



THE MANAGEMENT PLAN OF GREAT GOBI 'B' STRICTLY PROTECTED AREA AND ALAGKHAIRKHAN NATURE RESERVE

(2011-2015)



**ULAANBAATAR
2010**

**In accordance to authorization made in the Nature, Environment and Tourism
Minister's order number 333 from 10th November, 2009**

APPROVED by:

Head of Department on Special Protected Areas Administration A.Namkhai

**MANAGEMENT PLAN FOR THE GREAT GOBI 'B' STRICTLY PROTECTED AREA
and ALAG KHAIRKHAN NATURAL RESERVE
(2011-2015)**

Developed:

On behind of Geoecology institute:

Director, doctor (Ph.D.)

J.Tsogtbaatar

Contributed and agreed on management plan:

Head of Great Gobi 'B' strictly protected area administration

O.Ganbaatar

Evaluated:

Specialist of the Department on Special Protected Areas Administration

D.Shijirbold

Ulaanbaatar, 2010

Contents

Introduction	6
Abbreviations	8
Part one. The current state of GG”B”SPA and its assessment	9
1. Management plan justifications and its objectives	9
1.1. Management plan justifications.....	9
1.2. Purpose and goals.....	10
1.3. Importance of management plan	10
1.4. Legal documents relevant to management plan	11
2. Significance of GG”B”SPA at the international level.....	12
2.1. Great Gobi B Strictly Protected Area.....	12
2.1.1. History and purpose of the GG”B”SPA	12
2.1.2. Geography, extent and zonation of GG”B”SPA	12
2.2. Alag Khairkhan Natural Reserve	17
2.2.1. History, aims and geography of Alag Khairkhan Natural reserve	17
2.2.2. Boundaries and extent of Alag Khairkhan Natural Reserve.....	17
2.2.3. Environmental settings of the Alag Khairkhan Natural reserve.....	19
2.3. Environmental settings and natural resources of GG”B”SPA.....	23
2.3.1. Geology and mineral resources	23
2.3.2. Relief.....	24
2.3.3. Landscape ecological peculiarities	25
2.3.4. Climatic conditions.....	30
2.3.5. Hydrology and hydro geologic conditions	31
2.3.6. Soils.....	33
2.3.7. Vegetation cover.....	34
2.3.8. Forest resources.....	35
2.3.9. Fauna	35
2.3.10. Human impacts.....	37
2.3.11. Natural, historic and cultural heritages.....	39
3. Threats and risks facing biodiversity in GG”B”SPA	40
3.1. Threats and risks facing fauna species	40
3.2. Threats and risks facing plant and vegetation	40
4. Constraints in implementation of management plan	42

4.1.	Irrational use of natural resources	42
4.2.	Natural disasters	43
4.3.	Difficulties in developing tourism.....	43
4.4.	Lack of ecological and environmental legislation knowledge among general public.....	43
4.5.	Inefficiency of cooperation and collaboration among different stakeholders	43
4.6.	Lack of scientific research and knowledge	44
4.7.	Administration capacity, human resources and constraints.....	44
4.8.	Financial Constraints.....	45
4.9.	Constraints in transboundary cooperation with the Russian Federation	45
5.	Current state of management within GG”B”SPA administration	46
5.1.	Management structure	46
5.2.	Administration structure, location of rangers and their responsible area	46
5.3.	Facilities and finances	47
5.4.	Protection and inspection activities	49
5.5.	Research and monitoring activities	49
5.6.	Environmental education, awareness and public participation	50
Part two. Management plan for GG”B”SPA.....		50
6.	Aim, goals and long term objectives	50
7.	Implementation of the management plan, research and monitoring (2011-2015).....	52
7.1.	Implementation.....	52
7.2.	Monitoring and evaluation	53
7.3.	Risk management	53
References		54
Appendix 1. The action plan to strengthen capacity of the Great Gobi B SPA (2011-2015)		55
Appendix 2. The action plan to implement the Great Gobi B SPA management plan for the period of 2011-2015.....		59
Appendix 3. The action plan to implement the Alag Khairkhan Natural Reserve management plan for the period of 2011-2015		67
Appendix 4. The list of participants involved in development of the management plan for GG”B”SPA and AKhNR		71

Introduction

The Great Gobi “B” strictly protected area (GG”B”SPA) administration is responsible for managing environmental protection and biodiversity conservation activities in GGSBPA and Alag khairkhan natural reserve. Administratively the territory of GG”B”SPA occupies southern parts of Bugat and Tonkhil soums of Gobi Altai aimag, and Altai and Uench soums of Khovd aimags. The Alag Khairkha Natural reserve (AKhNR) is located in territory of Bugat soum of Gobi Altai aimag.

Historically, GG”B”SPA established in 1975 by the resolution number 84 of National Parliament of Peoples’ Republic of Mongolia in order to sustain ecological balance of Gobi desert ecosystems as the main representative of Central Asian desert zone, and to conserve plant and animal species registered in Red Book of Mongolia. In 1995, the Parliament of Mongolia by its order number 26 in accordance to the Law on Protected areas left the status of strictly protected area of Great Gobi B.

Great Gobi B strictly protected area covers 892730 ha area. In 1994 by the order number 177 of the Minister of Nature and Environment the internal zonation of SPA concluded that 18.5 % of total territory is pristine zone, 40.8 % is conservation zone and 40.7 % is limited use zone.

The Alag Khairkhan Natural reserve occupies 36400 ha area and established by the 43rd resolution of Parliament in 1996 to conserve natural wilderness and its natural integrity, as well as protect rare and endangered species of plant and animal. In 1996 the Mongolian Government by its order number 166 defined its boundaries.

There were many significant decisions made during the past years to strengthen environmental conservation in this region. For instance, in 1991 Great Gobi Strictly Protected Area were accepted by UNESCO as International biosphere reserve, thus enabling opportunities to conduct broadband researches as well as implement conservation activities within Central Asian desert ecosystems at the international level. In a framework of the programme on reintroduction of Przewalski's Horse in Mongolia the Experimental and research center on Reintroduction of Przewalski's Horse established within the GG”B”SPA in 1992, which was responsible for environmental protection and inspection within this SPA. From 2009 the center was reorganized into the GG”B”SPA administration.

According to the Law on Protected Areas all protection and conservation activities within the natural reserve areas should be under the responsibility of local governments, however, due to the emergency to protect rare and endangered species of plant and animal species the management for AKhNR is assigned to be under the responsibility of GG”B”SPA administration as the only specialized organization within the region.

This management plan was developed in a framework of the technical assistance tender on “Developing management plan for specially protected areas” announced by MNET and implemented by the Institute of Geoecology. The management plan is developed by Mr. S.Bandi, doctor (Ph.D.) G. Udvaltsetseg, Mrs. D. Munkhtsetseg and head of GG”B”SPA administration Mr. O.Ganbaatar.

At the end we would like to express our sincere gratitudes to all who supported this work and contributed with their suggestions and comments. Especially, we would like to thank local people, Governments of respective aimags and soums, Frontier troops and their administrations, the direction

of Geoecology Institute. We would like to thank International Takhi Group for their valuable recommendations and financial support also.

To implement this management plan and fulfill its objectives the cooperation at all level is essential. Thus, we delivered our recommendations and suggestions to the GG”B”SPA administration and believe we will cooperate in future to protect and conserve unique lands of Dzungarian Gobi and Altai mountainous region.

Abbreviations

MP	Mongolian Parliament
MPR	Mongolia Peoples’ Republic (old name)
MNET	Ministry of nature, environment and tourism
MNE	Ministry of Nature and Environment (old name)
ITG	International Takhi Group
FIWI	Research Institute for Wildlife and the Environment, Austria
SDC	Swiss agency for development and cooperation
KLIV	Konrad Lorenz Institute Vienna
SPA	Specially protected area
AKhNR	Alag Khaikhan Natural Reserve
GG“B”SPA	Great Gobi “B” Strictly Protected Area
GGSPA	Great Gobi Strictly protected area
NUM	National University of Mongolia
UNESCO	UN Education, Science and Culture Organization
NR	Natural Reserve
EIA	Environment Impact Assessment
EPA	Environment protection agency
SIA	Specialized inspection agency
SSIA	State specialized inspection agency
NGO	Non-government organization
NEU	National Education University
NETD	Nature, environment and tourism department (new name of aimag level MNET authority)

Part one. The current state of GG”B”SPA and its assessment

1. Management plan justifications and its objectives

1.1. Management plan justifications

In a “Strategy on specially protected areas” adopted by 8th conference of the parties of UN Convention on Biological diversity some of the gaps facing SPAs has been identified. Internationally agreed that coverage of SPA is less than it should be, protection activities are unplanned, support and contribution to sustain function of SPAs is not relevant to the current requirement and mismanagement in certain parts of the world still continues. The international community proclaimed parties, governments and regional mechanisms to improve coverage of SPAs, increase representation of different ecosystems as many as possible and make advances in SPA management as soon as possible.

Mongolian Government developed its sustainable development strategy and policy for environmental sector to which indicated necessity to integrated environmental protection issues into the socio-economic development strategy in order to conserve wilderness of its territory for next generation. The government policy mainly directed into the rehabilitation of degraded lands, rational use of natural resources, conservation of rare and endangered wildlife and plants. Moreover, it is established strong legal and institutional framework to protect land within the specially designated areas, contribute to the research and monitoring activities within specific ecoregions and promote rational use of natural resources. As a result of steady policy and management activities, by now, totally 44.5 million ha areas brought under the special protection. As a follow-up measure in 1998 Mongolia Parliament adopted National Programme on Protected Areas which indicates necessity to develop management plan for each specially protected area taking into account the specifics of their environmental settings, unique features, wilderness and biodiversity. This will ensure implementation of global goals in environmental conservation, realize obligations under the international treaties and enforce national and regional policies and laws.

To fulfill these objectives as well as to improve environmental protection and conservation activities within GG”B”SPA and Alag Kharikhan Natural reserve, and promote rational use of natural resources this management plan document has been developed. The management plan elaborated basing of extensive research and survey on current state of SPA management taking into account its needs in reintroduction of rarest species of wildlife, specifics of their environment and nature (Appendix 1, 2, 3).

The development of management plan requires collaboration and cooperation at all its stages, therefore, while elaborating this particular management plan we involved such stakeholders as local governments of respective soums, different administrative bodies, local people and communities, rangers and buffer zone council, national and international projects and programmes, their officials. Their participation was crucial in identifying threats, evaluating effectiveness of the current protective measures and identifying future goals.

The management plan for GG''B''SPA and AKhNR development approached on following broad accepted concepts or rules:

- The management plan developed basing on Recommendation developed by MNET on elaboration of management plan for SPAs;
- Management plan is continuous process, therefore, if necessary, it will improved in accordance to the changes and requirements;
- Management plan mainly devoted to conserve biological diversity, its restoration and rational or sustainable use of biological resources;
- The management plan will integrate needs and necessities of different stakeholders involved in SPA measures or other interested parties;
- The implementation of management plan is independent from politics and political views;
- It is designated for next five years and set realistic and essential goals;
- It is a main reference document to use for day-today management activity of the SPA administration.

1.2. Purpose and goals

The purpose of this plan is to determine future directions and objectives, based on the evaluation made on current status of environmental conservation, research, tourism and economic development. It also provides complex measures to implement and achieve the goals to conserve biological diversity of GG''B''SPA and Alag Khaikhan NR, effective reintroduction of rarest and endangered species, especially Przewalski's Horse, protect and promote sustainable use of natural resources, and restore and rehabilitate degraded lands. To achieve these goals the following objectives are defined:

- Improve cooperation in field of environmental protection among main stakeholders, such as SPA administration, soum and bag government and administrative bodies, and local people;
- Progress public awareness and information dissemination;
- Support GG''B''SPA buffer zone council with professional and methodological guidance;
- Enhance protective, inspection, research and monitoring activities within the SPA;
- Advance scientific researches within the SPA;
- Develop environmentally friendly forms of tourism and promote ecological tourism;
- Ensure an effective collaborate with main donor organizations.

1.3. Importance of management plan

The importances of management plan for GG''B''SPA administration are:

- To conserve unique desert and semi-desert Dzungarianian ecosystems, endemic species habiting there and its wilderness;
- To support reintroduction of Przewalski's Horse and protect internationally and nationally threatened animal and plant species as well as their habitats;

- To research, protect, sustainable use and rehabilitate natural resource, especially pastures;
- To develop tourism industry basing on available natural resources, support the development of the alternative sources of income to enhance local economy;
- To regulate use of water and fuel wood resource not harming the environment;
- Implement biotechnology measures to protect, conserve and restore rare and endangered species of animal and plant;
- To communicate biodiversity issues at national and international levels;
- To raise awareness among local people to protect environment and save nature, support rural livelihood and ensure sustainable rural development;
- To expand international cooperation in field of protection and conservation of desert ecosystems.

1.4. Legal documents relevant to management plan

The main function of the SPA is ensuring compliance of legislative acts adopted by Mongolian Government. Since 1995, there are about 31 environment related laws and by-laws adopted.

Following are the main regulating laws and regulations in the GG”B”SPA:

1. Law on Special Protected Areas: 1994
2. 171st Order of Minister for Nature and the Environment to approve methods and instructions: 1994
3. Approval of service fee and procedures: 94th Order of Minister for Nature and Environment, 1994
4. Approval of procedures to conduct research activities: 36th Order of Minister for Nature and the Environment, 1996
5. Environmental laws: 1995
6. Approval of procedures and activities of environmental inspectors and rangers: 37th Order of Minister for Nature and the Environment, 1996
7. Approval of the internal zonation: 15th Order of Minister for Nature and the Environment, 1996
8. Approval of procedures on tourism activities: 43rd Order of Minister for Nature and the Environment, 1996
9. Joint Decree of Minister for Nature and the Environment and chairman on the authority of Border Army: 1996
10. Law on Buffer Zones of Special Protected Areas: 1997
11. 70th Order of Minister for Nature and the Environment on the approval of buffer zones: 1999
12. Law on Land
13. Law on fauna
14. Law on natural plant species
15. Law on Forests
16. Law on Water.

2. Significance of GG”B”SPA at the international level

2.1. Great Gobi “B” Strictly Protected Area

2.1.1. History and purpose of the GG”B”SPA

To protect unique Central Asian desert ecosystems, conserve nationally and internationally threatened species, such as wild camel, gobi bear, Przewalski's Horse, wild ass, black tailed antelope, snow leopard, lynx, Siberian ibex, wild sheep, houbara bustard, their habitats and support their natural regeneration Parliament of MPR by its order number 84 from 1975 established Great Gobi Strictly Protected area with A and B main clusters. Afterwards in 1995, according to the 26th decision made by Mongolian Parliament, the SPAs examined in accordance to pre-defined criteria and decided to leave the category of Strictly Protected Area.

From 1992 one of the priorities of GG”B”SPA became reintroduction, breeding and creating independent population of Przewalski's horse, which was totally extinct in this region. Moreover, the SPA administration highly concentrates on conducting ecological researches and monitoring within the desert ecosystems as well as conserving wilderness of this region.

In 1994 by order from the Minister of Nature and Environment the zonation of SPA has been approved.

In 1991 in accordance to decision made by UNESCO the SPA included into the networks of Biosphere reserves, which enabled possibilities to exchange research information and data, and opened opportunities to conduct researches and protective measures at the international level.

2.1.2. Geography, extent and zonation of GG”B”SPA

Geographic position: The GG”B”SPA is located in south western part of Mongolia occupying southern parts of Bugat and Tonkhil soums of Gobi Altai aimag and Altai and Uench soums of Khovd aimag, representing southern Altai desert ecosystems along the Mongolia-China border. According to the physio-geographic regionalization it belongs to Dzungarian district of Southern Altai Gobi region of Gobi realm.

Regarding natural zones, most of the area belongs to the real desert zone; the northern west parts falls into the extra-arid desert zone; and southern east parts has mountain semi-desert zone characteristics.

According to the ecological-geographic regionalization the region belongs to Bor Tsonj-Khonin Us Gobi district of Dzungarian Gobi region of Central Asian semi-desert and desert realm.

Extent: Total area of GG”B”SPA is 892.7 thousand ha, of which 73.3 percents belongs to Khovd aimag and the rest 26.7 percents to Gobi Altai aimag.

According to the land use category, 68.11 percents of total territory of SPA are agricultural land, 31.87 % are forest land and 0.02 % is lands under infrastructure and road. 96.8 percents of total agricultural land belongs to pasture land of which 2.8 % are sandy pasture and 0.4 % is saline lands.

Table 1. Land use categories for GG”B”SPA

№	Aimag	Soum	Total area, ha	Of which					
				Agricultural land	Of which			Land under the infrastructure and road	Forested land (mainly saxaul)
					Pasture	Sandy pasture	Saline land		
1	Khovd	Uench	56320	26998	26698	-	300	60	29262
		Altai	598310	445843	435483	9585	775	75	152392
		Total	654630	472841	462181	9585	1075	135	181654
2	Gobi Altai	Tonkhil	137370	62505	58575	2700	1230	22	74843
		Bugat	100730	72664	67964	4700		22	28044
		Total	238100	135169	126539	7400	1230	44	102887
Grand total			892730	608010	588720	16985	2305	179	284541
In percents			100.0%	68.11%	-	-	-	0.02%	31.87%
			-	100.0%	96.8%	2.8%	0.4%	-	-

Zonation: The zonation of GG”B”SPA approved by Minister of Nature and Environment order number 177 in 1994. In accordance to the law on protected areas the GG”B”SPA administration follows rules and resolutions designated for each of its classes.

Nowadays, pristine zone of GG”B”SPA occupies 18.5 %, conservation zone 40.8 % and limited use zone 40.7 %.

The research and monitoring results conducted during last two decades shows increased impact of both natural and human induced degradation processes, thus the revision of zonation scheme within the GG”B”SPA is one of the priority actions towards effective functioning of SPA. The proposal on renovation of zonation scheme will be developed and introduced to the respective Government organization within the implementation of this management plan.

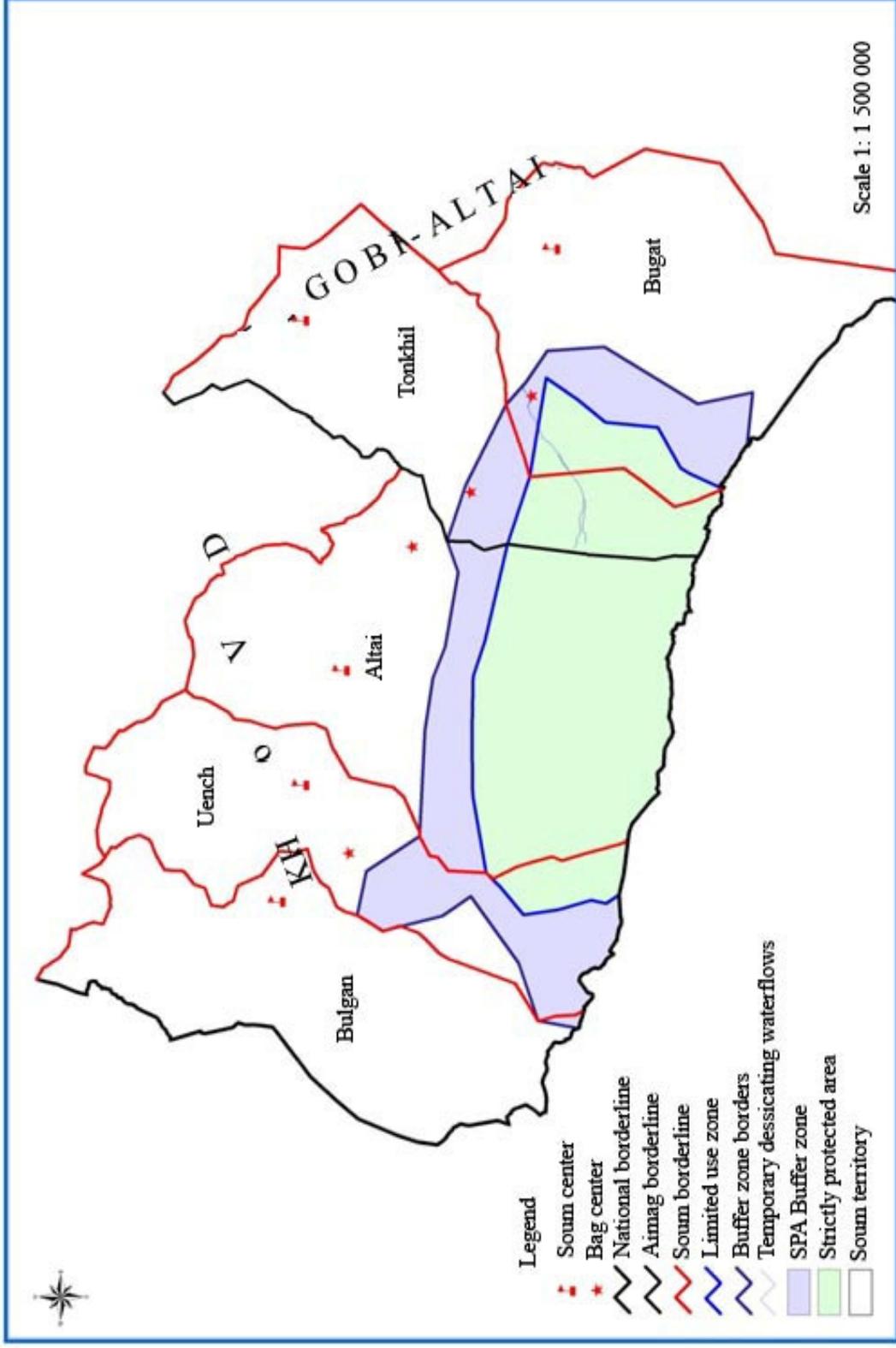


Figure 2. Map of the Buffer zone and respective administrative units

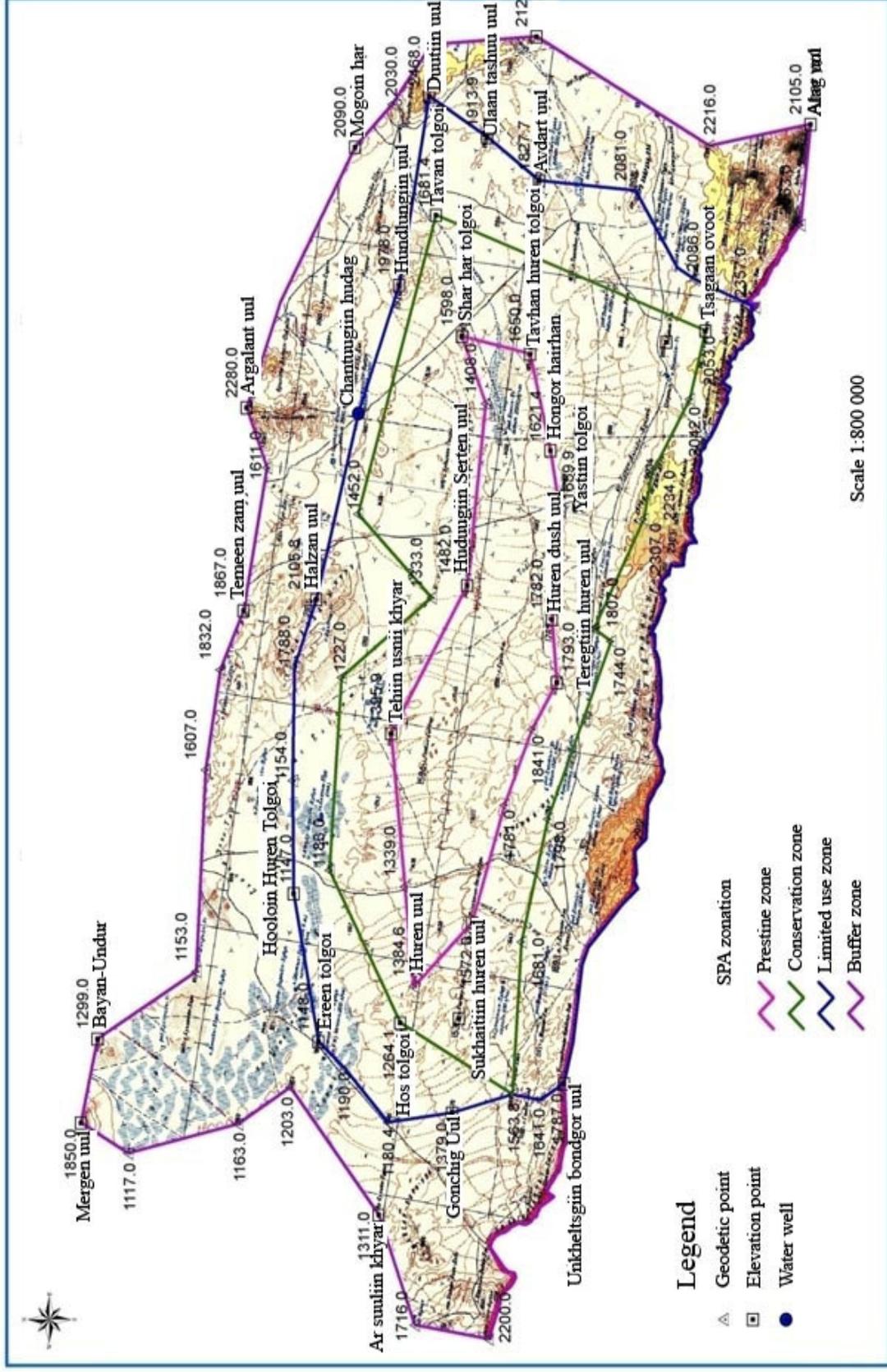


Figure 3. Great Gobi "B" Strictly Protected Area zonation map

2.2. Alag Khairkhan Natural Reserve

2.2.1. History, aims and geography of Alag Khairkhan Natural reserve

The Alag Khairkhan Mountain located in Bugat soum of Gobi Altai aimag is famous by its diversity of biological resources. It is habitat for such wildlife as wild sheep, ibex, snow leopard, lynx and snowcock. Also, there are many rare, endangered and medicinal plants, like *Saussurea dorogostaiskii palib*, *Dianthues superbis L.*, *Hemerocallis minor Miller*, *Valerianae officinalis*, and *Rosa acicularis* growing. Alag Khairkha Mountain is one of the main representatives of Altai high mountain ecosystem.

During last few decades the use of medicinal plant resources and other human factors negatively influenced on ecosystem health, threatening both wildlife and plant species diversity. Due to mismanagement of natural resources in this unique area Mongolian Parliament by its decision number 43 from 1996 to conserve wilderness of the land, protect rare and rarest species of animal and plant, and to promote rational use of biological resources decided bring Alag Khairkhan Mountain and its surrounding under the protection in category of natural reserve.

The Alag Khairkhan mountain natural reserve consists of Bus, Barzan, Alag Khairkhan, Buga Khairkhan and Baga Khairkhan mountains. The slope of the mountain very steep, but once you are on top you can observe such high mountains as Baatarkhairkhan (Khovd aimag), Otgontenger (Zavkhan aimag), Sutai Khairkhan (Gobi Altai aimag) as well as lowlands like Sharga, Tsenkher Nomin and Khonin Usnii Gobi. The highest peak of the Alag Khairkhan Mountain elevated at 3738 m asl. The mountain is forming headwaters of many springs and small rivers which fed territory of Bugat soum by water. The largest water flows originated from this mountain are Ikh and Baga Uliastai rivers flowing into Alag Khairkhan Lake. Recent times the area was covered by larch forest and inhabited by red deer, which is now rarely occur.

2.2.2. Boundaries and extent of Alag Khairkhan Natural Reserve

The extent and fixed boundaries of Alag Khairkhan Mountain defined by Government order number 166 from 1993 as it showed in Figure 4.

Total area of Alag Khairkhan Natural Reserve is 36400 ha. According to the land use category all area falls into the agricultural land use category.

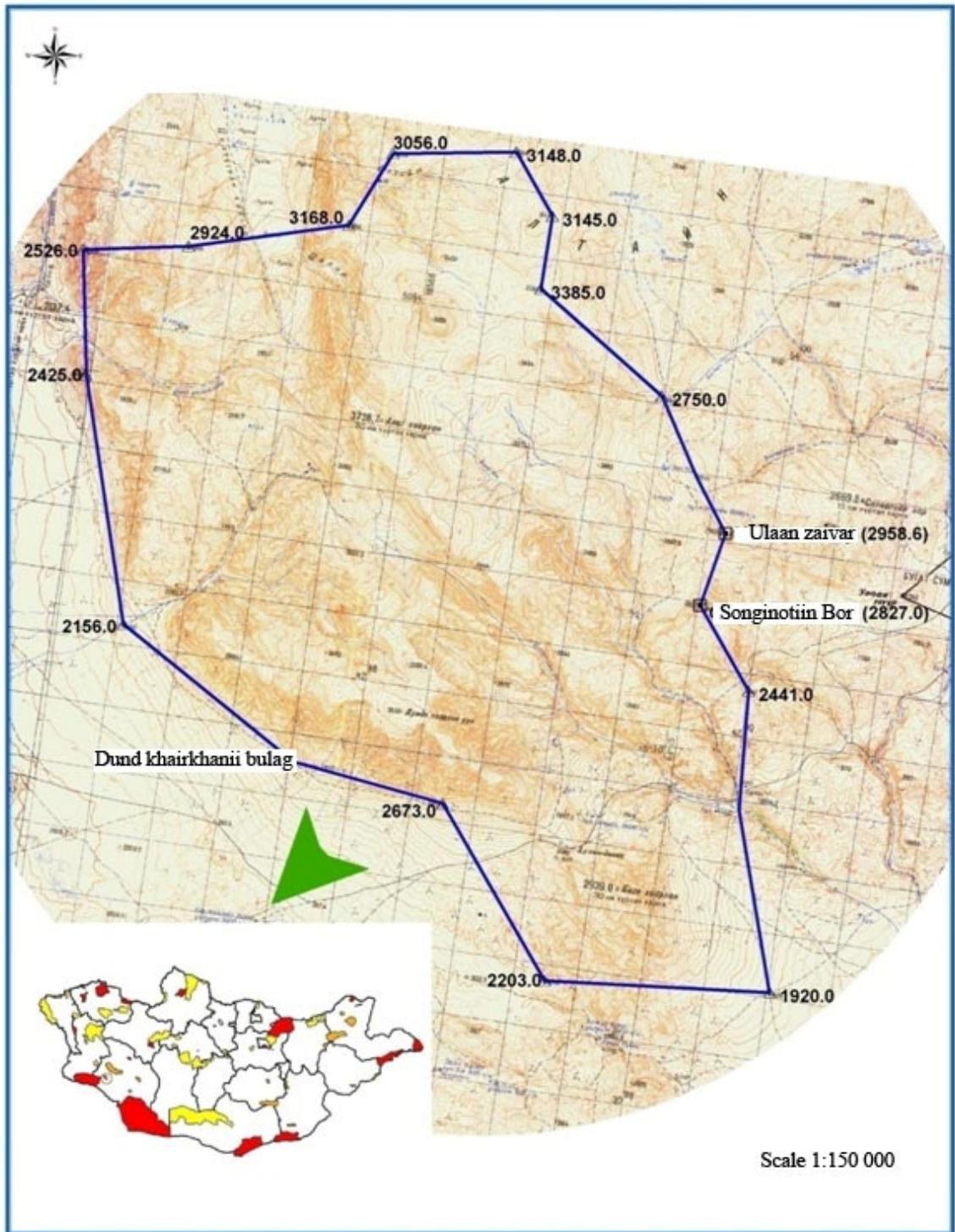


Figure 4. Alag Khairkhan Natural Reserve and its boundaries

2.2.3. Environmental settings of the Alag Khairkhan Natural reserve

Natural regions and landscapes: The most part of AKhNR belongs to mountain meadow, mountain steppe region of Mongol Altai Mountains and intermountain hollows of Altai mountain realm. The small southern eastern part belongs to desert steppe, desert district of Gobi Altai piedmont region of Altai mountain realm. The southernmost parts have characteristics of desert district of Baruun Khuurai piedmont and intermountain hollow region of Central Asian plain and mountain realm (Figure 5.)



Alag Khairkhan Mountain

The territory of NR consists of southern dry steppe, meadow steppe, combination of dry steppe and steppe, mountain meadow and combination of desert-steppe and northern dry steppe landscapes.

Relief: The territory of NR can be classified into following forms:

- Dissected high mountains with round top;
- Slightly dissected high mountains, mountains and hummocky with peneplain tops;
- Highly dissected and slightly steep medium height mountains;
- Slightly and moderately dissected medium height mountains;
- Highly dissected low height mountains with stone and rock outcrops.

Climate: The climate characterized by extra continental regime with low rate of precipitation. The mean sum of annual rainfall is 71.5 mm. The temperature of hottest month in July is +36°C and the temperature of coldest months in January and February is -40°C. Mean temperature of summer season is +28°C and winter -27°C. The winds mainly blowing from north-west to south-east, maximum wind velocity is 20-30 m/sec.

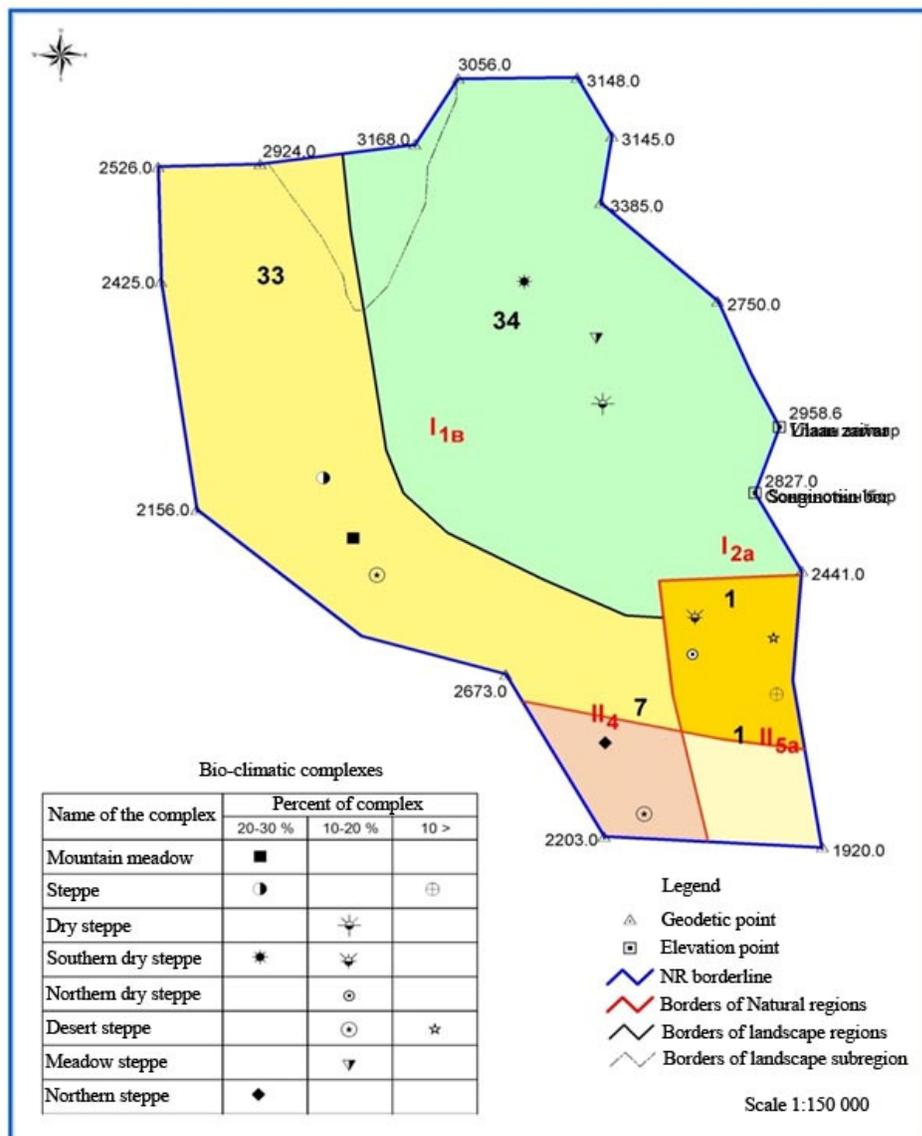


Figure 5. Landscape map of the Alag Khaikhan Natural Reserve

Soils: The NR belongs to the mountain brown soil region. According to the 1961 soil survey in foot plains and lowlands sandy and stony soils are prevailing.

Hydrology: Within the territory of natural reserve 3 lakes (Khyariin, Baajgana, Khavchig) , 9 rivers (Ikh and Baga Uliastai, Khukh sair, Tsagaan sair, Tsakhir am, Ulziit, Khatuu, Bij) and 19 fresh water springs (Khutliin, Byatskhan, Dund, Khoit Zakhiin, Ar Tsagaan Saiiriin, Khukh Duguin, Tsakhir buraatiin, Tsaluugiin Baruun etc.) are located. There are a few mineral waters too, such as Tsagaan khadnii, Dagshingiin etc. Springs as Tsakhir am, Khar angilag and Ulziit form Tsaluugiin River which is tributary of Bij River.

Fauna: Main mammal species of Altai Mountain represented in the territory of natural reserve, such as snow leopard, Siberian ibex, Mongolian marmot, black-tailed antelope, ground squirrel, rabbit,

wolf, fox, corsac, marten, weasel, ferret, lynx, wild cat and bat. From birds such species as snow-cock, ptarmigan, chukar, cuckoo, hoopoe, hawk, vulture, eagle, kite, crow, partridge, osprey, swan, goose, duck, scoter, crane, bearded vulture, owl, hawk-owl, rook, falcon, chickadee, sparrow, swallow are wintering in and migrating through this area. From reptiles Mongolian racerunner and Stepperunner (*Arguta*) listed as rare species inhabiting in this region.

Flora: Within local people Alag Khairkhan mountain famous by its medicinal plants. One of the common medicinal plants is *Rhodiola qyadrifida*. The medicinal and rare plants grow in different places according to their ecological niches, for instance *Saussurea Dorogostaiskii Palib* mainly grows in top of the mountain, in river headwaters *Cacalia hastate L*, *Hemerocallis minor L* are widespread, in upper parts of the Khukh sair *Rosa acicularis*, *Valeriana officinalis*, *Juniperus spp* are common. Such medicinal plants, as *Dianthues superbis L.*, *Artemisia sieversiana*, are distributed in Khukh Jalga, Gants salaa. Moreover, the mountains are rich by *Allium altaicum*, *Berberis spp.*, *Ribes spp.* and many other useful species of plants. From tree species *Populus spp.*, *Betula spp.*, *Salix spp.*, *Juniperus spp.*, *Lonicera altaica*, *Spiraea spp.*, *Calligonum spp.*, *Myricaria spp.*, *Cotoneaster spp.*, *Sambucus spp.*, and *Caragana* are represented. The SPA administration should take into account importance of these medicinal and useful plant species for both ecology and economy, and implement protection, restoration of their habitat as well as promote sustainable use among main stakeholders.



Saussurea dorogostaiskii palib

Human impact: The western part of Alag Khairkhan Natural Reserve highly impacted by human activity, which is mainly defined by overgrazing. In figure 7 the level of human impact on Alag Kharikhan mountain ecosystem has shown from which it is visible that the human activity is not significant for the most parts of the region.

The relatively wilderness of this place is related to traditions of Mongols living there. Alag Khairkhan is local worshipped mountain, therefore traditionally people not allowed to bring damages, e.g. remove soils, use plants and trees, pollute water etc., to its nature.

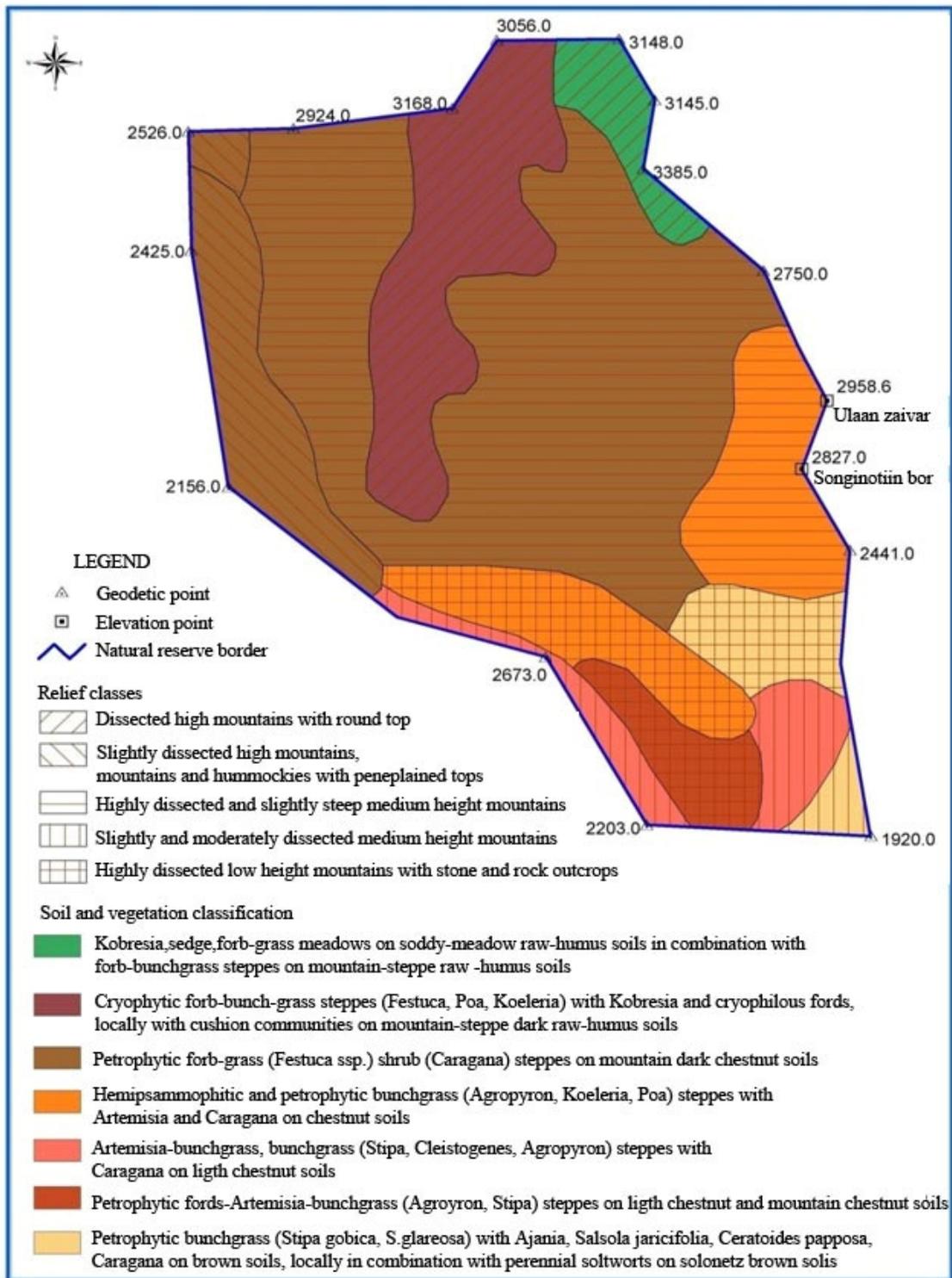


Figure 6. Ecosystems map of Alag Khairkhan Natural reserve

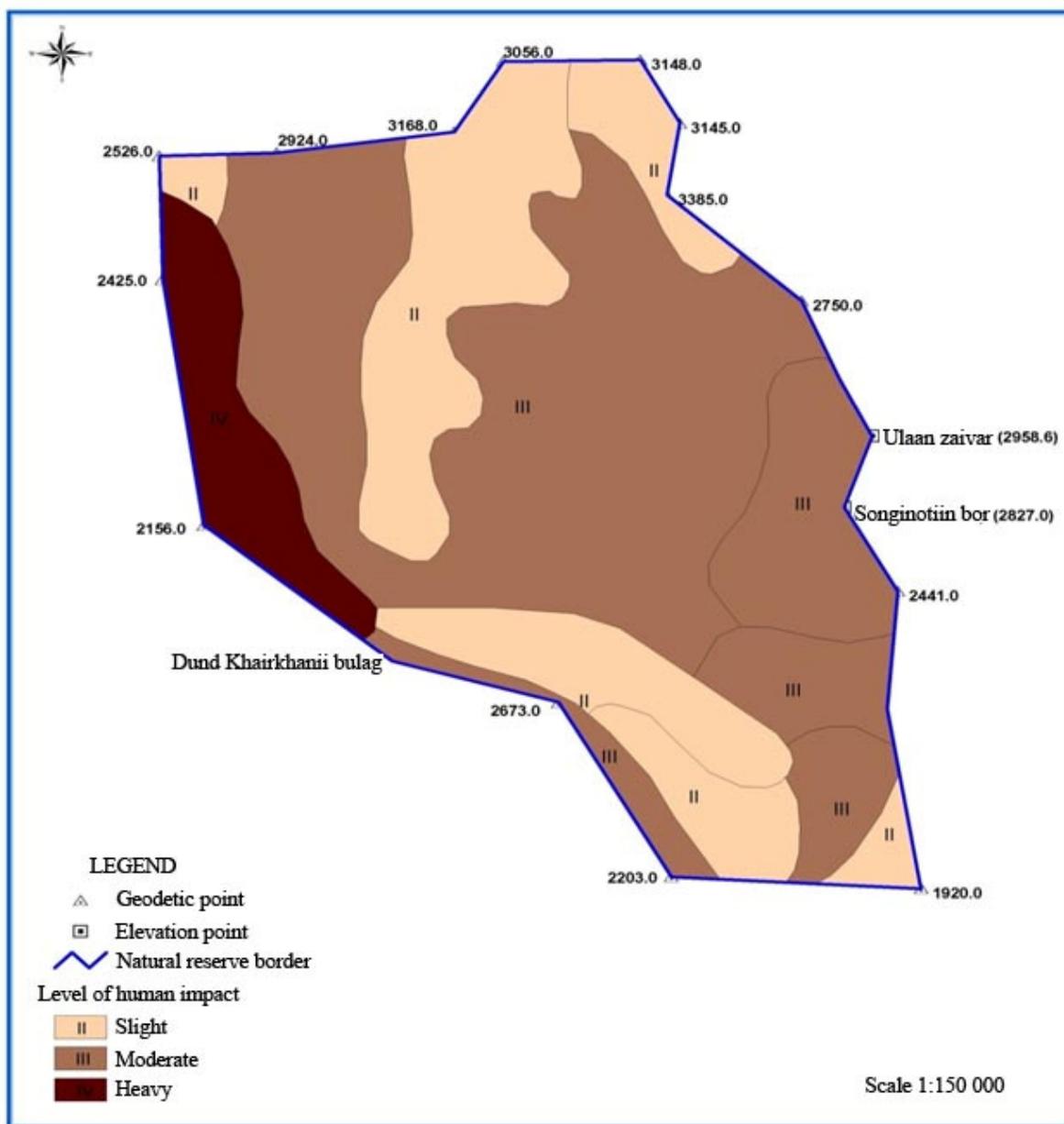


Figure 7. Map of the human impact level in Alag Khairkhan Natural Reserve

2.3. Environmental settings and natural resources of GG”B”SPA

2.3.1. Geology and mineral resources

In territory of strictly protected area deposits and sediments from Mesozoic and Cenozoic era well represented, which creates opportunities to understand geological transformations occurred the territory. The Mesozoic sediments mainly distributed in large basins, along mountain foot plains and river beds. This kind of sediments formed under the warm, humid climate, whilst the sediments with ages of late cretaceous and tertiary periods formed in conditions of more dry and hot climate. They mainly represented by red colored sands, sandy marl-stone and gravels.

The late cretaceous sediments mainly accumulated in lake basins, whilst in tertiary period due to consecutive mountain formation movements the basins were changed a lot and the characters of sediments are different.

The area of Cenozoic sediments represented in relatively small area mainly occupying lake and river beds mostly accumulated in form of sand, gravel, sand stones.

From neogene the relief of the region become in its modern state with high difference between mountains, intermountain hollows and large valleys. However, detailed geological researches has never done for this region before and only from now the project on developing geological map with scales of 1:50 000 is going to implement. In terms of mineral resources, the region might be rich by brown and black coal. In Nukhengiin range the ruins of old polymetals mining exists, therefore, there are many other types of mineral resources and deposits may exist.

2.3.2. Relief

The relief of the region can be classified into medium-height Mountains, low-height Mountains, intermountain hollows, hummocky and socle or high-plains.

High mountains: Along the southern boundary of SPA high mountains with steep slopes, deep and large ravines dissected by many sairs, with many cliffs and shears, and mainly rocky mountains from Baitag Bogd group of mountain are located. For instance, Baga Khavtag (2699 m), Ikh Khavtag (2918 m), Khukh Undur (2553 m), Takhiin Shar Range (2725 m) and so on. The Baitag Bogd and its branches are formed parallel to each other and continue on length of over 150 km.

Medium-height mountains: The group of medium-height mountains represented by such relatively high mountains as Mergen (1772 m), Yamaat (2014 m), Zeeg (1893 m), Shuurgat (1852 m) and Tsakhir (1839 m), medium-height mountains as Khaltar (1537 m), Banzain Khuren (1541 m), Yambat Tolgoi (1582 m), Yast (1659 m), Galbiin Gozgor (1594 m), Khalzan Burgedei (2105 m), Khundlun (1978 m), Shiree Khairkhan (2081 m), Duut (2468 m), Tangadiin khar uul (1834 m), Tovkh Khuren (1650 m), Ulaan Tashuu, Gashuun Khar, Uushgiin Ulaan (1888 m), and low-height mountains as Nukhen (1798 m), Erguu Khar (1785 m), Teregt Khuren (1793 m), Tsakhir (2145 m), Khuren Bogd (2234 m). These mountainlins are usually hogback, rocky and highly impacted by weathering process. Due to active weathering processes, the surface on the top of the mountain formed by hoe and rocky cliff, however, at the foot plains accumulation of sands and small gravels exist. The landscapes are usually represented by various mountain steppes with underdeveloped soil and vegetation covers. Surface forms developed by water and wind erosion are very common for this region but sometimes erosion-accumulation forms can be identified.

Low-height mountains and hills: The main low-height mountains and hills are Serten (1482 m), Ereen Tolgoi (1148), Khudgiin Tolgoi (1419m), Takhiin Usnii Khar (1395 m), Tavan Tolgoi, Khaltariin tolgoi, Tasarkhai Khar, Burz, Shal Khar, Gangan Khar, Khoni Usnii Adgiin Bor Tolgoi, Gobi elsen Tolgoi, Zagiin Tolgoi and so on. They mainly timed to the intermountain hollows of Southern Altai Mountains and located separately from other high mountains occupying relatively small area.

Inter mountain hollows and depressions: Within largest mountains and mountain ranges wide plains or hollows as Takhiin Tal, Khagiin khooloi, Khuren del, Sukhait, Elkhonii ekhnii khundii and many others are located. These hollows and depressions in some places form hummocky patches.

Socle or tectonic plains: This type of the surface occupies largest parts of the SPA. For instance, Khonin Usnii Gobi, Yolkhon khooloi, Davsan Khuurain khotgor, Elkhoni Ekhen Tal etc. They are mainly flat and covered by gypsum brown soils. The effect of solar and wind weathering creates dark colored surface with pebble, gravel and sand cover.

The highest peak of the SPA is Khukh Undur Uul with elevations of 2725 m asl, which is a branch of Takhiin Shar Nuruu. The lowest point is Tsonjiin eren tolgoi with elevation of 1146 m.

2.3.3. Landscape ecological peculiarities

According to the natural regionalization the territory of SPA belongs to Baruun Khuurai desert region of Central Asian highlands, lowlands and mountains realm.

By landscape classification 26 % of territory occupied by desert and extra-desert landscapes with combination of sand complexes and saline lands, 19 % semi-deserts, 18.4 % northern deserts with combination of sand complexes and 15.2 % southern deserts with combinations of sand complexes (see figures).

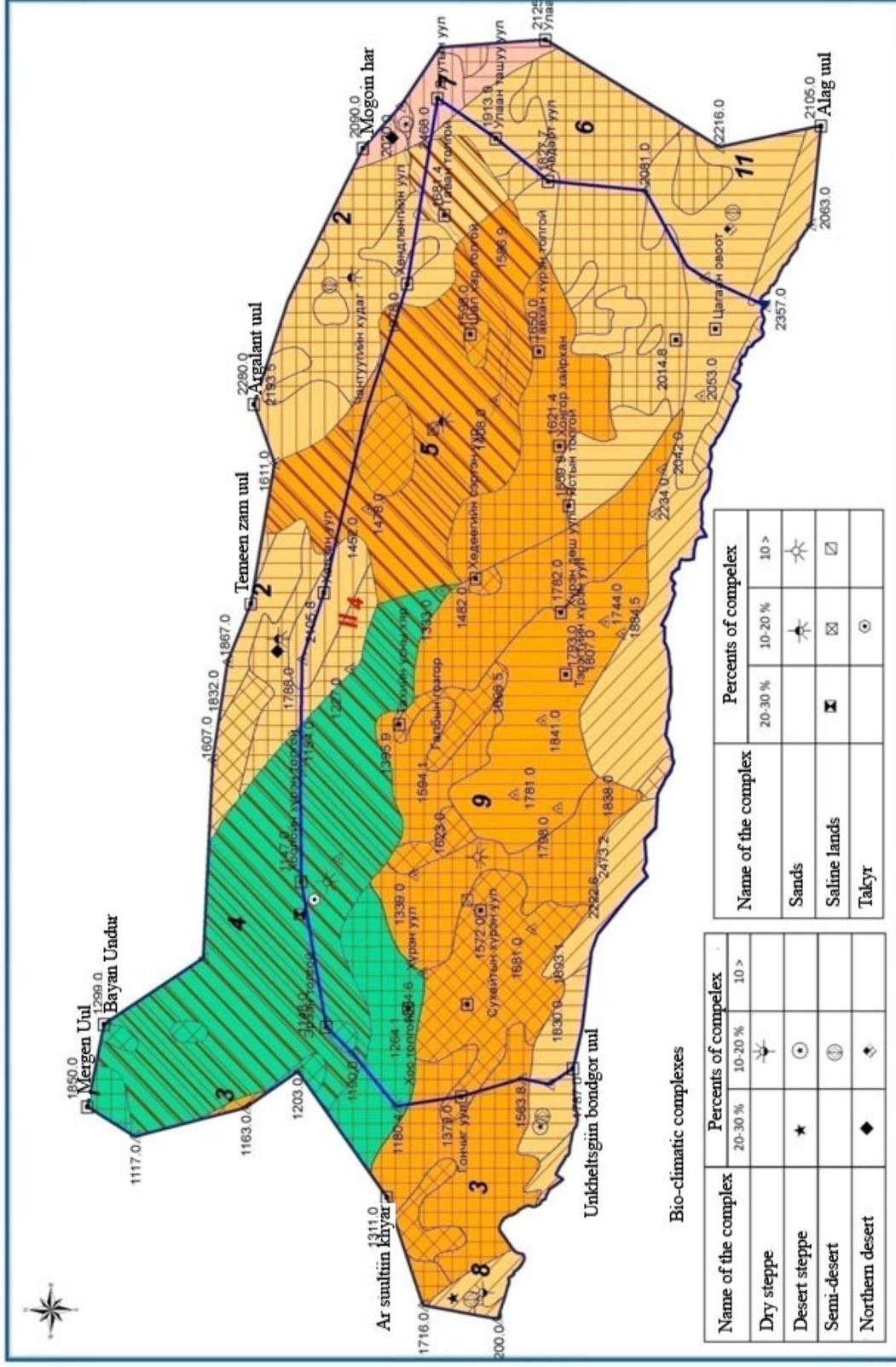


Figure 8. Landscape map of Great Gobi "B" Strictly Protected Area

Legend to the Landscape map of Great Gobi B SPA

Natural regions

I Altai mountainous realm

I₁ Mongol Altai crest-block mountainous region

I_{1a} Mountain meadow, mountain steppe subregion of southern Altai crest-block mountains and intermountain hollows

33 Desert steppes, mountain meadows and combination of steppes and southern steppes along Barlagiin Gol

34 Dry steppe, meadow steppe and southern dry steppes of Bugat

I₂ Gobi-Altai piedmont and mountain region

I_{2a} Desert steppe and semi-desert subregion of western part of Gobi Altai piedmont, mountains and intermountain hollow

1 Steppes, desert steppes, southern dry steppe, northern dry steppes of Haan Jargalant mountain range

II Central Asian realm of highlands, depressions and mountains

II₄ Desert region of Baruun Huurai piedmonts, mountains and intermountain hollows

7 Semi-deserts of Huviin range with desert steppe and northern desert complexes

II₅ Southern Altai region of piedmont and plain

II_{5a} Desert region of Baruun Huurai piedmont and intermountain hollows

1 Northern deserts in combination of southern deserts, semi-desert, saline land and sands of Alag Nuur lake

Relief classification



Highly dissected high mountains with more than 2500 m height



Slightly dissected high mountains with more than 2500 m height



Slightly dissected medium-height mountains with 1500-2500 m height



Highly dissected plains with more than 1000 m height

Landscape classification



Steppe in combination with southern dry steppe, meadow steppe and dry steppe



Dry steppe in combination with northern dry steppe, southern dry steppe, desert steppe and steppe



Southern dry steppe in combination with steppe, mountain meadow and desert steppe



Semi-desert in combination with northern desert and desert steppe



Northern desert in combination with southern desert, sand complexes, saline land and semi-desert

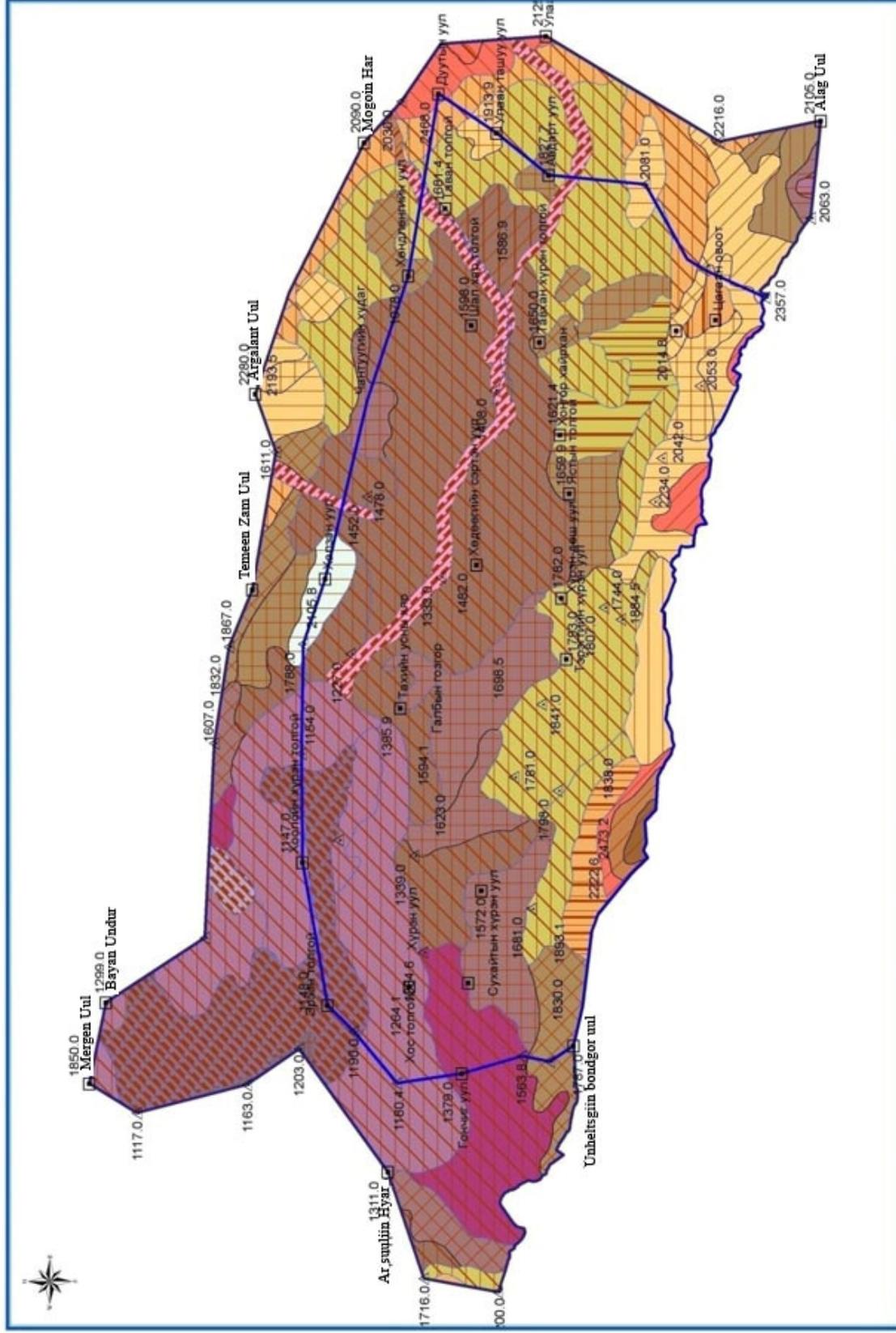
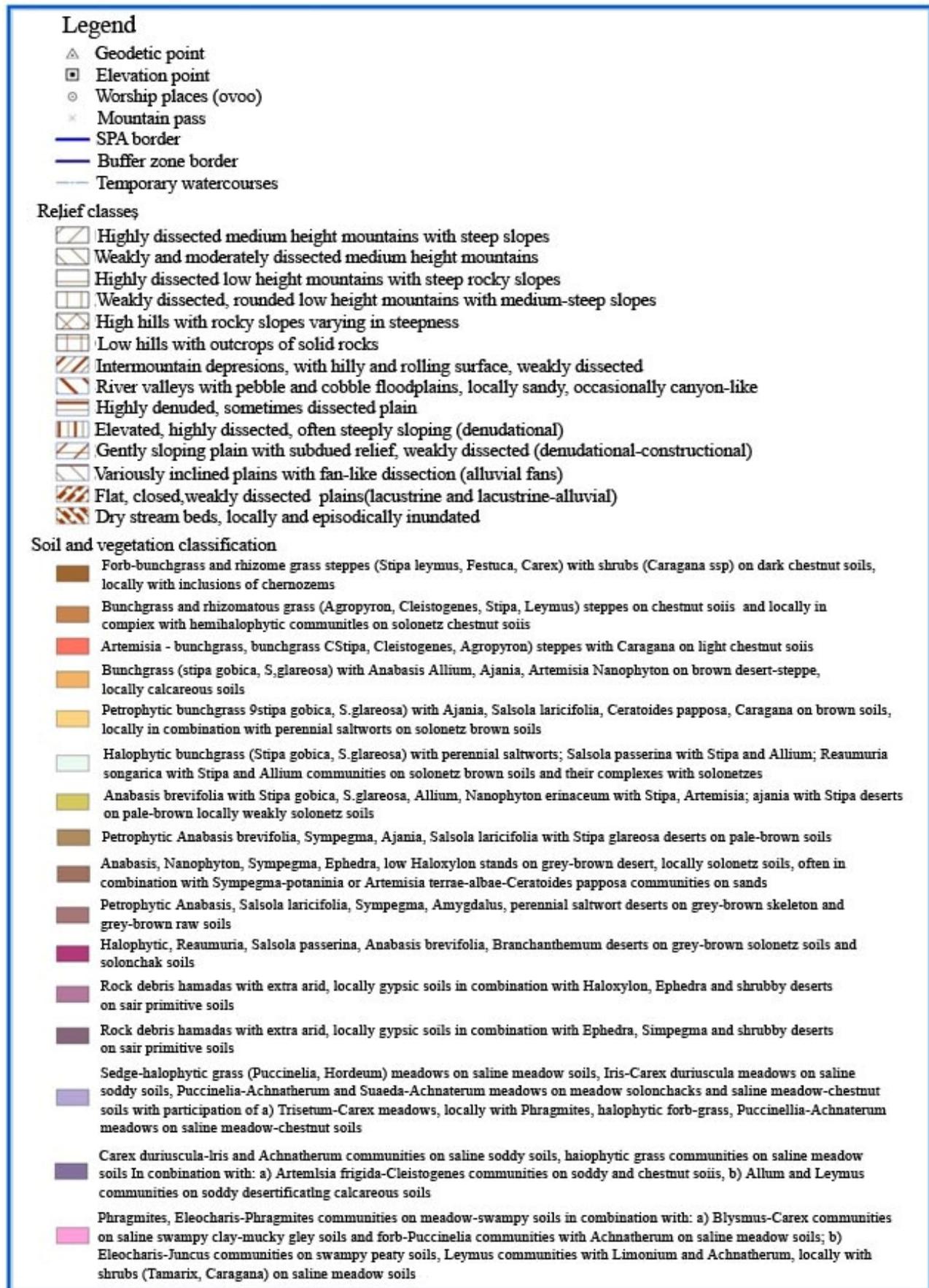


Figure 9. Ecosystem map of Great Gobi B SPA



2.3.4. Climatic conditions

The climate of the region is distinct extra continental climate with average temperature in winter (January) -20 - 24°C and in summer (July) $+42.3^{\circ}\text{C}$. The sum of temperature with more than $+10^{\circ}\text{C}$ is a main criterion for assessing plant thermal supply condition used in agricultural climatology. This criterion varies with natural zones and belts and for Mongolia ranges between 1000 and 3000°C . Within the SPA the sum of temperatures with more than $+10^{\circ}\text{C}$ is about 3000°C and sometimes can be more than that. A mean annual temperature within the territory of SPA varies between $+1$ - 3.2°C , which indicates long duration of warm period in a year and high range of absolute temperatures. The duration of days with temperature more than 0°C accounts over 200 days which is 20 days more comparing to the other mountainous parts.

A sum of the annual precipitation is very low and ranges between 39 - 65 mm per year, however in lowland the precipitation amount is little higher raising to 50 - 55 mm, in mountains it is 55 - 65 mm. In seasonal distribution, 77.3% of total precipitation falls in warm period of the year and the rest in winter season.

In last 2009-2010 winter the region suffered from natural disaster and between 30 December, 2009 and 7th January 2010 the strong snow storm affected the region. According to the Bugat meteorological station data in plains and lowlands about 40 cm thick snow has been accumulated, but in Takiin Tal it was about 60 - 70 cm, whilst in mountains it increased up to 1 m.

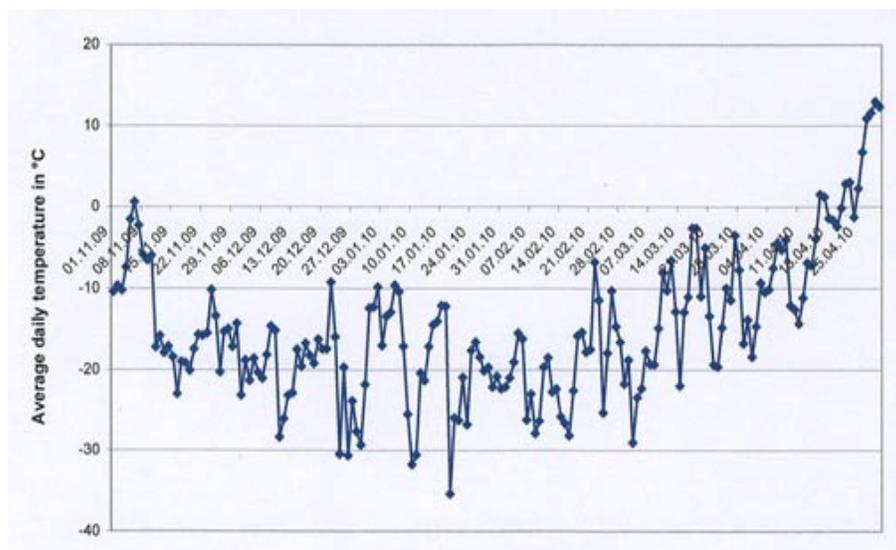


Figure 10. An average diurnal temperature measured by automatic weather station in SPA administration during 1 Nov, 2009 to 25 Apr, 2010

Another climatic peculiarity of this region is high velocity of winds, which is highly depend on geographic location, land surface, air mass movement and seasonal characteristics of the main climatic parameters. According to the long term meteorological monitoring, 46.8% of all winds blow from west with average velocity of 4.8 m/sec. 6.8 - 8.0% of total winds blow from north east, east and south west

with average velocity of 4.7-7 m/sec. A long term average wind velocity for the region varies between 2.3-3.6 m/sec, the maximum speed can rich up to 40 m/sec.

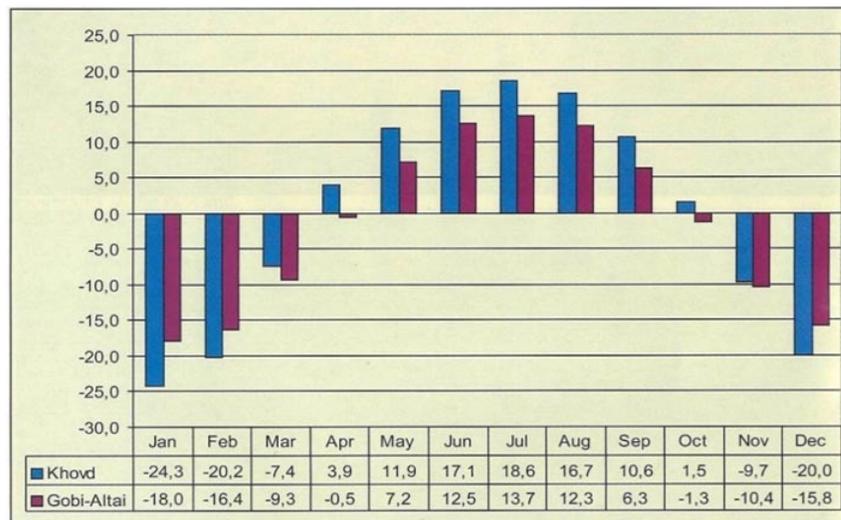


Figure 11. Mean monthly temperature

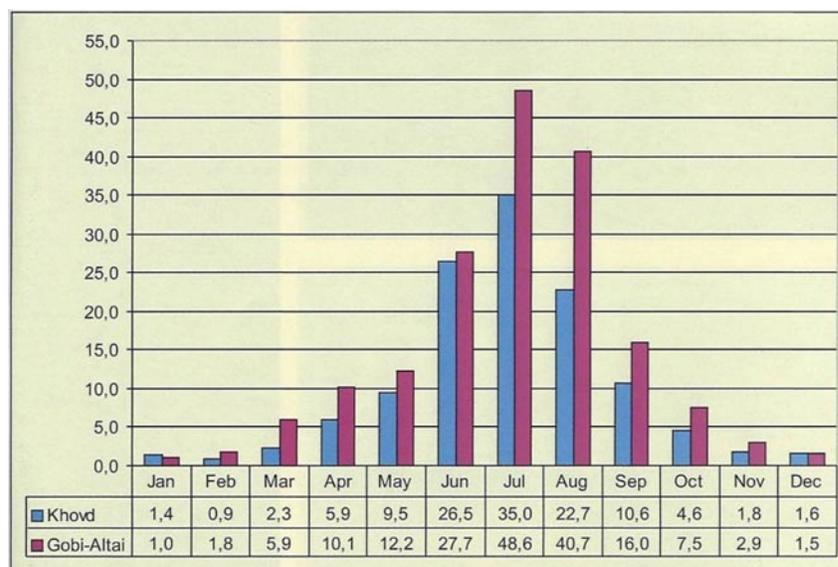


Figure 12. Mean monthly precipitation

2.3.5. Hydrology and hydro geologic conditions

Hydrology: The territory of GG”B”SPA belongs to the Central Asian endorheic drainage basin. Due to dryness, low rate of precipitation and high evaporation the region is abandoned by surface water resources. Therefore, water supply mainly comes from underground water. The largest permanent rive in this region is Bij river, which is originated from surface water flows along sairs after the summer rainfalls. The width of Bij River is 2-3 m, shores are unstable, and riverbed makes man bend forming the system of meanders. The riverbed mainly filled by sandy and gravel sediments, during spring flooding the speed of water flow can reach 2.5-3 m/sec.



Bij River. Right: General view of Bij river; Left: Przewalski's Horse watering from river

In territory of SPA besides Bij river small permanent water course named Gun Tamga also exists. In Buffer zone area there are a few large rivers, namely Uench, Bodonch, Uvchuu, Tsgaan Gol, Mogoi-Gunangii Gol, Takhilt, Bogd and many other small streams.

In deserts an essential ecological services are provided by oases. In oases of different deserts concentration wildlife, existence of different plant species as well as human dwellings is very common. The same can be distinguished for oases in this region. The oases of Great Gobi SPA are an essential ecological niche for much wildlife, thus monitoring over the biodiversity is much more visible in oases.

The most important water sources for both wildlife and human are Yolkhon, Khoni Us, Takhi Us oases formed by small springs and streams. Besides these water sources such rivers/streams as Bosgo Us, Elsen Us, Zadgai Us, Argali Shand, Sukhaitiin Us, Tsarigiin Us, Gun Tamga, Khairkhan Bulag, Tavan Ovoo, Toodog Us, Bij, Gashuun Us, Shiiriin Us, Doviin Ovoonii Bulag, Yargaitiin Bulag, Zeeren Bulag, Badgait Bulag, Zeegiin Us, Elgenii Khundii, Yamaan Us, Yargait Ulaan, Nariin, Zeeren, Tseejin, Baga Khavtagiin Us are play an important role in water supply.

According to the survey conducted among local population 41 % of total population use surface water for household needs, 32 % from water wells and 21 % use spring water.

Hydro geological conditions and underground water: According to the hydro-geological regionalization the territory of GG”B”SPA belongs to the Baruun Khuurai district (52) of southern hydro geological system (Figure 13).

Within the Baruun Khuurai intermountain artesian basin the following water storing geological formations identified:

- Water layer in alluvial sediments of Holocene age;
- Water layer in alluvial fan-diluvia-alluvial sediments of Pleistocene age;
- Water layers stored in unconsolidated sediments with unclassified Neogene age, in sedimentary, metamorphic and effusive rocks with Paleozoic age;
- Water layers in continental sedimentary rocks;
- Water layer in sandstones, limestone and other fluvial sedimentary rocks;
- Water layers in daze, quartz, meta-hassock, effusive rocks;
- Water layers in intrusive rocks with different ages.

The water layers developed in sediments of Holocene, Pleistocene and Neogene age form the major underground basins. Along sairs and tectonic fault lines some small aquifers of underground

water can be determined. The restoration capacity of underground water within Baruun Khuurai basin is $0.03 \text{ km}^3/\text{yr}$. The rough estimations on underground water resource are given in Table 2.

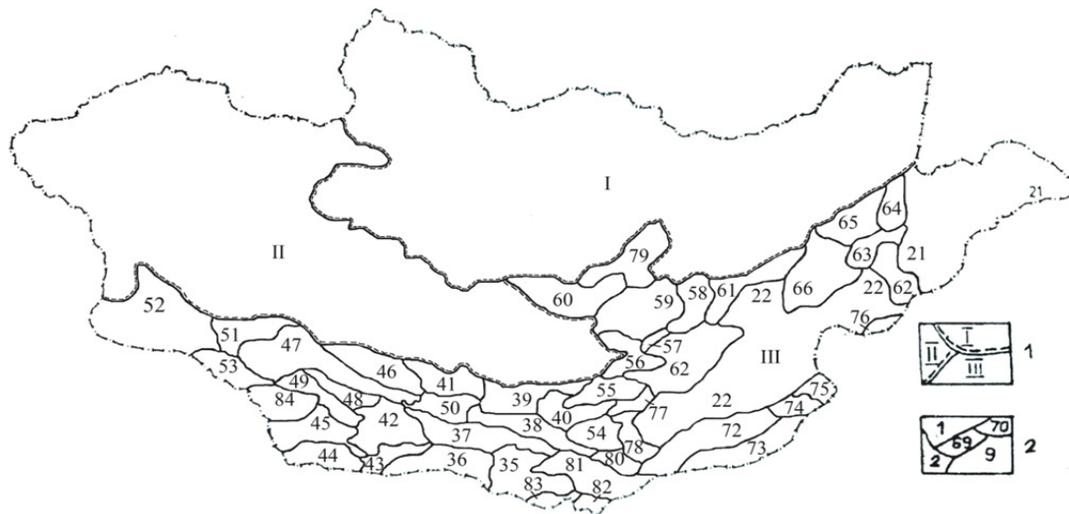


Figure 13. Hydro-geological regionalization of Mongolia (N.Jadambaa, G.Tserenjav, G.Udvaltsetseg, 2003)

Table 2. Rough estimation of underground water resources

№	Basin name	Area, '000 sq.km		Underground water discharge, mm/yr		Rainfall, mm/yr		Evaporation, mm/yr		Water resource, km^3/yr
		Feeding zone	Accumulati on zone	Feeding zone	Accumulat ion zone	Feeding zone	Accumul ation zone	Feeding zone	Accumul ation zone	
52	Baruun Khuurai	25.8	17.8	10	30	60	80	50	50	0.03

2.3.6. Soils

According to the soil regionalization the region belongs to the Dzungarian Gobi region with predominantly grey brown soils in combination with desert grey brown, desert-steppe brown and saline soils. Within SPA in desert landscapes the grey brown soils and in extra deserts pale brown soils are dominating. In a central, lower parts gypsum brown, extra arid desert grey brown soils are developed. In mountains along the national border, like Ikh and Baga Khavtag, Takhiin Shar, soil cover forms altitudinal belts where desert steppe brown, light brown soils are spread.

The soils of this region have mainly loamy, sandy loam structure. In some depressions takyr types of soil are distributed. The desert gray brown, extra arid desert pal-brown soils has pebble pavement on the surface which creates natural protection from winds, heating and evaporation of moisture. The pavement usually sun burnt and have dark colors. Soils usually abandoned by humus; the pH of desert soils vary between 0.4-0.17 or predominantly alkaline.

The deserts has high deficit in moisture. Winter in this region is very cold therefore soil frost duration is more than 4 months, which creates limitations for soil-biological processes. Only during summer rainfall season the biological processes are relatively active, but the duration of this season is

limited. Extreme hot or cold weather, dryness, and seasonal irrigation all this creates specifics of desert soils (Dorjgotov, 2003).

2.3.7. Vegetation cover

The territory of GG”B”SPA belongs to Dzungarian desert vegetation district of Asian desert vegetation region. The Mongolia-Russian Complex Biological Expedition conducted an extensive research over the vegetation cover of southern Altai and Dzungarian desert region. The researchers differentiate desert steppe, real desert and extra arid desert subregions within Zuugar Gobi.

In desert steppes *Stipa glareosa* P.Smirn, *Allium bidentatum* are dominating. The dominant species in real deserts are *Halloxylon ammodendron*, *Zygophyllum xanthoxylon*, *Nitraria* spp. In extra arid deserts along sairs *Ephedra przewalskii*, *Anabasis brevifolia* and *Haloxylon ammodendron* are widespread. According to the recent research results, in Dzungarian Gobi, totally, 572 species from 226 genera belonging to 54 families has been identified (Grubov, 1982; Tserenbaljid, 1991; 1993).

The soil and vegetation cover of this region highly dependent from climatic conditions, therefore mainly low height, less nutrition, salt and heat adapted grass species growing. In desert steppes formed by *Stipa glareosa*, *Stipa glareosa-Cleistogenes squarrosa*, *Stipa glareosa-Allium bidentatum*, *Stipa glareosa-Reumuria soongorica*, *Stipa glareosa-Artemisia frigida* communities are dominating. In deserts different saltwort (*Reumuria soongorica*, *Anabasis brevifolia*, *Salsolaa* spp. etc.), *Achnatherum* spp., *Berberis sibirica*, *Amygdalus mongolica*, *Caragana* spp., *Haloxylon ammodendron* are dominating, however along sairs, rivers and oases *Populus diversifolia*, *Elaeagnus moorcroftii*, *Ulmus pumila*, *Tamarix* spp. trees are common. The deserts famous by its rare, medicinal and useful plants, such as *Nitraria* spp., *Cistanche deserticola*, *Allium bidentatum*, *Ajania* spp., *Ephedra* spp., *Artemisia rutifolia*, *Artemisia* spp., *Oxytropis* spp. are sparsely distributed.

In GG”B”SPA, totally, 204 species from 135 genera belonging to 42 families has been registered so far. Our of total species 113 species are medicinal plants, 83 species are honey plants, 16 species are essential plants, 15 species are considered as high protein plants, 33 species are poisonous, 2 species are useful, 12 species are ornamental and 7 species have sand fixing abilities (G. Tserenbaljid, 1991-1992).

In master’s thesis developed by Num researcher A. Oyunbolor, who conducted research in 1999-2002, totally 184 species of plant mentioned, of which 66 medicinal, 18 palatable, 21 soil protective, 15 ornamental, 18 poisonous and 117 forage species. Moreover, he identified 30 forage species effectively used by both livestock and wildlife. Such species as *Ptilagrostis Pelliotii*, *Stipa gobica*, *Stipa glareosa*, *Phragmitis communis*, *Agropyron repens*, *Agropyron cristatum*, *Agropyron geniculatum*, *Elymus Pabianus*, *Elymus angustus*, *Elymus secalinus*, *Achnatherum splendens*, *Scirpus Hippolytii*, *Blysmus sinocompressus*, *Allium polyrrhizum*, *Iris tenuifolia*, *Medicago falcata*, *Melilotus suaveolens*, *Kaschgaria Komarovii*, *Artemisia caespitosa*, *Artemisia Mongolica*, *Artemisia pectinata*, and *Artemisia macrocephala* are much more used by grazing animal. There are globally threatened endemic species, as *Oxytropis monophylla*, *Zygophyllum neglectum*, *Artemisia gobica*, *Astragalus Sanchirii*, *Ajania achilleoides*, *Artemisia xanthichroa*, *Scirzonera pseudodivariata*, *Scorzonera Ikonnikovii*, and sub/semi-endemic such as *Ptilagrostis Pelliotii*, *Stipa gobica*, *Allium mongolicum*, *Allium polyrrhizum*, *Artemisia caespitosa*, *Saussurea Grubovii*, *Calamagrostis salina*, *Asparagus gobicus*, *Corispermum mongolicum*, *Kalidium gracile*, *Dontostemon senilis*, *Zygophyllum gobicum*, *Pedicularis altaica*,

Artemisia mongolorum, and relict species as *Ephedra Przewalskii*, *Reaumuria soongorica* are registered in this region.

2.3.8. Forest resources

The forestry survey conducted a decade ago revealed that 31.87 % of GG”B”SPA total land occupied by saxaul forest. 53.6 % of total saxaul forest located in Altai soum of Khovd aimag. Due to climate change, increased use of saxaul for fire wood it is need to conduct an extensive research to determine exact area of saxaul forest within GG”B”SPA.

In Dzungarian district of Central Asian desert region the only representative of tree species *Populus diversifolia* is growing, creating small forest patches in Bayan Ovoo, Elegnii Us and Yolkhonii khooloi. In Yolkhon khooloi is about 2500 strands of *Populus diversifolia* exist, their width is 40-60 cm and height is 8-12 m (A.Khaulenbek, 2007).

2.3.9. Fauna

The GG”B”SPA belongs to the Western Gobi district of Dzungarian region. The region is rich by its biodiversity, especially those which listed as rare, endangered and threatened within the Dzungarian Gobi region. Therefore, researches to identify home-range, population and habitat specifics are needed. Moreover, activities related to protection and conservation of these species, as well as reintroduction of extinct species is became an urgent matter.

The area is distributed by rare and endangered mammals, listed in the "Red Book" such as Przewalskii horse, wild ass, goitered gazelle, argali sheep, Siberian ibex, snow leopard, five-toed pygmy jerboa, Tamarisk gerbil; birds e.g. Altai snowcock, Mongolian ground jay, osprey, bustard; reptiles such as steppe racerunner, sunwatcher toadheaded agama, Tatar sand boa as well as amphibians e.g. green toad. The distribution of aforementioned species is shrinking and population is declining. In 2005, Red List of mammals has been revised in accordance to the IUCN standard, where animal classified into such categories as not evaluated, data deficient, least concern, near threatened, vulnerable, endangered, critically endangered, extinct in the wild and extinct. In new and revised Red list of mammals such wildlife as Gobi jerboa, Little jerboa, Thick-tailed pygmy jerboa, Dzungarian jerboa, Grey hamster, Flat-headed vole, Yellow steppe lemming, Steppe lemming, Meadow vole, Scilly shrew, Savi's pipistrelle, Grey long-eared bat, lynx, Manul cat, Grey wolf, Corsac fox, fox, Marbled polecat are registered. Rabbits and picas play an essential role in ecosystem function of Dzungarian Gobi region. From birds Bearded vulture, eagle, vulture, different species of osprey, falcon, sharp eared guivang, wood owl and owl are relatively abundance in this region.

The recent studies reported that in Dzungarian Gobi out of totally 46 species of mammals 25 are Rodents, 8 are Carnivores, 5 are Bats, 4 are Artiodactyls, 2 are Odd-toed mammals and 2 are insect eaters. From last year in some places within SPA buffer zone a few number of red deer registered. Moreover, according to the research results done by Petra Kaczensky and Ueli Rehsteiner in 2002-2003 there are totally 97 species of migratory and permanent bird inhabiting in Dzungarian Gobi. Also, 1 species of amphibian and 6 species of reptiles has been registered.

The Green toad (*Bufo viridis*) is distributed in wetlands of Uushgiin Us and Damjigiin Us of Dzungarian Gobi, which are considered as eastern fringe of Green toad global distribution. This specie is included into the Red book of Mongolia.

From reptiles in this region Kaspischer Even-fingered Gecko (*Alsophylax pipiens*), Variegated Toadhead Agama (*Phrynocephalus versicolor*), Sunwatcher Toadhead Agama (*Phrynocephalus helioscopus*), Mongolian Rock Agama (*Laudakia stoliczkana*), Multi-ocellated Racerunner (*Eremias multiocellata*), Steppe Racerunner (*Eremias arguta*), Dione Rat Snake (*Elaphe dione*), Steppe ribbon racer (*Psammophis lineolatus*), *Halys pit viper* (*Gloydius halys*) are registered within the GG”B”SPA.

Przewalski's Horse (*Equus ferus przewalskii*) or Dzungarian Horse is a rare and endangered subspecies of wild horse (*Equus ferus*) native to the steppes of central Asia, specifically Mongolia. The horse is named after the Russian explorer N.P.Przewalsky (1839–1888), who first described the horse in 1881. Many of these horses were captured around 1900 and placed in zoos. The native population declined in the 20th century due to a combination of factors, with the wild population in Mongolia dying out in the 1960s. The last herd was sighted in 1967 and the last individual horse in 1969. Expeditions after this failed to locate any horses, and the species was designated "extinct in the wild" for over 30 years. In 1992, Mongolian Government in cooperation with German Cristian Oswald Fund first time implemented reintroduction of Przewalski's Horse in Mongolia by transporting 5 takhis to Bij river valley of Bugat soum, Gobi Altai from Askania Nova preserve in Ukraine. Until 2007 that about 11 activities to reintroduce Takhi in a wild has been implemented capturing takhis from European and Australian zoos. In GG”B”SPA, by 2009, totally 137 heads of Przewalski's Horse are reintroduced.

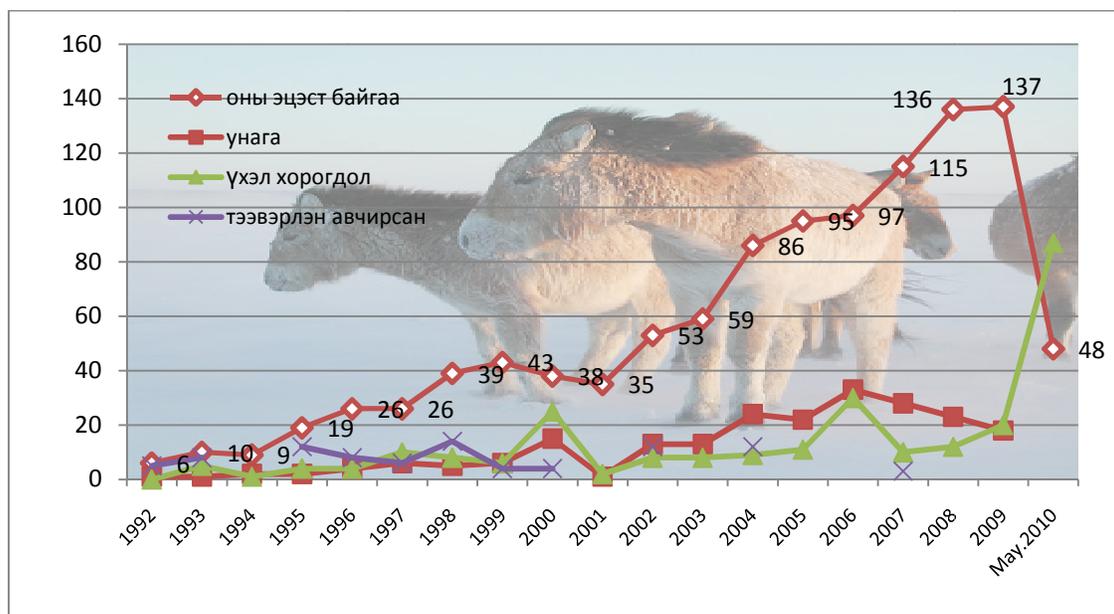


Figure 14. Dynamics of Przewalski's Horse population reintroduced in GG”B”SPA (1992-2010)

Since 1999, all actions related to reintroduction of Przewalski's Horse as well as provide management and financial support to GG”B”SPA was implemented by Swiss based International Takhi Group non-government organization in cooperation with MNE, Mongolia. The ITG involves zoos, researchers, fund and volunteers from German, Swiss, Austria and Czech Republic in its organization.

The main objective of ITG in Mongolia is to reintroduce Przewalski's Horse in a wild, establish independent and sustainable population of this animal in Takhiin Tal, protect their habitat as well as research and monitor its ecology. Therefore, GG”B”SPA conducting research and monitoring over the reintroduced animals within its territory as well as support this international initiative at the local level. According to the latest census, within the GG”B”SPA totally 152 individuals are inhabit.

2.3.10. Human impacts

The territory of GG”B”SPA is relatively less threatened by human impact comparing to other regions of Mongolia, due to its distant geographical location and harsh ecological conditions. The land is mainly used for grazing by local people. Takhiin Shar Nuruu the southern most fringe of the GG”B”SPA, located near to the national border, traditionally used for winter pasture by local communities. Nowadays, local households using these pastures at contract base under the monitoring and regulation for GG”B”SPA and local frontier troops. By 2009, totally 47180 livestock of 78 households used to winter in this place.

Table 3. Number of households and livestock using the GG”B”SPA territory for winter pasture

No.	Name of the winter pasture	Number of households	Residency (aimag, soum, bag)	Sheep and goat	Cattle, horse and camel	Total
1	Khundlun uul	6	Bij bag, Bugat soum of Gobi Altai	4100	120	4320
2		5	Altan-soyombo bag, Tonkhil soum, Gobi Altai	4000	120	4120
3	Duut and Berkh	6	Bij bag, Bugat soum of Gobi Altai	2950	88	3038
4	Takhiin Shar Nuruu Range	13	Bij bag, Bugat soum of Gobi Altai	11050	842	11892
5		1	Altan-soyombo bag, Tonkhil soum, Gobi Altai	1000	48	1048
6	Khukh Undriin Nuruu Range	14	Barlag bag, Altai soum of Khovd	7350	450	7800
7	Khavtagiin Nuruu Range	33	Altangadas bag, Altai soum of Khovd	14099	955	15054
Total		78	4 bags of 3 soums belonging to 2 aimag	44549	2631	47180

In a future, as it required by the Law on Protected Areas it is need to decrease number of livestock.

The mining considered as one of the huge threats facing the management of SPA all over the country. In 2009, within the territory of Khaltar Uul, located in Altai soum of Khovd aimag local people investigated some gold deposits. The GG”B”SPA administration with support of police and frontier troops successfully stifled the intrusion of miners and implemented rehabilitation activities. Although that was only one time the territory of GG”B”SPA still have risks from mining activities.

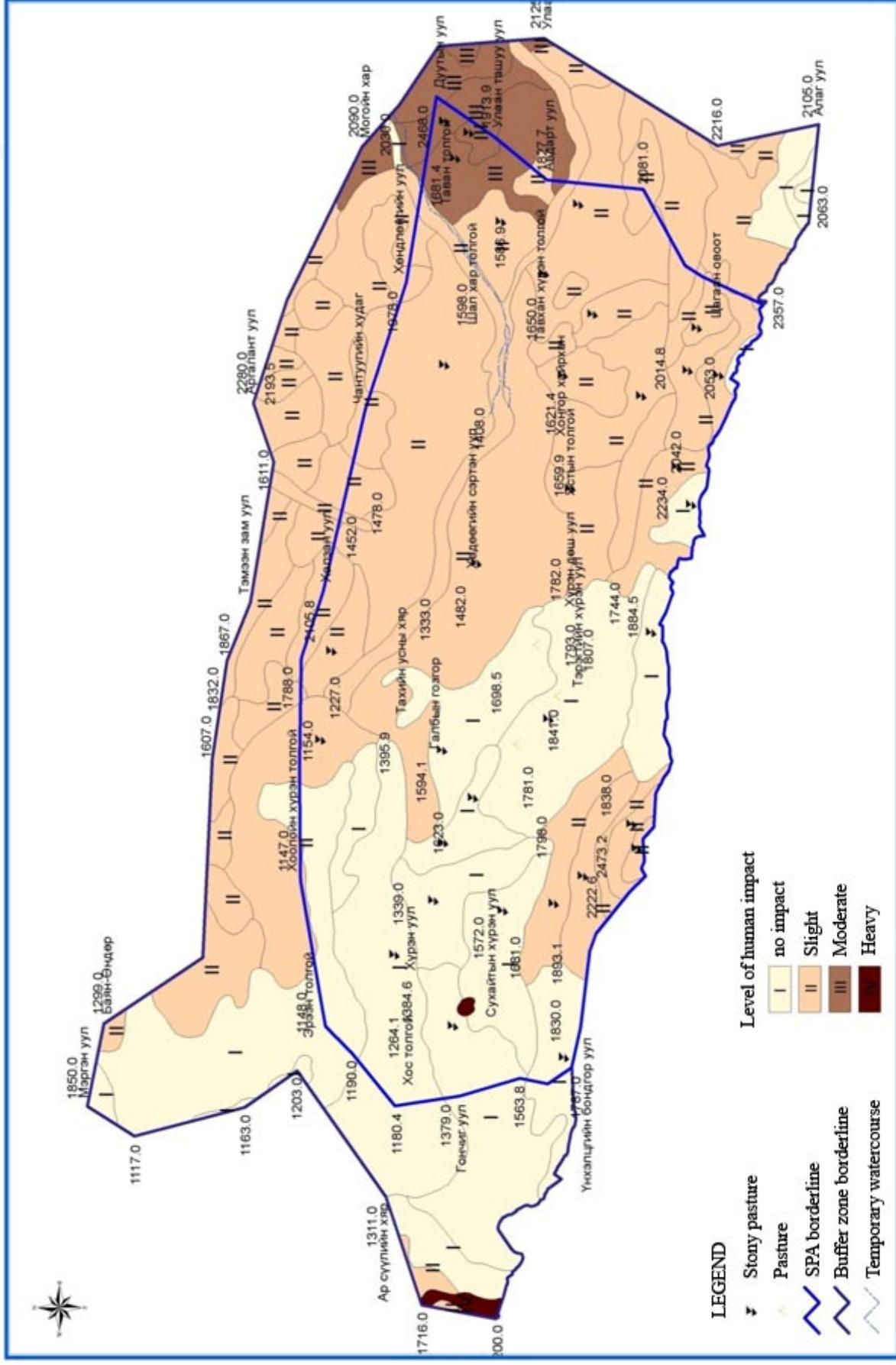


Figure 15. Map of the human impact level in GG”B”SPA

2.3.11. Natural, historic and cultural heritages

The territory of Gobi is famous by its zoolites, petrified woods and other fossils, considered as natural heritages. Moreover, it has many historic and cultural heritages of Central Asian nomads and ancient human civilizations. In Shiree Khairkhan mountain large fossil deposits of Devonian ages represented by fossil mollusks exists. In oases, sandy lands and takyrs some shell heaps from Old and New Stone ages are found, especially in south eastern foot plains of Khalzan mountain, Uvdug Tunge a few tomb from this period has been identified. In Khundlun Uul, Takhiin Shar Nuruu range and Khavtagiin Mountains various rock paintings exist.

The Buffer zone of GG”B”SPA is not rich by natural and historic heritage; however a number of historic heritages from medieval era can be listed here. For instance, Khuduu Khushuu monument, consisted of several gravestones for soldiers from XIII century, is located in Uliastai valley of Bugat soum. In Khuren Tevkh of Tsagaan Gol valley some stone monuments from prehistoric tribes, Hunnu age tombs, and a cave for about 500 livestock are located. In Toodog Us, Khairkhan Bulag, Khuvchiin Shirtiin Aguit places fossil deposits; Baragshin monestry, ancient cravings and rock painting are also surveyed.

3. Threats and risks facing biodiversity in GG”B”SPA

3.1. Threats and risks facing fauna species

Human Activities:

- Distributions and habitats of some wildlife species have been destroyed by human activities such as many people wandering in the forests and mountains to hunt.
- As privatization occurred at the beginning of 1990, the herding size has increased by 20-35 per cent in the area. As a result, habitat competition between the wild animals and livestock has increased.
- Poor involvement of local communities in informing environmental violations and awareness on laws, procedures and their enforcement among local people.

Hunting and poaching

- Illegal hunting of game and endangered species (such as Argali, Ibex, Lynx, Fox, Manul, Snowcock and others) for their furs and meat occurs in the area. Due to illegal activities, distributions, habitats and growth rates of the species have been disturbed.
- Elimination of illegal hunting and other violations have not been successful due to lack of regular monitoring and patrolling by rangers within their responsible area.
- It is not clear that how many percentages of species are being hunted or killed due to lack of information on the available resources of game species in the areas.
- Rangers do not know exact numbers, compositions and resources of species within areas of their responsibilities

Zonation:

- Distributions of some rare and endangered species, which are included in the Mongolian Red Book, are found outside the established SPAs. It causes much difficulty for the administration center to take preventive measures.

3.2. Threats and risks facing plant and vegetation

Overgrazing:

- Pastureland degradation has occurred in areas, particularly in the Khundlun uul, Duut and Berkh, Takhiin Shar Nuruu Range, Khukh Undriin Nuruu Range, Khavtagiin Nuruu Range areas due to overgrazing year around.
- As privatization occurred at the beginning of 1990, the herding size has increased by 20-35 per cent in the area. As a result, numbers of wintering settlements and herding families have increased in the SPAs.

Illegal Harvesting:

- Distributions and resources of some rare species such as *Rhodiola qyadrifida*, *Saussurea Dorogostaiskii Palib* have decreased by illegal harvesting of local and outside communities for household and commercial uses.
- Saxaul trees are being harvested in large amounts by residents for household purposes.
- Violations occurs in large numbers due to lack of awareness among the communities on laws, in particular, Laws on Natural Plants, Forest, Prevention from Steppe and Forest Fires, and Laws on Payments and Fees on Natural Resources Use.

Lack of information

- Implementation of conservation measures have been unsuccessful due to lack of scientific justification and methodology on rare and endangered species, included in the Mongolian Red Book and Mongolian law on Natural Plants.

4. Constraints in implementation of management plan

4.1. Irrational use of natural resources

The following negative impacts and consequences have been emerged in natural resource use within the area:

- Breakdown of carrying capacity of pastureland and increased degradation of pastureland.
- Habitats of wildlife are confined and competition between grassland and pastureland has occurred in the area.
- Increased consumption on firewood, medicinal plant and animal resources
- Soil erosion and low quality of pastureland are caused by overgrazing in some particular areas.
- Soil erosion and sand movement is caused by multiple motor tracks.
- Soil fertility has decreased by tree harvest, due to soil water decline.
- Areas near lakes and rivers have been degraded by wind and flooded water.
- Some areas are being polluted with trashes/garbage. For instance, areas near resorts and camps.

Causes for Inadequate use of natural use:

- Increased number of livestock
- No mechanism for rational use of pastureland, animal, plant and mineral resources
- Increased number of goats among the livestock herds
- Increased number of poor and extremely poor households, who cannot afford transportation means (horses, camels)
- Concentration of herding households and livestock within areas with better grass coverage
- Increased demand in primary natural resources e.g. wood, plant, soil etc.



Collection of Saxaul trees for firewood by local people

4.2. Natural disasters

The following negative impacts and consequences have been emerged in natural disaster within the area:

- Deterioration of vegetation cover and palatable plants in both winter and summer grazing land.
- Desiccation of springs and streams within wildlife home-range.
- Shrinking of home range within oases;
- Habitat fragmentation.

Causes for natural disaster:

- Increased human impact on pastureland;
- Increased number of natural disaster (e.g. snow and dust storms, drought);

4.3. Difficulties in developing tourism

- Distant geographic location from main economic centers, e.g. Ulaanbaatar, Dalanzadgad, Khovd etc., causing low tourism flow, expensive route and operation;
- Lack of assessment of possible tourism resources and their marketing
- No Master Plans for tourism development in the area.
- A lack of information and communication on tourism
- Poor level of management capacity for tourism development.
- No local tourist companies and economical entities in charge of tourism

4.4. Lack of ecological and environmental legislation knowledge among general public

- Local communities are mostly discouraged to inform violations in the areas.
- A low quality of conducting public awareness programs among local communities.
- A lack of mechanism for information dissemination
- No specialist in charge of information and publicizing
- A lack of materials and equipment for awareness and communication (mass media, handbooks, leaflets, and others)
- Poor level of cooperation between local communities and authorities

4.5. Inefficiency of cooperation and collaboration among different stakeholders

- Lack of transparency with local government administrative as well as in stable human resource policies within local administrations;
- Absence of long term cooperation programme among relevant stakeholders;
- No legal and institutional framework in cooperation with frontier troops and their administrations;
- Insufficient function of Buffer zone councils;
- Absence of effective management from the Department of SPA administration;

- Absence of participatory evaluation and monitoring system at the management level causing knowledge gaps among SPA administration and local Governments.

4.6. Lack of scientific research and knowledge

- Lack of policies and programs in conducting researches and surveys with the SPAs and their buffer zones.
- Lack of researches and investigation on compositions, resources, distributions of flora and fauna species within the area.
- Researches and investigation formerly carried out by scientists and researchers during the socialist time have tried to make business by selling their scientific reports and papers in high price to the center. It caused a problem to establish information database in the administration center.
- There is no a permanent research field, which is necessary for the establishment of information database on natural conditions and resources in the GG”B”SPA.
- A lack of equipment and instruments used in researches and investigation within areas.
- A lack of scientific papers and references on research methodology, guidance and conclusion
- A lack of specialists in charge of researches and investigation at the center
- A poor level of relationship between specialists and rangers within the area.

4.7. Administration capacity, human resources and constraints

Lack of cooperation with local people:

- Lack of cooperation with local authorities in the conservation field
- Low level of economic incentives and encouragement for informer and rangers who reveal violations

Lack of information and facilities:

- Lack of information system on forest and steppe fires
- There is no communication network between the administration center, rangers, and local authorities and residents
- A lack of training and awareness on preventive actions from steppe and forest fires (due to financial restrictions)

Lack of facilities for Rangers:

- Most rangers are not professionally trained
- Insufficient level of monitoring and investigation by rangers due to lack of self-defense weapons
- Rangers have no patrolling boats
- Difficulties in patrolling by rangers within areas of their responsibilities due to coverage of high mountains, lakes, rivers and swamps
- Rangers have no uniforms and badges
- A lack of transportation means available for patrolling and monitoring by rangers

- Very poor level of involvement of local communities in the buffer zones for environmental protection activities.

4.8. Financial Constraints

- Low salary rate for ranger that is not under the public servant salary structure
- Financial shortage to implement planned activities by the center
- A lack of transportation and communication means, and self-defense weapons for rangers
- A lack of rangers and specialists
- Financial constraints to conduct species conservation management
- A lack of equipment and instruments at the administration center

4.9. Constraints in transboundary cooperation with the Russian Federation

- Numbers of poaching have occurred due to low level of border patrolling.
- An agreement for cooperation with the similar organization from China is needed.
- No activities are carried out on bilateral monitoring and investigation on transboundary SPA.
- No exchange of information between the SPA administration centers.

5. Current state of management within GG”B”SPA administration

5.1. Management structure

The Research and Experimental Center for Przewalski's Horse Reintroduction was reorganized into the GG”B”SPA administration by 75th order from 27th March 2009, which will operate under the Department of SPA Administration of MNET.

The SPA administration is responsible to conserve wilderness of the GG”B”SPA, conduct research and monitoring, plan and implement actions for environmental protection and restoration. It is assigned report to MNET at annual and quarter basis.

5.2. Administration structure, location of rangers and their responsible area

The GG”B”SPA administration functioning with 13 positions as it is defined from the Department of SPA administration, MNET.

Table 4. Human resource structure of GG”B”SPA

No	Position	Number	Note
1	Director	1	
2	Senior specialist	1	
3	Specialist for inspection and monitoring	1	
4	Accountant	1	
5	Treasurer-service's person	2	
6	Driver	1	
7	Ranger	7	
Total positions/vacancies		14	

There are totally 7 graduate specialists, 3 college level workers, 1 undergraduate and 2 workers with secondary education. Therefore, the SPA administration has relatively high human capacity. Nowadays, 86 percents of rangers has graduate degrees in respective fields of study.

Taking onto account the approved structure of administration from MNET in GG”B”SPA specialists responsible for research and monitoring, and buffer zone are missing. People, how interested in these positions, has to take state officers' exam. However, the specialists' interest in these positions is very low, therefore, SPA administration and MNET Department for SPA administrations has to promote them at broader level.

Table 5. List of place names under the responsibility of each ranger

No	Name	Name of responsible area
1	B. Batsuuri	Downstream of Bij river, Shar Har and Honi Us
2	B. Chinbat	Ilmen-Serven, Bambagar, Khundlun (responsible for Przewalski's horse home-range)
3	Z. Baast	Shiiriin Us, Uvchuugiin Adag, Kholboo Tolgoi, Huh deliin Uvur, Ulaan

		Ganga, Honi Us
4	Ya. Amgalan	Huh Undur, Takhi Us, Ulaan Ganganii Adag, Barlagiin Sair, Teregt and Edrengiin Nuruu
5	L. Oinbayar	Tahiin Shar Nuruu, Tsakhiriin Nuruu, Tangadiin Hyar, Tsagaan Hurgastai
6	G. Nisehhuu	Yolkhon, Hool, Banzain Huren, Havtagiin Nuruu, Haltar Uul
7	H. Ganbaatar	Alag Hairhan Uul

In Law on Environmental Protection (5th provision, 26th Paragraph) all rangers should have higher education or graduate degree in environment and ecology. Moreover, to improve performance of specialists and rangers of SPA administration in 2007 the Government of Mongolia by its order number 236 decided to increase category of these employer up to state officer. During last years, all employers of SPA administration involved the State Officers’ exam and evaluated.

5.3. Facilities and finances

According to the 2009 financial report the capital assets of GG”B”SPA is account of 23357.5 thousand MNT, working capital is 4345.3 thousand MNT and total 27702.8 thousand MNT.

Income and investment: The SPA administration receives 64429.5 thousand MNT of investment from State Central Budget. The income comes from service and fees is equal to 2010.0 thousand MNT. Finally, the total income and investment for SPA administration is accounts 66439.5 thousand MNT, of which 72 % or 48211.5 thousand MNT spent for wage and salary for workers. The current investment from the state central budget is not enough to cover all costs necessary for SPA main function or protection and conservation of nature and environment.

Table 6. GG”B”SPA administration assets

No	Name of the property	Unit	Number	Exploitation date	Cost for each, MNT	Total cost, MNT	Quality
<i>A. Vehicle</i>							
1	UAZ -31512	pcs	1	2009.12.30	1400000	1400000	Good
2	Trailer for liquid	pcs	1	1993	450000	450000	Acceptable
3	Chinese motorcycle	Pcs	1	2006	860000	860000	Bad
4	Chinese motorcycle	Pcs	1	2007	860000	860000	Bad
5	Chinese motorcycle	Pcs	2	2008	878000	1756000	Acceptable
6	Chinese motorcycle	pcs	1	2009	890000	890000	Good
Subtotal						18816000	
<i>B. Information and technology facilities</i>							
1	Computer	Pcs	1	2006	608268	608268	Poor
2	Printer	Pcs	1	2006	159392	159392	Poor
	Acaluos software	pcs	1	2009	495000	495000	Good
Subtotal						1262660	
<i>C. Other assets</i>							

1	Warehouse	pcs	1	2002	2735	2735	Poor
2	Expedition trailer	Pcs	1	1995	250000	250000	acceptable
3	Fence for Przewalski’s horse	Pcs	2	2002	25000	50000	Acceptable
4	TV antenna	Pcs	1	1996	300000	300000	Useless
5	Solar panel	Pcs	1	1996	190000	190000	Poor
6	Television	Pcs	1	1996	313600	313600	Poor
7	Invertors	Pcs	1	1996	110000	110000	Poor
8	Monument on the top	Pcs	1	1996	700000	700000	Poor
9	Gun	Pcs	1	2000	120000	120000	Acceptable
10	Water tank	Pcs	1	1999	12000	12000	Acceptable
11	Ger	Pcs	4	1993-1995	179000	716000	Acceptable
12	Office furniture	Set	1	2005	1000000	1000000	Good
Subtotal						3764335	
<i>D. Laboratory equipment</i>							
1	Equipment	Set	1	1993	45328	45328	Acceptable
Total						23888323	



GG”B”SPA administrative office

In 2006 with support from Austrian Government the long term monitoring station totally supplied with solar energy has been established.

5.4. Protection and inspection activities

The inspection is conducted by rangers and SPA personnel individually, in team and in collaboration with other specialized agencies.

The individual and team inspection conducted at least twice in a week to monitor population size of Przewalski’s horse in Honi Us and Takhi Us places. The team inspection is organized once in a month under the supervision of state inspector from SSIA in soum. Such inspection directed to monitor wildlife and biodiversity, use of natural resources by households, determine impact of livestock in SPA environment and conduct population observation for keystone species.

In seasons, when the number of law violations usually increases, the inspections involving police, aimag NETD, SSIA, Frontier Troop as well as Irves 3 team is implemented to cover all the necessary locations and places.

5.5. Research and monitoring activities

Since its establishment the territory of GG”B”SPA research and monitoring has been implemented at high level. For instance, during 1970-1990 Mongolia-Russian complex biological expedition in a framework of its research activities collected all necessary baseline studies on zoology, biology, botany and natural resources. The valuable contribution in research and monitoring within the GG”B”SPA done in cooperation with national and international research institutes, universities, researchers and students. The example of this cooperation is feasibility study for Pzewalski’s horse reintroduction conducted in 1991-1993 implemented by Institute of Biology, Institute of Botany, NUM, NEU, Khovd University and National Agricultural University. The feasibility study revealed specifics of forage plants distributed in the region, parasitic survey among horses and other undulates, study of contagious and virus diseases, which was valuable contribution in evaluating threats and risks for reintroduction of this specie.

Since first project on reintroduction of Przewalski’s horse an extensive studies of its biology, ecology, behavior and other environmental issues has become increased. The number of research papers, master degree and doctoral thesis can prove this. By financial support of ITG Swiss researchers Riki Elias, Feu Sterregaard and Simon Ruegg studied blood disease among horses infected by ticks; researchers N. Enkhsaikhan, O. Ganbaatar, A. Oyunbolor, D. Lahgvasuren from NUM studied vegetation cover, population of rodents and wolfs as well as their interactions and impact of environment and livestock.

Under the supervision of doctor Chris Walzer from FIWI researchers as Petra Kaczensky, Ueli Rehsteiner, H. von Wehrden, Moritz.S, Liz Hofer, Johan Lengger, Valentin Dresley, Tania Hoesli, Tanja Nikowiz, Johanna Painer, N. Enkhsaikhan, O. Ganbaatar, A. Oyunbolor and D. Lahgvasuren are implementing ecosystem level studies within the territory of SPA and its buffer zone during last 10 years.

5.6. Environmental education, awareness and public participation

The SPA administration in its own as well as in collaboration with international organizations implementing series of different activities to involve general public in environmental protection programmes, raise awareness and improve rural livelihood. In cooperation with ITG, Italia based OIKOS NGO the GG”B”SPA administration implemented “Developing rural communities” project in buffer zone soums for the year of 2009-2010. In a framework of this project the following trainings has been organized:

- Developing tourism service approaching on local communities;
- Training to produce felt products;
- Training on different types of carving;
- Training for management of projects for communities, small enterprises and private organizations;
- Training on pastureland management to provide knowledge for herders on introducing sustainable pastureland management in a region;
- Introduction of internationally recognized best practices on animal husbandry.

Part two. Management plan for GG”B”SPA

6. Aim, goals and long term objectives

The aim of this management plan is to ensure environmental sustainability and wilderness of Central Asian desert ecosystem and conserve their natural resources for the next generation.

I. Management plan for strengthening GG”B”SPA capacity for 2011-2015

Goal 1. Improve SPA administration budget

Objective 1.1. Ensure sustainability of SPA budget

Goal 2. Facilitate SPA administration

Objective 2.1. Improve SPA facilitation

Objective 2.2. Improving living conditions of the SPA administrative staff

Goal 3. Strengthen human resource capacity and improve capacity of the current specialists and rangers

Objective 3.1. Establish new position

Objective 3.2. Capacity building of SPA administrative staff

Goal 4. Broaden cooperation and support to implement activities listed in a plan

Objective 4.1. Nation-wide cooperation

Objective 4.2. International cooperation

II. The action plan to implement the Great Gobi B SPA management plan for the period of 2011-2015

Goal 1. Administration and supervision

Objective 1.1. Implement policies and strategies defined by the MNET

Objective 1.2. Ensure coherency of the SPA administration actions with higher level organizations

Goal 2. Broaden the scope of the environmental protection activities

Objective 2.1. Develop justifications to change SPA zonation and to improve management scheme for the protection of the SPA to the Department of SPA Administration of the MNET

Objective 2.2. Cooperate with law enforcing organizations (e.g. aimag EPA, aimag SIA) in Gobi-Altai and Khovd aimags

Objective 2.3. Raise environmental protection awareness in buffer zone

Objective 2.4. Involve military organizations into the environmental protection activities

Objective 2.5. Open migratory corridors between Gobi B and China

Goals 3. Awareness raising

Objective: 3.1. Improve access to information and raising the public awareness

Goals 4. Ensure sustainability within buffer zone

Objective 4.1. Implement buffer zone management plan

Objective 4.2. Ensure full function of the Buffer zone committee

Goal 5. Increase effectiveness of the inspection and protection activities

Objective 5.1. Emerging illegal actions

Objective 5.2. Prevent the adverse effect of the poaching, saxaul collection and mining

Objective 5.3. Increase the motivations of the specialists and rangers

Goal 6. Protection of the key species

Objective 6.1. Define key species and implement actions for their protection

Goal 7. Researches and re-introduction of Przewalski’s horse in Great Gobi SPA part B

Objective 7.1. Increase the number of Przewalski’s horse population

Objective 7.2. Prepare hay for Przewalski’s horse

Goal 8. Research and monitoring

Objective 8.1. Strengthen monitoring activities and improve the environmental database

Objective 8.2. Conduct research on wild ass and Mongolia gazelle

Objective 8.3. Conduct wildlife and vegetation researches

Goal 9. Planning for tourism development

Objective 9.1. Receive tourists approaching on local resources

III. The action plan to implement the Alag Khairkhan Natural Reserve management plan for the period of 2011-2015

Goal 1. Improve cooperation among SPA administration, soum/bag governments and general public

Objective 1.1. Exchange information and improve cooperation

Goal 2. Improve public awareness and knowledge dissemination

Objective 2.1. Improve public knowledge in environmental legislation

Objective 2.2. Restore old customs and traditions on environmental protection

Goal 3. Increase effectiveness of the inspection and monitoring activities

Objective 3.1. Increase responsibilities of rangers and their capacity

Objective 3.2. Combat with irrational use of natural resources

Objective 3.3. Supply rangers with clothing, equipment and vehicles

Objective 3.4. Revise and improve environmental observation notebook content

Goal 4. Protect natural resources and promote rational use of natural resources

Objective 4.1. Establish natural resource database

Objective 4.2. Provide training on monitoring activity

Objective 4.4. Develop ecological tourism

7. Implementation of the management plan, research and monitoring (2011-2015)

7.1. Implementation

The GG”B”SPA administration is responsible to implement this management plan as well as provide professional supervision for buffer zone counsels.

The management plan will be implemented jointly with local people, specialize research agencies, institutes and universities, soum and aimag governments, frontier troops, private organizations operating in the territory, and other relevant government and non-government organizations.

The GG”B”SPA is responsible to develop detailed annual plan in line with this management plan in order to achieve its goals and objectives. The annual plans will be adopted by Department of SPA administrations of MNET, which will further responsible for monitoring and evaluation of the management plan implementation.

The successful implementation of management plan depends on both human and financial capacity. Thus, SPA administration should be responsible to train its human resources. Meanwhile, the only financial source is State central budget and little income comes from services provided by SPA administration to visitors. Therefore, it is need to increase the financial support through implementing some of activities by national and international funds dedicated to environmental protection and biodiversity conservation.

7.2. Monitoring and evaluation

The GG”B”SPA administration is responsible to monitor day to day performance of their officers and rangers towards successful implementation of this management plan. The monitoring should be implemented by those indicators which are listed in the management plan and evaluated against them. It is recommended to introduce a participatory approach in monitoring and evaluation involving all above mentioned parties in this process.

The evaluation of the management plan will be implemented in two stages: in 2013 and 2015. Based on the final evaluation the GG”B”SPA in cooperation with the Department of SPA administration will develop a new management plan defining new goals and objectives.

7.3. Risk management

During the implementation the following natural climatic and other risks might occur:

- Drought due to global change and irrational use of land resources;
- Harsh winter conditions causing excess rate of snowfall and decline of fodder availability;
- Increase in the number of livestock of households;
- Poaching;
- Deficit of financial resources to implement the management plan;
- Loss of wildlife habitat and increase of disease;
- Increase of mining related activities in the buffer zone;
- Increased use of land for road and transportation;
- Mismanagement of human and financial resources, lack of supervision.

To avoid those risks the following assumptions are defined:

- Facilitate SPA administration by necessary equipment, vehicle etc.;
- Establish an operative mechanism for information and knowledge exchange among research organizations, local administrative bodies, and other relevant stakeholders;
- Sufficient budget is allocated for management plan implementation;
- Allow participation in EIA process for projects, programmes and policies to be implemented in the buffer zone area and provide rights to monitor over their execution;
- Increase the number of professional human resources with graduate degrees in biology, ecology, geography and other environmental sciences;

References

Legislations and legal references

1. Compendium of environmental laws and by-laws. Ulaanbaatar, 2006
2. Compendium of environmental laws. Asian Development Fund. Ulaanbaatar, 2009
3. National Action Plan on Biodiversity Conservation. 163rd Decision of Mongolian Government, 1996
4. National action plan on specially protected areas. 29th Decision of Mongolian Parliament, 1998
5. National action plan on conservation and rational use of rare and endangered plant species of Mongolia. 105th Decision of Mongolian Government, 2002
6. Red Book of Mongolia. Ulaanbaatar, 1997
7. Guidance to develop SPA management plan

Books, reports and brochures

1. Bold A. Birds of Mongolia. Bulletin of the Institute of Biology. 7. UB, 1973
2. Bold A. Birds. Red Book of MPR, UB. 1987.
3. Institute of Biology. Report of hoofed wildlife resource assessment in Mongolian steppe, dry steppe and desert regions. UB, 2009.
4. Institute of Biology. Report of mountain hoofed wildlife resource assessment in Mongolia. UB, 2009.
5. Geology of MPR. Vol. 1, Eds. N.A.Marinov, L.P.Zonenshine, V.A.Blagonravov. Moscow, Nedra. 1973
6. Dash D. Landscape-ecology issues of Mongolia. Ed. Sh. Tsegmid, UB. 2000.
7. Dorjgotov D. Soils of Mongolia. UB, 2005.
8. Dulamtseren S., Tsendjav, Avirmed D. Fauna of Mongolia. Vol.2, Mammals. UB., 1989.
9. Jigj S. Main types of land surface of Mongolia. Eds. Sh. Tsegmid, J. Tserensodnom, UB. 1975
10. Jadambaa N., Udvaltsetseg G., Unurjargal D. Underground waters of Mongolia and its changes. Bulletin of the Institute of Geoecology. UB, 2007
11. Ligaa U. Reference book of rarest plant species. UB, 2008
12. Myagmarsuren D., Enebish D. Strictly protected areas of Mongolia. UB, 2008
13. Myagmarsuren D. Environmental settings of Mongolia –II. UB, 2009
14. Namnandorj O. Gobi strictly protected area. UB, 1990
15. Oyungerel B. Mongolian specially protected areas. UB, 2004
16. Ulziikhutag N. An overview of Mongolian flora. UB. 1989
17. Khaulenbek A. *Populus diversifolia* in Mongolia. UB., 2007
18. Tsegmid Sh. Physical geography of Mongolia. UB, 1969
19. The network of specially protected area: assessment and extension issues. UB, 2002

Maps and atlases

1. Ecosystems map. Scale 1:1000000., 1990.
2. Landscape-typology map. Scale 1:1000000., 1981.
3. National Atlas of Mongolia. UB-Moscow, 1990.
4. Map of the specially protected areas. Scale 1:5000000., 2008.

Appendix 1. The action plan to strengthen capacity of the Great Gobi B SPA (2011-2015)

Goals and objectives	Actions/Activities	Implementation timing	Costs, thousand MNT	Responsible person	Indicators
Goal 1. Improve SPA administration budget					
1.1. Ensure sustainability of SPA budget	1.1.1. Approaching on management plan develop annual action and financial plan in accordance to the needs and necessities suggested by administrative staff and rangers, and get approval from the MNET	2011-2015	Annual plans should reflect costs for actions to be implemented	MNET ¹ , SPA ² Administration	The approved budget and work plan
	1.1.2. Extend alternative income sources and reduce unnecessary expenses of the SPA Administration	2013	20000.0	MNET, SPA Administration	The SPA administration increased its income from other sources
	Goal 2. Facilitate SPA administration				
2.1. Improve SPA facilitation	2.1.1. Maintenance of the SPA administrative building and redesign workspaces	2013	20000.0	MNET, SPA Administration and ³	The administrative building is restored and redesigned in 2013
	2.1.2. The purchase equipments to facilitate inspection and monitoring activities:			MNET, SPA administration	The SPA administration and rangers inspection and protection functions are improved.
	- Short wave repeating station (1 set)		6600.0		
	- Mobile shortwave radio repeating station (5 pcs)		1500.0		
	- Snow vehicle (2 pcs)		20000.0		
- Russia made motorbike (8		20000.0			

¹ Ministry of nature, environment and tourism

² Strictly protected area

³ International takhi group

	pcs)							
	- GPS equipment (8 pcs)					3200.0		
	- Russia made binocular (8 pcs)					800.0		
	- Gas pistol (8 pcs)					2560.0		
	- teaser (8 pcs)					360.0		
	- Digital camera (4 pcs)					1600.0		
	- Tent (2 pcs)					600.0		
	- TV, radar antenna and receiver (1) set					500.0		
- Medium size electricity generator (1 pcs)					1500.0			
Objective 2.2. Improving living conditions of the SPA administrative staff	2.1.3. Thematic maps (soil, vegetation, natural and historic heritages), reference books and educational videos about the environment for rangers, visitors and general public	2012-2015				10000.0	MNET, SPA administration	Relevant maps, books and videos are purchased
	2.1.4. Purchase uniforms for specialists and rangers, and periodically change uniforms in accordance to their durability	2011				9000.0	MNET, SPA administration	The rangers are facilitated
	2.2.2. Build an apartment for 4 families of the SPA administration	2015				80000.0	MNET, SPA administration	The living conditions of the Administrative staff are improved.
	2.2.3. Procure possibilities to pay bonus salaries depending on work experience and Government budgetary salary difference grade for administrative staffs and rangers	2011				Budget		
	2.2.4. Support administrative staff to purchase coal for heating	2011				5000.0	SPA administration	
	2.2.5. Establish first aid cabinet	2011				200.0	MNET, SPA Administration	
	2.2.6. Fresh water supply (<i>digging water well</i>)	2012-2014				45000.0		

		<i>and install purifier)</i>					
Goal 3. Strengthen human resource capacity and improve capacity of the current specialists and rangers							
3.1. Establish new position	Objective	3.1.1. Develop terms of references for 2 positions regarding the inspection and protection and get approval from the MNET	2011-2014	5000.0 (the amount of salary for 2 rangers)	MNET, SPA Administration	The administration capability for full range of inspection and protection is increased	
3.2. building of SPA administrative staff	Objective	3.2.1. Ensure participation of SPA specialists and rangers in various capacity building trainings 3.2.2. Organize field trip to Khuvsugul, Khar Us and Orgontenger National parks in order to exchange knowledge and experiences between specialists and rangers 3.2.3. Organize trip to introduce with best practices and exchange knowledge with Kalameili natural reserve and Takhi breeding centres in Xingjian-Uigur region	2011-2015 2013	5000.0 2000.0	MNET, SPA Administration and ITG SPA Administration and ITG	The capacity of the personnel is improved Introduced with best practices of different SPAs and knowledge are improved	
Goal 4. Broaden cooperation and support to implement activities listed in a plan							
4.1. Nation-wide cooperation	Objective	4.1.1. In collaboration with programmes implemented in Khustai NP and Khomin tal conduct researches on reintroduction of the Przewalsky's horse 4.1.2. Cooperate and exchange data and information among national institutions (e.g. National University of Mongolia, University of Agriculture, University of Education, Khovd university, State administration for border	2011-2015	-	SPA administration	Reports and results of the research work are documented	
			2011-2015		SPA administration	Reports and results of the research work are documented	

	defense, Institute of Geocology, Institute of Biology, environmental NGOs, programmes and projects (MNCES ⁴ - Dorjraa, WWF ⁵ programme office in Mongolia, GTZ ⁶ , Wild camel protection fund, Altai-Sayan ecoregion project)).	2011-2015			SPA administration	Best practices are introduced
	4.1.3. Exchange information and share knowledge between Great Gobi SPA part A and Khar Us NP ⁷ .	2011-2015			SPA administration	The local level cooperation is improved
	4.1.4. Establish close cooperation with local government and non-government organizations (e.g. herders communities, cooperatives and ecoclubs) to implement laws and by-laws related to SPA and NR ⁸	2011-2015			SPA Administration and ITG	
Objective 4.2. International cooperation	4.2.1. Continue and establish close cooperation with international organizations, e.g. ITG, FIWI, IUCN, SDC/DEZA, OIKOS, Jumsar PH breeding center, KLLIV, Senskenberg Gorlitz museum, ALPARC, CIPRA, ISCAR etc.	2011-2015				

⁴ Mongolian National committee for conservation of endangered species

⁵ World wild fund – for Nature

⁶ German international technical cooperation agency

⁷ National park

⁸ Natural reserve

Appendix 2. The action plan to implement the Great Gobi B SPA management plan for the period of 2011-2015

Goals and Objectives	Actions	Period	Costs, thousand MNT	Responsible person	Indicators
Goal 1. Administration and supervision					
Objective 1.1. Implement policies and strategies defined by the MNET	1.1.1. Implement the decisions and actions defined by the MNET	2011-2015	In accordance to the approved annual budget	SPA Administration	All decisions and actions of the State Government Organization implemented
	1.1.2. Implement recommendations and decisions made by State PA Administration	2011-2015		State Administration, SPA administration	All decisions and actions of the State PA Administration implemented
	1.1.3. Develop and get an approval of the annual plan in line with management plan and recommendations given by high level organizations	2011-2015		SPA Administration	The action plans developed, approved and implemented and assessed
Objective 1.2. Ensure coherency of the SPA administration actions with higher level organizations	1.1.4. Deliver suggestions on improving the law enforcement mechanism to the MNET	Time to time		SPA Administration	At least 2 suggestions delivered
Goal 2. Broaden the scope of the environmental protection activities					
Objective 2.1. Develop justifications to change SPA zonation and to improve management scheme for the protection of the SPA to State PS Administration of the MNET	2.1.1. Develop and submit the proposal to include Toodog us, Takhi us, Zadgai us and Kholboo tolgoi in to the core zone of the SPA	2011	2000.0	SPA administration, State administration, Geocology institute	Basing on the results of the last 10 year researches the SPA area is extended to improve key species protection and their management
	2.1.2. Develop the proposal to extend the area of the protected zone from 1227.0 elevation point to 1452.0 elevation point, and get an approval				
	2.1.3. Introduce the decision on road closure within the core zone to local authorities, frontier guard organizations and local communities	2014	5000.0	SPA administration, Soum government, Border defense organization	

Objective 2.2. Cooperate with law enforcing organizations (e.g. aimag EPA, aimag SIA) in Gobi-Altai and Khovd aimags	2.2.1. Sign MOU with aimag EPA ⁹ and aimag SIA ¹⁰ and establish constant information sharing mechanism	2011-2015	2500.0	SPA administration, aimag EPA	The cooperation established and functioned
	2.2.2. Conduct inspection activities in collaboration with soum authorities and reimbursement of damages caused	Every year	10000.0	SPA administration, Buffer zone committee	The law enforcement is strengthened. The damages to the environment decreased
	2.2.3. Organize training course for rangers and administrative officers				
	2.2.4. Cooperation with local police, emergency group, environmental inspector and Irbis-3 anti-poaching team in law enforcement field if necessary	2011-2015	-	SPA administration	The number of accidents are decreased
Objective 2.3. Raise environmental protection awareness in buffer zone	2.3.1. Organize meetings with soum and bag authorities about the enforcement of laws on SPA and Buffer zone, and assess their roles and implementation. Sign MOU ¹¹ between soum and bag authorities on law enforcement	Every year	2000.0	SPA administration, Soum government	At least 3 accidents are investigated and solved each year
	2.3.2. Establish SPA Information and education centers in Bugat, Tonkhil soums of Gobi- Altai aimag, and Altai and Uench soums of Khovd aimag	2014	8000.0	Soum Government	Soum communities constantly receive information about SPA and environmental protection activities
	2.3.3. Include into	Once	8000.0	SPA	The

⁹ Environmental protection agency

¹⁰ Specialized inspection agency

¹¹ Memorandum of understanding

	school curricula lessons about SPA, biodiversity and environmental protection	in a season		administration, School directorate	environmental knowledge and awareness of people are increased
Objective 2.4. Involve military organizations into the environmental protection activities	2.4.1. Develop cooperative action plan on environmental protection 2.4.2. Implement the heating system renovation activities within Yargait, Ulaan khad and Zeeg frontier guard units by shifting to the low pressure heating systems. Promoting the use of coal brackets and dung in heating	Start from 2011 2011-2014	4000.0	SPA Administrative SPA Administrative	The provisions of the national Law on SPA is enforced within in border area The use of saxaul trees in heating is decreased by 2012. In 2014 the use of saxaul tree in heating is stopped.
Goals 3. Awareness raising					
Objective: 3.1. Improve access to information and raising the public awareness	3.1.1. Organize awareness raising through information sharing during the soum and bag meetings 3.1.2. Publish the brochures and leaflets about SPA and its activities in both Mongolian and English 3.1.3. Broadcast SPA activities through mass media 3.1.4. Organize awareness raising activities on environment protection within frontier guards	Once in a season 2011, 2015 2013, 2015 2011-2013	2000.0 2000.0 10000.0 2500.0	SPA Administration, Soum governments SPA Administration SPA Administration SPA Administration	The SPA actions and its management is became transparent Domestic and international visitors are aware about the SPA and its management The SPA actions and its management is became transparent Border defense organizations and their staff are became aware about the function and importance of SPA
Goals 4. Ensure sustainability within buffer zone					
Objective 4.1. 4.1.1. Support		2012	4000.0	Soum	The enforcement of

Implement zone management plan	Government and Buffer zone council in developing SPA buffer zone management plan				government and Buffer zone council	the Law on Buffer zone is ensured
	4.1.2. Control over the implementation of the Buffer zone management plan	2011-2015	1000.0	SPA Administration		
Objective 4.2. Ensure full function of the Buffer zone committee	4.2.1. Fundraising to ensure sustainable use of natural by-products within the Buffer zone (e.g. Yolkhon salt ore), and support to merchandise the local products	Starting from 2012	3000.0	Buffer zone council, SPA Administration		The Buffer zone fund is established and fully function
	4.2.2. Fundraising to ensure the development of the handicrafting and touristic cooperatives established by SPA administration in Bij, Altan Soyombo bags	2011-2015	5000.0	SPA administration and environmental protection communities		
	4.2.3. Organize trainings on establishing community level enterprises, e.g. handicraft, touristic etc., in Altai and Uench souns of Khovd	2013	5000.0	SPA Administration		
	4.2.4. Establish Buffer zone fund	2011-2015	5000.0	Buffer zone council		
Goal 5. Increase effectiveness of the inspection and protection activities						
Objective 5.1. Emerging illegal actions	5.1.1. Introduce visitors and local population with rules and norms of SPA	2011-2015		Specialists and rangers		The number of incidents decreased
	5.1.2. Close entrance roads to the core zone and locate information boards	2012	5000.0	SPA administration, Border defense organizations and Soum government		
Objective 5.2. Prevent the adverse effect of the poaching, saxaul collection and mining	5.2.1. Increase the number of the control and inspection, and establish strong mechanism for reimbursement of damage	2011-2015	Budget	SPA Administration		The accidents are uncovered and the damages are reimbursed. By 2016 the number of
	5.2.2. Input data on numbers of	2011-	Budget	Voluntary rangers		

	poaching and their uncover into the “IRVESSAN” wildlife database	2015			voluntary rangers increased up to 6.
	5.2.3. Develop plan of revision and inspection, and implement unplanned inspections	2011-2015	Budget	SPA Administration, SIA, local police, Frontier guards	
	5.2.4. Building 2 ranger hut in Khoni us and Takhi us oases	2011	20000.0	SPA Administration, international organizations	The inspection and research activities are facilitated
	5.2.5. Fight with illegal natural resource use activities (e.g. mining)	2011-2015		SPA Administration, SIA, local police	The enforcement of the law on SPA is ensured
	5.2.6. Restore and rehabilitate the land affected by illegal NR use activities (e.g. Khaltar mountain and Shiiriin us)	2011-2012	The expenditures will be estimated by EIA companies	SPA Administration, other specialized agencies and organizations	The environment in fully damaged areas are restored
	5.2.7. Organize training for rangers and voluntary rangers. Establish a mechanism to buy information on illegal activities from local people	2011-2015	2000.0	SPA administration, Environmental protecting activists	The accidents within the SPA are uncovered in time.
Operational activity	5.3.1. Provide recommendations to overcome corruption and ensure the income statements are submitted on time	At the annual basis		SPA Administration	The personal interests of being ranger are increased and the accidents uncovered on time
	5.3.2. Establish system of incentives for rangers basing on assessment of their performance	2011-2015	5000.0	SPA Administration	
	5.3.3. Pay the field trip daily subsistence allowance and make available to pay bonus salaries from the reimbursement of damage to the ranger uncovered an accident	2011-2015	Budget	SPA Administration	
Goal 6. Protection of the key species					
Objective 6.1.	6.1.1. Conduct detailed bio-	2011-	10000.0	SPA	The biological and

Define key species and implement actions for their protection	ecological researchers over the Przewalski's horse, wild ass, goitered gazelle, houbara, lammergeyer, Altaic snowcock, saxaul and Juniperus and develop specie protection plan for each of the species	2015		Administration, ITG, research community	ecological peculiarities of the keystone species are identified. The plan for their protection is implemented.
	6.1.2. Set up the budget for biotechnical activities to ensure sustainability of population in extreme and harsh winter periods	2011-2012	14000.0	MNET8 SPA Administration	By 2012 the hay reserve is established and in total 2000 press hay are stored
	6.1.3. Stop the use of saxaul and collection of Juniperus within the buffer zone area	2011-2015	10000.0		The habitats of keystone species are conserved
	6.1.4. Protect critical habitats from overgrazing and mining		5000.0		
Goal 7. Researches and re-introduction of Przewalski's horse in Great Gobi SPA part B					
Objective 7.1. Increase the number of Przewalski's horse population	7.1.1. The western part of the Great Gobi SPA assessed as favorable place for wintering of ungulate animals, therefore organize the re-introduction of PH to this part of the SPA	2011-2015		SPA Administration, ITG	By 2016 totally 150 Przewalski's horses inhabiting at the region
	7.1.2. Develop an agreement to bring 12 Przewalski's horses from Khustai NP and 24 Przewalski's horses from Jimsar breeding center of PRC	Starting from 2010			
	7.1.3. Transport 2 male Przewalski's horses from the eastern part of the SPA and unite them with Takhi Us group	2011		SPA administration, research community	Emerge inbreeding of Takhi us group and increase the number of population
Objective 7.2. Prepare hay for	7.2.1. Build a hay storage (7x7x3.5 m) to	2011	19000.0	SPA administration, ITG	The operational capacity to overcome

Przewalski's horse	overcome harsh winter in Takhi us and Khoni us oases	2011-2015	10000.0	natural disasters is increased
Objective 8. Research and monitoring				
Objective 8.1. Strengthen monitoring activities and improve the environmental database	8.1.1. Conduct the environmental monitoring activities by SPA specialists and rangers , and store the data in BIOSAN database	2011-2015	5000.0	By 2016 the environmental database improved. All data and information stored in database and SPA information center
	8.1.2. Collected data (ranger data) transferred into the electronic database, and the database is constantly renewed			
	8.1.3. Send all data and information collected in local database to central environmental research and monitoring database			
Objective 8.2. Conduct research on wild ass and Mongolia gazelle	8.2.1. Continue monitoring of the wild ass population using satellite collars, start similar studies for the goitered gazelle and report the results of their seasonal movement and habitat use		30000.0	The habitat use, seasonal and daily migrations are identified, mapped and published
Objective 8.3. Conduct wildlife and vegetation researches	8.3.1. Continue the research over the biodiversity of the SPA, focusing on argali sheep and ibex (mountain ungulates)	2017		The distribution and population size of the ungulate species are determined and published
	8.3.2. Conduct vegetation research.	2015		The list of vegetation species is renewed
	8.3.3. Conduct detailed research over the invertebrates distributed in Dzungariani Gobi	2013-2015		The results on invertebrates' research are available

	8.3.4. Conduct research of carnivores (snow leopard and lynx) using camera trapping method	2011-2014	20000.0	ITG, FIWI	The research results are available
	8.3.5. Continue bird research			KLIV	The list of species is renewed
	8.3.6. Conduct physiological research of the rodent species			ITG, NUM, Khovd university, FIWI, SPA Administration	The research results are available
	8.3.7. Conduct researches of small mammal				The research results are available
	8.3.8. Conduct growth and restoration monitoring for saxaul and Juniper				The methodology for restoration of species is available
	8.3.9. Investigate possibilities to establish wildlife ecological corridor among SPAs and transboundary				The research results are available
Goal 9. Planning for tourism development					
Objective 9.1. Receive tourists approaching on local resources	9.1.1. Develop touristic route and tourism development plan by 2012. Develop own webpage and link it to the ITG website to advertise the tourism resources available in a region. The research possibilities to develop tourism basing on current and potential international cooperation	2011-2012	2000.0	SPA administration	The advertisement of tourism resources and SPA are made available. The research results of potentials to develop tourism is documented
	9.1.2. Develop community based tourism	2011-2015	3000.0	SPA administration, ITG, OIKOS	Tourism is accepted as an alternative income generation method

Appendix 3. The action plan to implement the Alag Khaikhan Natural Reserve management plan for the period of 2011-2015

Goals and Objectives	Actions	Period	Costs, thousand MNT	Responsible person	Indicators
Goal 1. Improve cooperation among SPA administration, soum/bag governments and general public					
Objective 1.1. Exchange information and improve cooperation	1.1.1. The ranger should report their activities to Soum and Bag People’s Representative Council	2011-2015	5000.0	SPA Administration, Soum government, Buffer zone council, Rangers	At least 3 emerging issues discussed with People’s Representative Councils and relevant decisions are made.
	1.1.2. Raise awareness through disseminating knowledge about local, regional, national and international best practices, as well as newly adopted laws and other legal documents through newspaper and mass media				Publish environmental related news in local newspaper.
	1.2.1. Introduce contract based cooperation mechanism among rangers with SPA administration and soum Governor	From 2011			As result of collaborative inspection the number of law violations decreased.
	1.2.2. Evaluate contract works at annual basis				
Goal 2. Improve public awareness and knowledge dissemination					
Objective 2.1. Improve public knowledge in environmental legislation	2.1.1. Promote importance of sustainable natural resource use and protection for local people	From 2011	5000.0	SPA Administration, Soum government, Buffer zone council, Rangers	The number of law violations and damages decreased
	2.1.2. Promote best practices on community based environmental protection and natural resource use activities				
	2.1.3. Organize series of trainings on environmental legislations				
Objective 2.2. Restore old customs and traditions on environmental	2.2.1. Research traditions of worshipping, regulate and organize constant worship events	From 2011		Soum government, Private sector	Establish information board about worshipping traditions, its ceremony and guidance for public t behave during worship events.

protection	2.2.2. Promote knowledge and information about traditional and existing worshipping places among local population, tourists and other stakeholders.			Soum government, Peoples’ Representatives Council, Private sector	The worship ceremonies will be organized by Soum Governments, SPA administration and private sector organizations at the rotational basis.
Goal 3. Increase effectiveness of the inspection and monitoring activities					
Objective 3.1. Increase responsibilities of rangers and their capacity	3.1.1. Evaluate performance of rangers by methodology developed from SPA administration	2011-2015	3000.0	SPA Administration, Soum government, Buffer zone council	The rangers’ performance improved and their reputation among general public is increased
	3.1.2. Provide step by step training for rangers				
	3.1.3. Evaluate rangers by Government officers evaluating system				
Objective 3.2. Combat with irrational use of natural resources	3.2.1. Select activist-rangers	From 2011		SPA Administration, Soum government, Buffer zone council	Number of law violations decreased.
	3.2.2. Develop schedule for rangers				
	3.2.3. Support grassroots initiatives from local communities to protect their environment				
	3.2.4. Make contracts with communities to protect environment and conserve biodiversity				
Objective 3.3. Supply rangers with clothing, equipment and vehicles	3.3.1. Supply rangers with suitable clothing, equipment and vehicles.	From 2011	2000.0	MNET, SPA Administration	Rangers’ working place is improved
	3.3.2. Develop rules and guidance to regulate the usage of equipment and other facilities.				Rangers use equipment and facilities prudently
Objective 3.4. Revise and	3.4.1. Revise and improve Environmental observation notebook and disseminate among rangers	From 2011		SPA Administration	The rangers performance on keeping diary on Revise and improve Environmental

improve environmental observation notebook content	3.4.2. Provide training on use of Revise and improve Environmental observation notebook				observation notebook is evaluated	
Goal 4. Protect natural resources and promote rational use of natural resources						
Objective 4.1. Establish natural resource database (on forests, wildlife, vegetation, water and land)	4.1.1. Conduct research on mammals inhabiting in NR area and develop plan and methodology for further research and monitoring	From 2011		SPA Administration, Soum government and ranger	The dynamics on mammal population determined and the plan for their conservation is developed	
	4.1.2. Implement assessment of surface water resource and develop action plan for further its protection and rational use	2011-2015		Research organizations	The number of protected headwaters are increased	
	4.1.3. Protect headwater of at least one spring involving local community					
	4.1.4. Consolidate data and information on forest and vegetation resource and integrate it into the database	2011		3000.0	SPA Administration, Soum government and ranger, public and private organizations	The integrated database is in place
	4.1.5. Conduct pasture carrying capacity survey of surrounding NR land and develop guidance for sustainable use of pastureland					
	4.1.6. Install road marks in different locations					
Objective 4.2. Provide training on monitoring activity	4.2.1. Train rangers and local people to methods of monitoring	2011-2015	1000.0	SPA administration	The dynamics on mammal population determined and the plan for their conservation is developed	
	4.2.2. Assess the monitoring data and information constantly					
Objective 4.4.	4.4.1. Develop zonation within and around NR possible	From	2000.0	SPA	The waste management issues are solved.	

Develop ecological tourism	for tourism and plan touristic routes	2011	Administration, Government, rangers, public and private organizations	Local people get knowledgeable in ecological tourism. An alternative income source is established to support local communities.
	4.4.2. Establish camp sites for tourists under the responsibility of local communities			
	4.4.3. Provide trainings for households and communities planning to be involved in touristic activities			The livelihood of local households improved.
Total		2011-2015		
			16000.0	

Appendix 4. The list of participants involved in development of the management plan for GG”B”SPA and AKhNR

No	Name	Position
1	L. Tuvd	Head of the Nature, Environment and Tourism Department, Gobi Altai
2	Ch. Tumendemberel	Head of the Nature, Environment and Tourism Department, Khovd
3	Ya. Myatav	Bugat soum Governor, Gobi Altai
4	U. Davaa	Bugat soum Vice-Governor, Gobi Altai
5	J. Narush	Speaker of People’s Representative Council of Bugat soum, Gobi Altai
6	A. Myagmarshagdar	Bij bag Governor, Bugat soum, Gobi Altai
7	L. Tsedenbal	Tonkhil soum Governor, Gobi Altai
8	S. Tserenpil	Altan Soyomba bag governor, Tonkhil soum, Gobi Altai
9	D. Battumur	Speaker of People’s Representative Council of Altai soum, Khovd
10	R. Badamtsetseg	Altai soum Governor, Khovd
11	N. Ichinkhorloo	Head of Altai soum administration, Khovd
12	D. Altangerel	Land manager of Altai soum, Khovd
13	Sh. Davaa	Uench soum Governor, Khovd
14	D. Batsukh	Uench soum Vice-Governor, Khovd
15	L. Bold	Lieutenant, Head of 0132 nd frontier military unit headquarter
16	M. Huangan	Lieutenant, Head of the technical department of 0132 nd frontier military unit
17	D. Meiram	Head of the Ulaan Khad frontier post of 0132 nd frontier military unit
18	B. Buyannemekh	Head of the Yargait frontier post of 0214 th frontier military unit
19	O. Dorjraa	Secretary of the National Commission on Conserving Endangered Species
20	N. Enkhsaikhan	Director of ITG Mongolian office
21	B. Chinbat	Senior specialist of GG”B”SPA administration
22	N. Altansukh	Specialist on inspection and monitoring of GG”B”SPA administration
23	B. Chinbat	Ranger, GG”B”SPA
24	G. Nisekhkhuu	Ranger, GG”B”SPA
25	B. Batsuuri	Ranger, GG”B”SPA
26	Z. Baast	Ranger, GG”B”SPA
27	L. Oinbayar	Ranger, GG”B”SPA
28	Ya. Amgalan	Ranger, GG”B”SPA
29	Kh. Ganbataa	Ranger, AKhNR
30	B. Galbadrakh	Driver, GG”B”SPA administration
31	N. Tumor	Treasurer, GG”B”SPA administration
32	S. Tungalagtuya	Ministrant, GG”B”SPA administration
33	President and board of directors of ITG	
34	Chris Walzer	ITG Director for research and monitoring
35	Petra Kaczensky	ITG researcher