



Evaluating the management effectiveness of protected areas in Mongolia using the management effectiveness tracking tool

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Abstract

The importance of management increases in the context of numerous and intensive inner and outer pressures on Protected Areas (PAs). The need to assess the management effectiveness (ME) in protected areas is increasing around the world. The ME assessment helps to improve the management of PAs and to develop a rational, long-term action plan. This study was conducted using the World Wildlife Fund for nature (WWF) Management Effectiveness Tracking Tools methodology (METT) to evaluate the ME of six PAs in central and eastern regions of Mongolia. The main purpose of this study was to assess ME and identify common threats of PAs across different natural zones and administrative areas in Mongolia. The results of this evaluation indicate that, the main threats faced by PAs in Mongolia are: (i) degradation of ecosystems, (ii) environmental pollution, and (iii) habitat fragmentation, resulting from over-exploitation and inappropriate use of natural resources. All six PAs examined have clear management goals and management decision-making systems however, their ME scores differ significantly. This research suggests that the administrative features of the individual PA influence management effectiveness and problems in the efficient implementation of management still need to be resolved.

Keywords METT · Management effectiveness · Protected areas · Threats · Mongolia · Community participation

Introduction

Natural protected areas play an essential role in conserving biodiversity (Stoll-Kleemann et al. 2006). The International Union for Conservation of Nature (IUCN) defines a Protected Areas as “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Dudley 2008). Protected areas (PAs) are recognized as the most effective way to protect biodiversity, and ecosystem function (Ervin 2003 Wells and McShane 2004, Figueroa and Sánchez-Cordero 2008, Gaston et al. 2006). According to the UN List of Protected Areas, there are 209,429 sites, covering more than 15.4% of the world’s terrestrial areas (Deguignet et al. 2014). This percentage is expected to increase influenced by the Convention on Biological Diversity (CBD) and the Aichi Biodiversity Targets of 17% of the land (Eklund and Cabeza 2016) and 10% of marine environments by 2020 globally (Juffe-Bignol et al. 2014).

Thus, although PAs are increasing globally (Naughton-Treves et al. 2005, Kolahi et al. 2013), there remain many

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Table 1 The categories of PAs in Mongolia by 2015

Categories	Number	Area (ha)	% to the whole PAs	% to the country
Strictly Protected Area (IUCN categories Ia/Ib)	20	12 411 066	45.6	7.9
National Parks (IUCN category II)	32	11 711 815	43.0	7.4
Natural Reserves (IUCN category III)	33	2 958 142	11.0	1.9
Natural Monument (IUCN category III)	14	126 848	0.4	0.1
Total	99	27 207 871	100	17.4

negative human impacts and biodiversity losses continue in PAs (Hockings 2003, Geldmann et al. 2013, Butchart et al. 2012), putting many ecoregions under pressure (Butchart et al. 2015). As the pressure and threats to biodiversity of PAs has grown (Bruner et al. 2001, Timko and Innes 2009, Mora and Sale 2011, Rodriguez-Rodriguez 2012), the need to assess and improve the effectiveness of protected area management has become a high priority throughout the world (Ervin 2003, Lu et al. 2012, Joshi et al. 2011). This need to assess the effectiveness of protected area management is recognized in the Convention on Biological Diversity Programme of Work for Protected Areas that called on Parties to implement Management effectiveness evaluations (MEE) for at least 30% of the PAs by 2010 (Hockings and IUCN World Commission on Protected Areas 2006), and Adams (2009).

MEE is globally recognized as a mechanism for creating proper accountability and good management practices for improving PA management (Hockings 2003, Margolius and Salafsky 1998, Hockings et al. 2009). To date over 18 000 protected area management effectiveness (PAME) studies have been conducted in over 9000 protected areas worldwide (Geldmann et al. 2013).

MEE is defined as “the assessment of how well the protected area is being managed – primarily the extent to which it is protecting values and achieving goals and objectives” (Hockings and IUCN World Commission on Protected Areas 2006, p xiii). Assessing management effectiveness and applying the results for adaptive management is now at the core of well protected area management.

The fourth IUCN World Parks Congress in 1992 established a recommendation for the IUCN to develop a system for monitoring management effectiveness (ME) of PAs (Stolton 2008), and subsequently, the World Commission on Protected Areas (WCPA) of the IUCN developed guidance for the assessment systems and tools (Hockings et al. 2000). Based on these series of frameworks (Hockings 2000, Hockings et al. 2002, 2006) a number of ME assessment tools have been developed around the world.

The WCPA published a global framework that guides the development of management effectiveness assessment methodologies (Anon 2007). Since then, more than 50

methodologies for assessing management effectiveness have been developed (Leverington et al. 2010). Two of the most widely used methodologies are Rapid Assessment and Prioritization of Protected Area Management (RAPAM) which was developed by WWF (Ervin 2003) and the Management Effectiveness Tracking Tool (METT), which was developed by World Wildlife Fund for Nature (WWF) and the World Bank (Stolton et al. 2007, Hockings et al. 2006).

Several internationally developed assessment tools were explored. The METT methodology was ultimately selected because of its uncomplicated approach and practicality, plus its suitability to the Mongolian situation. The METT is designed to further track and monitor progress towards worldwide protected area management effectiveness (Stolton et al. 2016, Leverington et al. 2008). It is aimed at being a cheap and simple method to use by park staff while supplying consistent data about protected areas and management progress over time.

In the face of numerous pressures on PAs in Mongolia, the importance of management has increased. Located at the crossroads of the Central Asian Steppes, the Siberian Taiga and the Gobi Desert, Mongolia hosts a globally important biodiversity. Over past decades the country’s biodiversity has come under significant pressure – especially from economic growth, hunting, logging, land degradation, mining and climate change.

Protecting nature, fauna and flora have a long history in Mongolia. There were closed seasons for hunting rabbits, deer, antelope, and gazelles in the time of Marco Polo; later the laws of Khalkh Jiram between 1709 and 1799 set aside sixteen mountains that were to be protected from hunting, cultivation and timber felling (Primak et al. 2003). Bogd Khan Mountain was established as Mongolia’s first official protected area in 1778 (Myagmarsuren and Namkhai 2012).

Since 1990, environmental protection has been given high priority by the Government. In 1992 the Mongolian Parliament established the goal to expand the protected area system, to protect 30% of the country by 2030 (Chimed-Ochir 1997). By 2000 Enebish and Myagmarsuren (2008) had provided a list of potential areas for protected designations that would meet this goal. Subsequently progress has been made towards this goal and Mongolia’s protected

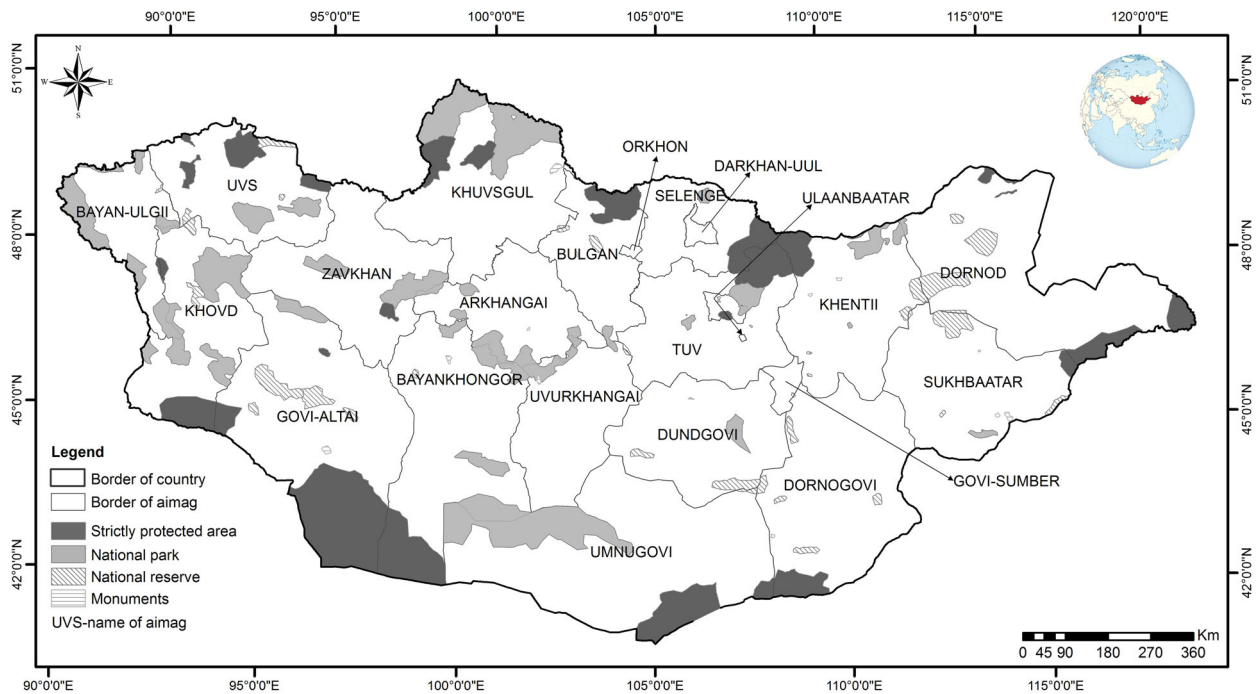


Fig. 1 Protected areas network in Mongolia

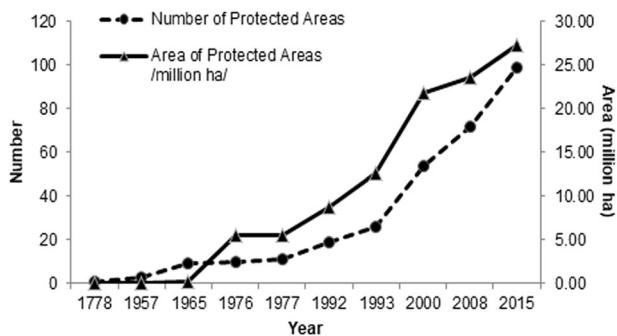


Fig. 2 Growth in the total number and area of PAs in Mongolia

area system has been significantly expanded (Reading et al. 1999), with more than 90 protected areas totaling 27.2 million ha (as of 2015), or 17.4% of the country's surface area (Table 1) ("National Programme on Protected Areas" Mongolian Parliament (1998); "The Green Development Policy of Mongolia" Government of Mongolia (2014)). However, the capacities and resources for protected area management have not kept pace with the expansion of the PA system, resulting in a situation where most PAs in Mongolia suffer from inadequate management resources.

The Law on Special Protected Areas (LSPA) of Mongolia has established four types of protected area designations as illustrated in Table 1: Strictly Protected Areas (SPA), National Parks (NP), Nature Reserves (NR), and Natural and Historical Monuments (NM and HM) Figs. 1 and 2.

The protection regime under which they are managed is described as in the following:

1. Strictly Protected Areas are ecologically important natural areas with "particular importance for science and civilization," and which protect "natural features" and prevent "environmental imbalance."
2. National Parks are natural areas with historical, ecological and cultural value that are intended for the development of tourism.
3. Nature Reserves are areas set aside to protect or restore natural features or natural resources. There are four types of Nature Reserve, each protecting a different type of feature or resource.
4. Natural and Historical Monuments are intended to protect Mongolia's historical and cultural heritage. They include natural landscape formations such as waterfalls, caves and volcanic formations, as well as archaeological and religious sites. They are protected by gates and fences where necessary and by regulations controlling land use up to the km from the boundaries.

Mongolia has a vast territory covering an area of 1,566,500 square km with poor infrastructure. Consequently, Park administration is located in the aimag¹ center cities and soum² center towns. Recognizing this we aimed to evaluate management effectiveness of some PAs in the central and eastern region of Mongolia and check whether

¹ Mongolian administrative unit (Province)

² Mongolian administrative unit (sub-district of aimag)

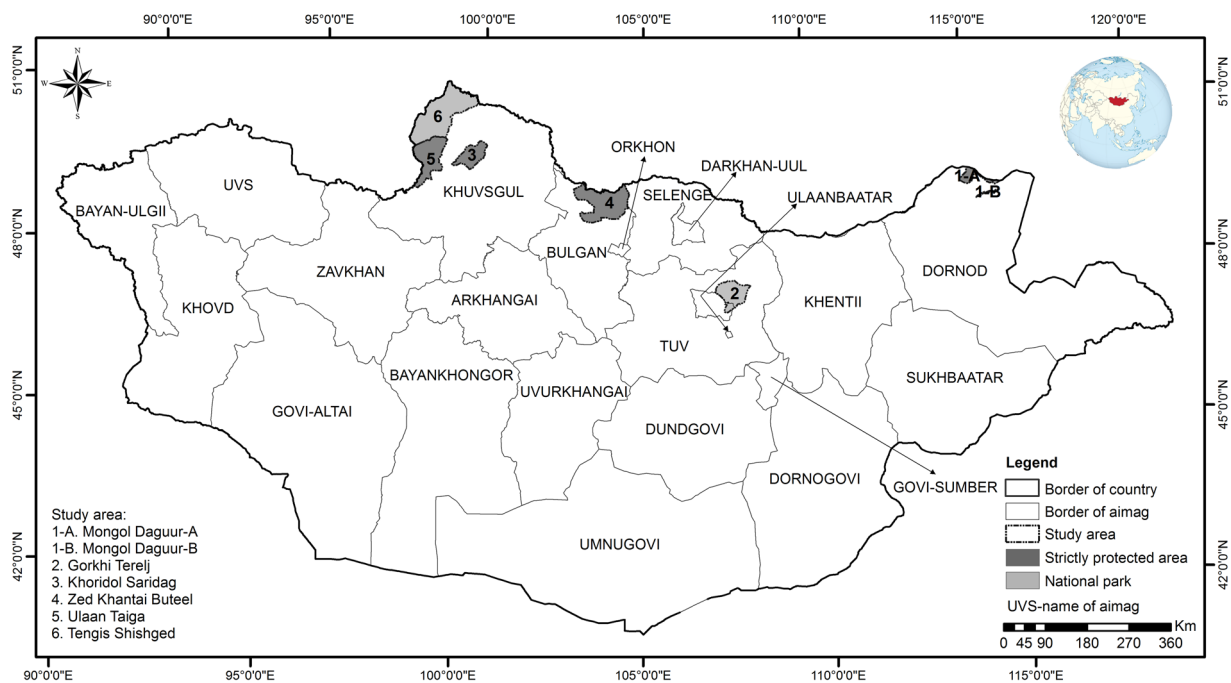


Fig. 3 The localities of the six case studies

management effectiveness is impacted by the management status (whether they have their own Park Administrative Areas (PAAs) or belong to other PAAs). to the objective was to improve management effectiveness of PAs in Mongolia through enabling managers and stakeholders to reflect on their experience, allocate resources efficiently, and plan for effective management in relation to potential threats and opportunities (Dudley et al. 2007).

Methods

Study area

Six protected areas with different natural conditions and administrative status (Fig. 3 and Table 2) were studied. They were: the Sed Khantai Buteeliin nuruu Strictly Protected Area (ZKB), the Ulaan Taiga Strictly Protected Area (UT), the Khoridol Saridag Strictly Protected Area (KS), the Mongol Daguur Strictly Protected Area (MD), Tengis Shishged National Park (TS) and the Gorkhi Terelj National Park (GT).

We evaluated the GT site for the first time in 2012, whilst this was the first evaluation for the other five sites. Basic information about these areas is included in Table 2. Although all six PAs are classified as IUCN I–II protected areas, two of them are high mountain forest type dominated with taiga ecosystem (TS and KS), one is high mountain forest type (Ulaan Taiga), one is forest type (Zed Khantai

Buteel), one is forest and steppe type (Gorkhi Terelj), and one is the steppe type (Mongol Daguur). Among these PAs Zed Khantai Buteel, Ulaan Taiga and Gorkhi Terelj have own PAAs, but Tengis Shishged, Khoridol Saridag and Mongol Daguur belong to Protected Areas Administrations of other PAs.

Methodology

A preparatory literature review covered, World and Mongolian literature on protected areas, the literature on methodologies for assessing management effectiveness in PA's. This covered Rapid assessment and prioritization of protected areas management (RAPPAM) and Management effectiveness tracking tool (METT). Finally, an analysis of information on the current state of PAs in Mongolia was made.

Data collection consisted of three steps, namely field data collection, statistical data collection and METT (Fig. 4). Subsequently, the data was analysed and we present the results and draw some conclusions and recommendations for further protection of PA's in Mongolia.

The available methodologies for assessing management effectiveness of protected areas (Nolte et al. 2010, Leverington et al. 2010) was reviewed prior to the selection of the method ultimately used. The Management Effectiveness Tracking Tool (METT) developed by World Wildlife Fund for Nature (WWF) and the World Bank (Stolton et al. 2007) was selected due to its straightforward approach and ease of

Table 2 Background information on the six case studies

Name of PA	Gorkhi Tereij	Zed Khantai Buteel	Tengis Shishged	Ulaan Taiga	Khoridol Saridag	Mongol Daguur
Size (ha)	292,905.5	611,300	869,070	434,900	227,413	108,154
Year of establishment	1995	2011	2011	2003	1997	1992
Justification for taking under protection	Beautiful scenery, outstanding natural and cultural landscape and drinking water resources for the capital city	Unique ecosystem of coniferous forest, river valley and meadow	Rich flora and fauna; historical, cultural and ethnic heritages	Taiga ecosystem in western shore of Khuvsugul lake	High mountain landscape, richest biodiversity, habitat of argali sheep	Onon River basin and its rich fresh water resources, forest steppe ecosystem, considerable natural and historical sites
Local authority or management agency	Gorkhi Tereij Protected Areas Administration	Zed-Khantai-Buteelin Protected Areas Administration	Belongs to Ulaan Taiga Protected Areas Administration	Ulaan Taiga Protected Areas Administration	Belongs to Ulaan Taiga Protected Areas Administration	Belongs to Dornod Mongol Protected Areas Administration
Number of staff	16 (7 of them are rangers)	23 (9 of them are rangers)	39 (29 of them are rangers)			18 (9 of them are rangers)
Annual budget/ million MNT*	194,300.5	233,775.4	343,397.3			169,619.0

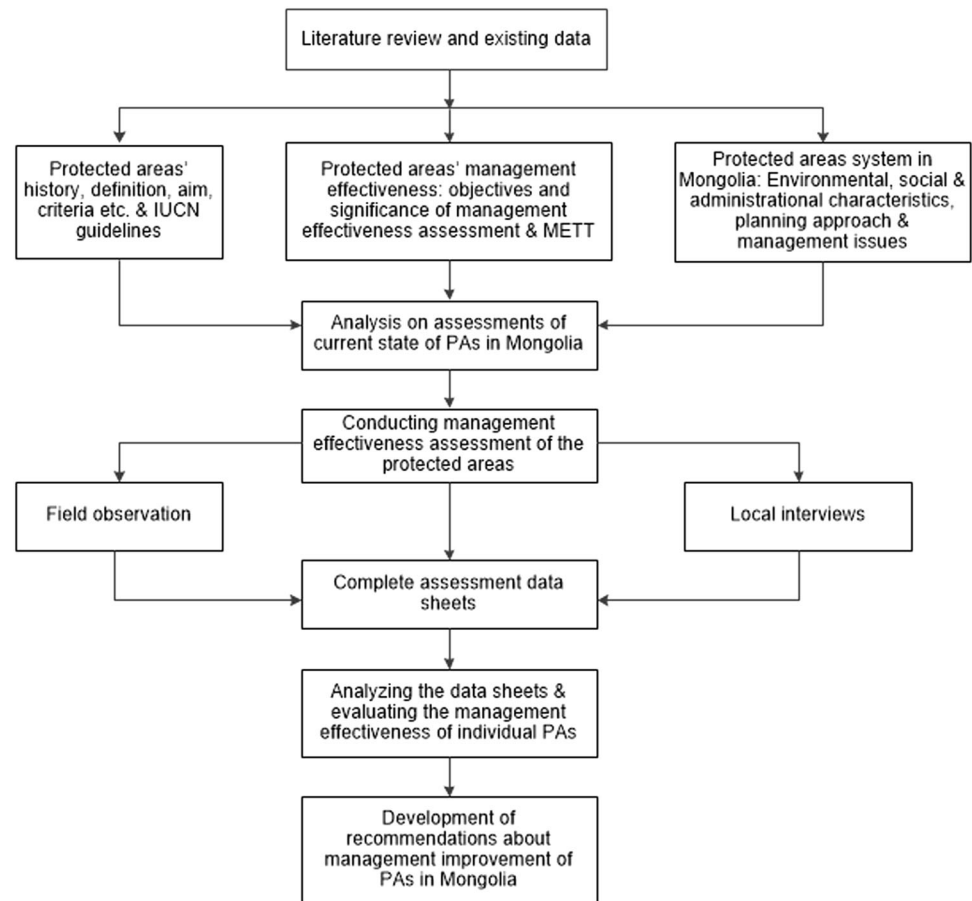
application to the work. METT is one of the most widely applied tools for Protected Area Management Effectiveness (PAME) and has been used in over 2500 protected areas covering over 4.2 million km² in at least 127 countries (IUCN- 2016).

In addition, METT was successfully adopted since 2005 with joint contribution and support by WWF Mongolia, German Agency for International Cooperation (GIZ), United Nations Development Programme (UNDP) and PAA of Mongolia. The methodology of METT is being developed in line with the experience of 2005–2015 and its future development trends, and approved by a decree of Ministry of Environment and Tourism of Mongolia in 2016 (“Methodology for Evaluating Management Effectiveness of Protected Areas” (2016)). The supportive approach to METT from Mongolian Government was one of the main reasons of choosing METT for this research.

METT consists of two main sections: two datasheets of key information on the protected area, and an assessment form. The first datasheet provides details of key information about the areas including its name, categories, date of establishment, size and location, and management objectives. The second datasheet records a broad list of threats that protected areas are facing/or can face in the future. This datasheet should be filled out by protected areas’ staff, and then identify the threats, and rated their impacts on the protected areas based on the datasheet. The assessment form contains a questionnaire with 30 questions, and each question has four alternative responses scoring between 0 (which means poor) to 3 (which means excellent).

Minor adaptations were made to the METT to reflect the socio-economic and environmental characteristics of Mongolia. These were accepted by the Department of Protected Areas Administration in the Ministry of Environment and Tourism of Mongolia. The six PAs were assessed using a modified assessment form with the 47 multiple choice questions related to 6 main elements (Anthony et al. 2015, Hockings 2003, Leverington et al. 2010) and 13 directions (Galragchaa et al. 2016) and qualitative information was added. The total score on the assessment form ranged from 0 to 147 point.

In order to complete the 147-point assessment form, interviews were conducted and field observations recorded. At each area we preferred to meet with appropriate individuals to interview, including PA staff, local herders and local governors (aimag/soum governors and environmental specialists). We also visually assessed habitat conditions, evidence of wildlife presence and use. Local interviews were especially helpful in terms of ongoing uses. Formal interviews were conducted with forty one individuals, including PA staff. Many other interviews were conducted on an informal basis.

Fig. 4 Research methodology

Results and Discussion

Pressures and threat analysis

The threat status of the biodiversity in the PAs has been defined through the participation of specialists and rangers of the PAAs. Each threat was assessed with the following three criteria: (1) scope, (2) severity, (3) irreversibility; and the overall assessments were made based on these findings. Average assessment scores were identified as a group and paired into 12 chapters.

The results of the threat assessment show that the following threats have the most impact on the degradation of the ecosystem, biodiversity, habitat fragmentation and depletion (see Table 3).

L low threat impact, *M* medium threat impact, *H* high threat impact

The result of threat assessment shows that one threats to the biodiversity of the Ulaan Taiga, Khoridol Saridag and Mongol Daguur are high, whereas Gorkhi Terelj and Zed Khantai Buteeliin nuruu are medium (Table 3). The Ulaan Taiga, Khoridol Saridag, Tengis Shishged and Zed Khantai Buteeliin nuruu are located in the areas with abundant forest and ground water resources of Mongolia. Due to this

features, the main threats in these areas are related to an inappropriate use of forest and non-timber resources, illegal hunting and forest fire. Also, there are evident the threats which resulted from the infrastructure, natural resources and land use. For instance, in Tengis Shishged, Ulaan Taiga the main threats are related to illegal mining and pasture use, in Ulaan Taiga, Khoridol Saridag and Mongol Daguur there is the threats of wild fire and changes in tradition and society is high, whereas in Gorkhi Terelj prevails the threats from transportation and services in the buffer zone and pollution due to its proximity to the capital city.

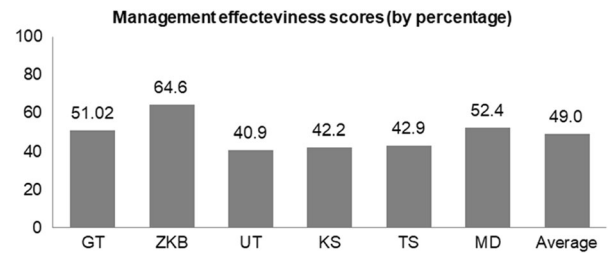
Management effectiveness of the PAs

Management effectiveness (ME) of PAs was assessed with 47 questions related to 6 main elements and 13 directions. Figure 5 shows the results in management effectiveness of the selected protected areas. In Central and Eastern region of Mongolia (PAs 3,4,5,6 on Fig. 3), we determined the average management effectiveness to be around 49.0%, with a high 64.6 (Zed Khantai Buteel), and a low of 40.9% (Ulaan Taiga).

Among the PAs that were assessed with scores higher than 50 percent 2 PAs (Zed Khantai Buteel and Gorkhi

Table 3 Threat impacts on the biodiversity of PAs

PROTECTED AREAS	Human settlement and land use	Pasture use	Forest resource use	Forest fire	Over exploitation of natural resources		Mining industry in a buffer zone	Infrastructure; and transportation services within PA and its buffer zone	Natural system modification		Pollution	Changes in tradition and society.	RESULTS
					Illegal hunting	Unsustainable use of non-timber products			Wild fire	Impacts from buffer zone			
Zed Khantai	L	L	M	H	L	L	L	—	L	L	—	L	L-8; M-1; H-1
Butseel													
Ulaan Taiga	—	L	L	L	H	M	M	L	H	M	—	M	L-4; M-4; H-2
	-	M	M	M	M	H	L	L	H	M	—	M	L-2; M-6; H-2
Khoridol													
Sarddag													
Tengis	M	M	M	M	H	M	H	L	M	L	L	M	L-3; M-7; H-2
Shishged													
Gorkhi Terelj	M	M	L	L	L	L	—	M	L	M	M	L	L-6; M-5; H-0
Mongol	M	M	—	L	H	—	L	L	H	L	L	H	L-5; M-2; H-2
Dagur													

**Fig. 5** Management effectiveness score of the protected areas studied (by percentage)

Terelj) have its own PAA and 1 (Mongol Daguur) is managed by another PAA (Eastern Mongolia Protected Areas), headquartered in Choibalsan town. Other 3 PAs (Ulaan Taiga, Khoridol Saridag and Tengis Shishged) are managed by one PAA (Ulaan Taiga PAA) and were assessed with the lowest scores (40.9). Therefore, our research results allowed us to formulate general suggestion that in most cases, the management effectiveness has a particular association with the management status of the protected areas.

Six management effectiveness evaluation elements were calculated as a percentage of the maximum possible score. As indicated in average scores of the main elements: (a) legal framework and law enforcement is assessed with highest average score 77.8%, then (f) biodiversity and economic values and benefits of PAs were assessed with 68.5%, (b) designing and planning 59.5%, (e) monitoring and evaluation 41.7%, (d) physical activities of protected areas administrations 41.4% (c) ME of resources 40.3% (Fig. 6).

Here: a – Legal framework and law enforcement; b – Designing and planning; c – Resources; d – Physical activities; e – Monitoring and evaluation; f – Biodiversity and economic values.

The six management effectiveness evaluation elements and ME scores were classified into four categories based on the percentage of a maximum possible score: <25%, unsatisfactory; 25–50%, slightly satisfactory; 50–75%, satisfactory; 75–100, very satisfactory. Among the six evaluation elements: resources (c), physical activities (d) and monitoring and evaluation (e) in the protected areas studied achieve slightly satisfactory management effectiveness, designing and planning (b) and biodiversity and economic values (f) satisfactory, and legal framework and law enforcement (a) very satisfactory.

In case of resource management effectiveness of these protected area administrations, we see that the efficiency of human resource management was assessed with 33.3–58.5%, management effectiveness of equipment 16.7–66.7% and management of finance 33.3–50.0%.

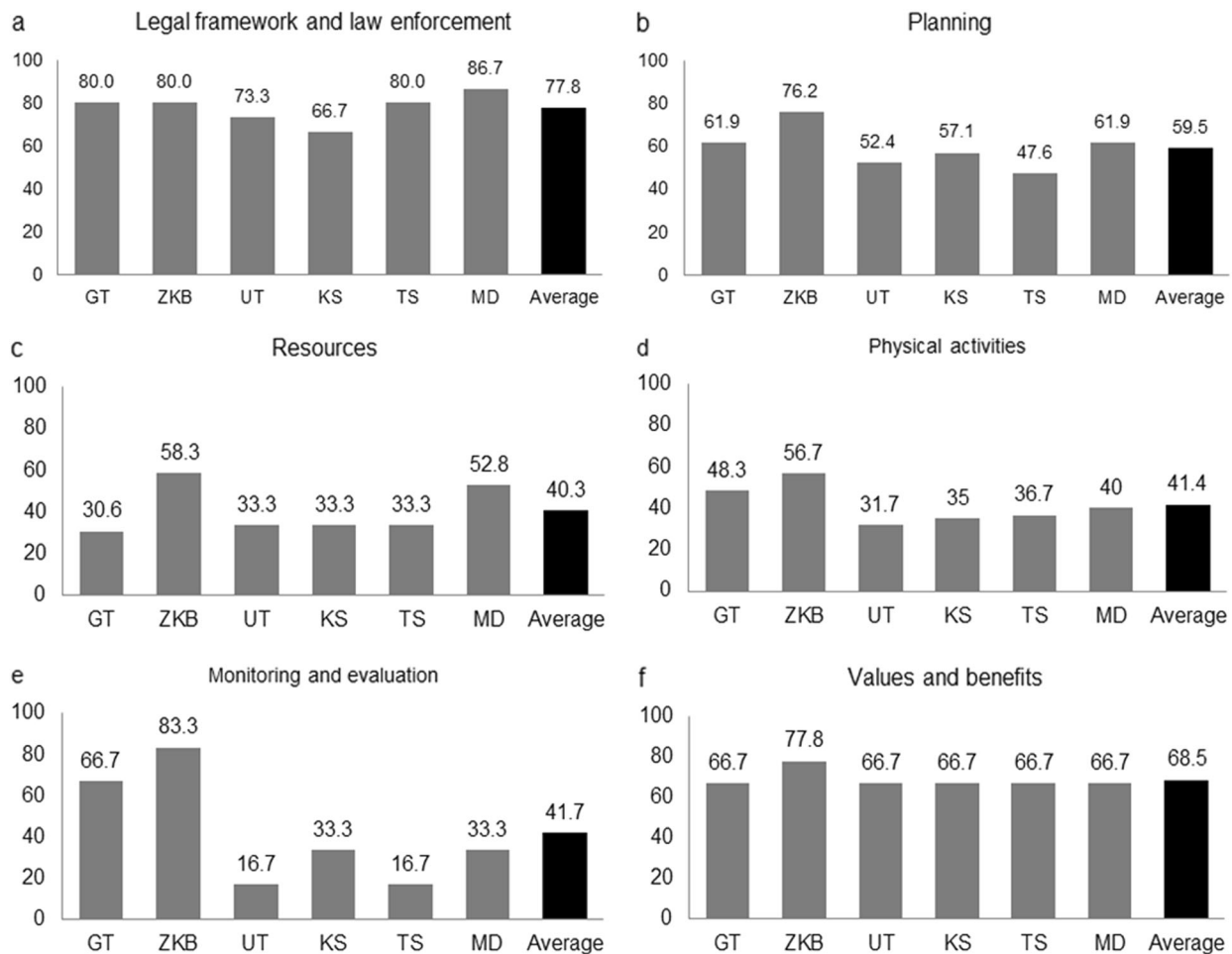
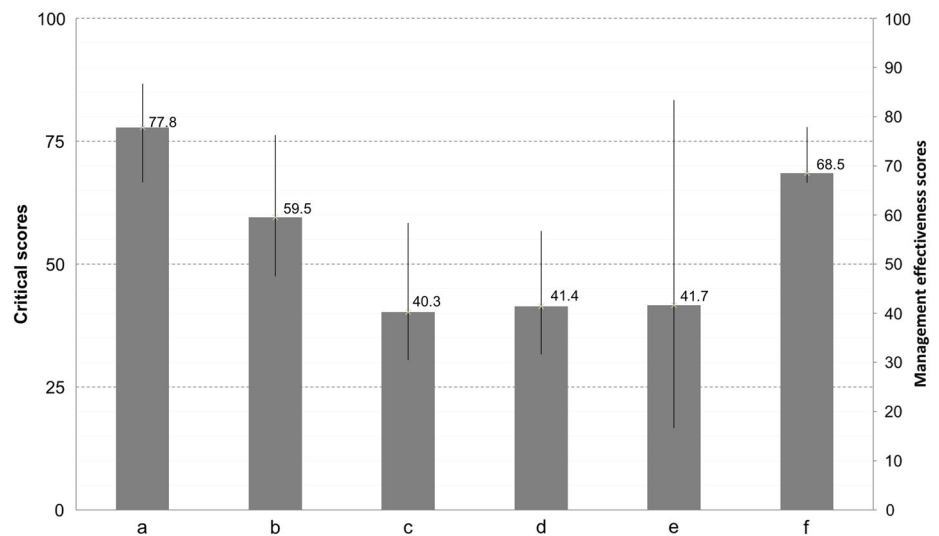


Fig. 6 Management effectiveness score of the protected areas studied (by elements of evaluation, in percentage)

Fig. 7 Average scores of six management effectiveness evaluation elements in the protected areas studied



Among the assessment elements, issues related to budget, education, resource investment, policy conflict among government sector and community involvement received the lowest scores (Fig. 7).

According to the detailed evaluation of the physical activities' management, ME of education and awareness and co-management or stakeholder participation in PA management were higher than other indicators with

40.0–86.7%, whereas ME of protection system and research and resource inventory 44.4–75.0%, buffer zone management 25–33.3%. However, management effectiveness of tourism varied from 16.7 to 66.7%.

Results of the assessment show that the following difficulties hamper the improvement of the management and the need to reduce the threats to the biodiversity of the protected areas.

- Lack of legal framework and conflicts between Law and regulations on PA and other newly revised Environment related Laws;
- Scarcity of budget;
- Lack of equipment and infrastructure in PAA;
- Lack of capacity of human resource of PAAs and key local stakeholders;
- Lack of research and monitoring and data management;
- Not adequate responsibility of the natural resource users and key stakeholders;
- Weak monitoring and evaluation systems.

The collapse of the socialist governance system of Mongolia at the beginning of the 1990s and the emergence of the free-market, democratic society has resulted in serious economic and cultural changes, many of which impact PA resources. Major impacts included the illegal taking of animals and plants, overgrazing by livestock, mining, tourist activities, drought, and wildfires. Our assessment revealed that the management system of the protected areas studied was well established, but issues of the management such as inadequacy of well-trained staff, extremely low budget, and legal environment lag and policy conflicts among government bodies still need to be solved.

Conclusions and recommendations

Applying the METT methodology, this study assessed six protected areas in central and eastern regions of Mongolia. The results of this study have shown that structured interviews (using METT), open interviews, and site visits reveal that the major pressures and threats to the protected areas come from outside. The assessment of legal status, planning for land and water use, regulations, and objectives received the highest average scores, whereas education and awareness, community co-management, visitor facilities, budget sources, staff training, and protection systems received the lowest ones. The results revealed that the major factors that contribute to an ineffective management in six cases stem from inadequacy of resource investment, inability, and a lack of support from upper management levels. Another aspect that needs further research is to assess the impact of

the size of the PAs in Mongolia, and the effect of the distance between PAs and PAAs.

To improve ME, some countermeasures should be taken, such as increasing funding, strengthening capacity building, planning, and adaptive management, and implementing community participation (Shafer 2012). Investments from the government should be strengthened to hire well-trained staff and promote and train existing staff and managers. Education and training are key elements to strengthen the protection and management of these fragile areas (Jeffrey and McNeely 1994). In terms of available technologies, more use should be made of earth observation and GIS as shown by Tan et al. (2004) and Hadeel et al. (2011) for meeting the UN's Sustainable Development Goals (SDG's) (Salafsky 2011, Anderson et al. 2017 and Scott and Rajabifard. 2017). Also, different strategies for budgetary support should be implemented. All necessary facilities or equipment should be procured. And the existing laws and regulations should be consistent and operational.

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Compliance with ethical standards

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent Informed consent was obtained from all individual participants included in the study.

Conflict of interest The authors declare that they have no conflict of interest.

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