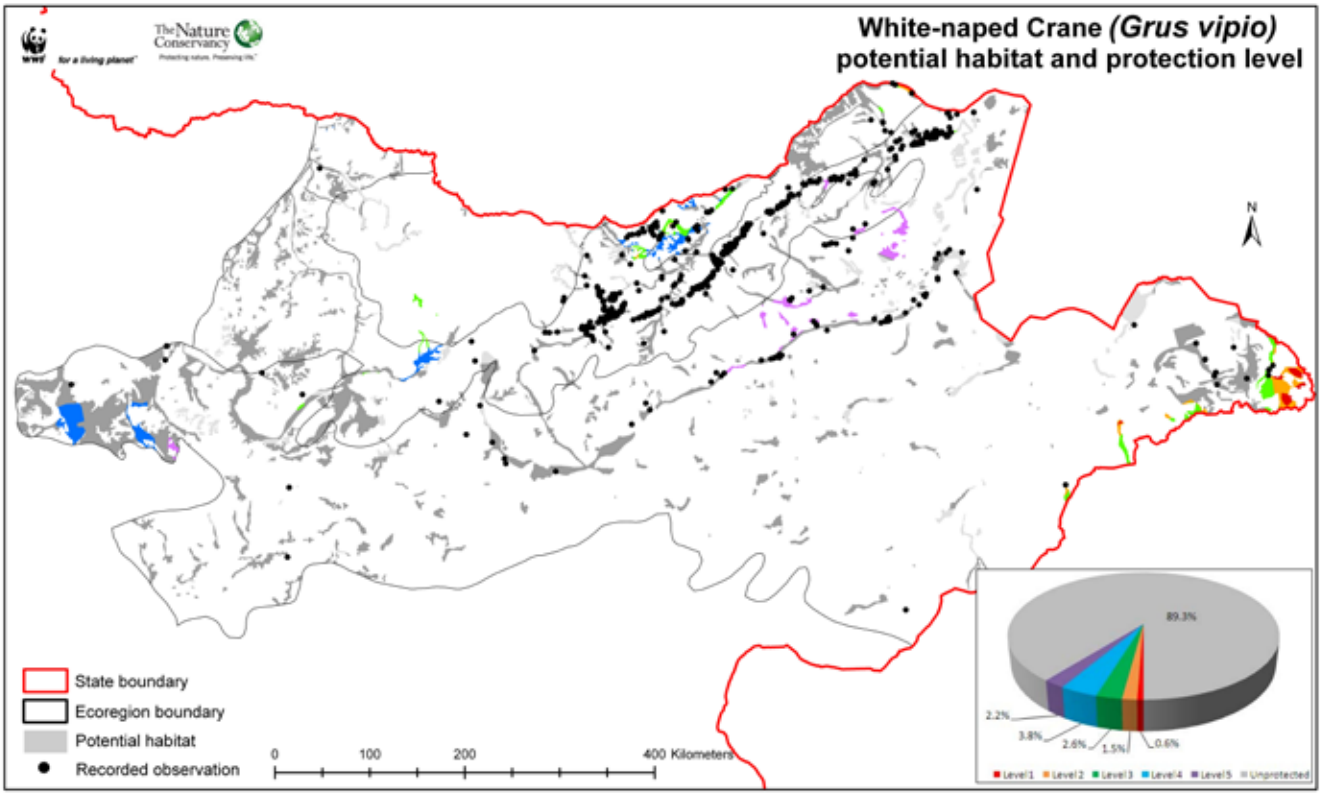
Causes of scarcity/rarity

The loss of wetlands to agricultural expansion, especially in its breeding grounds, is its main threat. Steppe fires also threaten breeding birds.

Human disturbances during the nesting season and overgrazing cause a threat. The main threats to its wintering grounds result from human induced development and an increasing disturbance of wetland functioning.

International and regional assessment

The White-naped Crane has a small population, which is thought to be undergoing a continuing decline. The species is considered vulnerable by international organisations such as IUCN.



© N.Batsaikhan

White-naped Crane in its habitat

Potential habitat

The map below shows the Daurian eco-region in which the potential habitats for the mammals and birds selected and listed above has been analysed.

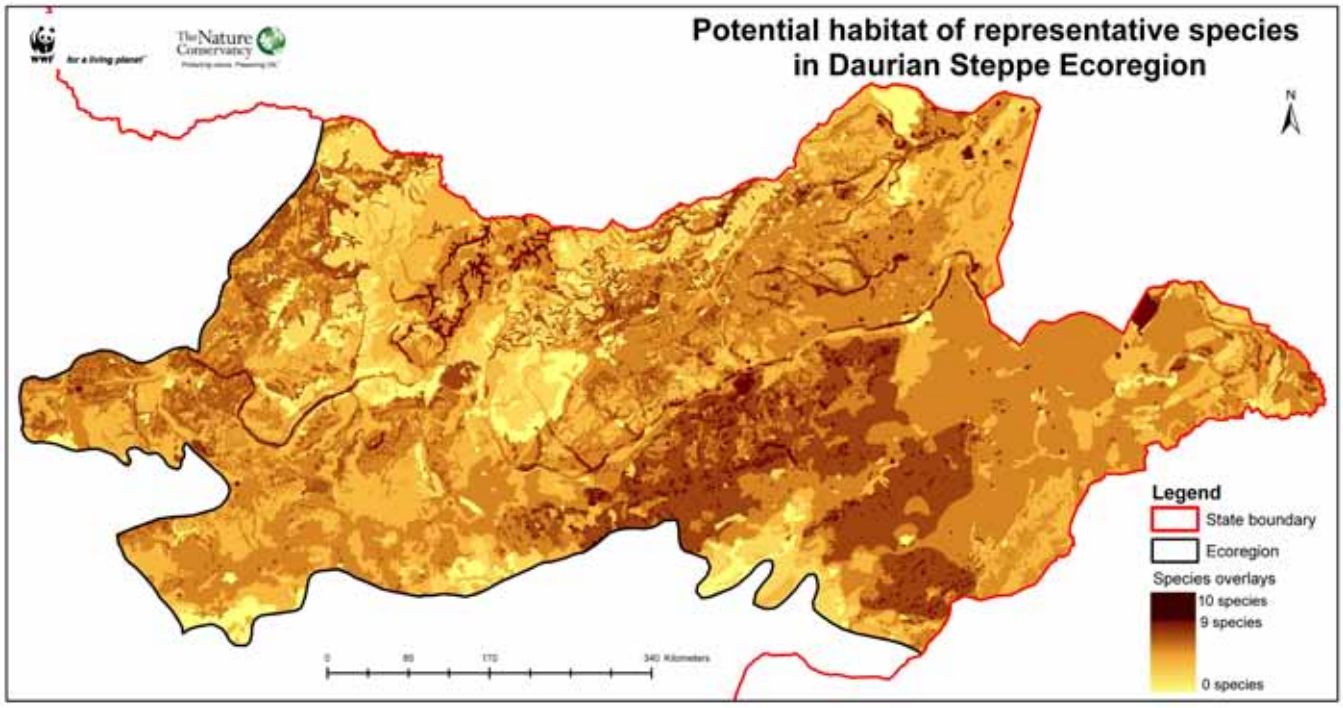
As shown in the maps some species such as the Gray Wolf is less connected to a narrow ecosystem or habitat range. They are generalists with a distribution more related to availability of prey than to specific relationship with another species or habitat. The opposite is true for species like the Swan Goose, linked to a more patchy distribution of specific habitats for nesting and feeding. The Mongolian Gazelle is strictly bound to the grasslands of the wide steppes while the Eurasian Elk is linked to forest, flood plane forest and wetlands.

The maps of the potential habitats show that, for example, the wetlands along rivers suitable for the wetland birds such as cranes and geese are generally protected to a low degree. Similar figures are valid for the Mongolian Gazelle and its habitats – the grass dominated steppes.

On the other hand, forests suitable for the Eurasian Elk and Red Deer are well covered by PA measures, above 30 and as much as 50 percent of this habitat is included in the current PA network.

The concluding analyses of the maps show a number of areas where biodiversity could be successfully protected. These areas are:

- **Ugiy Lake**
- **Sevsuul Mountain**
- **Hurh Valley**
- **Extension of Mongol Daguur SPA**
- **Extention and upgrade of Toson Hulstay NR**
- **Tashgay Tavan Lake**



- **Buyr Lake**
- **Degee River**
- **Dariganga High Plateau**
- **Jaran Togoo Plain**
- **Area South of the Herlen River**

© B.Lkhagvasuren Dariganga High Plateau

Species requiring attention

However, there are also some key species that require special attention beyond an improved PA network. An action plan applying an integrated approach for each species is required. Those species are:

Cranes and Geese

Only about 2-10 percent of their potential habitats are included in the existing PA network. Onon, Ulz, and Herlen river basins support globally important populations of endangered species of both cranes and geese. Thus, an increased area of PAs covering rivers and adjacent wetlands is urgently needed. However, for viable populations there is also a need for increased transboundary cooperation to assure not only summer habitats, but also winter habitats for these species.

Mongolian Marmot

Currently, only 5-7 percent of potential habitats of the Mongolian Marmot are protected, the population has drastically decreased in the last decade. The Marmot used to be a characteristic species of the Mongolian landscape and requires special attention to prevent further decrease in population. Establishment of PAs and a stronger enforcement of hunting regulations are required.

Saker Falcon

This species of Falcon is globally endangered and requires special attention, if Mongolia is to live up to international commitments. The network of PAs covers as little as seven percent of the potential Saker Falcon habitat. However, an increased area of PA will be of little benefit if hunting and export of the Saker Falcon continue as today.

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 3.3.3 Species in Daurian Steppe	KEY FINDINGS	WAY FORWARD
	The Mongolian Gazelle is an example of a species where combinations of measures are needed in order to maintain current populations. PA expansion should focus on more productive grasslands used as breeding grounds. Fragmentation of habitats and distribution areas requires action in general land use planning as well as in expanded PAs.	E 1, E 2, E 7
	The population of the White-naped Crane is an example of a species requiring national and transboundary action plans for improved population management.	E 8
	In terms of biodiversity conservation, there is no need to focus on including more forested areas in the network in the Daurian eco-region.	E 1
	The key areas for high biodiversity potential are not covered by the PA network. These are Ugiy Lake, Sevsuul Mountain, Hurh Valley, Tashgay Tavan Lake, Buyr Lake, Degee River, Dariganga High Plateau, Jaran Togoo Plain, Eej Had Mountain.	E 2

3.3.4 Key Species in Central Asian Gobi Desert Eco-region

The Gobi desert eco-region may be the most famous of the Mongolian eco-regions and covers over 500.000 km² in the southern parts of the country. It is completely dominated by different types of desert ecosystems including some of the driest on earth. The homogeneity of the landscape is broken by a few mountain chains and scattered patches of temporary water bodies as dry river beds.

The biodiversity includes endemic species and sub-endemic species such as *Potaninia mongolica, Nitraria sphaerocarpa, Asterothamnus centrali-asiaticus, Ptilagrostis pelliotii, Amygdalus mongolica, Allium mongolicum* and *Dontostemon senilis*. Among the mammals, there are a number of highly vulnerable species, for example the Gobi Bear, the Asiatic Wild Ass and the Bactrian Camel.

Species selected

The following species of the Central Asian Gobi Desert eco-region were selected for the Gap analysis:

Association maps were developed for all these species, exposing the potential distribution within this eco-region. One of the species and one vegetation association are shown below as examples of information collected and analysed in order to support the Gap analysis.

Areas/sizes and conservation of potential habitats of representative species and communities in Central Asian Gobi Desert eco-region

#	Names of representative species selected in Central Asian Gobi Desert ecoregion	Selection criteria	Percentage of potential habitats in the ecoregion	Percentage of potential habitats in the existing PA network	Percentage of PA under protection level 1 and 2
		Mammals			
1	Asiatic Wild Ass (*Equus hemionus*)	• Declining population • Limited distribution • Globally rare • Vulnerable • Wide ranging individuals/ groups • Disjunctive distribution • Listed in the CITES Appendix I and CMS Appendix II • Listed as very rare species in the Mongolian Red Book	28.5	24.4	6.5
2	Gobi Bear (*Ursus arctos gobiensis*)	• Declining population • Limited distribution • Disjunctive distribution • Globally rare • Critically endangered • Wide ranging individuals • Listed in the CITES Appendix I • Listed as very rare species in the Mongolian Red Book	2.0	99.9	49.5
4	Przewalski's horse (*Equus ferus przewalskii*)	• Declining population • Limited distribution • Globally rare • Disjunctive population • Critically endangered • Listed in the CITES Appendix I • Listed as very rare in the Mongolian Red Book	5.8	31.7	2.6

5	Argali Sheep (*Ovis ammon*)	• Declining population • Widespread scattered distribution • Near threatened species • Listed in the CITES Appendix II • Listed as rare in the Mongolian Red Book	16.8	15.9	2.6
6	Goitered Gazelle (*Gazella subgut-turosa*)	• Declining population • Globally rare • Widespread distribution • Disjunctive distribution • Vulnerable • Listed as very rares in the Mongolian Red Book • Listed in the CMS Appendix II	28.5	24.4	6.5
Birds					
7	Mongolian Ground Jay (*Podoces hendersonii*)	• Declining population • Limited distribution • Vulnerable according to the regional assessment • Listed as very rare in the Mongolian Red Book	23.8	34.0	14.1
8	Short Toed Snake Eagle (*Circaetus gallicus*)	• Rare • Limited distribution • Disjunctive distribution • Vulnerable species according to regional assessment	2.4	26.2	2.8
Reptiles					
9	Gobi Naked-toed Gecko (*Cyrtopo-dion elongatum*)	• Limited distribution • Globally rare • Disjunctive species • Very rare species in the second edition of Mongolian Red Book	0.7	54.4	16
Plant Associations					
10	*Potaninia mon-golica* dominated desert	• Limited distribution • *Potaninia mongolica* and *Brachanthemum gobicum* are endemic to Mongolia • *Potaninia mongolica* is relict species • Disjunctive distribution • *Potaninia mongolica, Brachanthemum gobicum, Cara-gana brachypoda* are listed as very rare in the Mongo-lian Red Book	11.7	20.0	2.2
Plant Associations					
11	*Nitraria sphaero-carpa* dominated desert	• Limited distribution • *Nitraria sphaerocarpa* is sub-endemic • *Iljinia regelii, Zygophyllum xanthoxylon, Reaumuria songorica* are relict species • *Iljinia regelii* is listed as very rare species in the Mon-golian Red Book	5.6	23.5	3.3
12	*Gymnocarpos przewalskii* domi-nated desert	• Limited distribution • *Asterothamnus centrali-asiaticus* and *Ptilagrostis pel-liotii* are sub-endemic • *Zygophyllum xanthoxylon, Ephedra przewalskii* are relict species • *Gymnocarpos przewalskii* is listed as very rare in the Mongolian Red Book	4.6	31.5	6.7

13	*Amygdalus mongolica* dominated desert	• Limited distribution • *Amygdalus mongolica, Incarvillea potaninii* are subendemic species • *Amygdalus mongolica, Incarvillea potaninii* are listed as very rare in the Mongolian Red Book	0.5	27.6	5.7
14	*Stipa gobica-Achnatherum saposhnikovii* community dominated mountain steppe	• Limited distribution • *Saussurea catharinae* is endemic species • *Stipa gobica, Allium mongolicum, Dontostemon senilis* are sub-endemic species	0.2	33.2	18.1
		Plant			
15	Desert living Cistanche (*Cistanche deserticola*)	• Limited distribution • Extremely uneven distribution within its range • Very narrow habitat requirements • Listed in the CITES Appendix II • Listed as very rare in the Mongolian Red Book	8.9	41.8	20.1

Asiatic Wild Ass

(Equus hemionus hemionus)

© Chris Walzer

Asiatic Wild Ass

Distribution

The distribution of Asiatic Wild Ass is limited to Dzungarian Gobi, Trans Altay Gobi, Eastern and Southern Gobi Deserts in the most southern part of Mongolia. The distribution is very limited and the suitable habitats have been reduced by about 50 percent since 1940. There are two bigger populations and one small population with separate (fragmented) distribution range in Mongolia.

Habitat

The Asiatic Wild Ass is found in the Central Asian Desert, desert steppes and semi-desert habitats, as well as some parts of mountain steppe in Mongolia. Additionally, they are found in the Gobi Mountains and the mountain foothills, valleys and in the vicinity of swampy depressions and salt banks.

The Asiatic Wild Ass is a migratory species and its movement and migration is dependent on the yields of pastureland and on the seasons. Late autumn and in winter, big herds usually concentrate from several hundreds to more than a thousand individuals.

Population

National and international researchers recorded that there were about 3,500-5,000 individuals in Trans Altay and Dzungarian Gobi Deserts, 1,000-2,500 individuals in the South Gobi, and 35,000 individuals in the Eastern Gobi steppe in the middle of the 1990s. According to the latest surveys, there are now only 15,000-20,000 individuals recorded in the country, indicating a reduction of 50 percent.

Causes of scarcity/rarity

The main cause of population decrease is illegal hunting for trading of meat. It is estimated that about 3,000 individuals are illegally hunted annually. Mining is a growing concern and risk to violating the integrity of small Gobi SPA sections “A” and “B”. With mining activities, new human settlements and infrastructure development are inflicting increased pressure on the habitats.
Land use issues such as livestock expansion and coal transporting roads and fences along railways result in fragmentation of habitats, restriction of migration, exclusion from grazing areas and water sources.

In addition, the subsequent natural disasters e.g. droughts and dzud, heavy snow falls, partially driven by climate change, cause additional stress to the limited population. Fragmentation of the migration habitats through the railway construction between Tavan Tolgoi and Gashuun Sukhait are likely to negatively affect the populations. The risk of decreasing genetic diversity, following isolation of populations threatens the viability of the species.
Pressure from big carnivores e.g. Gray Wolf and Snow Leopard have negligible impact on the population of the Asiatic Wild Ass.

International and regional assessment

The Asiatic Wild Ass is listed as an endangered species according to the international assessment by IUCN. It is also listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), as well as in Appendix II of the Convention on Migratory Species.
The Asiatic Wild Ass is legally protected by the Mongolian Laws on Fauna and Hunting, and hunting is prohibited. Additionally, the species is listed as a very rare in the second edition of Mongolian Red Book.

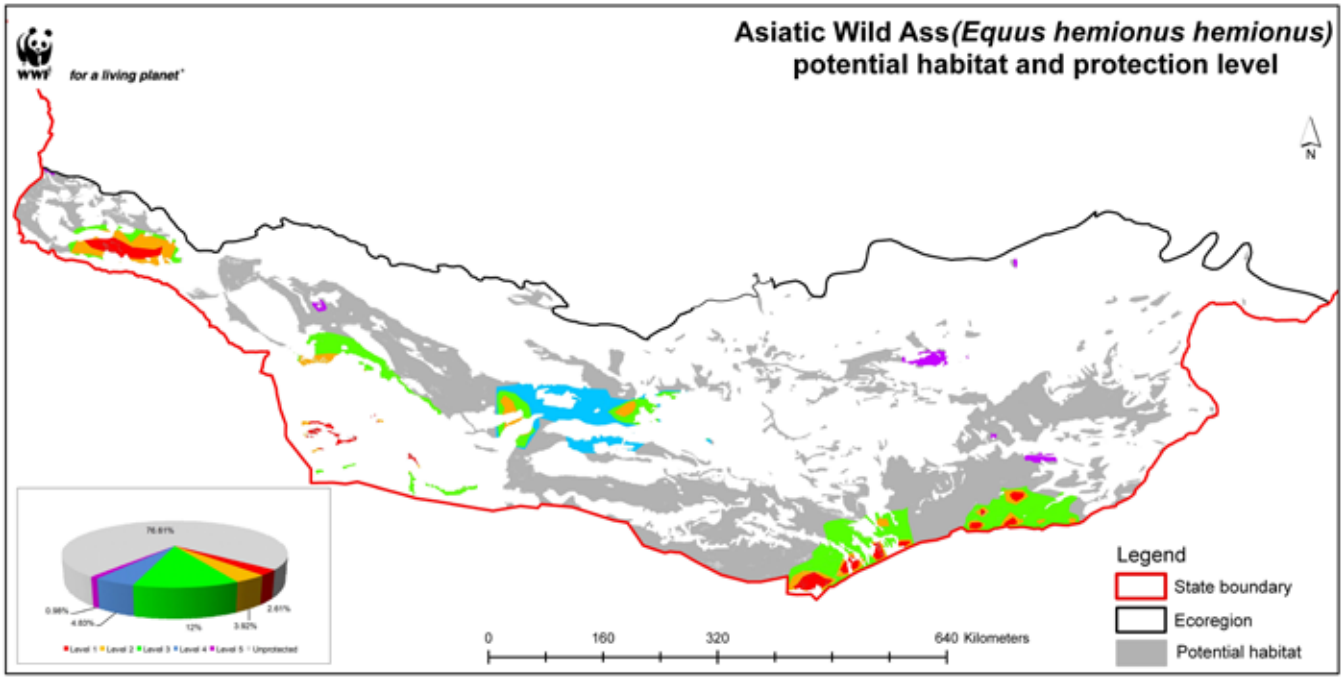
Salt Tree dominated desert

© R.Tungalag

Nitraria sphaerocarpa community

Distribution

The association of plant species is found in the eastern part of Trans Altay Gobi Desert, Alashan Gobi Deserts and southern part of Gobi Altay Mountain range.



Habitat

The Salt Tree dominated desert is most often found on sandy saline soils with gypsum content. These soils are mainly cretaceous deposits of mud and sand transported by ancient rivers to riverbanks and delta areas.

Frequency

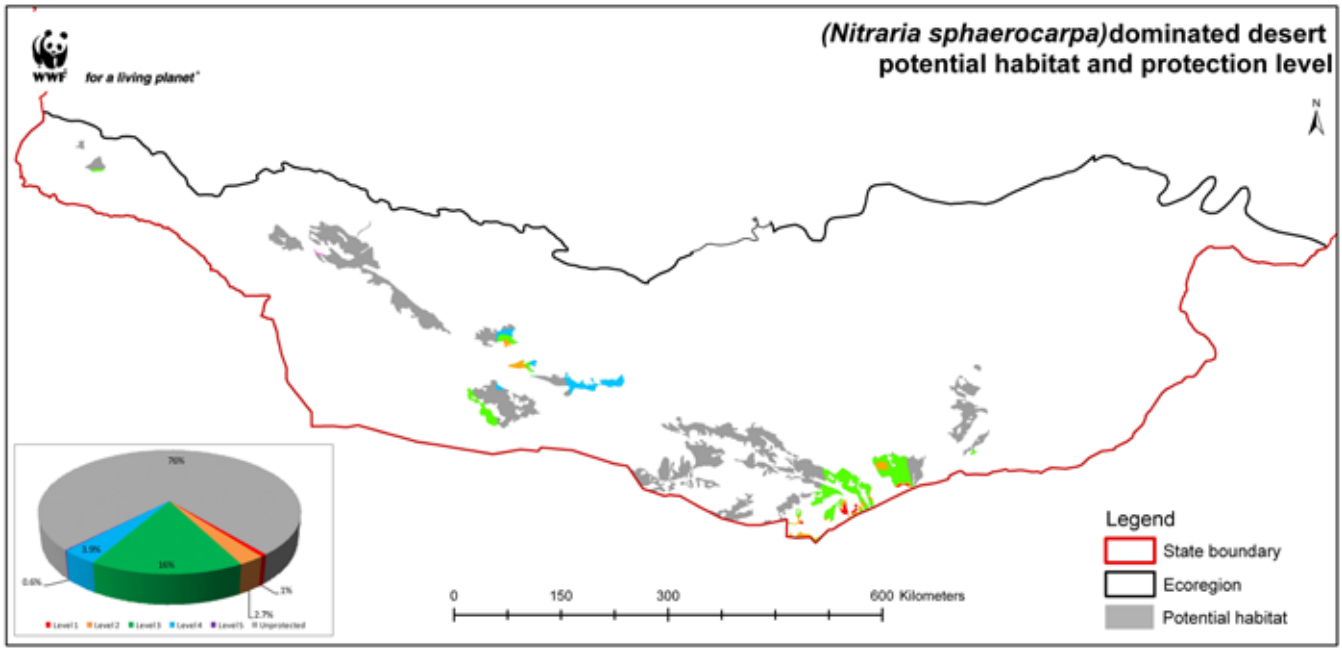
Not assessed.

Plant Community Composition

The Salt Tree dominated desert contains a variety of plants that are limited in distribu-

tion, among those are *Nitraria sphaerocarpa, Reaumuria songorica, Salsola arbuscula, S. passerina, Haloxylon ammodendron, Calligonum mongolicum, Zygophyllum xanthoxylon, Anabasis brevifolia, Allium mongolicum, Iljinia Regelii, Micropeplis arachnoidea, Bassia dasyphylla, B. hyssopifolia, Tribulus terrestris* and *Erodium tibetanum*.

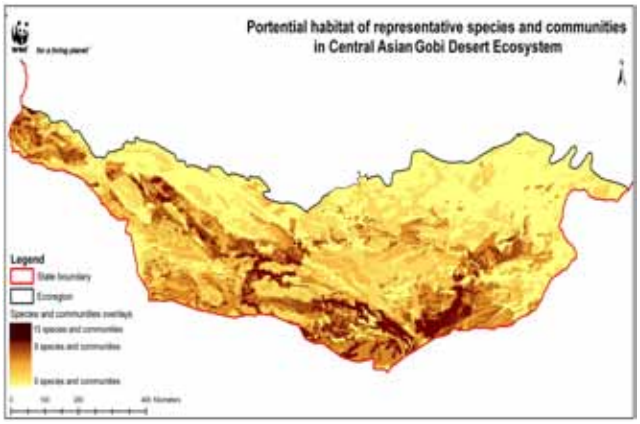
areas with high biodiversity potential. Identified areas such as Zeergent Plain, Borzon Gobi, Ulaan Tolgoy Plain, Hatavch Plain, Sain Tooroy Ulaan Mountain, Hulan Valley, Baytag Bogd Mountain and Edren Mountain would give high biodiversity output if included in the PA network.



Causes of scarcity/rarity

The distribution of this plant association is highly restricted and the structure has been lost due to impact of climate change and human activities (e.g. mining industry).

Potential habitat



Above is the map over the Central Asian Gobi Desert eco-region in which the potential habitats for the mammals, birds, plant associations, plants and reptiles have been analysed. The PA network does not cover key

Species requiring attention

A number of the selected species will require special attention within which extension of existing PA network is only one measure needed.

The Gobi Bear

(Ursus arctos gobiensis)

© L.Amgalan

Gobi Bear in the Oasis

The Gobi Bear is a species that occurs in very limited numbers and within a highly restricted distribution area. The analyses show that

the Gobi Bear, due to very specific habitat requirements, has very limited opportunities to expand its habitat range.

Almost the entire potential habitat is already protected and the only method to further protect the Gobi Bear is to improve the protection level and the legal enforcement in the current distribution range. The Gobi Bear prefers oases that are distributed in patches in the desert. The patches often contain reed and Poplar trees, bushy vegetation with *Tamarix* spp. Their ideal habitat also includes caves and rocky terrain particularly during the hibernation period in the winter.

The Gobi Bear is strictly linked to the Trans Altay Gobi Desert area.

The Bactrian Camel
(Camelus bactrianus ferus)

© Yad.Adiya

Wild Camel herd in its habitat

The existing PA network covers almost 50 percent of the potential habitat of the Bactrian Camel. However, the camel is still considered “Critically Endangered” with a decreasing population. The Protection levels within the existing PAs could be improved to facilitate better conservation of the species. Further, more than 50 percent of the potential habitat is unprotected including patch ecosystem areas in Dzungarian Gobi and Borzon Gobi.

Expansion of the PA network together with improved enforcement of existing PA regulation is certainly needed. Fragmentation of potential habitats is a key issue requiring attention. Mongolia as a country has a special responsibility for this species being endemic to the country.

Gobi Naked-toed Gecko
(Cyrtopodion elongatum)

© N.Batsaikhan

Gobi naked-toed Gecko

The Gobi Naked-toed Gecko is a vulnerable species with a very limited distribution range. The habitat requirement is connected to patch ecosystem with desert hummocks and oasis. Although much of the potential habitat is already in the PA network, the protection level is quite low. Strengthened protection measures would favour population development of this species.

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

	KEY FINDINGS	WAY FORWARD
Chapter 3.3.4 Species in Central Asian Gobi Desert	The potential habitat areas are relatively well covered but decreasing populations and increasing mining activity require attention with respect to ecological integrity, ecological corridors, fragmentation and land use planning in general.	E5, E7
	Several of the key species selected are in need of special attention in the form of Endangered Species Management Programmes.	E 6
	The Asiatic Wild Ass and the Bactrian Camel require vast habitats for viable population size. The PA network is currently not effective in this aspect. In addition, in order to further expand the PA network, measures such as transboundary cooperation are needed to avoid habitat fragmentation and population decrease.	E 5, E 6, E 8
	The PA network does not cover key areas with high biodiversity potential. Identified Areas such as Zeergent Plain, Borzon Gobi, Ulaan Tolgoy Plain, Hatavch Plain, SainTooroy Ulaan Mountain, Hulan Valley, Baytag Bogd Mountain and Edren Mountain would give high biodiversity output if included in the PA network.	E 1, E 2

CHAPTER 4 TYPES OF PRESSURES AND THREATS

The fact that biodiversity is under threat is the ultimate reason for the CBD process and also for the Gap analysis. This is obvious outside the PA network., but also inside the existing PA network in Mongolia. As in all other PA networks across the globe, a number of current pressures and future potential threats can be identified and action or at least planning of action is necessary. A number of studies have been made to analyze how the current pressures affect biodiversity conservation effectiveness and the integrity of the PAs. An increased understanding of the current pressures means that stakeholders will be better equipped to take strategic decisions and thereby avoid real and negative impacts on the PAs and the conservation ambitions.

4.1 Types of pressure and threats

There are differences in the nature of the pressures and threats to the biodiversity. For example, logging is often restricted by law, though it is still practiced through illegal activities, but can be addressed by improved law enforcement. The conflicts around land use are examples of inadequate administrative functions, where PA administrations and surrounding local and regional authorities need to improve cooperation and consistency. Further, there are pressures and threats that are caused by climate change or invasion of alien species where the current management of PA can only try to find means to reduce these problems.

In the so called Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) analysis, jointly conducted by MNET and WWF in 2005, the following pressures and threats were identified and grouped here into 3 levels in the order of estimated seriousness:

Most serious pressures and threats

Logging

Logging is normally regulated in the decisions on PA's with the theoretical outcome that trees are not felled. However, in practice this is not always enforced and illegal logging is a big problem in several PAs. Most forested PAs view illegal logging as an increasing threat with significant difficulties in enforcing rules and regulations. Improved cooperation with local communities, sharing benefits of protection and of course improved enforcement by better-trained and trustworthy rangers are ways to reduce this pressure and threat.

© B.Munkhchuluun Impact of logging

Land use

There is currently a lack of coordination between the protection ambitions and the planning of possible land use around and in the PAs. This is partly caused by the fact that the authority over PAs and Land Use Planning are not the same and are not encouraged to cooperate. Buffer Zones have been established in several PAs, however with little mandate and function to reduce the conflicting aspects between use and conservation. An improved land use process and increased awareness about the linkages between the PAs and the surrounding land are necessary tools to reduce this pressure.

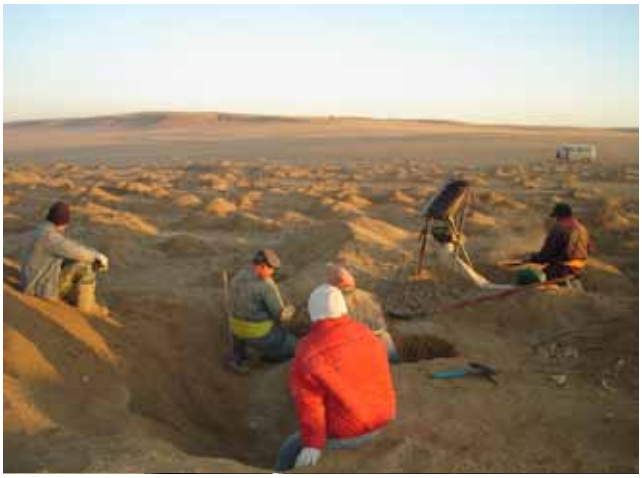
© D.Sanjmyatav Gorkhi-Terelj NP

Mining

Mongolia is a country with outstanding biodiversity and mineral wealth. This leads to conflicts regarding protection levels of established PAs and discussion of potential lifting of protection regulations from some PAs. Licensing of mining rights is also done in areas that are potential areas for effective conservation of species on the endangered species list. Mining is therefore less of a

pressure and more of a threat. The threat is that economic interests in mining will be stronger than conservation and thereby reduce the opportunities to set aside new PAs and even keep others under conservation status. The infrastructure required for mining poses a risk to the migrating herds of species such as the Asiatic Wild Ass and Mongolian Gazelle. Railroads are constructed surrounded by fences that cut off inherited migration routes between grazing areas and dividing threatened populations into even smaller groups with risk of genetic loss and population decline.

While legal and responsible mining can contribute to conservation or at least minimize damage, illegal, artisanal mining constitutes a big and complex environmental and social problem in certain areas.



© Yo.Onon Illegal miners

Grazing

The tradition of herding leads back to the time when human race first established itself in Mongolia. The culture is strongly linked to the sustainable use of natural resources through herding practices, requiring migration and availability of vast rangelands. As in all pastoralist cultures, conflicts and unsustainable use of resources have arisen when modern culture has entered the scene. Reduced pasture areas by conflicting land use, capitalization of economy and migration to urban centres are some of the common patterns. Improved livelihood requires bigger herds and deprived livelihoods cause overuse of limited natural resources such as water and grass. Recent decades in Mongolia have seen a tremendous increase in the number of livestock and in addition, an increase in more aggressive grazers such as Cashmere goats. In certain areas such as Khovd Aimag, number of livestock has surpassed twice the overall carrying capacity of the land. Unclear legal and institutional frameworks, weak political leadership and limited alternatives for income generation lead to a vicious circle of overgrazing, loss of biodiversity and increased poverty among the herders.

Support to and cooperation with local pasture management groups, exclusive leasing procedures combined with more strict application of PA regulations could help reduce the problem.

© G.Sukhchuluun Railroad threat

Hunting

Hunting in Mongolia is well regulated in the legal framework, however the enforcement is weak and irregular. Poaching is common and often targets spectacular species or species linked to oriental medicine traditions. Conflict between predators and domestic animals is also a well-known cause of illegal hunting. Recent studies have shown that poaching pressure is high in almost all PAs as well as in the rest of Mongolia. A number of species listed in both the Mongolian Red List and on international lists of endangered or migrating species are still under pressure from poaching, among those are for example Moose, Red Deer, Marmots and Saker Falcons all of which could be conserved in a PA network. However, populations are currently declining due to both overhunting and

poaching. The Saker Falcon is frequently illegally and legally captured and used in falconry abroad. Stronger enforcement and alternative incomes/improved livelihoods are the most effective measures against the threat of poaching.

© G.Olonbaatar Marmot Poaching

Medium seriousness

Hydropower development

Current development in Mongolia requires large-scale support of electricity. The use of coal leads to both national ecological stress through mining as well as global impacts of the release of greenhouse gases and CO2. Hydropower is obviously a more sustainable source, if well planned and implemented. However, recently a number of cases have shown that hydropower establishment can have fatal impact on river and lake ecosystems when filling of dams cuts of water supply to downstream placed lakes, wetlands and streams, even if those are placed under protection scheme as NP or SPA. Severe impact on fish migration has also been noted. Improved planning and practicing of Integrated Water Resources Management could minimize the risk connected to hydropower development.

© N.Enkhbayar Taishir Hydro Power Plant

Tourism, tourist camps and recreation

Tourism, in addition to grazing is a source of tension for all PA managers. On one hand, they can contribute funding, income and increased cooperation with local communities. On the other hand, if badly planned, managed or implemented, they can lead to deteriorating environmental qualities. Most PAs in Mongolia are facing increased pressure from tourism and a general lack of competency and capacity to strategically handle the increasing number of visits from tourists. Improved management planning and understanding of tourism values and markets could lead to reduction of pressures and threats.

Less serious

The inventory of Pressures and Threats made by PA staff also lists a number of less serious, but still important threats to the sustainability of PAs and their values. Along the border with China, a number of cases have occurred where the difference in protection status has allowed hunting of species in China that has had negative impact on populations of protected species in Mongolia. The possibilities to establish cross border PAs, as recommended in Chapter 3, could be one way to deal with current differences in conservation ambitions along the borders.

Further, both the harvest of Non Timber Forest products (NTFP) and the disposal of waste have been cited as threats and growing problems in several PAs, both of which seem to have solutions in improved planning and enforcement of existing rules and regulations in the respective PA.

4.2 Mapping pressures and threats

What was mapped?

As part of the current Gap analysis, we identified a variety of threats and pressures. Urban or human settled areas, large and small-scale mining, road networks and agricultural land use all represent pressure and threats to biodiversity as described above.

An example of figures used for analysing landscape/ecological impact of human activities. Similar tables were made for each of the four eco-regions.

Central Asian Gobi Desert eco-region				
Threats & pressures		Distance (metre)	Decline	Weight
Aimag centre		10000	Moderate	500
Soum centre		5000	Moderate	500
Road network	Paved road	500	Abrupt	500
	Improved dirt road	1500	Abrupt	500
	Track or dirt road	1000	Abrupt	500
Exploitation site, oil drilling, mining and pits		6000	Abrupt	500
Artisanal and small scale mining		3000	Moderate	500
Agricultural land		100	Gradual	100
Tourist camp		1000	Moderate	300
Border point		2000	Gradual	300

As a tool to increase the understanding of the threats and the potential to set aside new areas for conservation, a selection of threats were described and mapped, thereby creating a new GIS layer for analysis. The outcome is a map that can be used for planning of future conservation measures.

For example, in the areas where high density of threats prevails, it will be less effective to localise a new PA. On the other hand, if the map of potential habitats of key species (Chapter 3.5) overlaps with more intensive threats, the map can also describe the urgency of conservation action. Further, the map gives an excellent picture of fragmentation of habitats not least for the migrating herds of ungulates.

The pressures of the threats vary from region to region- both in relation to type and of threat and severity of the impact. This in turn, depends on the ecology of the eco-region, the physical features such as soil, topography and hydrology. Considering the specific geographical characteristics of each eco-region, we developed models of threats and pressures based on three impact indicators making it possible to give each source geographical coordinates and thereby a distribution on the maps:

Distance – describes the distance from the activity to where the threat declines to zero. It varies between threats, but also between eco-regions (Above table indicates the distance in meters).

Decline – describes how fast the threat declines on a line from the source to the edge of impact (gradual, moderate and abrupt indicate the rapidness of decline).

Weight- is a factor describing how serious an impact the threat has. Combining it with impact decline gives a decreasing threat from the source (A relative scale from 500 to 100 where 100 is lighter) (See above table).

What is not mapped?

The methodology used is developed in order to understand threats of point source character. This means that a number of anthropogenic threats are not mapped. Among those are the threats related to *herding and grazing*. Few areas, including most of the PAs in Mongolia are exempted from grazing and the intensity varies from herd to herd depending on number and combination of livestock.

Moderate grazing has sometimes a positive impact or relation to biodiversity while overgrazing is one of the main environmental problems in Mongolia. However, it is simply not possible to combine the grazing factors with geographical coordinates and therefore grazing is not included in the analysis below.

Climate change is another factor not suitable for GIS modelling in the context of a Gap analysis. Climate change is a dominating factor in the current changes in the Mongolian landscape and much research is needed to increase the understanding of how Mongolian land use should be adapted to future scenarios of the changing climate. The changes will affect biodiversity and a strategy concerning the relationship between climate change and PA management is needed in the close future. It is obvious that the development of hydropower stations has an environmental impact. Much of this impact can be managed and reduced. However, the impact on upstream and downstream ecological functions caused by changed hydrological schemes in the rivers, lakes and wetlands should not be underestimated and is often not considered or understood. This impact varies from area to area and from scheme to scheme and thus it has not been possible to include in the GIS model developed for this Gap analysis.

4.3 Pressures and threats in the four Eco-regions

This chapter describes the result of the GIS based mapping of pressures and threats as described above in Chapter 4.2.

4.3.1 Pressures and threats in the Altay-Sayan Eco-region

Pressures and threats on the eco-region

Pressure and threats in the Altay-Sayan eco-region are relatively low and appear in a scattered pattern, mostly originating from point sources such as settlements (center of aimag and soum), hydropower stations, agricultural development, tourist camps and small mining activities (Please see Altay-Sayan Ecoregion Threats Map).

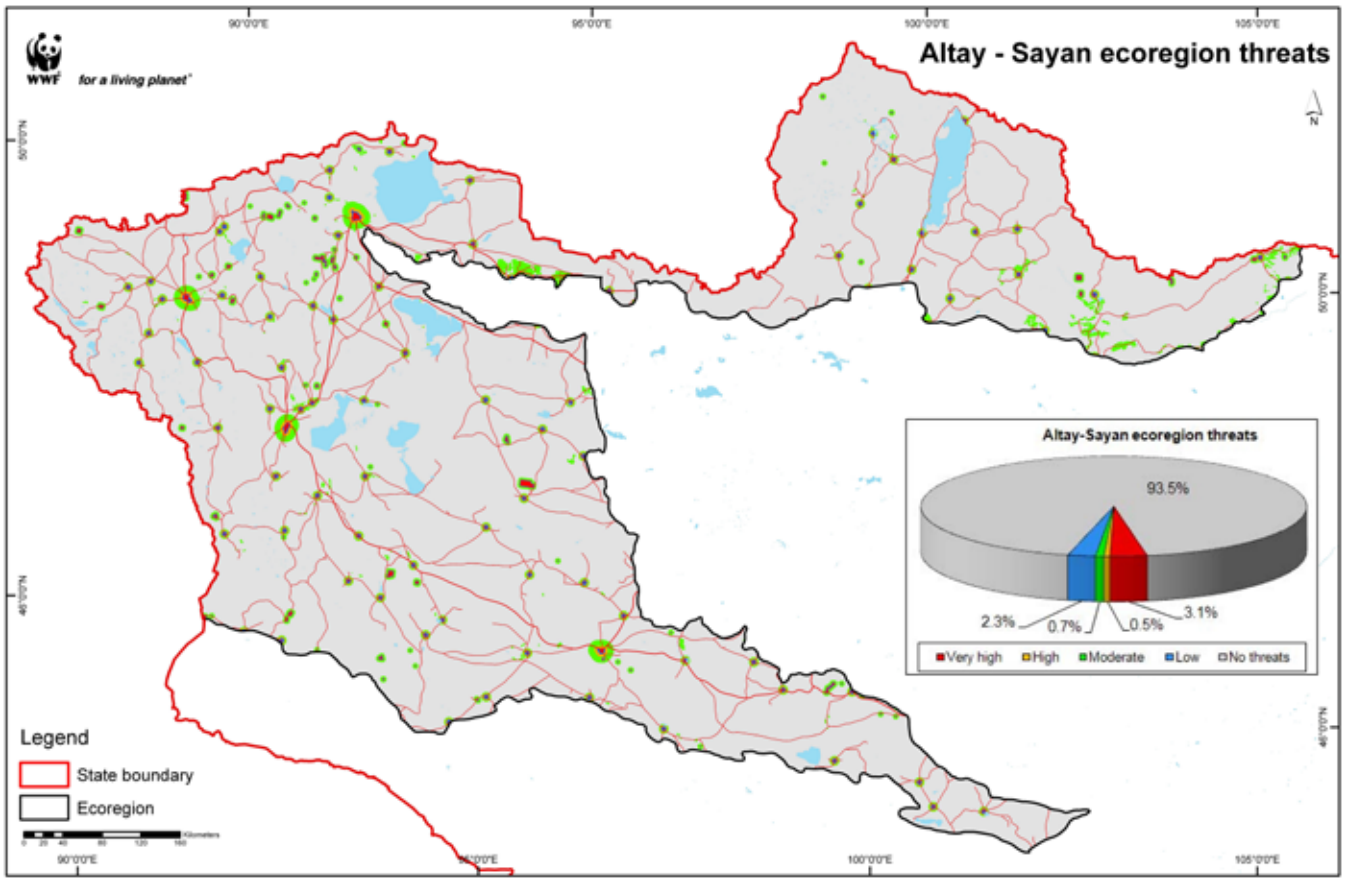
Pressures and threats on the ecosystems

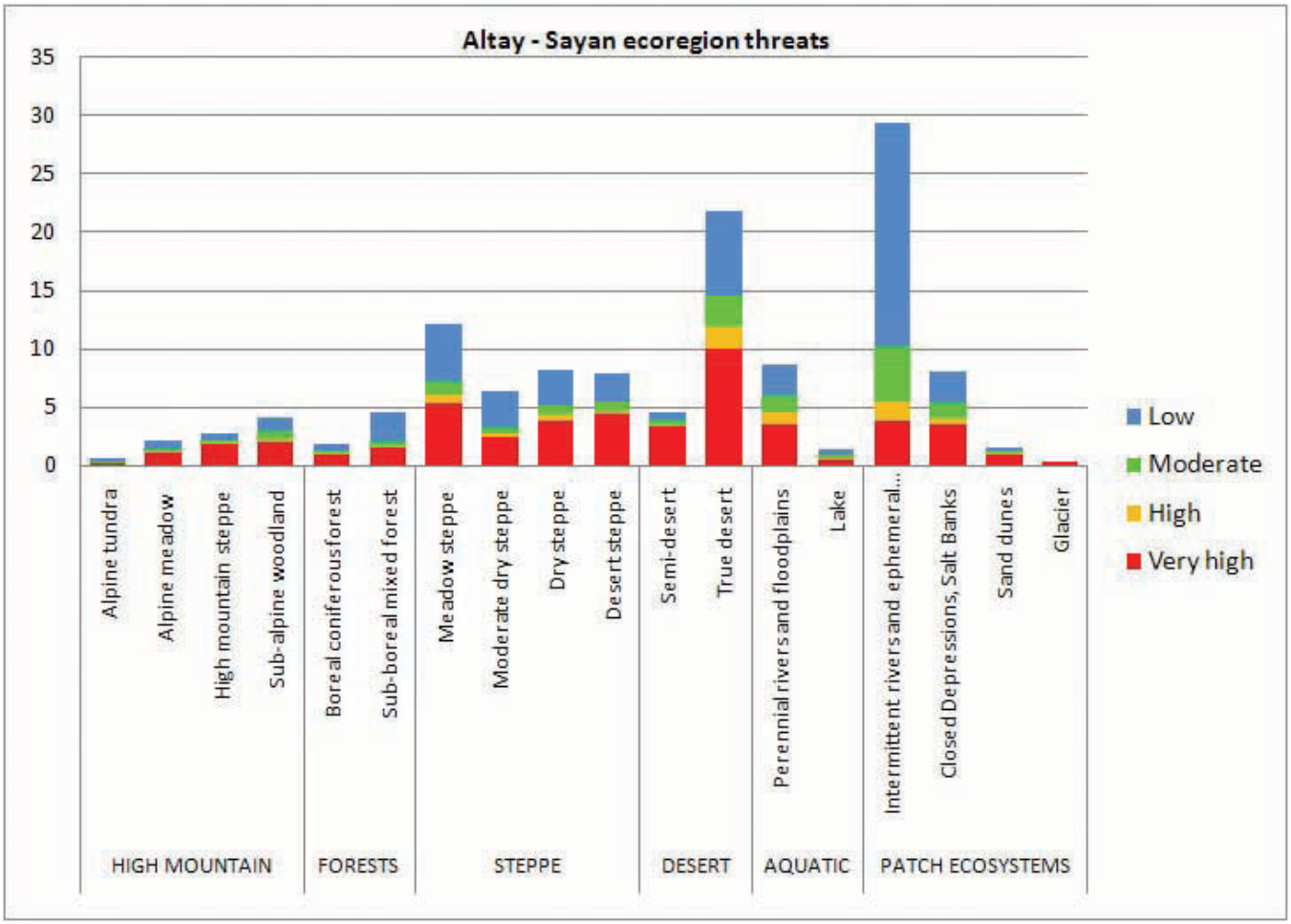
The ecosystems under highest threat are the intermittent river and ephemeral channel and the true desert ecosystems. Further, over 10 percent of the meadow steppe ecosystem along the rivers is under threat mainly from agricultural activities, while the other ecosystems are currently under low level of threat and pressure (Please see diagram of Altay-Sayan Ecoregion Threats).

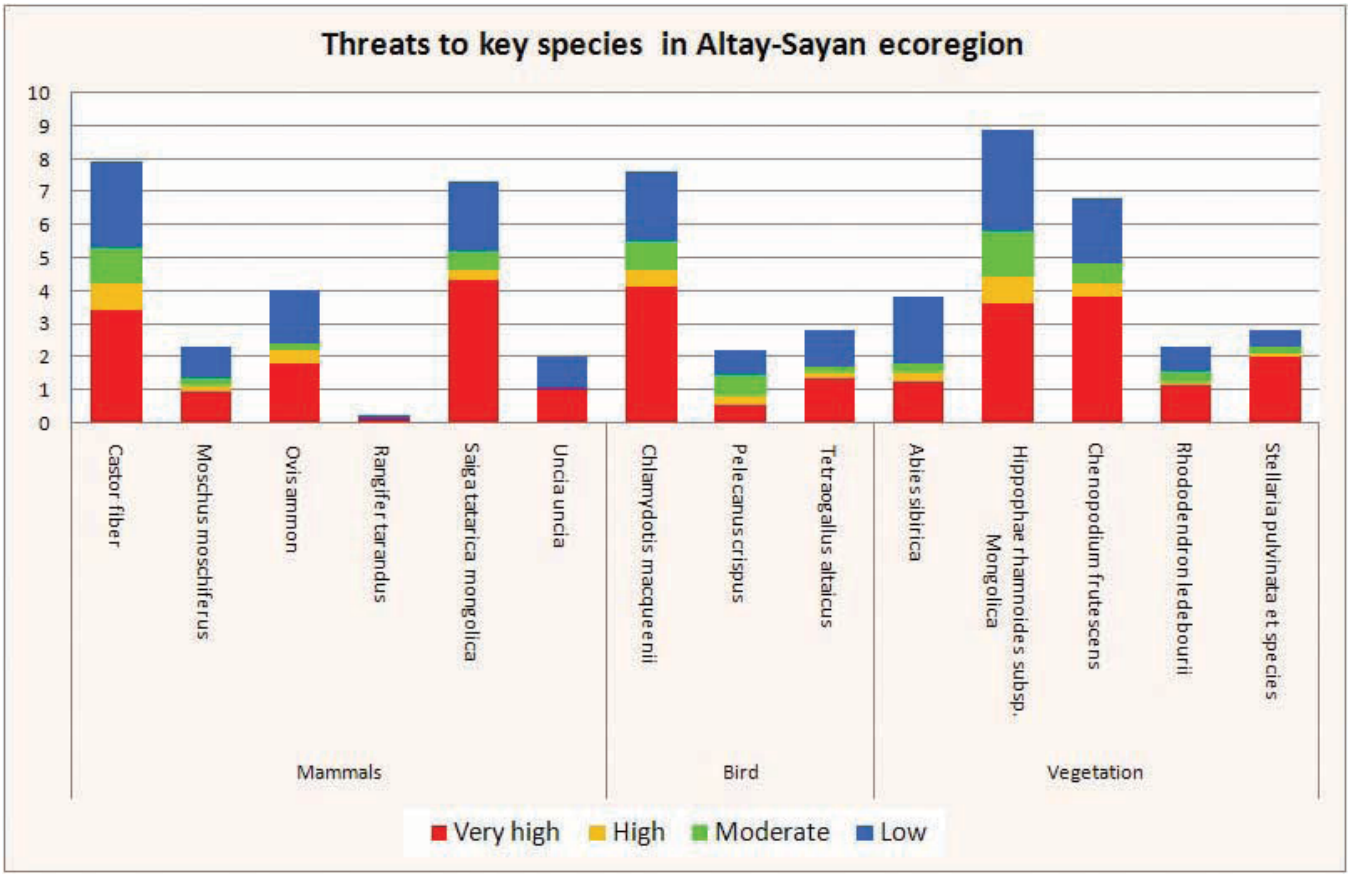
It should also be noted that the presence of mapped threats in the northern part of the eco-region is generally low. This means that establishing new PAs to conserve boreal coniferous forest and Alpine tundra, being the habitats of Reindeer (*Rangifer tarandus*), should be managed with relatively low conflict levels.

Pressures and threats to key species

The analysis shows, that the level of threats to the key selected species are generally low. This means that there is good room for expansion of the existing PAs. Among the species requiring particular concern are the Mongolian Saiga and the Macqueens Bustard. Particularly, the conservation of Saiga Antelope, which is linked to the desert steppe ecosystem, seems to have good opportunities to be successful as the level of threats is low. Also the habitat of Snow Leopard, being the mountainous area, is under a relatively low level of threat and conservation measures therefore should generate a low level of conflict. It must however be noted that the analysis above does not take into consideration the pressure from grazing and herding. There is an obvious conflict between biodiversity conservation and herding as described above in Chapter 4.1.


Altay - Sayan ecoregion threats
for a living planet
Altay-Sayan ecoregion threats
93.5%
2.3%
0.7%
0.5%
3.1%
Very high
High
Moderate
Low
No threats
Legend
State boundary
Ecoregion


Altay - Sayan ecoregion threats
35
30
25
20
15
10
5
0
Alpine tundra
Alpine meadow
High mountain steppe
Sub-alpine woodland
Boreal coniferous forest
Sub-boreal mixed forest
Meadow steppe
Moderate dry steppe
Dry steppe
Desert steppe
Semi-desert
True desert
Perennial rivers and floodplains
Lake
Intermittent rivers and ephemeral...
Closed Depressions, Salt Banks
Sand dunes
Glacier
HIGH MOUNTAIN
FORESTS
STEPPE
DESERT
AQUATIC
PATCH ECOSYSTEMS
Low
Moderate
High
Very high



Chapter 4.3.2 Pressures and threats in Hangay Eco-region

Pressures and threats on the eco-region

In comparison with other eco-regions, the entire Hangay eco-region has relatively low presence of pressure and threats, with the exception of threats related to road networks, human settlements and agricultural activities. Mining activities cause pressure in the southern and eastern parts of the eco-region resulting in serious concern as much of the sources of the fresh water basins are based here (Please see Hangay Ecoregion Threats Map).

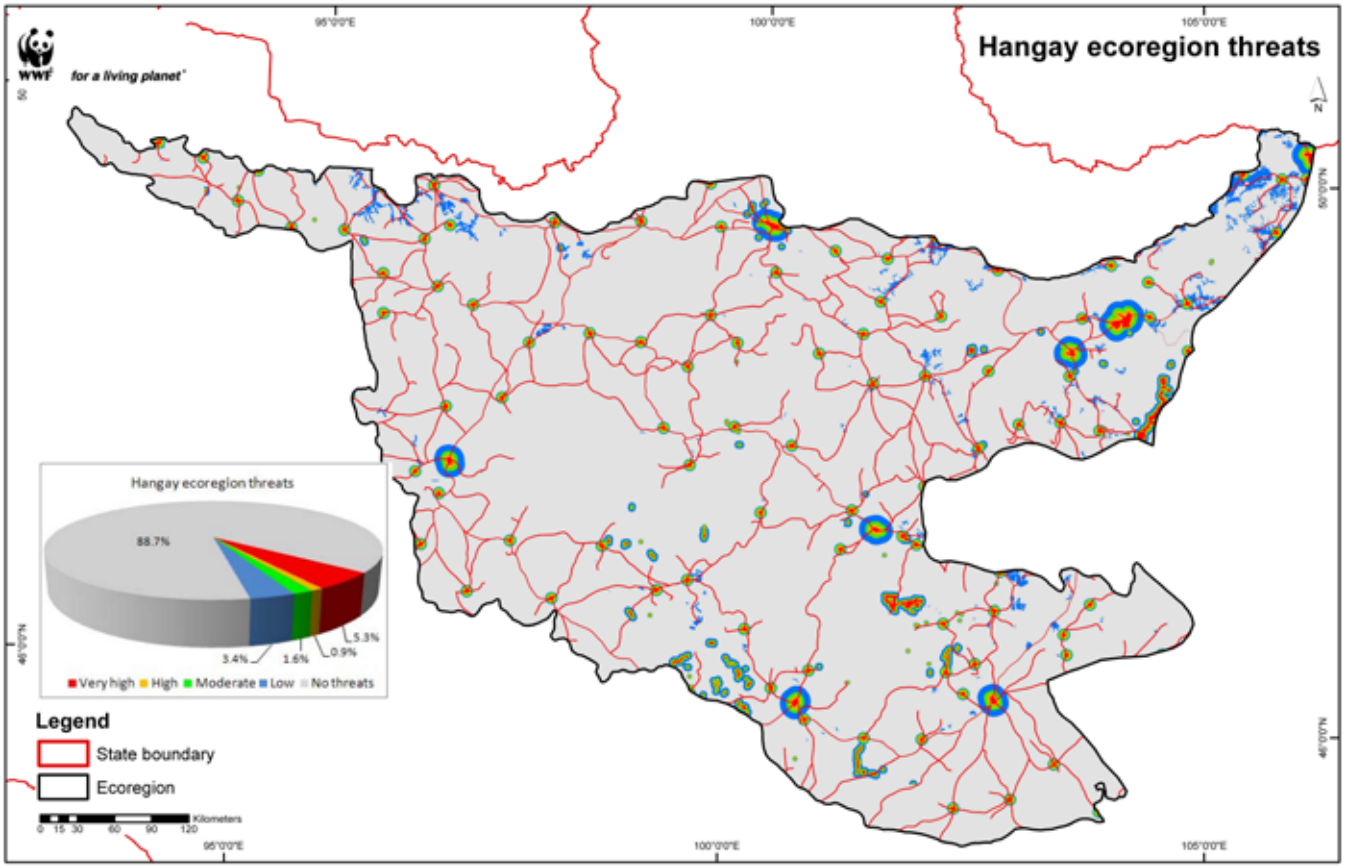
Pressures and threats on the ecosystems

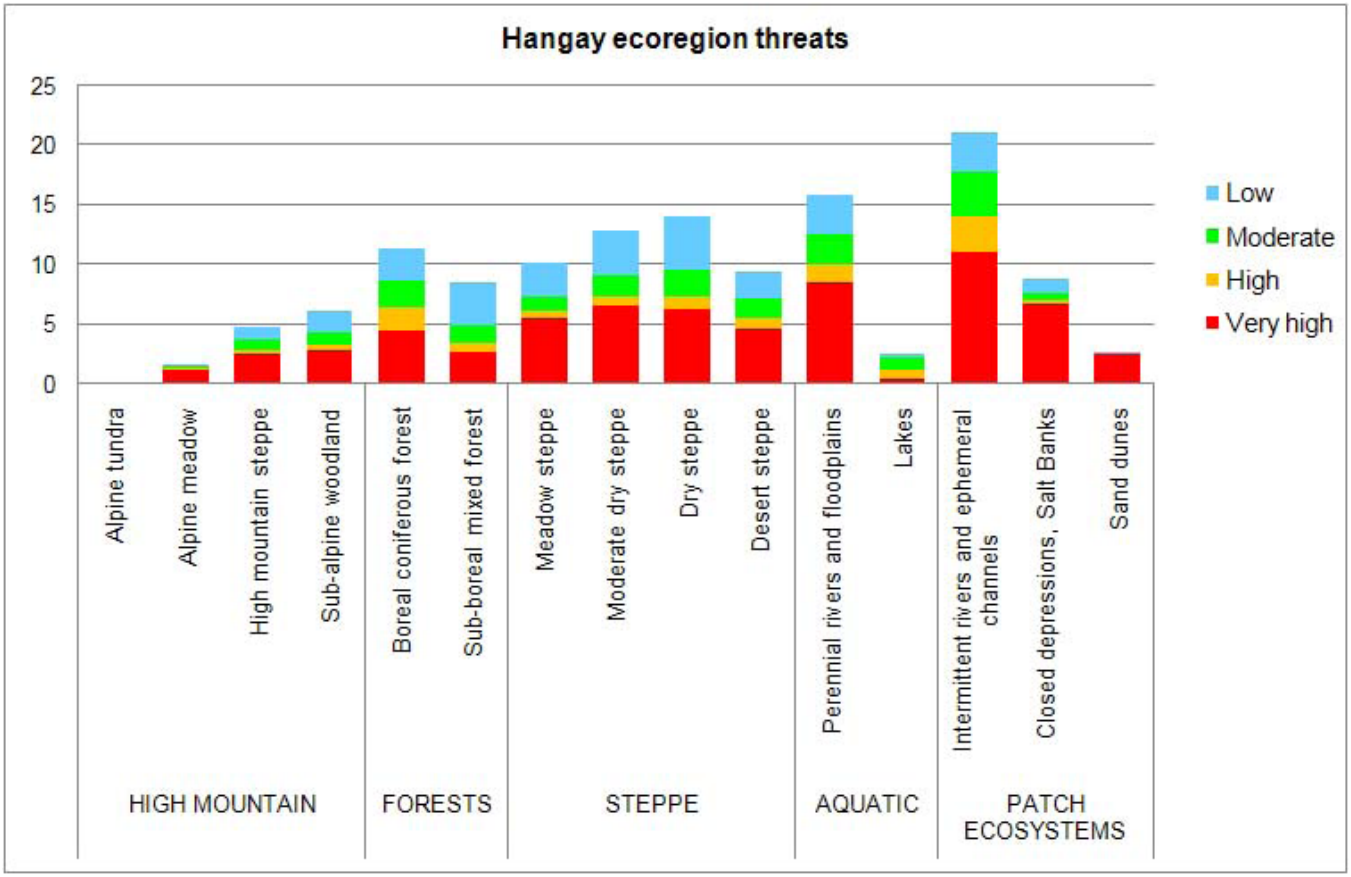
The ecosystems most affected and under most threat are the Aquatic Ecosystems and especially the ecosystems present as patch ecosystems (see Chapter 3.3). The diagram shows that both intermittent river and ephemeral channel ecosystems and the Perennial River and Floodplain ecosystem are most affected. This is a general picture in the Central Asian and Arctic freshwater ecosystem and requires special attention if substantial conservation values are to be preserved (Please see diagram of Hangay Ecoregion Threats).

The dry steppe and moderate dry steppe ecosystems, both of which have a limited distribution in the eco-region, are under more serious threat. This is concluded even before the serious pressure of grazing is included in the analyses. As logging and forestry related activities are also not included in this analysis it should be noted that the forest ecosystems are under serious pressure and threat even if the current analysis shows relatively low pressure. This is made even worse as forest fires cause severe environmental and conservation damage. If these threats were included in the analysis, the situation for the forest eco-systems would be much more dramatic than the map shows.

Pressures and threats to key species

According to the analysis of threats and pressure to the potential habitats of the selected species and plant communities in Hangay eco-region, a relatively small portion of their potential habitats are under threat.


Hangay ecoregion threats
for a living planet
Hangay ecoregion threats
88.7%
5.3%
3.4%
1.6%
0.9%
Very high
High
Moderate
Low
No threats
Legend
State boundary
Ecoregion
Kilometers
0 15 30 60 90 120


Hangay ecoregion threats
25
20
15
10
5
0
Low
Moderate
High
Very high
Alpine tundra
Alpine meadow
High mountain steppe
Sub-alpine woodland
Boreal coniferous forest
Sub-boreal mixed forest
Meadow steppe
Moderate dry steppe
Dry steppe
Desert steppe
Perennial rivers and floodplains
Lakes
Intermittent rivers and ephemeral channels
Closed depressions, Salt Banks
Sand dunes
HIGH MOUNTAIN
FORESTS
STEPPE
AQUATIC
PATCH ECOSYSTEMS

Among the species in this eco-region, the black stork is highly affected by pressures and threats and over 10 percent of its potential habitat is affected by human activities.

Since the fresh water ecosystem is highly affected, the threats and pressure to the species is high, which in turn indicates the need for special conservation measures (See diagram of Threats to key species in Hangay eco-region).

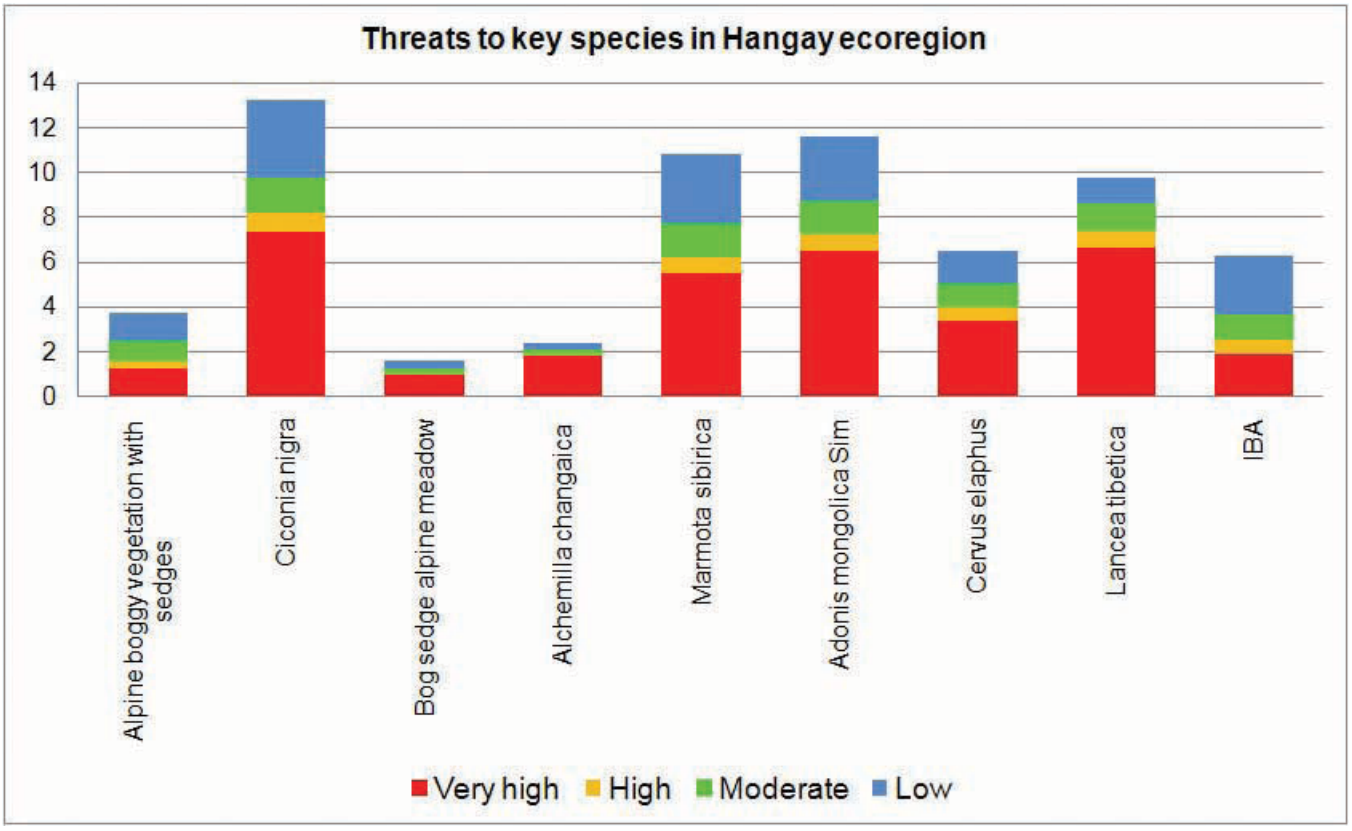
4.3.3 Pressures and threats in the Daurian steppe Eco-region

rounding suburbs are easily identifiable and represent a high pressure and threat to biodiversity and the PA network.

To the east of Ulaanbaatar the increasing presence of tourist camps, human settlements and mining sites is a further cause of pressure and threats. In the rest of the eco-region the vicinity of Choir indicates pressure and threat from mining and road network in these dry areas.

Pressures and threats on the ecosystems

Consistent with what is described above concerning the eco- regions, the aquatic ecosystems represent the ecosystems under highest pressure and threat.

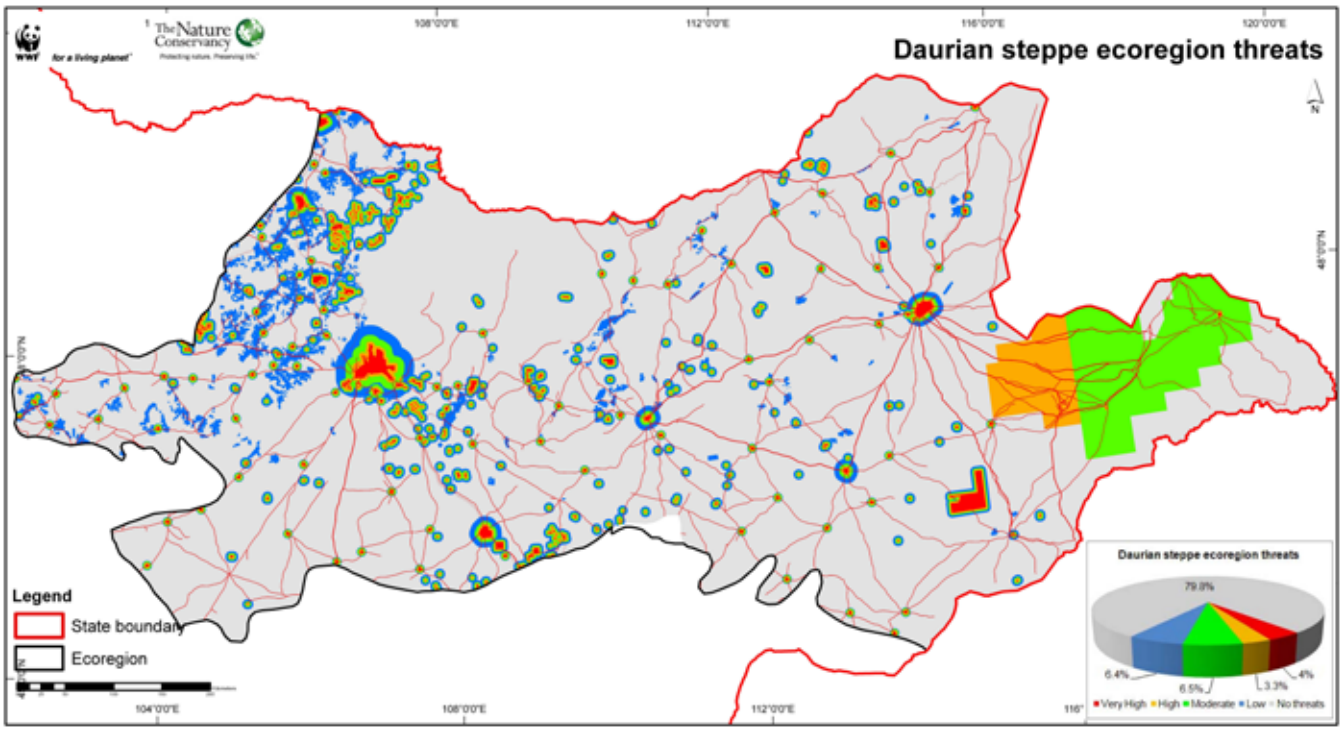


Pressures and threats on the eco-region

This eco-region covers both the Mongolian capital, Ulaanbaatar, and the areas in the East where the presence of oil and minerals causes both pressures and threats.

The map shows high frequency of red spots in Orkhon-Selenge river basins, indicating pressures from agriculture, human settlements, urban areas, railway, road network as well as mining. Ulaanbaatar and its sur-

About 5-10 percent of perennial river and floodplains, intermittent river and ephemeral channel, closed depression and lake ecosystems are highly affected by human activities. Mining in the Daurian Steppe in the form of oil extraction occupies vast areas and causes serious environmental concern.



Of the forest ecosystems, over 20 percent of the boreal coniferous forest ecosystem is under human influence.

The characteristic grassland ecosystem with its high conservation value is affected by grazing and herding but also by the factors analysed here.

All Steppe ecosystems are affected by human activities causing problems for biodiversity and the sustained conservation of the characteristic ecosystems in the region (See diagram of Daurian Steppe Ecoregion Threats).

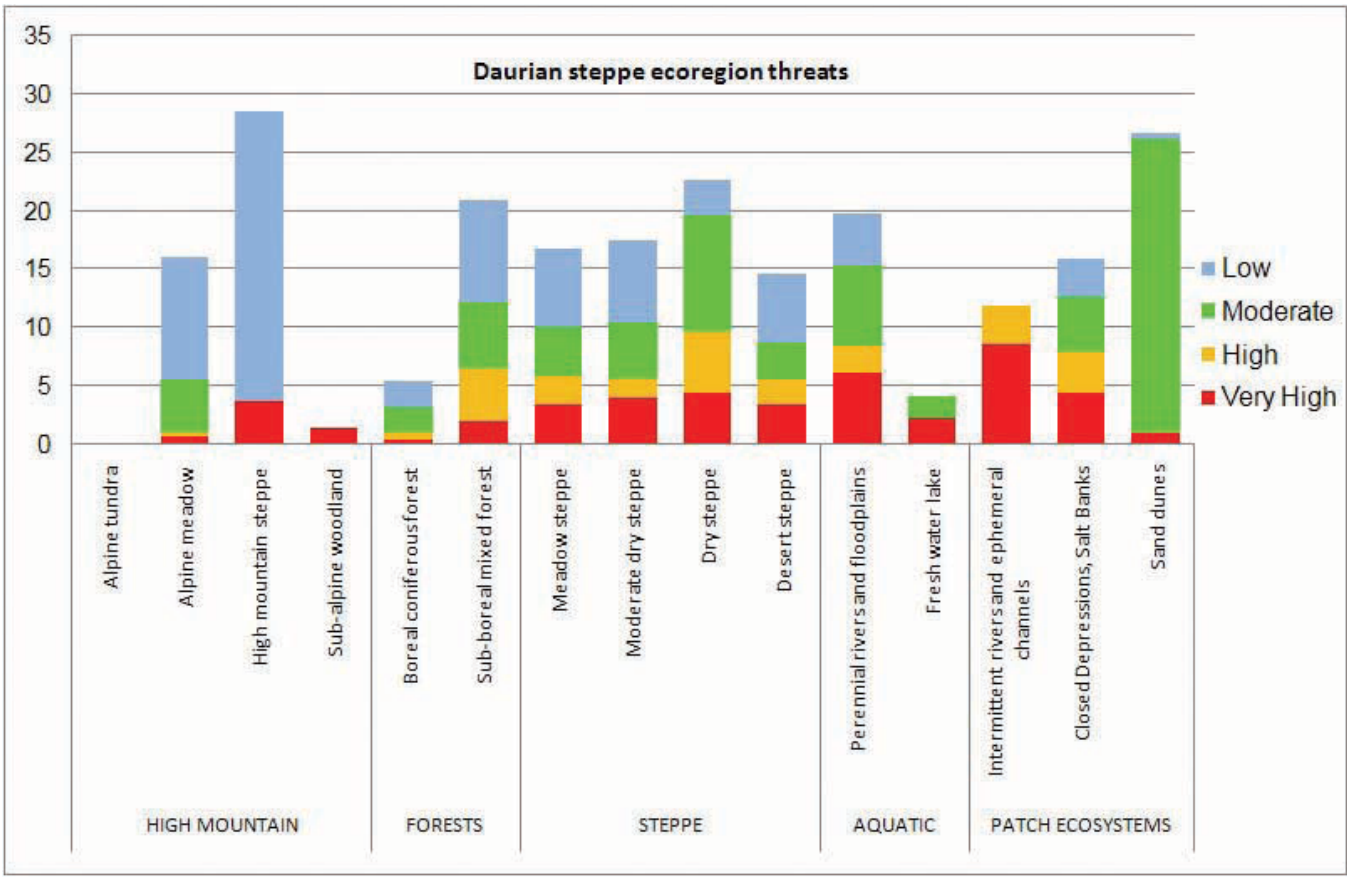
In general, the grassland ecosystems are under relatively severe pressure and would be even more so if grazing was considered and analysed. As these grasslands represent unique, and for Mongolia characteristic biodiversity there is a need for urgent and serious action to conserve national and international values at risk.

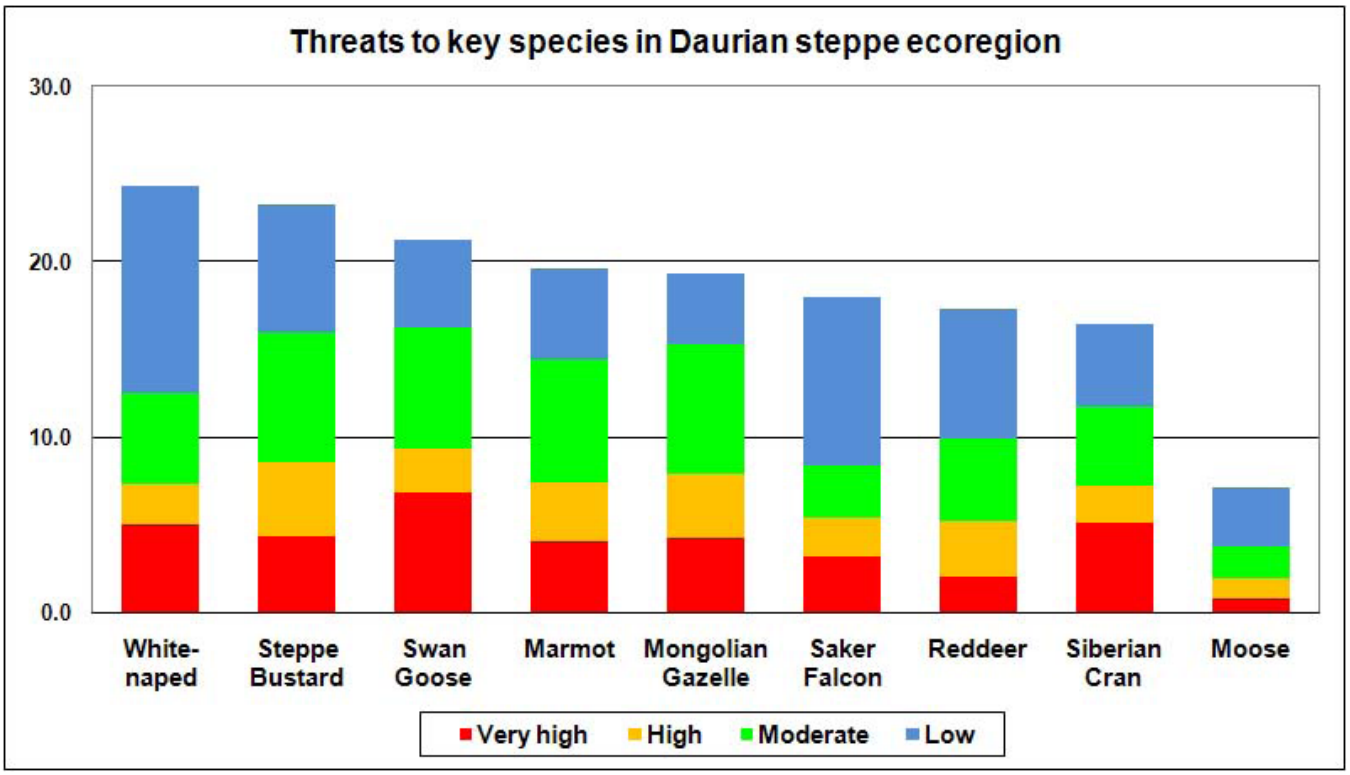
Mining is causing an increased and intensified threat to parts of this eco-region. Among affected ecosystems are the Alpine meadow and sub-alpine woodland as well as the boreal coniferous forest ecosystem.

Pressures and threats to species

The analysed pressures and threats have affected more than 15 percent of potential habitats of the selected species.

This eco-region is the region where the highest pressure against the species prevails. Several of the species, whose potential habitat has been analysed, are dependent on habitats and areas of which 20 percent are under pressure and threat. This is also valid for the two grassland species e.g. the Mongolian Gazelle and Mongolian Marmot for which Mongolia carries a special conservation responsibility. This makes this region unique to the Mongolian context and leads to the conclusion that the eco-region needs special and urgent attention. The wetland and grassland dependent populations of birds, such as the Siberian Crane and the Swan Goose, all of which are globally endangered species, are under great pressure and threat due to increasing human activities. Increased competition for water resources that led to dried wetlands has affected about 20 percent of the suitable and potential habitats of these birds.





4.3.4 Pressures and threats in the Central Asian Gobi Desert Eco-region

Pressures and threats on the eco-region

The eco-region with the overall highest pressure and threat in Mongolia is the Central Asian Gobi Desert. Increasing mining activity is the main reason for the situation and the recently licensed mining of the Oyu and Tavan Tolgoi resources will have a very strong impact on the overall environment

and the biodiversity in the years to come. Development of urban centres and construction of roads and railways to support the mining business are complementary reasons for the dramatic situation. It should also be noted that the region is weak in water resources and consist of relative fragile ecosystems.

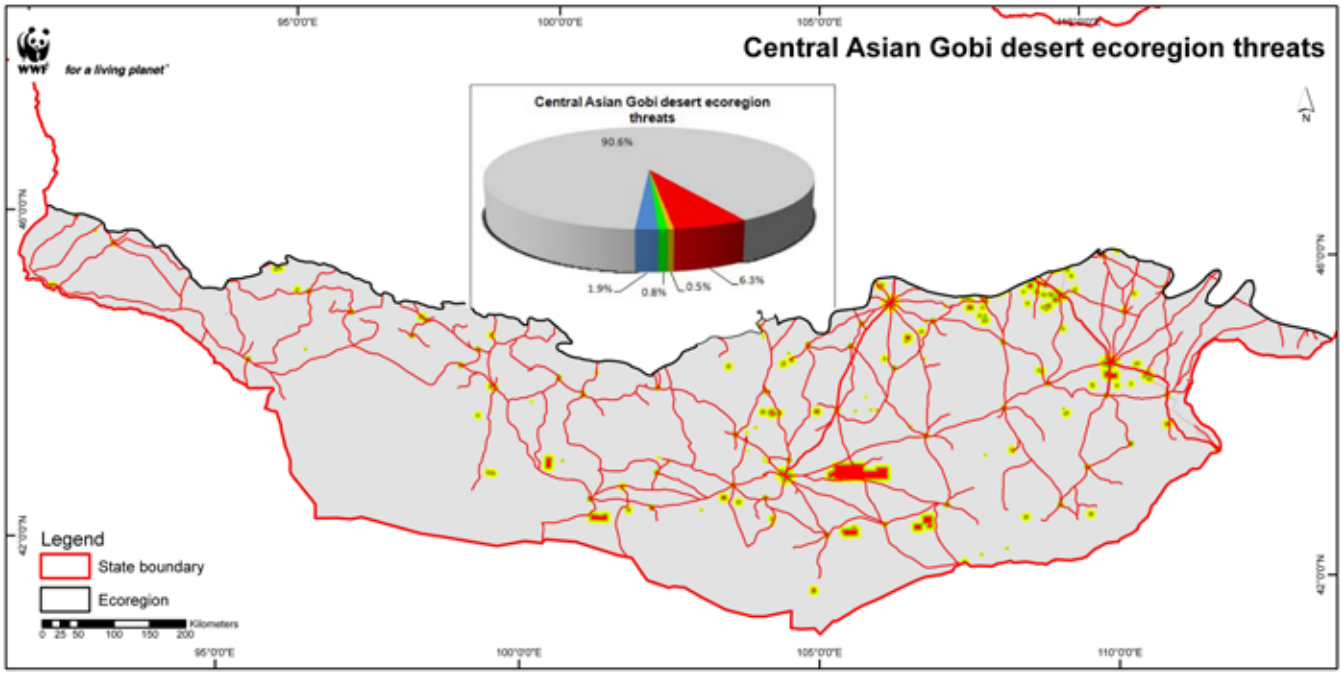
Pressures and threats on the ecosystems

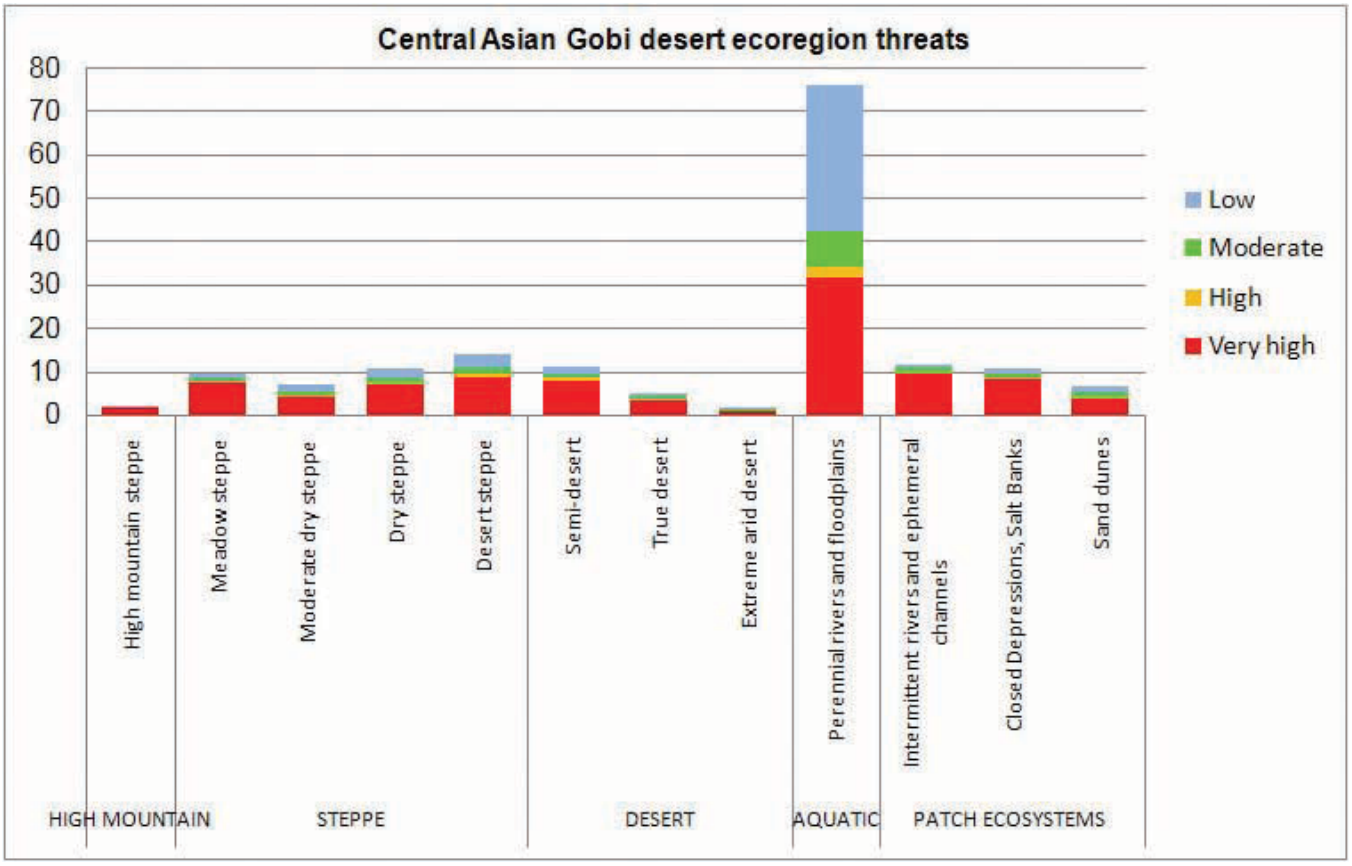
Over 70 percent of Perennial River and Floodplain ecosystem are affected by mining activities in the valleys of the Baidrag, Tui, Ongi and Taaz rivers originating from the Hangay mountain range. Currently, there are no other ecosystems that are under such high pressure and threat in Mongolia. As the mining activities are bound to increase this pressure will also increase, affecting both human cultures/livestock as well as the biodiversity dependent on these water systems. The need for water has also resulted in threats and pressures to as much as 10% of intermittent rivers and ephemeral channels.

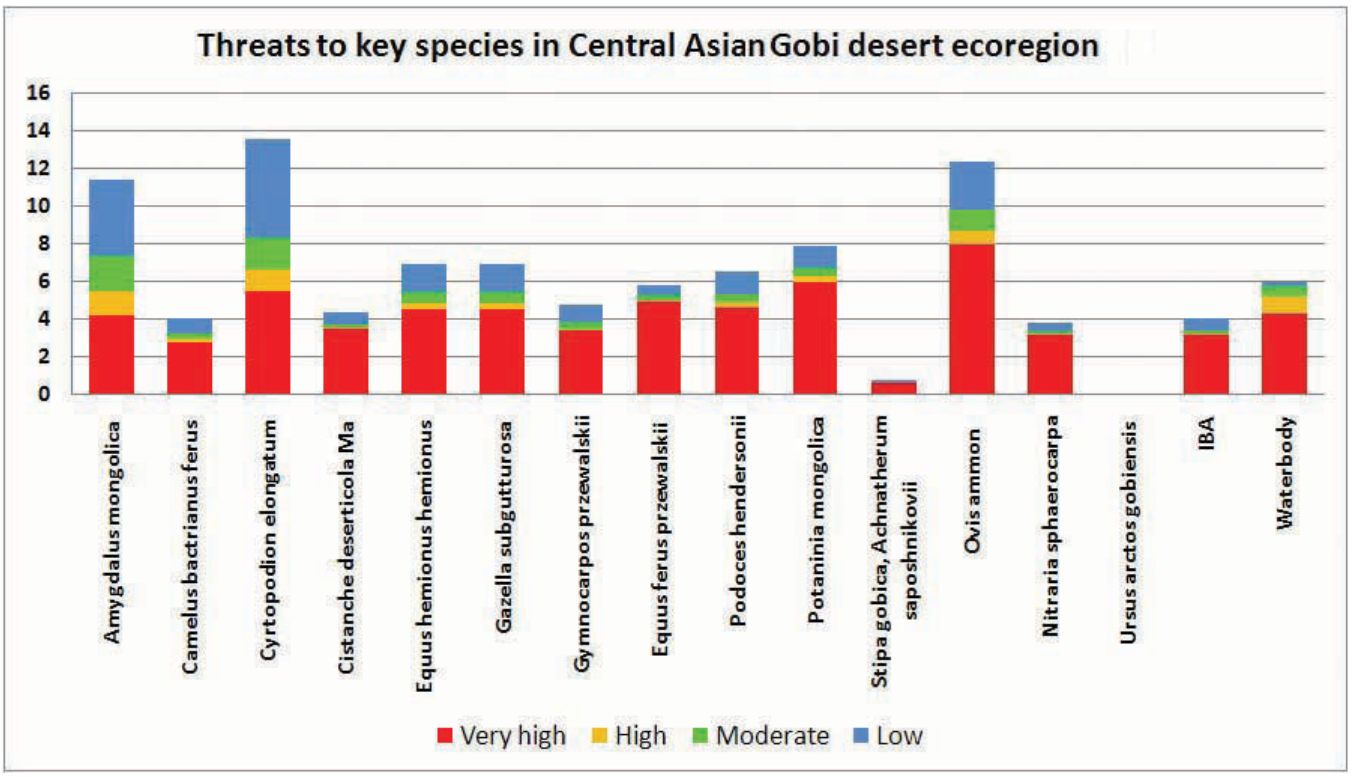
The biodiversity in the Central Asian Gobi Desert is partly linked to the patchy distribution and the diversity of habitats and ecosystem. However, the pressure on these mosaic structures of dry steppe, meadow steppe, and moderate dry steppe is unreasonably high and an action to reduce this pressure by extension of the PA network is highly justifiable.

Pressures and threats to species

The small and hardly exciting Gobi naked-toed Gecko is a representative of the biodiversity that is highly dependent on the patchy ecosystem and the diversity in the desert. About 14 percents of its potential habitats are under pressure and will be affected by the increasing threats. Additionally, the suitable and potential habitats of migrating wildlife e.g. the Asiatic Wild Ass, Black-tailed Gazelle and the Bactrian Camel requiring widespread habitats, are threatened by fragmentation where also small reduction in habitats can have a big impact on the populations.




Central Asian Gobi desert ecoregion threats
80
70
60
50
40
30
20
10
0
Low
Moderate
High
Very high
High mountain steppe
Meadow steppe
Moderate dry steppe
Dry steppe
Desert steppe
Semi-desert
True desert
Extreme arid desert
Perennial rivers and floodplains
Intermittent rivers and ephemeral channels
Closed Depressions, Salt Banks
Sand dunes
HIGH MOUNTAIN
STEPPE
DESERT
AQUATIC
PATCH ECOSYSTEMS


Threats to key species in Central Asian Gobi desert ecoregion
16
14
12
10
8
6
4
2
0
Amygdalus mongolica
Camelus bactrianus ferus
Cyrtopodion elongatum
Cistanche deserticola Ma
Equus hemionus hemionus
Gazella subgutturosa
Gymnocarpos przewalskii
Equus ferus przewalskii
Podoces hendersonii
Potaninia mongolica
Stipa gobica, Achnatherum saposhnikovii
Ovis ammon
Nitraria sphaerocarpa
Ursus arctos gobiensis
IBA
Waterbody
Very high
High
Moderate
Low

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 4 Pressures and Threats	KEY FINDINGS	WAY FORWARD
	Some threats- such as illegal logging and hunting can be met by improved staffing and enforcement and thereby achieve positive impact on biodiversity	M3, M4
	Some threats- such as grazing require policy changes and improved land management capacity in and around PAs	M3, M7
	Climate Change progress requires strategic analyses and a common action plan	E1
	Aquatic ecosystems as well as the steppe and desert ecosystem are under greater pressure and threat and require attention and multiple measures	M3, M8
	Threats to a number of species and their potential habitats require immediate action if populations are to be prevented from decreasing	E6
	The PA will never function as isolated islands, but rather closely dependent on the local setting. Closer cooperation with local authorities and local communities would improve protection status	M7, E7
	Future mining activities and connected infrastructure development will create big risks for several species and their habitats. Active measures need to be taken in cooperation with mining companies outside the PA network through biodiversity off-set	E1, M3

Chapter 5 GAP ANALYSES OF PA MANAGEMENT

Maps of many countries give the impression that PAs are numerous, well distributed and therefore should have the capacity to meet the needs of the biodiversity. An isolated ecological Gap analysis can therefore conclude that no additional measures are required. However CBD guidelines demand an additional section of the Gap analyses, looking into the quality of management and the integrity of the established PA network. With insufficient resources and lack of integrity, the PA network will have a minimal positive impact, if any, on the biodiversity they are designed to protect.

This Gap analyses on management related issues are based on four key issues. The first is concerned with the overall Legal Framework within which PAs are planned, selected, protected and managed. The second deals with the Ecological integrity of the established protected areas. The reason for analyzing is that international ecological and conservation research has found that in many cases the system of PAs does not have sufficient impact on biodiversity conservation. Many PAs are found to be either too small or with a surrounding that does now allow the protected areas to function in practice. Furthermore, PAs were established a long time ago when biodiversity conservation was not yet understood. The selection and establishment was often based on criteria other than biodiversity conservation. Some PAs were often given borders and a size that did not give sustained integrity to host viable populations.

The third and forth chapters deal with the resources given to the PA system. This is about the Human Resources- that is, the people who are employed for and charged with protecting and managing the PAs, especially the NPs or SPAs. Finally, management requires financial support for infrastructure, salaries, research, monitoring and maintenance. These financial resources are almost entirely based on government budget at central level for NP and SPAs and local level for NR and NMs and this is currently one of the main hindrances to effective management of existing PAs, let alone the new proposed PAs.

In addition, one chapter deals with Public Awareness and Information as this in many cases is an overseen aspect of projects where effective management has been targeted. Well developed information and communication strategies built on the needs of the target groups often lead to improved understanding and support to PA management. This in turn, will also lead to a more cost-effective management of the PAs.

5.1 Legal framework

Effective PA management requires an effective and coherent legal framework within which planning, establishment, enforcement and management can be implemented. The legal framework must contain national policies setting the framework of principles as well as roles and responsibilities including fixed targets and timelines. There is further need for a law that is clearly articulated and is coordinated with all other laws and regulations concerning the use of natural resources such as land, water, mineral resources and biological diversity.
Finally, a functional framework requires a set of institutions with clearly defined roles and responsibilities from the level of national ministry through to the regional authorities and down to PA management structures. The roles should clearly define functions such as enforcement, mandates to act as police, rights to lease land, financial mechanisms and not least the monitoring and audit of efficiency.

Policy documents

The main policy document adopted by the Parliament is the **National Programme of PA (NPPA)**, 1998. The programme is a comprehensive policy document defining the long-term policy, until 2015 and beyond for establishing a physical network of PAs as well as improving management of PAs to reach international standards and thereby to ensuring ecological integrity of the entire country. The NPPA has 7 chapters, covering background and justification; goals, timeframes and principles; policy framework; necessary actions; financing; implementation steps; and expected results. The programme defines a number of actions (93 actions) that require attention such as: physical network of PAs; creation of policy framework; governance issues; human resources; PA management and use of natural resources; research; public awareness and ecological education; public participation and buffer zone development; financing and physical infrastructure; and international cooperation. The NPPA thereby covers all dimensions of PA management from planning and selection to financing and sustained management.

Within the framework of World Bank, GEF Early Action Grant, a review of the implementation and status of the NPPA has been conducted. The review covered the quantity and quality aspects of the implementation and was generally assessed as '**moderate**' (2.76 within a 5 grade scale) as no single dimension of the programme was assessed with higher grades. The review concluded that four aspects of implementation were either at "a very low level" or "unsatisfactory".

Those were:

• To set up an economic and legal basis to increase funding sources beyond the state funding for the PA network

• To provide PA network staff with 1) opportunities to develop their professional skills and 2) stable working conditions

• To establish clear limitations for the use of natural resources within the established PAs by local communities as well as the implementation of restoration measures within the PAs and

• To develop and implement viable management plans for PA buffer zones as stated in the Law on Buffer Zones.

The process leading to the identification and protection of areas of high importance for biodiversity conservation and ecological balance was evaluated and given the highest score. It shows that the system for the establishment of a PA network is appropriate. However, the evaluation revealed the **implementation quality** was at "**unsatisfactory or low quality**" **levels** (1.41 of 5). The reason for this was that all twenty quality-aspects were judged as being of "moderate quality" or "unsatisfactory".

To summarise, the evaluation found that the implementation of the NPPA focused too much on quantitative rather than qualitative

Key Policy Documents Adopted By The Parliament/Khural	Statement Concerning PA network
The National Security Framework, Ecological Security, 1994 Chapter 10, Paragraph 55, Article 4, 18, and 19	• Include ecological important and representative areas in the PA network; • Give some areas international protection status and • Raise international awareness about the ecological function of Mongolia
Mongolian Development Framework, **1996** Chapter IV. Nature and Environment-Basis for Sustainable Development	• Include the territory of Mongolia as an International Biosphere Reserve
The State Environmental Policy, **1997** Paragraph 3, Article 2, 5.2, 9.2, 10.2, and 10.3	• Integrate PA area network into regional development plans • Elaborate on and implement the NPPA
Mongolian Millennium Development Goal, **2008** Target 7: Ensuring Environmental Sustainability, Percentage of PA	• The percentage of PA coverage will reach 30% by 2015 out of which half should be local PA
National Comprehensive Development Strategy based on Millennium Development Goal, 2008 Chapter VI Nature and Environmental Policy, 2008 Target 2, 5 and Major Indicators of Achievements	• Increase PA network coverage up to 20% (more than 30 million ha) by 2015 • Improve management of PA, through a) establishing a suitable governance structure b) increasing effectiveness of PA management and c) improving legislative framework

dimensions and that an effective PA system requires much more attention to content and function rather than to number and area. Ultimately, more tangible and realistic goals are required for the future.

In addition to the NPPA there are some key legal documents determining the establishment and management of PAs.

Multilateral Environmental Agreements

Mongolia has signed a set of international agreements such as the Convention on Biological Diversity (CBD), the Ramsar Convention on Wetlands of International Importance (Ramsar), the Convention on Migratory Species (CMS/Bonn Convention) and the World Heritage Convention (WHC).

It is agreed in the Mongolian Constitution that international conventions, once ratified by government also become part of Mongolian legislation and thereby equivalent to other laws such as the Mongolian Law on Special PA's (MLSPA) and the Law on Buffer Zones of PAs (LBZ).

The approach of automatically recognising international conventions as binding laws would appear to be a practical and simple solution. However, the experience so far indicates that in practice, this means very little for the use and management of the designated areas. In reality, the information on protection and regulation of management often remains at national/ministry level while local authorities and particularly local communities have little, if any information on the national commitments. In practice, this leaves the Ramsar site outside the official PA network with almost no or very limited protection.

Laws and regulations

The Mongolian Law on Special Protected Areas (MLSPA) was adopted in November 1994 and has since undergone a number of amendments. The purpose of the MLSPA is to create the foundation for designating land for special protection and conservation. The law sets the conditions for regulat-

ing the use and management of the PAs in order to preserve unique conditions, rare and endangered plants and animals, historic and cultural monuments etc. Furthermore, the MLSPA defines protected areas as land dedicated to the protection and maintenance of biological diversity and identifies management structures for these areas.

The MLSPA establishes four categories of protected areas namely Strictly Protected Areas (SPA), National Parks (NP), Natural Reserves (NR) and National Monuments (NM), with SPA offering the highest level of restrictions to human use. Within the SPA and the NP the MLSPA, three Protection Levels where Zone 1 and 2 for SPA and Zone 1 in NP represent the highest protection levels (see also Chapter 2).

Strictly Protected Area:

1. Pristine Zone
2. Conservation Zone
3. Limited Use Zone

National Parks:

1. Special Zone
2. Travel and Tourism Zone
3. Limited Use Zone

The internal zoning was proposed during the development a new PA proposal. However, the final decision about zoning is not part of the Parliament's decision to establish the PA. The ministry, when implementing the Parliament's decision decides the zoning details. As discussed below (Chapter 5.2) the function of the PA is highly dependent on effective zoning. The zoning therefore, should be part of the original decision about establishment of the PA or at least the ratio of internal zoning should be set by the Parliament or fixed by the law.

Nature Reserves (NRs) are established for the conservation of certain features and natural resources. There are four types of NRs: ecological, biological, paleontological and geological. National Monuments (NMs) are designated to preserve the heritage of natural unique formations as well as historical and cultural sites.

The system might look complicated, maybe more so for expatriates than for the Mongolian people. The main problem with the current system is that in practice it is only the highest protection levels that give adequate protection for biodiversity. This is as a result of a combination of insufficient legal frameworks, lack of political will to set aside substantial areas as strictly protected and generally low enforcement of existing laws (Chapter 5.2 and 5.3).

The MLSPA enables buffer zones to be created around the SPAs and the NPs and a separate **Law on Buffer Zones** (LBZ) was adopted three years after the MLSPA. The justification was that the PAs needed a buffer between them and the surrounding more intensively used land. The buffer zones were also thought to be a mechanism for closer cooperation between the PAs and the local communities creating a foundation for mutual benefits.

The use of the buffer zone instrument has so far been almost non-existent and there has been no impact on biodiversity conservation. However, buffer zones could be made Community Conservation Areas, which internationally have proven to be successful both in terms of conservation and of sustaining local people's livelihoods. The buffer zone mechanism could also be used to create ecological corridors and thereby avoid fragmentation of habitats.

The rationale behind having two laws regulating PAs and buffer zones has been questioned as it leads to differences in approaches and unclear distribution of responsibilities.

Management Plans are globally considered to be the key tool for guiding and prioritizing the management of any PA. They are a tool for identifying budget needs, prioritising within limited financial resources, management of human resources, cooperating with local communities, defining conservation

goals and measures etc. Currently, the ML-SPA does not give guidance or a framework for the process of creating management plans nor for their content and the structure. Internationally, many protected areas have also developed business plans in order to establish more cost effective management systems. Both these plans, together with an objective audit on the quality of management of protected areas are greatly needed in Mongolia.

Not least is the key issue of participatory processes in management planning if there is to be sustained impact of biodiversity conservation within the PA network, both existing and projected. Engagement of local communities and their involvement in PA management and safeguarding of key species is the key to success that has not been mobilized in Mongolia as yet.

The current law does not specify the minimum requirements for **establishing PAs**. Minimum requirements should specify clear objectives of PAs and how these objectives are to be met though setting management and regulatory priorities. The need to closely consult with communities adjacent to the proposed PA needs to be included in the law as well as the format for these consultations. An article should provide that the boundaries of all SPAs and all zones must be clearly marked on the ground and that local communities should participate in this process.

Finally, there is a need to improve **management efficiency**, particularly in a country where financial constraints set very narrow limits for PA management. The current legal framework should include clear directives for regular audits of PA management. Today certain audits take place focusing on financial management and on quantitative aspects. However, financial management is often not criticized while the ecological and biodiversity values of the PAs are deteriorating. There is an urgent need to create legal space for broad audits assessing the management efficiency of the PA administration. The process and results of these audits should be seen as tools for capacity development and be fed back into revision of management plans.

Institutional framework

The following institutions play a role in the planning, establishment and management of the national PA network.

The roles and responsibilities concerning management of NPs and SPAs are highly centralised. This also means that many of the problems identified and being addressed at the individual PA level have their roots and causes at the central government level. Until now most projects have tried to solve management failures in individual PAs by addressing the local PA administration. This is in practise not sufficient and there is need for more projects to focus on the problems in the parent organization - the SPA administration department at the Ministry of Nature, Environment and Tourism- and the interrelations between the national and local levels of PA management.

Land Use Law

The PAs are not isolated areas in the country's landscape. They are highly influenced by processes and activities in surrounding areas. The Mongolian Law on Land (MLL) guides the use of land in the country. This law prescribes that land use plans are to be developed and established as guiding documents for land use and sustainable development at country and aimag (provincial) levels. There is a great need to mutually link the applications of the two laws (the MLSPA and the MLL) and to ensure that planning, establishment and management of PAs is supported. In addition, a planning process should be used that does not jeopardise the values of the PAs by bad land use practices in the areas surrounding the respective PA.

5. 2 Integrity, Management and Monitoring

The reason for looking at issues of integrity, size and zoning in a Gap analyses lies in the fact that without ecological integrity, the efficacy of a PA is questionable i.e. the function of the PA is violated and the purpose can therefore not be fulfilled. For example, if a PA is established with the purpose of protecting Argali and the management of the PA cannot manage intensive domestic grazing, benefits for the Argali are limited as the integrity of the PA is violated. The concept of ecological integrity refers to the external impacts, which cannot be controlled by the PA management. Such factors might include the invasion of alien species, forest fires and drought indicating that for optimal integrity, the boundaries of the PA need to be based on ecological consideration rather than on administrative borders or traditional use of land.

In order to secure the integrity of existing and proposed PAs, it is necessary to make ecological analyses with a focus on the proposed function of the relevant PA. Depending on the settings of species, species requirements and the ecological conditions, the boundaries of the PA can be set in such a way that the key potential habitats (Chapter 3.5) are included. This normally leads to including large areas in order to secure the integrity. The bigger the PA, the more complicated the dialogue will be with the local communities. However, an understanding and acceptance from the local stakeholders is essential for increasing and sustaining integrity.

Another dimension of integrity concerns the protection of lakes, rivers and wetlands. For ecological integrity, availability of water in a certain patterns over the year is necessary. Most lakes in Mongolia are under SPA or NP. However, their watershed is almost never included in the PA arrangements. The supply of water in practice, can therefore not be guaranteed i.e. the PA itself does not secure the integrity of the lakes. A number of lakes and rivers have experienced dramatic reductions in water levels due to mining or hydropower development. In these cases, a combination and an integration of PA and land use decisions is necessary to secure integrity of the lake or river.

Decision Making and Management Levels	Name of Institution	Role in Planning and Establishing National PAs	Role in Management and Enforcement within National PAs
National	Parliament	• Determining policy on PAs, establishment • Establishing and de-gazetting PA at national level • Setting up border of SPA and NP	• Overall budget allocation for Environmental sector
	Ministry of Nature, Environment and Tourism- MNET (on behalf of Government)	• Elaborating on proposal for establishing new PA and determining the borders of NR and NM for concluding decision by Parliament • Adopting and implementing the rules and regulations for PAs	• Implementation of national policy on PAs • Issuing land use rights in SPA and NP) • Budget allocation for individual PA administration • Zoning of SPA and NP • Direct management of SPA and NP • Supervision of other PA categories (NR, NM and local PAs)
Regional/Aimag	The Aimag Parliament/ Khural	• Official statement on proposal for establishing new national PAs • Approving establishment of local PA at aimag level	• Approval of budget allocation for NR, MN and local PAs at Aimag and Soum level
	The Aimag Governor	• Elaborating on proposal for establishing new local PA at Aimag level	• Budget allocation for NR, NM and local PA at Aimag and Soum level
	Aimag Nature Protection Agency		• Management of NR, NM and local PA
Local/Soum	The Soum Parliament	• Official statement on proposal for establishing new national PA • Approving establishment of local PA at Soum level	
	The Soum Governor	• Elaborating on proposal for establishing new local PA at Soum level	
	Soum Environmental inspectors		• Supervision on law enforcement
Local/PA level	PA Administration (for NPs and SPAs)	N/a	• Management of individual SPAs and NPs • Occasional management of NRs and NMs nearby is assigned to these PA administrations (due to insufficient local budgets)

Size

Size is an important factor in this context. Particularly when dealing with species that have a wide range i.e. require vast areas for migration or as territory. This means that a PA set aside to protect the Mongolian Gazelle will be insufficient to cover their entire migration route. A network of PAs or a combination of PAs and other measures such as establishing ecological corridors might be necessary.

The integrity of a PA, in relation to the purpose of a PA, cannot be guaranteed unless the size is increased to a level where protection of the targeted species is secured. The initial phase of protected PA establishment often leads to relatively small areas being set aside as SPA or NP. Recently however, this has been changed into bigger more complex areas being taken under protection. However, the increasing competition with mining interests have again led to that proposals of larger PAs have been refused.

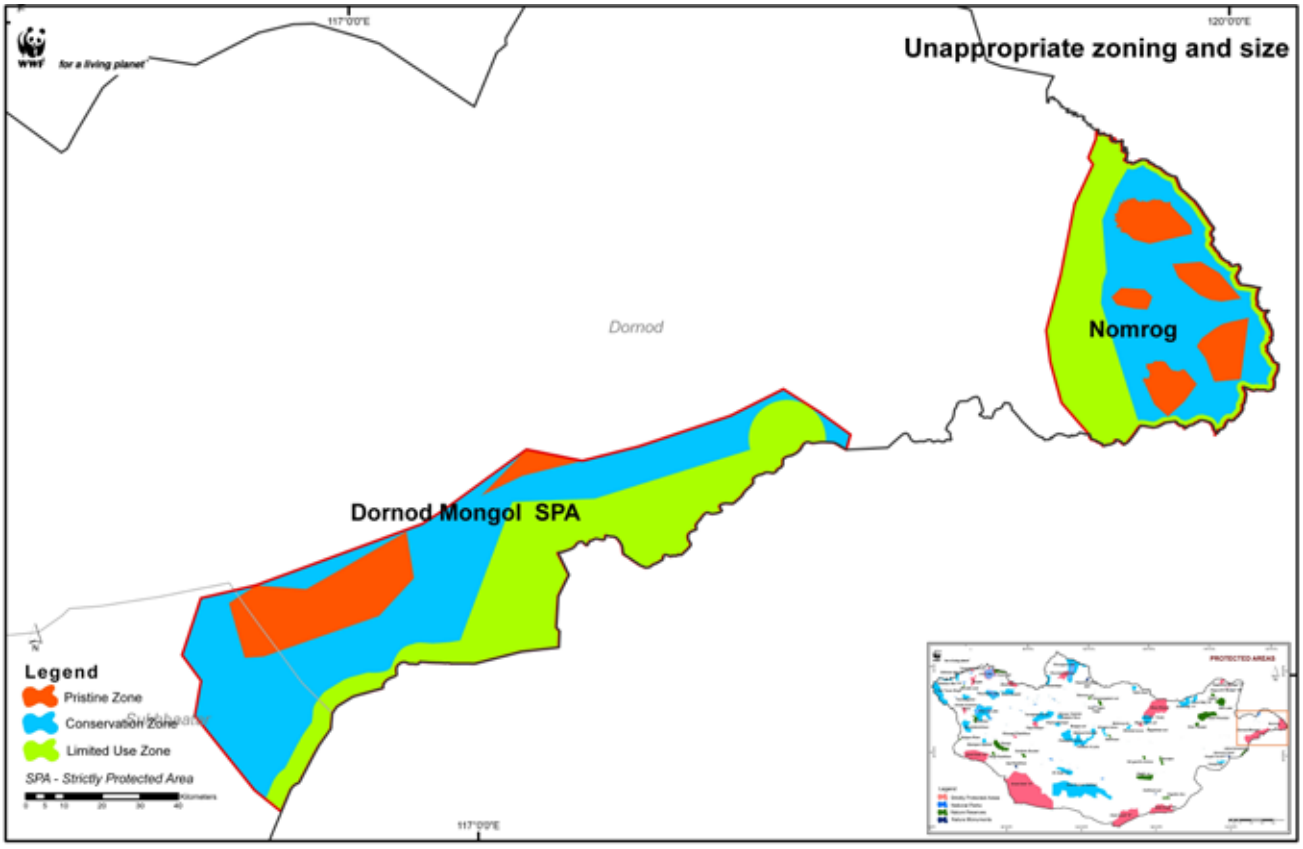
Zones

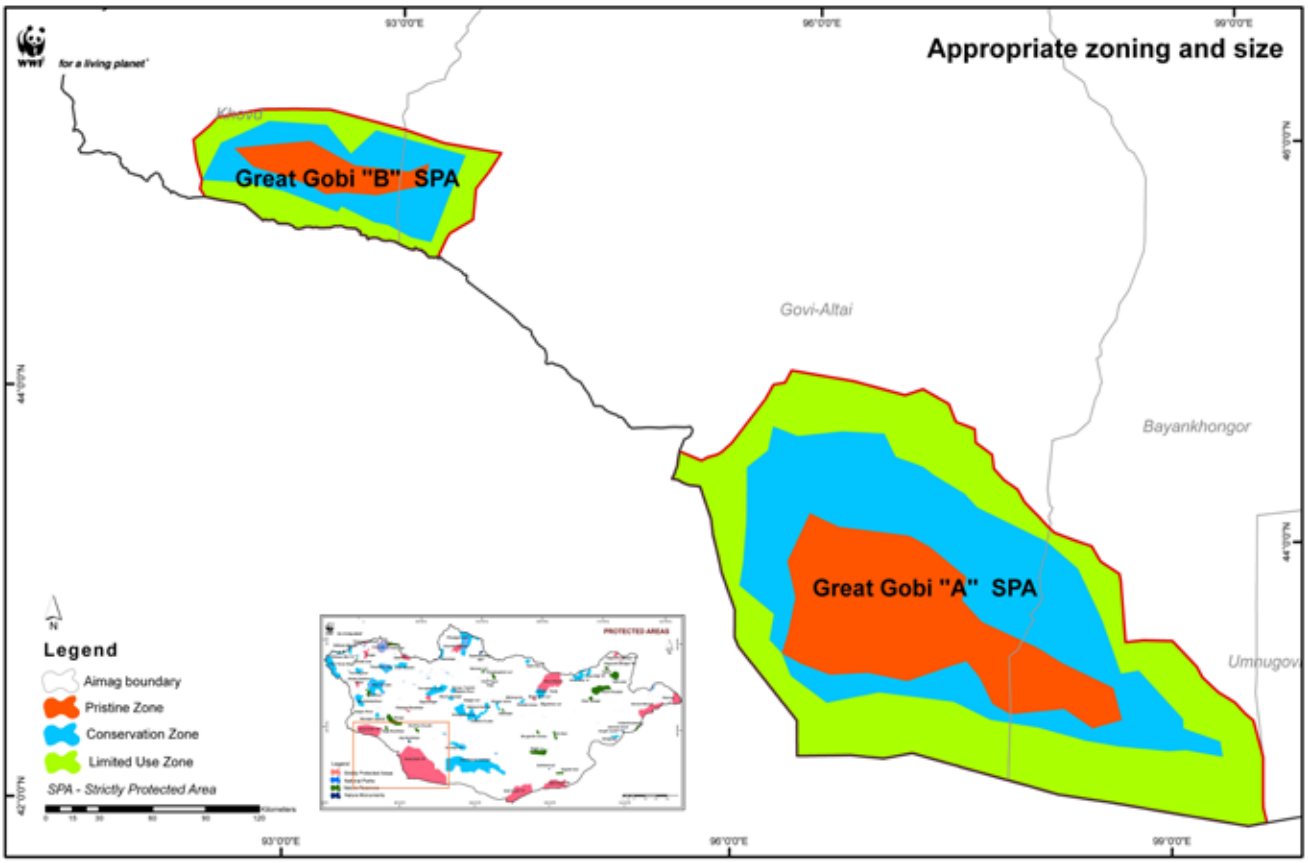
Finally, the system in Mongolia builds on differentiated protection levels within each SPA and NP (Chapter 2). Zoning is established from the highest level of protection (Core/ Pristine Zone) to the lowest level (Limited Use Zone) in each SPA and NP. This should ideally build on the ecological functions and give a higher level of protection to the key areas for the biodiversity surrounded by lower levels of protection in order to meet the PA objective.

The rules and regulations for each SPA and NP are based on both general regulations (through by-law adopted by the government decree, 1995) and a specifically designed set of rules and regulations as stated in the MLoPA and adopted by the minister's order (Chapter 5.1).

Most studies have concluded that the current practice and enforcement of the zoning allows for human activity at a level where conservation goals cannot be met. In practice, this means that it is only the two highest protection levels of the SPA and the highest level on the NP that is effective from the perspective of biodiversity. A case in point is the

Strictly protected Areas (SPA)		National Park (NP)	
Protection Level	Activities allowed	Protection Level	Activities allowed
Core or Pristine Zone	• Research • Protection measures	Special Zone	• The same as the Core and Conservation Zones of the SPAs
Conservation Zone	• Activities allowed in Core zone • Elimination of damage caused by disasters and biotechnical measures	Travel and Tourism Zone	• The same as Limited Use Zone of the SPA in addition to • Fishing in assigned areas
Limited use Zone	• Activities allowed in Core and Conservation zone • Use of mineral water and minerals for medical use • Eco-tourism including the establishment of temporary facilities • Worship and traditional ceremonies • Local people can be given a permit to a) harvest NTFP and b) graze their livestock	Limited use Zone	• Traditional Livestock herding • Establishment and management of permanent tourism facilities





pressure of grazing activities. In 15 out of 38 PAs, where the Gap analysis was carried out, overgrazing is a great concern as the number of livestock has surpassed twice the carrying capacity of the land. This situation is worsened by the fact that almost every second ranger lives with his or her livestock within the PAs. The current situation requires immediate measures to be undertaken. The conservation value of entire PAs is question-

Table: Percentages of PA internal zones

	Name	Area /ha/	% of Mongolia
Strictly Protected Areas	Pristine Zone	1.910.725.2	1.2
	Conservation Zone	3.140.598.5	2.0
	Limited Use Zone	5.827.444.3	3.7
National Parks	Special Zone	1.122.818.6	0.7
	Tourism Zone	1.406.836.0	0.9
	Limited Use Zone	6.741.338.5	4.3
Nature Reserves	Nature Reserves	2.017.495.4	1.3
Nature Monument	Nature Monument	103.229.7	0.1

able and the ecological integrity of what is not grazed will be lost.
There is of course no fixed ratio between the different protection levels and indeed should not be, as the need for protection intensity varies from area to area. However, it can be noted that the percentage of areas under the highest protection level is substantially lower than the areas with low protection levels. For example, the percentage of the PA where traditional grazing is allowed is 53.6 per cent of the SPA and 72.7 per cent the NP. As grazing and especially overgrazing is considered a major pressure to almost all PAs, it is obvious that the zoning patterns established in the different PAs does not safeguard the biodiversity values at present.

Management Plans

The Management Plan is the key tool for the functioning of the PAs. Without a good management plan, the work of the PA administration would be like travel without a map. The legal statute of management plans vary from country to country. In Mongolia, it is the role of the appropriate ministry to approve the proposed management plans. Since 2006, the contents and criteria of action programmes of management plans for PAs have been revised and optimized in accordance with international requirements and appropriate measures have been taken for development of adequate management plans for PAs in the existing PA network. This means that the plans are developed after the PA is established. In some countries, a management plan is a prerequisite for establishing any PA. Currently, the situation in Mongolia is that only some PAs have approved management plans. To date, only seven SPAs and ten NPs have approved management plans. This is of course not good as the function of the plan is to guide, improve and make the management more effective. There is therefore an urgent need to support the development of such plans. The plans must also be developed in a participatory process involving stakeholders and local communities. Moreover, the ministry rejects plans developed without consultation. Currently, the process of developing management plans has been done with little consultation of stakeholders causing decreasing confidence between authorities and local communities.

Monitoring and research

One key issue facing management plans is monitoring and evaluation. Without proper monitoring the effectiveness of investment in PA establishment and management cannot be described and proven. The management plan needs to set clear targets and clear goals against which a reasonably advanced monitoring programme is able to respond.

Currently, monitoring is initiated in several PAs. However, in reality, due to a lack of trained staff and limited financial resources available to conduct field surveys, the ambitions in management plans are not always met. Most PAs lack serious and result-oriented monitoring against the set conserva-

tion goal. A number of externally financed research projects have been implemented during recent years. However, these research projects have often little connections to the concrete and management related monitoring that is required for effective management of the PA network.

To justify further investment of government money, with or without contribution from other sources, it is vital to develop a comprehensive PA monitoring system. The monitoring system should not only focus on quantitative data in financial related issues but also on quality related data and analyses on how well the management has been able to work towards fulfilment of the set goals and targets for the relevant PA.

trained for their task, having insufficient theoretical and educational background and are given little support in the form of in-service training. The poor reward system also leads to high turnover among staff, reducing the value of the few training opportunities. It should at the same time be mentioned that MNET has taken some action in the field and there is a slight improvement. However, the needs are beyond current efforts.

Staff at the MNET

The Ministry of Nature, Environment and Tourism (MNET) is mandated with implementing Parliamentary and government policies on CBD, including development of the PA system. The ministry has established the SPAs Administration Department for this purpose and it is currently (2010)

Way Forward E see Chapter 6.1, Way Forward M see Chapter 6.2

Chapter 5.2 Integrity, Management and Monitoring	Key Findings	Way Forward
	Ecological integrity is not well considered in the current PA network nor in the establishing of new, raising questions as to the conservation efficiency	M4, E7
	Management plans need to analyze and establish means to increase integrity	M4, M2
	Zoning of protection levels is not used based on ecological criteria and is currently not used efficiently	M4, M2
	Monitoring of conservation efficiency is almost completely lacking and is not used as a tool to improve management	M2, M5

5.3 Human Resources

In order to manage the PA network effectively, skilled and devoted staff are required. Different areas demand different skills; some areas need more intensive and active management while other areas necessitate only few people and low presence. There is a need to analyse this for each PA and identification of number and skills of staff required for effective PA management should be included in the management plan. The staffing should be justifiable in number and well planned in terms of quality. It should then be the responsibility of the PA director to see to that staff is recruited and given in-service training in order to meet the conservation goals and the continuously changing human and ecological environment.

Current studies show that staff of the PA administration system are generally badly

staffed with 5 professionals.
Most studies on the PA system in Mongolia report on the inefficiency of the PA management and there have been a number of projects implemented where training of PA staff has taken place. However, this will not have a sustained impact as long as the central authority has insufficient resources to support and guide the activities on the ground. The current situation at the MNET needs substantial improvement and upgrading if the ministry is able to play this role with which it is charged. An increase in the PA network and higher ambition in management efficiency requires strengthened capacity at the MNET. The ministry must be given enough resources to handle the PA network in a creative and cost-effective way, such as creating a regional management structure and allowing staff to develop sufficient capacity to lead this process and establish

a current framework of PA management. Given these resources, the Ministry needs to adapt current management to a modern PA management system, including involvement of actors from civil society and the private sector, constructive dialogue with the tourism sector and not least a close and serious cooperation with local stakeholders. This will require changes in skills and even more so in attitudes.

Managers of PA

Managing a SPA or a NP is almost as complex as running a large company. There is a vast variety of issues requiring attention and handling the external factors and pressures requires skills, integrity, experience and understanding of the conservation goals. There are complex internal factors including financial and human resource management that demand administrative and leadership skills. Certain pressing issues require special competencies such as education and public awareness, participatory management and community cooperation as well as marketing and tourism to increase alternative incomes. These dimensions should then be handled within the overall objective of the PA itself, to conserve biodiversity. The recruitment of PA managers is not always done with this in mind and therefore the leadership capacity within the different PAs is extremely uneven and in many cases inadequate.

Experts at the PA

To understand how well the respective PAs actually contribute to the overall conservation goals and to the specific goals for the individual area, monitoring based on reliable scientific methods and techniques is required. It should be possible to answer how and in what way the PA meets the goals. For example, are the Argali numbers in the NP increasing or decreasing? Are the populations viable? There should be knowledge and skills available in the PA administration capable of facilitating surveys, registering population trends and collecting relevant data to explain those trends.

Financial managers

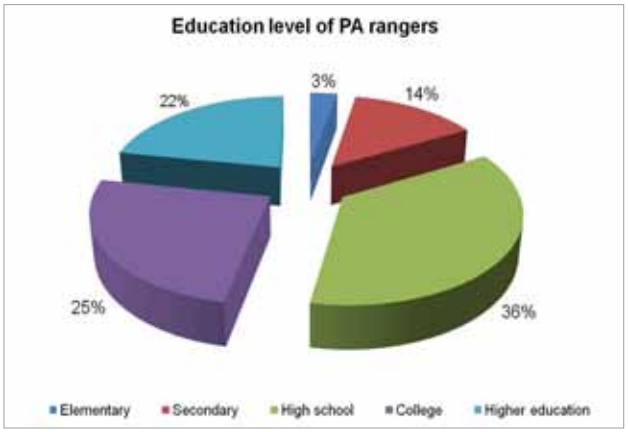
Given the limited budget support for PAs, there are difficulties in recruiting more experienced staff for this key task. This is indicated by the current details on staffing, their background and experience. However, if the PA network uses the resources efficiently, finds alternative income opportunities and effectively handles fees and leases, this function is crucial. As several PA administrations are small, alternative solutions could well be worth reflecting on such as outsourcing to private companies to manage financial books and audits.

Rangers at the PAs

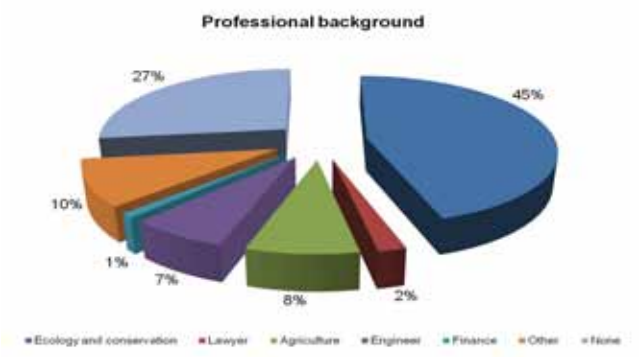
Almost all PAs face conflict with local communities on issues such as grazing, logging, hunting and tourism. Often, the specific conflict has to be handled by the rangers in the field. The rangers are often considered to be the face of the respective PA and play an important role in communication with local people and visitors. From this perspective, they are key staff members. However, the rangers are in general given little attention and appreciation and the effective management of the PA system would benefit from an upgrading of the rangers' status, skills and not least, payment. A ranger who is so low paid that he needs to have livestock grazing in the PA, can never play the role of defending the integrity of his/her NP or SPA in an effective way. Inadequate salaries also contribute to the inefficiency of the conservation measures. For instance, 111 out of 228 rangers in a survey live along with their livestock within the PAs, thereby contributing substantially to overgrazing and decreasing biodiversity. Better payment for the rangers would lead to less livestock and reduced overgrazing.
The low compensation and lack of career opportunities leads to rangers leaving their positions, which in turn, means poor quality management of experience and knowledge sharing opportunities.

Education levels among rangers as shown in the diagram below show a positive picture.

Almost 47 percent of rangers have college and higher education. However, the relatively high education level also means that the expectations of salary and position are higher, leading to high mobility as the system does not provide the opportunity for the rangers to realise their expectations.



The professional background of the rangers is quite varied. On the positive side, one can note that almost every second ranger has an ecological and conservation background making them highly suitable for the job. On the other side, remaining one third has very little professional background. This high figure requires a management system that has the capacity to guide and mentor young, inexperienced rangers in their challenging task.



Approach for PA management

The original role of PA staff was to police the implementation of regulations and management. Staff were seen to be most effective when using laws and fines in order to protect the area. Modern PA management still sees the value of the policing and legal enforcement, but often relies more on creating a participatory management and a wider understanding of the needs of the PA and its integrity. The viability of the PA as such is dependent on the positive attitudes among the local people living in or around the NP or SPA. Fostering this however, requires improved skills and changed attitudes of the staff of the NP or SPA. At the same time strong and undisputed enforcement is still required not least when it comes to combating illegal hunting and fishing.

The pattern within the PA network is to build the capacity to manage all tasks within the administration. Closer cooperation with other authorities such as the police or the state inspectors could mean that instead of employing more people on full time tasks, these authorities could be contracted on a part-time or casual basis. Further, contracting local entrepreneurs could often be an alternative for certain management tasks rather than hiring less experienced and trained staff.

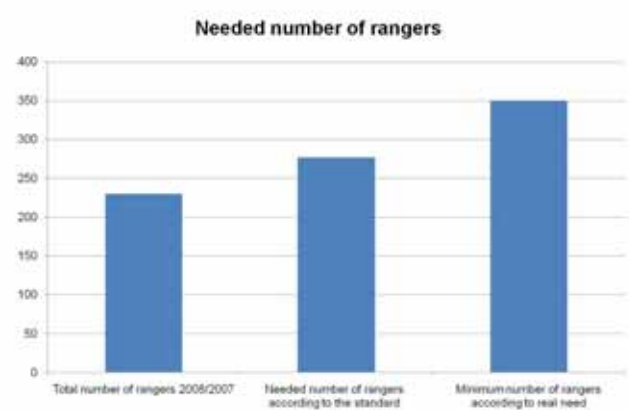
Human Resources development

When studying the developments during the last decade, it is obvious that training of PA staff has taken place. However, the development of training has almost exclusively been donor and NGO driven. There is urgent need for the establishment and implementation of a comprehensive plan for sustained capacity development within the PA system. The plan should build on clear definitions of roles and responsibilities of the different staff groups and be based on the approach mentioned above. The training should be linked to a transparent reward system, leading to greater responsibilities and increased salaries and thus ensuring staff retention resulting in greater quality of experience.

Number of staff in the PA network

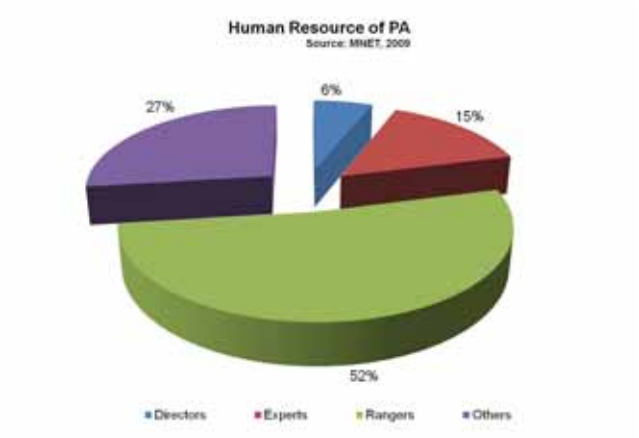
The number of staff in the respective PAs varies significantly from area to area. This is justifiable as the pressures and management tasks vary a lot between PAs. A remote mountain peak requires less intensive attention than forests and grasslands close to urban settings.

The government has set up a standard for ranger numbers per thousand hectares in SPA and NP's (2006, the Government Decree Nr.87), which varies depending on the different natural zones (e.g. high mountain, forest, steppe, semi desert and desert) and land use intensity (e.g. herding and use of forests) as well as location (eg. close to big settlements and cities). On the other hand, independent studies attempting to quantify the "real need" show that the staffing requirements in the PAs are even higher than the national standards. The diagram below shows the different levels of staffing and it should be noted that currently the standards set by government are not yet met.



Staffing categories

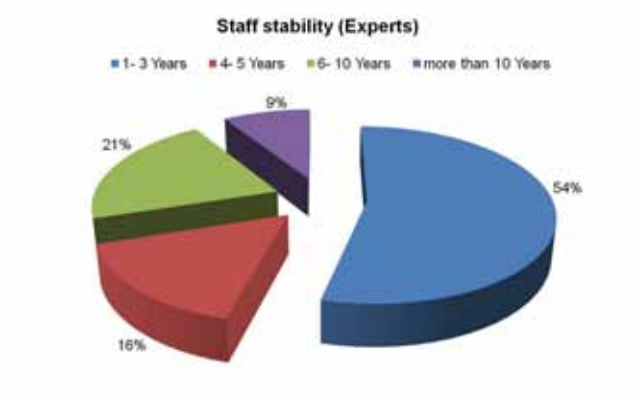
Recent years have seen an increase in staff within the PA network as the budget allocation for staff has been increased in the government budget. However, the priorities set by the ministry have lead to an increase in numbers of administrative staff while those of field staff for monitoring, research and practical enforcement have seen less of an increase. There are currently almost 5 administrative staff for every PA director and there are double as many administrators as experts capable of doing practical surveys or management for conservation purposes. There is therefore an urgent need to increase staffing in PAs with the capacity and resources to perform surveys and fieldwork and thereby build knowledge on management efficiency.

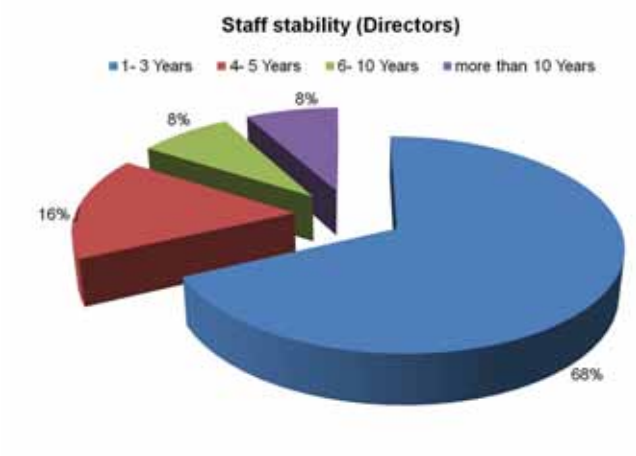


Staff turnover

In principle, good working conditions, possibilities for a career and a reasonable salary level lead to low staff turnover. The current PA management system has high or very high staff turnover, particularly for directors and experts. As shown in the diagrams the percentage of directors who have been working for only 1-3 years is as high as 68 percent, which is alarming. For the rangers, the same figure is 31 percent showing a very high level of inexperienced staff dealing with the key issues of field implementation of NP and SPA regulations. The high turnover leads to a situation where a large portion of staff is inexperienced and where continuity in management is frequently broken. It should also be noted that, in particular, directors are often appointed based on criteria other than suitability for the position resulting in management that lacks the necessary knowledge and education to perform duties. The assessment of human resources in PAs clearly shows that overall, efficient human resources policies are not being applied in the PA management system.

The diagrams below show how long rangers, experts and directors of PAs have been working in their current positions within PA administrations.



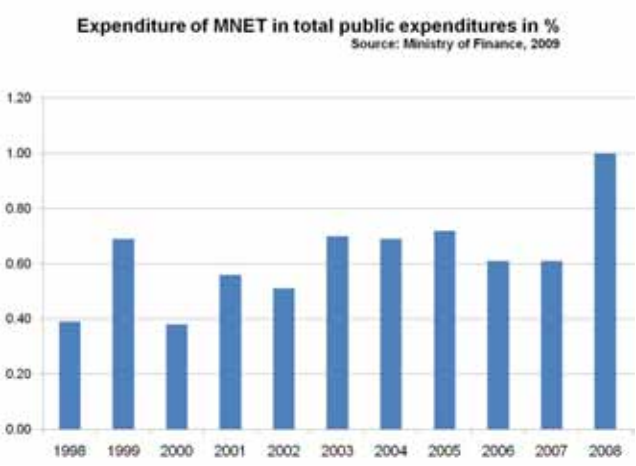


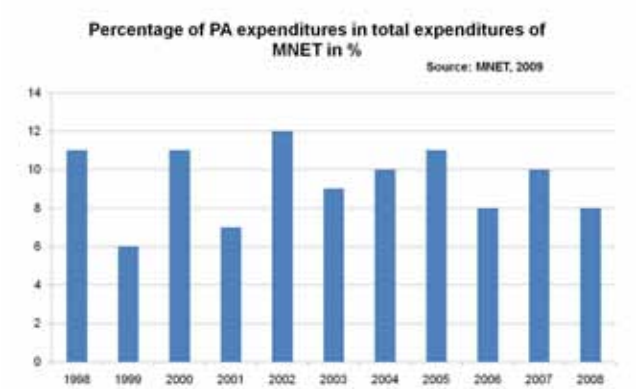
Way Forward E see Chapter 6.1, Way Forward see Chapter 6.2

	Key Findings	Way forward
Chapter 5.3 Human Resources	Staff at MNET designing PA areas and regulation have inadequate background and knowledge of effective contemporary PA management and biodiversity conservation	M5, M6
	PA managers often have inadequate background for his/her job	M5, M6
	PAs lack staff with relevant competence in environmental management, monitoring and public awareness	M5, M6
	Rangers need upgrading in number, status and competencies	M5, M6
	PA employment system does not reward skill development and experience.	M5, M6
	PA staff do not appreciate the involvement of local communities in management	M5, M7
	Alternative management solutions need to be attended to such as outsourcing of specific tasks etc.	M7

5.4 Funding and Finances

The costs for environmental protection and management are in most countries covered to a large extent by the governments national budget. Individual NPs and reserves have been allocated or even established by other means, but the overall responsibility for ensuring efficiency of the PA system in protecting biodiversity and living up to international commitments (like CBD or Ramsar) remains with the government. This also means that the state budget allocation will be a corner stone in the financial system.
The two diagrams below demonstrate how the government of Mongolia pays relatively little attention to environmental management in general and to PA management in particular. The Mongolian state budget has to cover many justifiable needs. However, the allocation for environmental management through the MNET budget was just 1 percent of the total state budget in 2008, making the ministry one of the smallest in terms of budget allocations.
Within that 1 percent, the amount allocated to PA management is only between 8 and 10 percent even showing a slight decrease the last ten years.





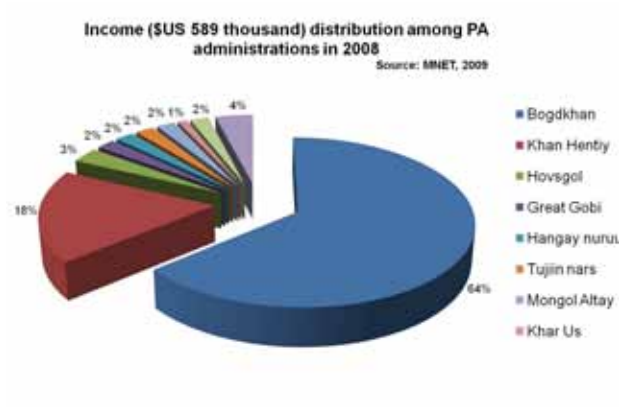
The Global Picture

The allocation to PA management in Mongolia can be compared with what other countries spend, which can be done by comparing PA expenditure per km² in different countries. When doing so, the Mongolian figure for expenditure is equivalent to US$ 7.4 per square kilometer, making it one of the lowest globally. The budget was raised by about 30 percent between 2008 and 2010, but is still among the lowest expenditures in the world.

The increase in PA expenditure per square km over the last two years were made possible thanks to generating income by PA itself.

Income volumes for PAs

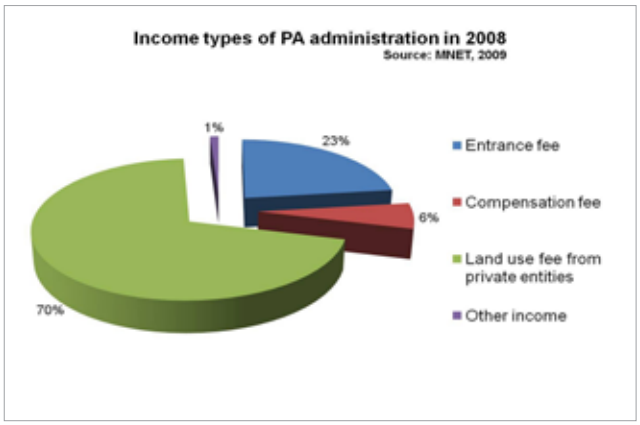
Among the PAs managed by PA administrations decided by the ministry, the differences in capacity to mobilize funds is remarkable. PA such as Bogd Khan situated in the proximity of Ulaanbaatar raises 54 percent of what all PAs manage to raise. This is equal to US$ 300,000 per year in a PA having great problems defending its integrity and



standing up against exploration. The internationally renowned Gobi Desert, attracting impressive numbers of tourists every year, mobilizes only US$12,000. The imbalance between the various PAs is striking and the efficiency of the current system must be questioned.

Sources of income

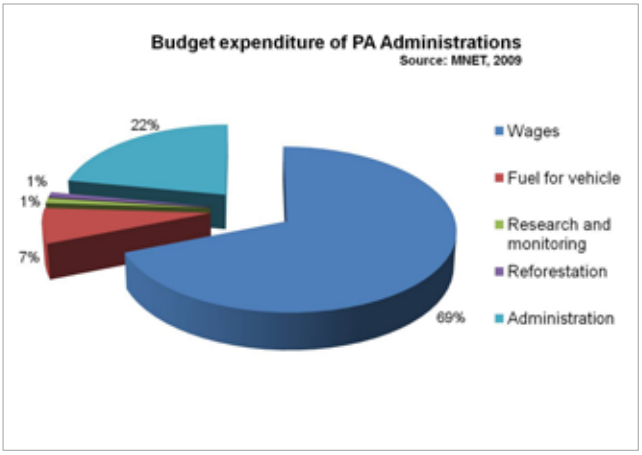
The possibilities to raise funds are limited in the current system. There are only two main possibilities - the entrance fees paid by visitors and the land use fees paid by entities for use of the natural resources, tourism etc. There is an obvious contradiction in the system. Herding or forestry heavily overuses



most of the PAs. At the same time, the main income for the PAs is raised through user rights to the natural resources that the PA is established to protect. This calls for an obvious need for very strong and clear rules and regulations to prevent current contradictions, and short-term financial results should not overshadow the long-term conservation goals.

Spending the small money

It has been noted that the money available for management of the PAs is small from a global perspective. The analyses of how this small money is used shows figures indicating a high level of inefficiency (more than 90 percent goes to salaries and administration) and as little as 1 percent goes to research and monitoring, the role of which is to ascertain



if the conservation goals are met or not. The figure above shows that conservation goals in the current PA system cannot be guaranteed and even less secured and sustained.

The real needs

A recent study on the financial needs of the national PA network shows that basic investment needs are between US$6.5 and 7 million. It further concludes that the annual budget demands for reaching reasonable management levels is 5 times higher than the current state budget allocations.

Further, Financial Scorecard exercise, conducted in 2008 (Method of UNDP), has concluded that Mongolia requires about US$10 million per year for optimum management of its PA network. This would mean a three-fold increase in the current budget.

The budget constraints also mean that the mobility of rangers and experts is very limited. Each staff has to cover vast areas or long borders of the respective PA and therefore probably does so relatively few times per year.
The likelihood that staff will be able to build confidence with local people, identify violations of PA regulations or even arrest poachers during those few visits is highly unlikely. Budget allocations for petrol are limited and possibilities to invest in modern communication equipment are almost non-existing, leaving most rangers without radio or telephone connections when patrolling.

Considering the limited and insufficient resources, the need to focus and prioritise becomes even more important. As mentioned in the chapter on human resources, the situation is made even worse as the management of most parks are generally understaffed, and often staffed with people lacking relevant background in PA and financial management. Effective management plans and business plans are often lacking which means that the limited financial resources are used in a way that does not support the goals and objectives of the PAs.

Incentives and auditing

Further, there are no incentives in place for motivating the staff to manage the park effectively. PA entrance fees are paid into the overall state budget. This means in practice that park staff has limited incentive to ensure that park fees are paid by visitors. This, in turn undermines the respect for rules and regulations of the entire PA system. Current annual audit and review of the financial performance of the PA administration is not linked to the purpose and objectives of the respective PA. This means that the annual auditing does not contribute to management effectiveness relative to the conservation and management objectives. Further, government interest in PA network management and active conservation measures seem to be very low and even elementary financing mechanisms such as entrance fees are not fed back into respective PA management. According to Mongolian law, the PA administrations are allowed to supplement certain portions of their financing with the income from tourism and other activities. However, due to a lack of legislation and regulation in this specific aspect, nothing happened on the ground. Further, the reinvestment of hunting fees into conservation is mandated through the Environmental Protection Fund. Only a tiny portion of this income has ever been reinvested in biodiversity conservation.

Alternative financing mechanisms

As budget allocations from government are likely to remain on a low level for the years to come and there is need to identify, develop and test alternative financial mechanisms. These include more effective mobilisation of funds within the PA (such as lease, entrance fees, tourism fees etc) and using these as incentives for effective management. Experience from within the country (Hustai NP) and internationally on finding alternative sources of income needs to be put into practice. This will include alternative/ private management systems.

The case of Hustai National Park

Hustai NP is located around 120 km west of Ulaanbaatar on the southwestern foothill of the Hentiy mountain range. In order to re-introduce Takhi horses, the government designated a Nature Reserve which was later upgraded to NP. The NP is the first and only NGO-managed PA in Mongolia to date. The Takhi re-introduction program and park management is supported by the Dutch government. Thanks to easy access from Ulaanbaatar, high tourist value for viewing wildlife including the Takhi horse and a relatively good infrastructure, the NP administration has been able to mobilize sufficient funds to be self-sustaining without government funds. Hustai NP is currently the best example of how the private sector can manage a PA with sustained and even increased conservation values and without burdening the limited government funds for PA management.

Current cooperation between the tourism sector and the PA system is not working well. The reason is a mutual mistrust. The quality tourist operators claim that PA administrations do not have the capacity to apply agreements and contribute quality to the management such as effective zoning and protection of key spots for tourism. As soon as the PA administrations can deliver quality outputs favouring the tourist sector, the tourism sector would be willing to contribute financial support, as tourists will appreciate those qualities and be ready to pay a higher price.

The economic value of PAs is not understood among decision makers or the local people. Well-managed NPs can attract impressive numbers of visitors that in turn, have to eat,

sleep, be guided and buy souvenirs in and around the PA. Experience from well-managed PAs such as the Hustai NP should be utilised in the PA network.

In addition, the ecosystem services in general need to be described, calculated and understood in order to add these aspects to land use planning and assignment of new PAs. These types of studies are few in Mongolia so far.

	Key Findings	Way Forward
Chapter 5.4 Financial Resources	Government budget allocations are far not at the level that the current PA system requires for quality management.	M1, M7, E1
	Insufficient budget allocations have severe impact on necessary investments and monitoring/evaluation of the conservation effectiveness is questionable.	1x1S
	The laws surrounding financial mechanisms within PA management are unclear and do not give any incentives for effective financial and conservation management.	M1
	Linked to Chapter 5.3 there is a need for capacity development and training on budget, business and financial management among managers and financial administrators.	M4, M5
	The current Law on State Budget does not allow testing alternative cost effective management systems. There is a need for finding effective alternatives internationally.	M7
	Increased cooperation and development of win-win solutions between the private sector, particularly the tourism sector and local communities is urgently needed.	M7

5.5 Public Awareness and Participation

Communication and Awareness

This dimension is often neglected – unfortunately. Many studies have shown that with an ambitious communication strategy, the impact of programs can be substantially improved. Also fields outside conservation studies indicate that effective information and communication processes facilitate empowerment, good governance, participation and wider support from the society. The CBD has a Program of Work on Communication, Education and Public Awareness (CEPA). It would be highly beneficial if the Mongolian system for PA and biodiversity management could develop and implement a more comprehensive communication strategy.

A high number, about 50, of information centres have been established in connection to PAs, several of them with funding from international donors. However, when studying the function of those it is obvious that little if any attention is given to them. The information centres were mostly established under the administration office or at a secondary school in Soum centres. Additionally, when the international donor withdraws, the information centres became almost non-functional due to lack of attention and professional guidance. Few information centres have managed to establish an active role in the community they are placed. Due to limited financial resources and a lack of understanding of the role that active communication can play, these centres have turned into wasted investments. Management plans need to highlight the importance of active dialogue, communication and awareness building and define key measures in this field and ensure that communication is an integrated part of PA management.
The role of the rangers in this aspect is fundamental (Chapter 5.3)- they are the most visible representatives of all PA staff and are in frequent contact with a variety of local stakeholders. To invest in training programmes for the rangers to better play the role as communicator concerning biodiversity conservation of the PA and is likely to yield positive results in the short term. Increased communication and dialogue will lead to increased participation from the local communities.

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Mass media could play an important role and improve a wider understanding of both biodiversity conservation needs in general and the more specific need of establishing and maintaining a PA network covering as much as the 30 percent of the territory as committed by the government.

In PAs, where the international donor community has been engaged, there has also been a large number of information materials published and distributed.
The main problem with the efforts listed above is that they are not embedded in a

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common strategy for communication and awareness creation. In addition, much of the communication is designed by specialists in the specific area of issues rather than by experts in communication, education and awareness creation. Specific goals are not set and are often not directed at appropriate target groups, which makes produced material redundant and remain unused. It also causes frustration and disappointment among staff that are engaged in those issues, as they can never register any positive impact or changed attitudes among communities.

Modern pedagogic and information strategies must be utilized to influence the design of both communication strategies and specific inputs targeting schools, decision makers or local communities. MNET staff and PA administration must be made to realise the power of good communication and dialogue and see these as an opportunity rather than tasks forced upon them.

Values of Protected Areas

There are no recent studies made in Mongolia on the public interest in and support of biodiversity conservation and PA establishment. The need for raising awareness among the public is therefore difficult to justify. However, the current development in Bogd Khan SPA at the border of Ulaanbaatar city gives an indication that things can be improved. The repeated violation of the conservation values in Bogd Khan SPA has so far been largely neglected. The conclusion could be that public awareness about conservation values and PAs is not high enough to raise debate about and criticism against the current mismanagement.

A more pronounced communication strategy on conservation values and the need for active involvement to protect the Mongolian landscape and biodiversity could therefore lead to increased support for improved PA management and therefore yield positive results in the long term. Much of what is needed when it comes to biodiversity conservation is linked to the heritage of the Mongolian people- their grasslands and their sustained relations with natural resources.

Participation and Engagement

It is now a given that without local participation and engagement in PA establishment and management, there is little chance that the PA can sustain a positive impact on the conservation values it is established to protect.

A number of projects have been initiated introducing Participatory Rural Appraisals (PRA) as part of PA management. Projects with biodiversity goals have engaged in rural development processes, building capacities in small-scale business and entrepreneurship among poverty-stricken herder groups. In Khar Us Lake NP, this approach has been highly successful and has led to a closer cooperation between the local herders, the PA administration and WWF, including dialogue on issues such as overgrazing and sustainable use of the lake and its surroundings.

© WWF Mongolia During PRA session

However, while these measures should be a standard for effective PA management, they have in fact been initiated from outside the MNET jurisdiction. It is therefore vital for MNET to request that all management plans should be developed in dialogue with local communities and that the plan should contain elements that facilitate dialogue and local participation in management and enforcement.

© D.Nandintsetseg Hustay Mountain

A broader definition of stakeholders involves NGOs, private sector and even local entrepreneurs that contribute to management of PAs as part of their business and economy. Alternative management systems for established and planned PAs are extremely necessary not least with the background of the poor financial resources mobilised through the government system. Hustai National Park is an example of how initiatives, other than those of the government can contribute to the success of biodiversity conservation. An open and constructive debate on how other resources can be allowed to develop, engage in and manage PAs is needed and MNET needs to take a constructive lead in this process.

	Key Findings	Way Forward
Chapter 5.5 Awareness and Participation	Local involvement in management must be seen as an asset in PA management in contrast to the current situation where local participation is not appreciated among field staff	M7
	In general, communication is given less priority than legal enforcement among rangers and PA staff	M8
	Education and awareness should be part of all PA management and require changed attitudes and improved skills among PA staff	M5, M8, M4
	Ambitious attitudes to information sharing will increase support for PA management and contribute to effective management in the long run	M 2, M 8

Chapter 6 FILLING THE GAPS ON THE ROAD AHEAD

The findings of this Gap analysis reveal a large number of Gaps in the current network of PAs. Gaps have been identified within almost every dimension of ecological representativeness as well as PA management. In order to turn these Gaps into a useful, readable road map for government, ministry, PA managers, NGOs and donors, we have endeavored to summarize the findings and provide recommendations on how to fill those Gaps. In this Chapter, they are divided into two blocks, one for the ecological Gaps and one for the management Gaps.

All concluding findings, identified in chapters 2, 3, 4 and 5 are addressed and included in the formulation of recommendations for the way forward. The heading of each recommendation includes reference to the chapter supporting the respective recommendation.

Finally, the recommendations for action have been given priority in the chapters below. This will help decision makers to take informed decisions on the way forward and advance from studies to action. Any prioritization can easily be misinterpreted and priority 3 might be regarded as of low interest. For the sake of clarification, we stress that the situation in the current PA network is so serious that all three levels should be considered as serious and the measures necessary. The priorities should be seen as a scale of urgency.

Chapter 6.1
Filling Ecological Gaps

Chapter 6.2
Filling Management Gaps

6.1 Filling Ecological Gaps

E1	**Develop a high-level supported and hands-on Conservation Strategy securing a rapid expansion of the PA network**	Supported by findings from Chapter 2, Chapter 3.1, Chapter 3.2 and Chapter 3.3	Priority 1

Mongolia has declared in international fora and nationally approved policy (Mongolia's Millennium Development Goal) that in 2015, the area covered by the PA network shall be 30 percent of its territory. The ambition is recommended and realistic from a biodiversity point of view, if we consider that more than 10 percent of land is under local protection, which is not included in this Gap analysis for several reasons (mostly lack of data/or borders are not clear etc). In order to fulfil this commitment, there is a need for urgent and rapid action to expand the PA network in the remaining 4 years. The local PA can play an important role in securing connectivity between national PAs. Unfortunately, most of the local PAs have been established on an ad-hoc basis, mostly securing the areas against mining activities. The task to reach the goal is huge and a strategy for rapid increase of existing and additional PAs needs to give a clear message to responsible authorities, define responsibilities and set clear deadlines. The strategy should be developed soon and the process should be action-oriented rather than theoretical, avoiding time consuming fine-tuning and focus on rapid implementation in order to achieve the set goals. It must build on ecological principles and broad biodiversity conservation values. The strategy should use the current Gap analysis as a platform whereby cost-effective biodiversity conservation can be secured in short time. The strategy must also respond to all recommendations below.

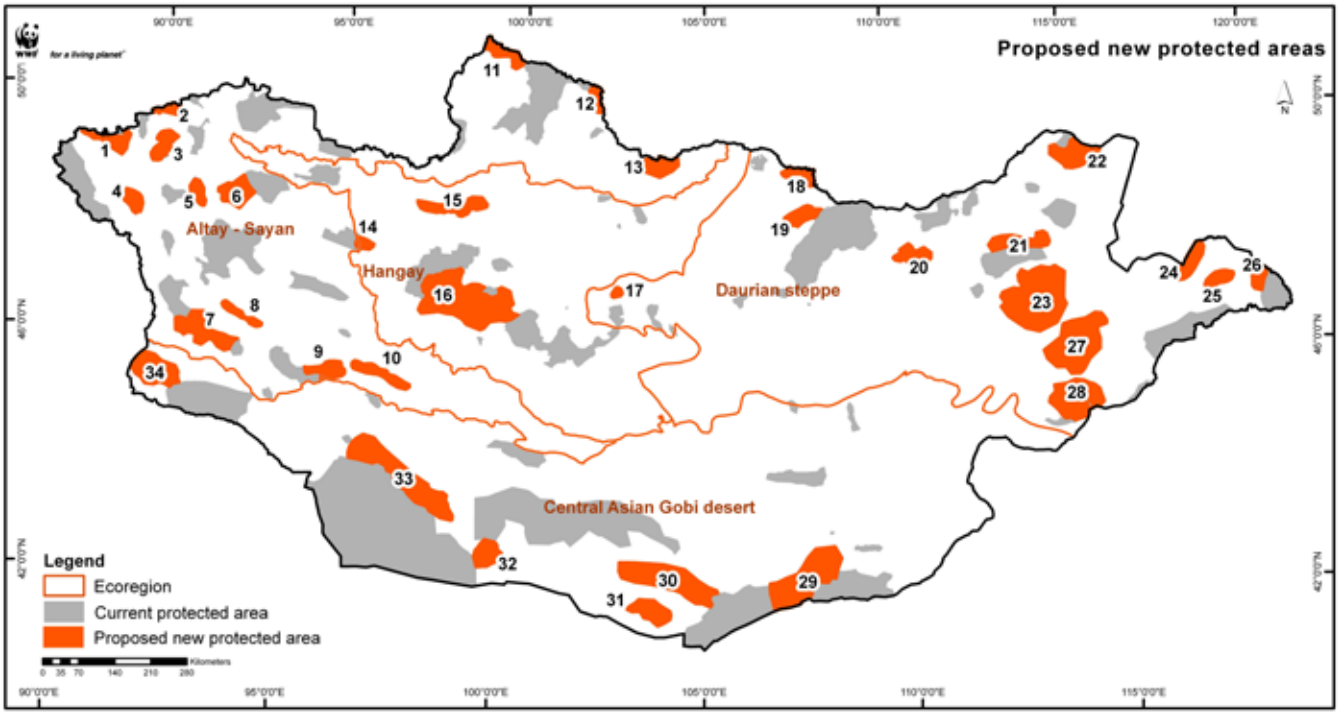
Finally, this process requires unreserved support from the highest political leadership to both developing the strategy and particularly to implementing it.

The recommendation is to create a practical, implementable Conservation Strategy for improving the current PA network and to set it in action immediately.

E2	**Apply the Gap analysis and focus PA network extension to the areas selected.**	Supported by findings from Chapter 2, Chapter 3.1, Chapter 3.2 and Chapter 3.3	Priority 1

The Gap analysis has clearly spelled out that the current PA network is not sufficient to meet Mongolia's obligation to international agreements and the national commitments. Ecological Gaps are identified in relation to overall ecological dimensions as well as to species and ecosystems. The current Gap analysis has resulted in a GIS based map in which the priorities are identified from the biodiversity point of view. The recommendation is that the available resources for extension of the PA network should focus on those areas in order to achieve optimal conservation output with the limited resources available.

The map over potential PA extensions gives a clear and reliable guideline for both the short and the long-term conservation strategy, these are the areas where the greatest biodiversity benefits are to be found.



The recommendation is to use the map from the Gap analysis as a roadmap for immediate expansion of the PA network.

E3	**Focus on ecoregions underrepresented in current PA network**	Supported by findings from Chapter 3.1 and 3.3	Priority 1

The Gap analysis clearly shows that none of four eco-regions reach the government's goal of protecting 30 percent of Mongolian territory, even if the Central Asian Gobi Desert is close by. The weakest network coverage is found in the Daurian Steppe where 9,6 percent is protected and in the Hangay mountains, where only 7.9 percent is included in the current PA network.

The Daurian Steppe represents an eco-region with very high conservation values also from an international perspective, the rolling grassland and the home of nomadic herders together with a number of species not found elsewhere in the world. It also represents a region where the complexity of pastoralism versus conservation is most evident. This complexity and the lack of tools to guide sustainable grassland management are the main reasons for the low representation of PAs. Perhaps also, protecting the common – the vast grasslands- has been less justifiable than protecting the exclusive. As a result, the biodiversity of the grassland is now threatened.

A similar chain of reasons can be found for the Hangay eco-region, dominated by forested mountains and mountain steppe.

The recommendation is to give priority to conservation measures in the Daurian Steppe and Hangay to safeguard the ecosystems and the biodiversity.

E4	**Focus on ecosystems underrepresented in the current PA network**	Supported by findings from Chapter 3.2 and3.3	Priority 2

Species are based in or linked to ecosystems. Among the 19 ecosystems in Mongolia, the following ecosystems are seriously underrepresented in the current PA network:
• The four Steppe ecosystems (4,24 – 7,62 % under the PA network)
• Sub-boreal mixed forest (9,96 % under the PA network)

Another pattern found in the analysis is that the higher the productivity of an ecosystem, the lower is the level of protection. While this is in no way unique for Mongolia, it nev-

ertheless requires attention. Conservation work must take this imbalance into consideration and increase protection levels in ecosystems with higher productivity. Among the steppe ecosystems, the Meadow Steppe is seriously underrepresented and among the forest ecosystems, the Mixed Deciduous Forest requires more resources for conservation in the future.

The recommendation is to focus future conservation work in Mongolia on areas where those ecosystems are present and the zonation within them is made more effective.

E5	**Improve conservation efficiency by improved zonation within PAs**	Supported by findings from Chapter 2, Chapter 3.1, 3.2 and 3.3	Priority 2

The Mongolian system of PA design and regulation allows for a zonation within respective PAs. The idea is that each PA should have a protection level reflecting the conservation needs with a nucleus of highest protection surrounded by one or two zones with more extensive regulations. Huge areas have been declared NP or SPA with a zonation leaving very small portions with the highest protection level. In practice, this means that out of 14 percent of PAs, perhaps only 2 percent is effectively protected.

The risk is also that by allowing intensive use of the outer parts of the respective PA, the ecological integrity of the relatively small Core or Pristine areas are at risk. The integrity of the PA requires ecological analyses before the zoning is decided, focusing on size (big is often more efficient than small), borders (ecologically motivated are better than administrative and coherent is more efficient than patchy) and proportion of the different protection levels, where as a general principle the core and pristine areas must increase.

The recommendation is that the zonation principle is used in a more constructive way that includes substantially larger areas in the highest protection level. This principle should be applied to all new designated areas as well as in management planning and possible revision of the existing PAs.

E6	**Establish "Endangered Species Management Programs" (ESAP)**	Supported by findings from Chapter 3.1, and Chapter 3.3	Priority 2

The situation for a number of species has shown to be deteriorating and special attention is required when it comes to improving the PA network. However, this is not enough and there is need for more strategic and targeted measures for the individual species. Species with wide range and migratory behaviour can be given support by protection of key habitats such as breeding sites, in the example of the Siberian Crane. But if the rest of the migration area is not protected, the impact will be limited and insufficient to reach the conservation goal decided by the government in signing the CBD. Further, unsustainable hunting practices can also cause population decline, even if habitats and migratory routes are included in a PA network. To conclude, a combination of measures, in addition to expansion of the PA network, are often required to reach sustainable populations.

There is need for a new tool – complementary to the few national programmes- to be developed and implemented. Endangered and vulnerable species should be listed and an "**Endangered Species Action Program**" for each of those species should be put in place. The ESAP must include concrete measures, clear distribution of responsibilities, integrated actions, fixed realistic targets and a high-level political commitment.

The recommendation is to complement the Conservation Strategy with an "Endangered Species Action Programme" and commence its immediate implementation.

E7	**Improve Ecological integrity by coordination of Laws and Plans**	Supported by findings from Chapter 2, Chapters 3.1 Chapter 3.2, Chapter 3.3 and Chapter 5.1 and 5.2	Priority 2

The PA network is not sufficient to sustainably protect key ecosystems. For example, the lakes are included to a very high proportion in the current PA network. An impressively high level of Mongolia's lakes, over 1 million hectares, is protected as NP or SPA. However, this does not protect the source of the water feeding these lakes and the alternative to take the entire watershed under the PA network is far from realistic. This dilemma indicates that there is need for complementary measures in order to protect the integrity of the lakes. Similar reasoning can be applied for a number of ecosystems indicating that the PAs need to be embedded in a system of land and water use regulations. In practice, this can be through regulations of water management in the watershed or regulations on land use in areas adjacent to a protected forest or steppe, regulating urban expansion, grazing or tourism development.

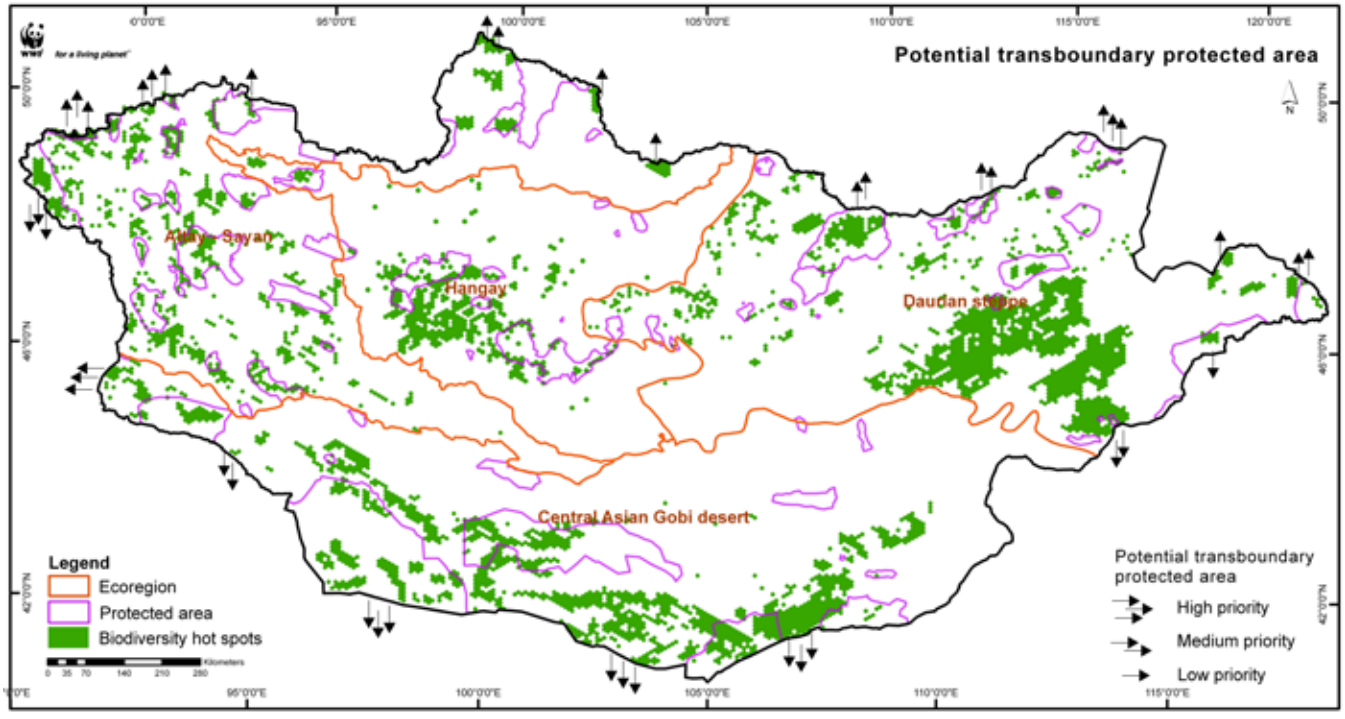
The recommendation is to develop, establish and implement a legal framework complementary to the Law on Protected Areas within which the integrity of PAs is viably protected.

E8	**Improve transboundary protection measures.**	Supported by findings from Chapter 2, Chapter 3.1 and Chapter 3.2 and Chapter 3.3	Priority 3

Administrative borders are not recognized by biodiversity, be it plants, birds, mammals or the ecosystems they are dependent on. The Gap analysis has shown that the existing PA network is often constrained by national borders (see for example Small Gobi SPA A and B). A similar Gap exercise on the Chinese or Russian territory would probably give similar results.

In other parts of the world, transboundary National Parks have been used as constructive means to reach better conservation outputs, but also a closer cooperation between nations and human populations on the two sides of the borders. Species like the Bactrian Camel and the Asiatic Wild Ass frequently cross the border to China. Other species such as the cranes and the geese migrate over borders depending on their nesting sites in Russia and Mongolia, but are similarly dependent on wintering sites in Southeast China.

The recommendation is that Mongolia should facilitate a closer cooperation mechanism across borders, through initiating concrete and common planning and establishment of transboundary PAs in two or preferably three countries.



6.2 FILLING MANAGEMENT Gaps

M1	**Find creative ways to finance the establishment of new PAs and the management of the current PA network**	Supported by findings from Chapter 5.1, Chapter 5.4	Priority 1

The issue concerning lack of funds arises so frequently in all analyses concerning both management and the highly needed extension of the current PA network. We would have liked to bring up any other issue as the key way forward, but financing is impossible to avoid. It is the key issue!

It is concluded in several studies and generally accepted among conservation practitioners that the budget allocation for PAs in Mongolia is seriously under-dimensioned and that the current level actually poses a risk for the values that the already established SPAs and National Parks constitute. Therefore, the government budget for PAs needs strengthening and that a substantial increase in funds is urgently required.

However, the budget constraints are so overwhelming that alternative financing mechanisms must be mobilised without delay. Internationally, a number of financing mechanisms have been tried and evaluated. In Mongolia itself, the Hustai NP is an example where government allocations are not required and at the same time high conservation values appear to be secured and sustained. Any such solution must be adapted to Mongolia and evaluated from the perspective of conservation impact and the need to establish and maintain a nationwide network of PAs.

The recommendation is to mobilise increased funding through greater government commitment and creative involvement and mobilisation of alternative financial sources and management models.

M 2	**Revise the Legal Framework for identification, establishment and management of PAs**	Supported by findings from Chapter 2, Chapter 3.4, Chapter 5.1, 5.2 and 5.4	Priority 1

Revision of the MLSPA has many advantages. The Law was enacted almost two decades ago and has undergone a number of amendments, which makes it increasingly difficult to understand and apply.

As clarified in this analysis, a number of specific issues need to be given attention. A revised legal framework will lead to an improved and more cost- effective management if the new law will:

- set up clear procedure and criteria for establishing local PAs and their management authorities
- allow for alternative funding sources beyond governmental funding
- give room for quality and efficiency audit
- allow for financial benefits to stay at the respective PA
- use ecologically justifiable protection levels/zones to increase integrity and efficiency of PAs
- prescribe management plans to be developed prior to establishment of PAs
- make business plans a compulsory tool to improve management
- require participatory approaches and cooperation with local communities
- define and favour mechanisms for outsourcing of management, research/monitoring and entire administrations
- strengthen enforcement of the law
- simplify and increase effectiveness of the institutional framework for PA management

• improve interface with other laws regulating use of land and nature resources;

The recommendation is to modernize current Law on Protected Areas including experience from Gap analysis and ecological realities.

M3	**Revise interrelated laws in the field of Nature Resources management.**	Supported by findings from Chapter 4, Chapter 5.1	Priority 2

The integrity of PAs is not secured today. Water resources feeding protected lakes are running dry, urban centres are intruding into PAs and grazing and mining activities are posing threats to their sustained conservation. There is therefore a need to revise the legal framework influencing the use of land and natural resources adjacent to the PAs.

The following laws need to be consistent and interrelated in a mutually supporting way within the overall national responsibility to secure the biodiversity heritage of Mongolia:

• Law on Environment Protection

• Law on Special Protected Areas

• Law on PA Buffer Zones

• Law on Land

• Law on Tourism

• Law on Forest

• Law on Hunting

The list of examples of laws could maybe made longer. But the key issue is that the laws must be complementary in function and interlinked, in order for them to support each other and not allow Gaps between their enforcement, or allow other laws to be superior to the Law on Special Protected Areas (MLSPA). These laws need a strengthened enforcement mechanism.

Further, the role and function of the national land use plans need to be revised. The latest national land use plan designated a wide number of areas to be included in the national PA network. However, the impact on the ground of those statements is still lacking.

A number of species are facing a serious decline in population caused by unsustainable and often illegal hunting pressures. A general overview of the hunting law, strengthened and pro-active enforcement mechanisms and active political leadership is required. For the species, internationally classified as endangered and/or vulnerable, the hunting permits must be centralized and strongly guided by sustainable population goals and international principles of preservation.

The recommendation is to see to that the entire legal framework concerning land use and natural resources supports biodiversity conservation and PA management in a better way than today.

M4	**Upgrade Management Plans and establish Business Plans to improve management of PAs**	Supported by findings from Chapter 4, 5.1, 5.2, 5.4 and 5.5	Priority 2

As the state budget is simply insufficient for the management of the existing PA network, there is obviously a need to find ways to improve management within the current budget frames. The outcomes of the Gap analysis identify a number of possible measures to improve the current situation and to reach more of the goals concerning biodiversity conservation. One of the key measures is to improve the process for establishing management and business plans and to improve the quality and implementation of the plans.

The recommendation is to develop up to date Mongolia specific guidelines and manuals for development of management and business plans. These would be built on international experience, but with necessary and beneficial adaptation to Mongolian conditions and situation. The guidelines and manuals must be developed based on participatory approaches and use both the elabo-

ration of the guidelines and plans as well as the developed plans for in-service training of current staff.

The plans must build on and support the conservation goals and the ecological integrity of the respective PA. Further, the plans should identify the most resource-efficient PA management, including the institutional structure, human and material resources as well as stakeholders involvement.

The recommendation is to improve efficiency of PA management by upgrading management planning and introducing business planning for all PAs.

M5	**Develop a Human Resources management programme for the PA network**	Supported by findings from Chapter 4, 5.2, 5.3, 5.4, 5.5	Priority 2

No PA network can operate efficiently without a capacitated, skilled and committed staff. The current situation is such that many positions are filled with staff lacking suitable background, having irrelevant education and lacking experience. A comprehensive and consistent Human Resources Management Programme needs to be developed and implemented involving all people from the Ministry down to ranger posts in remote PAs. The rationale behind the programme must be that the individuals are key to fulfilling conservation goals and that personal skills, ambition and improvement must be stimulated and rewarded at all levels in the system, and finally, the right person should be on the right position.

This requires a set of measures including:

• developing a plans building on encouragement and recognition of knowledge and skills in meeting the needs for effective biodiversity conservation

• linking these qualities to a salary reward system, improving the situation not least for the rangers

• encouraging staff to develop in fields related to public participation, community cooperation and public awareness

• develop mechanisms to reward staff for staying in their positions long-term, to build their own capacity and contribute to institutional experience

• strengthening resources and skills to contribute field surveys and monitoring

• establishing clear terms of reference for all levels (managers, specialists, financial controllers and rangers) in PA administration and apply those strictly when recruiting new staff

• coordinating training and experience sharing with other government bodies (Border defence and State inspectorate) as well as with staff from privately managed PAs (Hustai, Gun Galuut and others)

The recommendation is to better mobilise the human resources in PA administration and to attract competent people to engage in PA management.

M6	**Establish a PA Management Training Programme at University level**	Supported by findings from Chapter 3 and subchapters, Chapter 5.3, 5.4, 5.5	Priority 3

The capacity of the staff to effectively develop and implement effective management is very limited today. To build strengthened resources among both current and future staff there is need to link PA management to higher education and research in Mongolia. By linking training for PA management and research at tertiary level, long-term positive impacts can be reached. It will strengthen both the PA staff involved and the science linked to necessary monitoring and research in the PAs.

There is a clear need for a PA Management Training Programme at a national university in Mongolia. The programme should lead to academic credit points as well as a certificate defining what position the education has

targeted in PA management. The education model should be differentiated in order to meet the needs of different positions at the PAs. Managers need training in ecological and biodiversity issues as well as financial management, participatory management, ecological integrity, eco-tourism, governance, business management etc. Experts require training in monitoring, evaluation and education for sustainable development, while rangers need training in field observations, public relations etc. The recruitment of new staff should specify what education level is required for the respective position and the staff attending the training should be given recognition of completed education.

The recommendation is to support greater competence of the PA administration through a comprehensive higher education.

M7	**Linking PA network and the civil society/private sector**	Supported by findings from Chapter 4, 5.3, 5.4, 5.5	Priority 2

The establishment of PAs are often met with hesitation from local people and local authorities as they expect that it might hamper development of the local economy. There is also a general mistrust between citizens and authority representatives. However, there are many potential positive linkages between PAs and the related communities. There are examples of PAs contributing to employment, shared management, increased tourism etc, not to mention the economic goods that can come out of the ecosystem services of well managed and maintained PAs. There is an obvious win-win opportunity imbedded in a closer and a mutual cooperation between local society, PAs and the private sector.

Mechanisms stimulating coordination and cooperation between civil society and PAs need to be established and made part of all PAs. Decision-makers at all levels need to be exposed to the good examples from Mongolia and abroad. To make these examples function in practice, there is also need for changes in attitudes among the staff of the PA system at all levels and training is essential.

Tourism is often seen as a threat to sustainable PA management. However, a well developed, guided and managed PA network with a functioning leasing system, could obtain substantial financial resources from tourism. Mutual understanding between the tourism sector and the PA management system is needed and the good examples need to be given greater exposure. A national tourism master plan for PAs, addressing land use issues, exclusive rights, performance indicators as well as standards and requirements of tourist operators would be beneficial.

The recommendation is to change attitudes among PA administration at all levels and see involvement and cooperation with civil society and the private sector as an opportunity to reach improved PA management.

M8	**Develop Communication Strategies for PA network**	Supported by findings from Chapter 4, 5.5	Priority 3

When working under stressed conditions and within a system that has obvious short-term shortfalls, it is easy to focus only on the problems of today. In a more strategic planning of work in the PA system, more attention must be given to dialogue and communication that builds understanding, awareness and support. The communication linkages between Mongolian society as a whole and sectors involved in environmental management and biodiversity conservation is weak, if at all existent.

Several studies show that effective communication will lead to an improved situation for the biodiversity situation. Communication strategies today build on a deeper understanding of the values and ethics of the target groups than earlier campaigns that built more on superficial attitudes of changing behaviour through distribution of facts. Dialogue must build on mutual understanding and adapted campaigns for different

target groups. Campaigns must build on understanding the target audience and how to support their broader understanding of the values of biodiversity and PAs.
A key target group for improved communication is obviously the decision makers, including the government and the Parliament/ Great Khural as their commitment and support is crucial for filling some of the Gaps identified. Another important target group is the schools and the students where use of modern ecologically sustainable development principles can mobilise long term and sustained support for biodiversity conservation.

The recommendation is to see communication and dialogue as efficient tools to build support for and engagement in biodiversity conservation, establishment of new PAs and the sustained management of the PA network.

Chapter 7 METHODOLOGY FOR THE GAP ANALYSIS

The purpose of this Gap analysis is to increase the understanding of the effectiveness of the current PA system in achieving biodiversity conservation. The goals have been described in Chapter 2 and are a combination of national decisions in PA planning (such as having 30 percent of the territory under the protection framework) and international commitments (such as ratification of CBD and Ramsar conventions).

The two main questions raised and answered in this report are:

What are the Gaps in distribution and coverage, that need to be identified in order to achieve the goal of protecting 30 percent of the territory of Mongolia and preserving all dimensions of biodiversity?

> We need to compare the distribution of biological systems hosting biodiversity, with the distribution of PAs. Is there known biodiversity that is left outside the PA network or where the PA system does not give enough protection?

What are the Gaps in the management system that, if addressed, would improve functioning of these PAs and thereby in reality preserve the biodiversity?

> We need to understand if the protection resources are used effectively. Are the protection levels, the financial means and the resources enough to protect what they are supposed to protect? Does the system function in reality?

The need for analyzing the Gaps between biodiversity protection ambitions and the reality and function of the PA frameworks is a global one. To facilitate this, the CBD process has led to the establishment of a common methodology. This methodology- as described in Closing the Gap: Creating Ecologically Representative Protected Areas Systems (which can be downloaded from: https://www.cbd.int/doc/publications/cbd-ts-24.pdf) has been the foundation for this study as well.

Step	Chapter		Process/Function	Outcome/conclusion
8	Executive Summary and 6		Conclusions and way forward	Improved Biodiversity Conservation
7	5		Analyse the Management effectiveness	Conclusions on improved effectiveness
6	3		Analyse the gaps between PA system and biodiversity needs	Map of needs and opportunities for extension of PA
5	4		Analyse Threats and Pressures	Map of threats, focusing new PA establishments outside threats
4	3		Analyse occurrence and status of biodiversity	Map of Protected Areas
3	3		Identify biodiversity (eco-regions, ecosystems, habitats and species)	Map of biodiversity
2	2		Analyse and map occurrence of protected areas	Define key ecosystems, patch systems and key species
1	2 and 5		Identify Conservation Goal	Defined as by Government policy decisions on biodiversity

7.1 Step 1 Identifying the Conservation Goal

The analysis has been made on all policies directly and indirectly linked to biodiversity conservation and the process of planning and management of PAs.

7.2 Step 2 Identifing Representative Biodiversity

The simplest way of measuring fulfilment of conservation goals is by area. Many countries have officially or unofficially measured themselves against the goal of 10 percent of terrestrial area, developed by the IUCN World Conservation Union at the IV World Parks Congress in Caracas, Venezuela in 1992. Mongolia has however, through Parliament and government decisions, pronounced a higher ambition and aims to reach 30 percent.

However, this says nothing about the effectiveness of the system as such. If the 30 percent protected area is only localized within the desert dominated- southern Mongolia, all biodiversity in the northern forest ecosystems will be lacking protection. But an analysis cannot cover all dimensions of biodiversity (from species to eco-regions) as this would lead to a very complex process demanding knowledge and facts that are simply not available yet. The CBD process has therefore developed a Gap Analysis methodology, which focuses on a representative selection of the nation's biological diversity. In this exercise, the selection of the focal biodiversity elements is conducted to ensure that they represent the full range of biodiversity within the country from eco-region to matrix ecosystems, patch habitat and key species.

The terminology often used is that ecosystem for example represents a *Coarse filter level* while habitats/patches and species constitute a Fine Filter level. Both levels are needed in a Gap analysis and they complement each other in order to create a more holistic picture, leading to the establishment of an effective PA system.

7.3 Step 3 and 4 Evaluating Biodiversity Distribution and Status

An understanding of the spatial distribution of the identified ecosystem, habitats and species is fundamental to an assessment of the conservation effectiveness and the need to safeguard the biodiversity. However, the overall status (condition, viability) and trends (increasing, decreasing or stable) for each target are as important as the geographic distribution. Simply put, to capture biodiversity that will persist, information about each system or species and their viability and vulnerability is required. Knowing these trends in biodiversity will also contribute to prioritizing of conservation actions.

In the case of the Mongolian Gap Analysis, a set of 19 ecosystems were identified and selected as key elements for the coarse filter analysis. These ecosystems were identified after many consultations with experts in the field and comparisons with internationally accepted systems of classification. A similar process is applied to the fine coarse elements such as the key species (selected also because of presence in national and international Red data processes). Because of the existence of surprisingly good data for many of these targets, the team was able to produce maps that geographically represented these eco-regions, ecosystems, habitats and species across the entire country.

7.4 Step 5 Analyzing Pressures and Threats

Knowledge of threats to the targets is a key step in the prioritization process and therefore, this Gap Analysis has carried out detailed threats analysis.

Known threats were evaluated to determine their relative importance in creating negative habitat impacts or direct removal of the species themselves. Each threat was analyzed by its zone of influence in spatial terms around the source of that threat. For example, roads constitute a direct removal of habitat along the length and width of the roadbed itself, but also, depending on traffic volume, create a barrier to movement for some terrestrial species such as the Mongolian Gazelle, and also can inhibit movements across the landscape – again, depending on the degree of traffic crossing that roadway.

In the case of railroads, the two major rail lines in the study area are fenced on both sides to prevent train collisions with migratory wildlife and livestock. This prevents direct loss of those species in the population, but also completely prevents seasonal migratory movements that species rely on for finding nutritious forage and accessing traditional breeding/calving grounds. This leads to fragmentation of populations and decreased genetic diversity.

Mines were determined to be major sources not only of direct removal of habitat, but also, due to the amount of human activity occurring on site, create a significant inhibi-

tory effect on surrounding wildlife. This zone of negative influence was determined to be significant, to a radius of 6000 meters from the boundary of the mine sites.

7.5 Step 6 Analysing the Gaps between the PA System and Biodiversity Needs

At its simplest, a Gap analysis consists of overlaying a map of biodiversity on a map of protected areas and identifying the Gaps. A Gap analysis also looks at various kinds of Gaps – representation, ecological and management Gaps. But the extent to which this is possible depends on the quality of the data available.

In this Gap analysis, species distribution was mapped utilizing the potential habitat models available as little actual occurrence data existed. The extent to which the current PAs system "protected" these species was evaluated based not only on the spatial co-occurrence of the species ranges and the PAs boundaries, but also by evaluating the type of protection offered to the species based upon designated management regimes, zones of protection within each PA and the reality of the protection regime on the ground – regardless of the intended management scenario. For instance, a National Park may overlap significantly with one or more of our conservation targets, but that park may be poorly funded and heavily exploited by surrounding human communities for wood, grassland resources, meat or fur since little to no law enforcement exists. This would be considered inadequate for actual protection of that suite of conservation features (species and/or ecosystems) so that more areas would be recommended to make up for that Gap of management effectiveness relative to those features.

7.6 Step 7 Management Gap Analysis

PAs are only as good as their management. There are, unfortunately, many PAs that are poorly managed, or with management objectives or governance patterns that do not coincide with the needs of the specific biological elements contained within. Identifying and addressing such management Gaps can be critical for strengthening the national PA system. For the Mongolia Gap analysis, the current status of PAs, the PA governance regime and management effectiveness is described. Looking at these issues in detail, may well be beyond the scope of many national Gap analyses, but we suggest that they be examined in at least a cursory manner.

7.7 Step 8 Prioritizing, Filling Gaps and Identifying the Way Forward

PAs are needed primarily because the pressure of human activity is threatening, degrading, or eliminating some elements of biodiversity. A Gap analysis does not produce a precise plan that can be followed, but rather identifies a set of concerns and opportunities to be reconciled with the country's conservation goals and other national needs and expectations. A good Gap analysis will begin to outline the priorities to be addressed and a roadmap for taking action. Therefore, this current Gap Analysis also includes, if not a detailed map, at least a set of recommendations for the way forward. These recommendations have been discussed within the team. It was decided to conclude on a handful of tangible and realistic recommendations rather than a long wish list. The recommendations were also made so concrete that concerned actors can start to take action, rather than making further time- studies and reports.

TEAM MEMBERS CARRIED OUT GAP ANALYSIS IN BIODIVERSITY CONSERVATION

The Gap analysis concerning biodiversity conservation and the existing PA management has been successfully conducted as a result of combined and constructive contributions by the many and involvement of several different organizations and institutions. All of those have been active in building the foundation for this synthesis report.

Gap analysis in biodiversity conservation and their representations

Team members are:

Experts: from national universities including

N.Batsaikhan, National University of Mongolia

B.Boldgiv, Ph.D, National University of Mongolia,

B.Bayartogtokh, Sc.D, National University of Mongolia.

Kh.Terbish, Ph.D, National University of Mongolia

D.Nyambayar, National University of Mongolia

S.Erdenesukh, Professor of Hydrometeorological and ecological department of Physic-Electronics School under the National University of Mongolia

Researchers and experts

B.Nyambayar, Researcher Ornithological Laboratory of the Institute of Biology, Mongolian Academy of Sciences (MAS)

Ch.Sanchir, Sc.D. Senior Researcher of Institute of Botany, MAS

D.Dash, Sc.D, Scientist of Institute of Geo-ecology, MAS

G.Dorjgotov, Academician, Sc.D, Di rector of Institute of Geography, MAS

S.Tserendash, Sc.D, Animal Husbandry Research Institute

Ya.Jambaljav, Sc.D, Director of Permafrost Study Laboratory

Representatives of research: institutions including

D.Ouynchimeg, Director of Population and Social Statistic department of National Statistics Office

N.Buyandelger, Director of Land Use department of the Administration of Land Affairs, Geodesy, and Cartography

Ch.Dugarjav, Sc.D, Academician, Director of Institute of Botany, MAS

The Gap analyses further required inputs from National consultants

L.Ochirkhuyag, GIS Specialist, WCS

N.Odonchimeg, Specialist, WCS

S.Shiirev-Adiya, PhD, Head of GIS Laboratory of Institute of Geography under the MAS

N.Narantuya, Project Coordinator of Natural Resource Management and National Geo-Information Centre

A highly respectable Team carried out the Gap analysis in PA management

Ts. Adiyasuren, PhD, Prof, General Director of 'Eco-Asia' environmental management university

D.Batbold, 'Eco-Asia' environmental management university

D. Myagmarsuren, PhD, Referent of Standing Committee on Environment and Agriculture of the Parliament

B. Sergelen, Specialist of PA Management department of Ministry of Nature Environment and Tourism

Kh. Baasankhuu, Specialist PA Management department of Ministry of Nature Environment and Tourism

M.Soyolmaa, Specialist, PA Management department of Ministry of Environment and Tourism

S.Ouyndelger, Specialist of Tourism department of Ministry of Environment and Tourism

Kh.Khishigjargal, Specialist of Sustainable Development and Strategic Department of Ministry of Environment and Tourism

M.Bayarmaa, Specialist of Ministry of Finance, and

D.Gantsetseg, Specialist of Ministry of Justice

INGO consultancy included

The Nature Conservancy (TNC)

Researchers and officers took part and contributed in development of Gap analysis methodology and technical assistance especially GIS based analysis.

Charles Ferree

James Moore

Galbadrakh Davaa

Susan Antenen,

Chris Pague and

Michele Dephilip

Wildlife Conservation Society-Mongolia

Amanda Fine, Director

WWF Mongolia Programme Office

B.Chimed-Ochir, PO Representative

Yo.Onon, Species programme manager

D.Sanjmyatav, GIS specialist

B.Munkhchuluun, Protected area officer

Goetz Schuerholz and Tomas Hertzman (Independent experts)

Acronyms

Abbreviation	Explanation
CBD	Convention of Biological Diversity
CEPA	Program of Work on Communication, Education and Public Awareness
CITES (Appendix I)	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS (Appendix II)	Convention on Migratory Species
ESAP	Endangered Species Management Programs
ESD	Education for Sustainable Development
GEF	Global Environment Facility
GIS	Geographic Information System
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Development Cooperation)
IBM	Important Bird Areas
IUCN	International Union for Conservation of Nature
LBZ	Law on Buffer Zones of PAs
LPA	Locally Protected Areas
MAS	Mongolian Academy of Sciences
MLL	The Mongolian Law on Land
MLoPA	Mongolian Law on Protected Areas
MLSPA	The Mongolian Law on Special Protected Areas
MNET	Ministry of Nature, Environment and Tourism
NM	Natural Monument
NP	National Park
NPPA	National Programme of Protected Areas
NR	Nature Reserve
NTFP	Non-timber Forest Products
NUM	National University of Mongolia
PA	Protected Area
PA network	Protected Area Network
Ramsar	Ramsar Convention on Wetlands of International Importance
RAPPAM	Rapid Assessment and Prioritization of Protected Area Management
SPA	Strictly Protected Area
TNC	The Nature Conservancy
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UN	United Nations
WCS	Wildlife Conservation Society
WHC	World Heritage Convention
WWF	World Wide Fund for Nature

Aimag (= province) is the largest sub-national administrative unit; below the aimag is the soum (= district), which is divided into bag (= sub-district).

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www.panda.org

WWF International,
Gland (CH)
Av. du Mont-Blanc 1196
Gland Switzerland
Tel: +41 22 364 91 11
Fax: +41 22 364 88 36

WWF Mongolia Programme Office
Amar Street-4, SBD-8
PO Box-115, PO-20A
Ulaanbaatar 210620A
Mongolia
Tel: +976 11 311 659
Fax : +976 11 310 237
E-mail: info@wwf.mn

2010 International Year of Biodiversity

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WWF Mongolia Vision Statement

As a family member of WWF, the international conservation network, we will help Mongolia becoming a safe home for wildlife, where people enjoy a quality of life for generations to come in harmony with nature.