GREAT ALTAY TRANSBOUNDARY BIOSPHERE RESERVE

Development of a management plan of the proposed Great Altay Transboundary Biosphere Reserve (Republic of Kazakhstan and Russian Federation)

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Photo 1 and Photo 40: Impression of the Great Altay Transboundary Biosphere Reserve
Photographer: Alija Gabdullina

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Umwelt Bundesamt

Federal Agency for Nature Conservation

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Content

Abbreviations

ASER	Altai-Sayan Ecoregion
BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
BfN	Bundesamt für Naturschutz (German Federal Agency for Nature Conservation)
UBA	Umweltbundesamt (German Federal Environment Agency)
BR	Biosphere Reserve
C	Criticality
CBD	Convention on Biological Diversity
CICES	Common International Classification of Ecosystem Services
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMP	Conservation Measures Partnership
EEA	European Environment Agency
FSBO	Federal State Budgetary Organization
GIZ (GTZ) GmbH	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICC MAB	International Co-ordinating Council of the MAB Programme
IKI	Internationale Klimaschutzinitiative (International Climate Initiative)
ISESCO	Islamic Educational, Scientific and Cultural Organization
K	Knowledge
KEA	Key ecological attributes
NGO	Non-governmental organization
NP	Nature Park
NTFPs	Non-timber forest products
M	Manageability
MAB	Man and Biosphere Programme
MEA	Millennium Ecosystem Assessment
MARISCO	Manejo Adaptativo de Vulnerabilidad y Riesgo en Sitios de Conservación (span.) = Adaptive management of vulnerability and risk at conservation sites
MAES	Mapping and assessment of ecosystems and their services
PA	Protected area
RoK	Republic of Kazakhstan
RF	Russian Federation
R_S	Strategic Relevance
RSFSR	Russian Soviet Federative Socialist Republic
S	Strategy
S_A	Systemic activity
SNBZ	State Nature Biosphere Zapovednik
SNZ	State Nature Zapovednik
SNP	State National Park
TBR	Transboundary Biosphere Reserve
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WNBR	World Network of Biosphere Reserves
WNHS	World Natural Heritage Site
WWF	World Wildlife Fund

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Preface

Ecosystems, landscapes, species as well as natural processes do not stop at state borders. The environmental impacts of human activities in one country have an influence on nature and local communities in neighbouring countries, too. Peoples and their cultural identity are often artificially separated and constricted by state borders. There are many reasons and motives for transboundary approaches in nature conservation and regional development, which become increasingly important in times of global challenges like climate change, poverty, armed conflicts and financial crises. Many governments and communities have realized that they need to think and act even stronger in a global and transboundary way in order to address and solve these pressing issues.

The Altai countries cover one of the most pristine hotspots of diversity in terms of ecosystems, landscapes and biological diversity on earth. They share a long culture and tradition of nomadic tribes that lived and still live in close relation with nature. For many decades during the 20th century the four Altai countries were ruled in close cooperation by socialistic governments with Kazakhstan and Russia being part of the Soviet Union. When the Soviet Union dissolved in 1991, the State borders of the Altai countries received a greater importance again and weakened cultural and economic exchange in the border regions.

However, there have been initiatives and programmes that focus on transboundary cooperation in the Altai not only in the field of economy, but also in nature conservation and cultural identity. One outstanding example is the cooperation between the protected area administrations of the Katon-Karagay State National Park (Republic of Kazakhstan) and the State Nature Biosphere Zapovednik Katunskiy (Russian Federation), both of which have been working together since 2004. An important milestone was reached with the signing of the Intergovernmental Agreement on the establishment of the Transboundary reserve “Altai” in 2011. Based upon that, the German Federal Ministry for the Environment contributed to the further development of joint Kazakhstani-Russian nature conservation activities in the Altai region.

In the framework of the international project “Development of a management plan for the projected transboundary reserve “Altai” (2012-2015), we systematically analysed the current and potential future environmental and socio-economic situation in the Russian-Kazakhstani Altai border region and elaborated a joint strategic management plan for the projected bilateral **Great Altay Transboundary Biosphere Reserve (TBR)**. By applying an adaptive and participatory management approach by using the MARISCO methodology, we made sure that the transboundary management will be able to effectively address current and future challenges and requirements as being outlined in modern conservation concepts and programs such as the Convention on Biological Diversity (CBD) and the UNESCO Programme “Man and Biosphere” (MAB).

Parallel to the elaboration of the management plan, we prepared a nomination application for the Great Altay TBR, which may be submitted to the UNESCO International Coordinating Council of the MAB-Programme. Both documents will be presented as recommendations to the governmental authorities of the Russian Federation and the Republic of Kazakhstan in order to head towards the successful designation, establishment and management of the first transboundary biosphere reserve in Asia. Furthermore, the management plan may also be of interest to other countries and regions, which wish to create a transboundary biosphere reserve.

At the beginning of the document we would like to highlight two important issues: Throughout the present management plan descriptions concerning the Kazakhstani part of the Great Altay TBR are placed before the respective Russian part. Such arrangement does reflect an alphabetical order only. Furthermore, we would like to point out that the spelling ‘Great Altay’ is used as proper name for the transboundary biosphere reserve only, while the spelling ‘Altai’ refers to the geographical place, the various ethnic Altaian people and their language.

Our sincere gratitude goes to the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the German Federal Environmental Agency (UBA) and the German Federal Agency for Nature Conservation (BfN) for funding this specific project. In particular, we thank Heinrich Schmauder who provided continuous technical support and strategic advice during the entire process. Without his relentless commitment to nature conservation in the Altai region this project would not have been launched. Furthermore we would like to thank Sebastian Beckermann and Ralph Wollmann for their support and advice in administrative matters.

Our thanks also go to the national committees of the UNESCO MAB programme of the Republic of Kazakhstan and the Russian Federation as well as to Dr. Thomas Schaaf, former secretary of UNESCO MAB Paris. Their specialist knowledge and experience in biosphere reserve planning and nomination procedures significantly contributed to mutual understanding and helped developing the present TBR management plan.

Very special thanks go to the directors of the three protected areas, to Erlan Mustafin, Alexander Zateev and Igor Saylankin.

Furthermore, we like to extend our thanks to the following people and institutions. Their know-how and efforts helped in making this project a success:

- the colleagues of World Wildlife Fund (WWF) Russia and Netherlands, Gernant Magnin, Femke Koopmans, Alexander Bondarev and Mikhail Paltsyn, for advise and exchange of documents and GIS data in the framework of the situation analysis;
- our project partners Dr. Hans-Dieter Knapp (International Academy for Nature Conservation, Vilm island), Prof. Dr. Hartmut Rein (Centre for Sustainable Tourism at Eberswalde University of Sustainable Development) and Adrian Hoppenstedt (Hage & Hoppenstedt Partner - Consultancy for Territorial and Environmental Development, Hannover) for accompanying and consulting this project during the comprehensive situation analysis and the development of appropriate strategies;
- Oleg Chugunkov, Armen Grigoryan and Igor Ostapovich for compiling information on the legal framework of the TBR, transboundary agreements, the current management as well as key stakeholders;
- Evgeny Jurchenkov and the colleagues of the Altai-Sayan Mountain Partnership for gathering information related to the socio-economic situation of the local communities on the territory of the TBR;
- Sergey Starikov, Andrey Chelyshev and Igor Artemov for conducting analyses on flora and fauna within the territory of the Great Altay TBR;
- Maria G. Suchova and her GIS colleagues from Gorno-Altaisk State University as well as Julia Sauermann and Monika Hoffmann (Centre for Econics and Ecosystem Management, Eberswalde University for Sustainable Development) for evaluating and processing spatial information to be attached to the present plan and nomination form as cartographic basis;
- Felix Cybulla and Axel Schick for moderating, coaching and reviewing all steps of the MARISCO approach;
- our colleagues from the Biosphere Reserves “Schorfheide-Chorin”, “Rhön” and “Schaalsee”, especially Uwe Graumann, Ewald Sauer and Klaus Jarmatz for sharing their valuable experiences with us and their warm welcome during our excursion week in Germany;
- Dr. Jelena Leontjeva and Tatjana Furmenkova for supporting and assisting in the Russian translation of various project documents including the present management plan;
- the Eberswalde University for Sustainable Development for their support and assistance in administrational and logistical matters;
- all those people that actively participated in the workshops and meetings during the planning process and allowed a strong representation of various stakeholder groups.

The editors trust in a successful nomination of the Great Altay TBR and a fruitful future cooperation. May all efforts contribute to the conservation of the unique and magnificent Altai Mountains and all surrounding ecological treasures as well as cultural heritages for future generations!

Eberswalde/Katon-Karagay/Ust-Koksa, July 2015, the Editors

Photo 2: Planning team during a project workshop in Ust-Kamenogorsk, February 2014
Photographer: Pierre L. Ibisch

Executive summary

In central Asia, where borders of the four countries Russian Federation, Republic of Kazakhstan, Mongolia and People's Republic of China meet, the governments of the Russian Federation and the Republic of Kazakhstan have set an ambitious aim to establish a bilateral transboundary UNESCO biosphere reserve to improve the conservation of the various ecosystems shared by both countries, and to foster sustainable development within the local communities. Located in the mountainous Altai region, Southern Siberia, the unique and still relatively pristine region is part of the Altai Sayan Ecoregion and is recognized by various national and international protection statuses for its exclusive biodiversity and the large variety of ecosystems.

The exposure to risks like climate change and the inherent vulnerability of the fragile region requires an ecosystem-based conservation approach, which was applied using the MARISCO method during a 3-year participatory planning process that was initiated back in 2012. In the final outcome of the project the present management plan for the Great Altay Transboundary Biosphere Reserve was developed together with the application document for the official designation as a UNESCO Transboundary Biosphere Reserve. Developed as a long-term adaptive management plan, the final document meets the established requirements for biosphere reserves, which are the Seville Strategy, the Seville+5 Strategy and the Madrid Action Plan. Furthermore, the management plan serves as an overarching transboundary management strategy for two existing and adjacent biosphere reserves in the Republic of Kazakhstan and the Russian Federation.

Given its designation the Great Altay Transboundary Biosphere Reserve will be the first of its kind in Asia, and the first Asian-European Transboundary Biosphere Reserve (according to the UNESCO biogeographical classification system). More important, the transboundary biosphere reserve will serve as a regional model for the rest of the world in demonstrating successful strategies for inter-linking biodiversity and ecosystem conservation with sustainable development in the various local communities of the transboundary Altai region, South Siberia.

Photo 3: Landscape of Great Altay TBR
Photographer: Alija Gabdullina

Vision

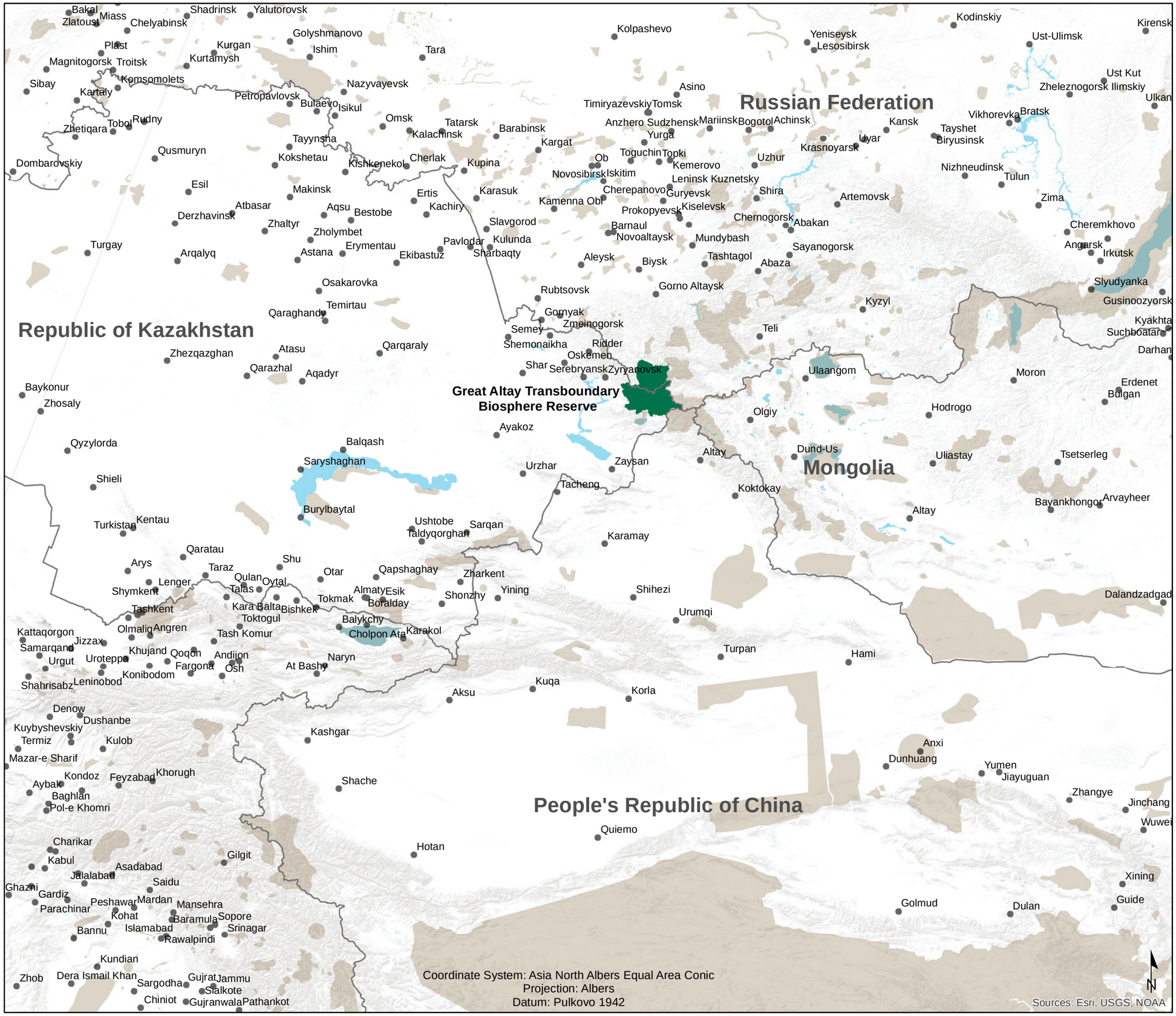
The Great Altay TBR Vision, which is shared by the Republic of Kazakhstan and the Russian Federation – recognizes the TBR area as a highly preserved natural area with a unique biological, landscape, ethnic and cultural diversity, providing a large range of ecosystem services, which are important to local communities as well as to humankind at the regional and global levels. It is created to conserve and study its biotic and abiotic features in a transboundary context and to enhance both the material as well as the spiritual wellbeing of local communities.

The Great Altay TBR will be a model for sustainable development of border mountain areas. It will be jointly managed by the Governments of the Republic of Kazakhstan and the Russian Federation with the participation of all stakeholders following an adaptive management approach. Thus, the management of the TBR and the activities of the local people will seek to adapt to existing and potential threats, including threats related to climate change.

The following page depicts the overview of the region in its transboundary context.

Figure 1: Overview map of the Great Altay TBR

Great Altay Transboundary Biosphere Reserve - overview map



Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

- Cities
- Great Altay Transboundary Biosphere Reserve
- Protected areas
- Lakes

Source:
Data from OpenStreetMap, ODbL1.0, www.openstreetmap.org; WWF 2011 (Protected areas, update 2011);
The World Database on Protected Areas (WDPA, 2013). UNEP-WCMC, Cambridge, UK. www.protectedplanet.net;
Natural Earth Data, www.naturalearthdata.com; ESRI;
Administrations of Katunskiy BR + Katon-Karagay BR;
Map created by Monika Hoffmann and Julia Sauermann (CEEM/HNEE)
06/2015

DISCLAIMER: All boundaries shown (state, regional, protected area administrative boundaries) and the designations used do not imply official endorsement or validity. The map authors take no responsibility for the accuracy or correctness of the shown contents.

HNE Eberswalde
Hochschule für nachhaltige Entwicklung (FH)
Eberswalde University for Sustainable Development
University of Applied Sciences

Centre for Econics and Ecosystem Management

1. Introduction[1]

The UNESCO Man and the Biosphere Programme (MAB) was launched in the year 1971 as an Intergovernmental Scientific Programme. With the establishment of biosphere reserves (BR) and transboundary biosphere reserves (TBR), it aims to improve the relationship between people and their natural environments. BRs and TBRs are areas for interdisciplinary research, demonstration and training in natural resources management, sustainable development and nature conservation. In addition, TBRs recognize the importance of managing species and ecosystems beyond artificial political borders. They contribute to a more effective management and conservation of shared ecosystems following the ecosystem approach of the Convention of Biological Diversity (CBD). So far, 15 transboundary biosphere reserves have been designated in 23 countries, most of them in Europe (UNESCO, 2015b).

Since the mid-1990s there have been several initiatives and activities to promote and foster transboundary nature conservation in the Altai region, which range from bilateral cooperation between protected areas to plans of establishing multilateral conservation sites within the framework of the World Heritage Convention and the UNESCO MAB-program. The bilateral Great Altay TBR will be the first transboundary conservation site with an international status in the Altai region. It comprises two existing UNESCO BRs, which are the Katon-Karagay BR in the Republic of Kazakhstan and the Katunskiy BR in the Russian Federation.

The present management plan of the Great Altay TBR and the UNESCO nomination form were elaborated in the framework of the international project "Development of a management plan for the projected transboundary Biosphere Reserve Altai" (2012-2015), which was initiated by the governments of the Russian Federation, the Republic of Kazakhstan and the Federal Republic of Germany and funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) with financial means of the Advisory Assistance Programme for Environmental Protection in the Countries of Central and Eastern Europe, the Caucasus and Central Asia. The Centre for Econics and Ecosystem Management at Eberswalde University for Sustainable Development (Germany) was mandated by the BMUB to implement the project under the supervision of the German Federal Agency for Nature Conservation (BfN) and the German Federal Environment Agency (UBA).

The developed management plan is based on a thorough **systemic and systematic situation analysis**. This analysis focuses on a comprehensive assessment of **conservation objects and their status** (chapter 2.1 and 2.2), followed by a systematic derivation of **threats and contributing factors that endanger the viability and functioning of the conservation objects** (chapter 2.3). In addition, essential information about the **political framework, main stakeholders, present management approaches** and the spatial relationship of the Great Altai TBR territory are outlined (chapter 2.4-2.7).

In this context, management is understood as the ongoing implementation of action in order to accomplish the vision for the Great Altay TBR with its related **overall goals and objectives**, outlined in chapter 3.1, 3.2 and 3.3.

Box 1: This management plan

has been compiled between September 2012 and July 2015, on the basis of various team and stakeholder workshops, comprehensive telephone and internet conferences as well as on commissioned expert reports on the ecological, socio-economic and legal situation in the region of the Great Altay TBR. The management plan refers to the strategic management of the Great Altay TBR. Therefore, it is designed as a general strategic framework for operative planning, which will be re-defined and adapted in participatory processes in certain time intervals. For this reason, the management of the Great Altay TBR does not include the fine-scale management of the national sites, of which the transboundary site is composed. Furthermore, it does not replace the operative management plans of the national sites.

[1] The authors of this section are Anja Krause, Anja Wünsch, Ulrike Gollmick, Judith Kloiber, Raushan Krykbaeva, Alija Gabdullina, Tatjana Yashina & Pierre L. Ibisch

Boundaries and spatial zoning of the Great Altay TBR are illustrated in detail in chapter 3.4. The developed **strategies** comprise concrete packages of objectives and corresponding lines of action, which contribute to the achievement of the overall goal as explained in detail in chapter 3.5. They can be grouped according to programmes that embrace related strategies and might also reflect a certain implementation structure.

Chapter 4 elaborates on the **requirements for operational planning** to translate the management strategies into action and implement them on a strategic level in a participatory approach, involving various relevant stakeholders.

Having verified the overall coherence of the developed TBR management strategies with the initially defined guiding principles (chapter 5), the management plan concludes with an **outlook regarding projected cooperation and extension of the Great Altay TBR** (chapter 6).

1.1. Background and justification

The Altai Sayan Ecoregion ('Altai-Sayan Montane Forests' global ecoregion) is ranked as number 79 in the WWF list of 'The Global 200 Ecoregions'[2] and stretches over four countries, which are the Republic of Kazakhstan, Russian Federation, Mongolia and the People's Republic of China. It consists of six terrestrial ecoregions: Sayan Alpine meadows and tundra; Great Lakes Basin desert steppe; Altai montane forest and forest steppe; Sayan montane conifer forests; Sayan Intermontane steppe; and Altai alpine meadow and tundra. The Ecoregion provides more than 3700 species of vascular plants, with 700 threatened or rare species, more than 300 endemic and more than 600 sub-endemic species (WWF, 2015b).

Box 2: The Golden Mountains

The Altai Sayan Ecoregion comprises the Altai Mountains, and is one of the most unique landscapes of Central Asia with Belukha Mountain (4,509 m) as its symbol. Alexander von Humboldt was one of the first scientists to visit and described the Altai Mountains. In his monography on Central Asia, more than 170 years ago, in 1843 (published in 1844), he compiled knowledge obtained from literature and personal observations (Humboldt, 1844). He starts his Altai chapter quoting the "*Thai-thsing-i-tung-tschi*" geography of China[3], which celebrates the Altai as "the Kin-schan of the elderly"; it was described as "so high that it reaches the milky way and that the snow on its tops does not melt, not even in summer". As Humboldt explains, the Chinese *Khin-schan* was the *Alta-iin-oola* or *Altai-alain* in Turkish or Mongol language: The golden mountain.

Humboldt also points out that the name of the golden mountain dates back to written documents from the 7th century. Dithubul, the Khakan of the Turks (*Thu-khiu*) who were camping in the Altai mountains, east or northeast from the river Irtysh, as early as 562, and established permanent communication with the emperors of Constantinople. Humboldt speculates whether the name refers to gold to be found in the mountains or to the fact that Turkish and Mongo noblemen were accustomed to giving honorary titles to mountains in the vicinities of their settlements. As evidence he cites Marco Polo who refers to Altai, when he describes the site where Genghis Khan was buried[4].

[2] Biodiversity is distributed on the earth according to climate, geology and evolutionary history. Regions with exceptional biodiversity that also act as representatives of their ecosystems were categorized into 200 global ecoregions. The WWF identified a list of 'The Global 200 Ecoregions' as priority areas for conservation and as the most valuable and vulnerable ecoregions in the world (Olson & Dinerstein, 2002) (WWF, 2015c).

[3] Translation by Heinrich Julius Klaproth, 1831.

[4] Alexander von Humboldt also reports about the first biological expeditions made by Alexander von Bunge (1829) and Friedrich August von Gebler (1833-35), collecting plants and insects respectively. Von Gebler also documented orographic results, among others describing the highest mountain of the Altai as *Belukha*, the White Mountain, or the pillars of Katun (*Katunskyi stolby*).
After extensively analysing the massifs and the geology of the Altai Mountains, Humboldt closes a few zoogeographical considerations. He refers to records of tigers, which were observed up north to the vicinities

Altai Mountains include steppes as well as a diversity of landscapes including forests, meadows and tundra, nival-glacial landscapes as well as mires. As described above, it is an area of international importance for biodiversity, supporting a number of rare and globally threatened species like the snow leopard and the argali**,** a mountain sheep species. The landscape has been managed for many centuries by various, culturally distinctive indigenous ethnic groups. The Millennium Ecosystem Assessment (MEA) identified the high value of the region for its biological, landscape, historical, cultural and religious diversity (Millenium Ecosystem Assessment, 2005).

In recent years the sparsely populated and economically least developed region straddling both countries has faced economic downturns and forced local people to rely increasingly on their surrounding natural resources. As a consequence, an increase in various threats to biodiversity such as unsustainable exploitation of natural resources, fires and climate change has been reported (WWF, 2012).

Earlier initiatives on both sides of the border to safe-guard the ecological integrity of the region have set in place important stepping stones for the establishment of the Great Altay TBR. At the International Conference, 'Strategic Considerations on the Development of Central Asia', held in 1998 in Urumqi (People's Republic of China), the 'Altai Declaration' was passed during which transboundary cooperation in the area of biodiversity conservation and sustainable development was proposed. Specifically, the declaration to establish the UNESCO transboundary biosphere reserve "Altai" comprising the frontier territories of the four Altai countries was made a key objective.

An important milestone was achieved in 2000, when the **Katunskiy Biosphere Reserve** (Russian Federation) was established, including the territories of the State Nature Zapovednik[5] Katunskiy (SNZ Katunskiy) and the Belukha Nature Park (Belukha NP). Two years later at the request of the four Altai countries, the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH conducted a feasibility study for the establishment of the quadrilateral TBR "Altai" including concrete suggestions for the delimitation of the territory (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eco Consulting Group, 2004). However, due to the absence of appropriate legal mechanisms, the implementation of the initiative was delayed for several years. Later, in 2004, the State Nature Biosphere Zapovednik Katunskiy (SNBZ Katunskiy) (Russian Federation) and the Katon-Karagay State National Park (Katon-Karagay SNP) (Republic of Kazakhstan) signed a cooperation agreement on the coordination of the protection of the shared territory, on joint scientific research activities and environmental education.

In September 2011, the **Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai"** was signed by the governments of the Russian Federation and the Republic of Kazakhstan, including the territories of the Katon-Karagay State National Park and the State Nature Biosphere Zapovednik Katunskiy. In September 2012, the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), initiated its support for the establishment of a bilateral transboundary biosphere reserve, which would represent a first step towards a wider regional cooperation. The governments of the Republic of Kazakhstan and the Russian Federation agreed on the international project "**Development of a management plan for the projected transboundary biosphere reserve Altai**". As a first step, a **Joint Commission for the**

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of Barnaul, which he in that time considered to be a tropical element. He was astonished that 'tropical' tigers were coexisting with reindeers and moose. Humboldt did not know of the Siberian tiger - *Panthera tigris altaica (!)* – that later on went extinct in Central Asia.

[5] A *Zapovednik* is a type of protected areas in the legislation of the former SU countries and Mongolia. It is a strictly protected nature reserve (IUCN category 1a) dedicated for conservation and scientific research and monitoring. Any economic activity (except in some cases strictly regulated tourism) is prohibited (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eco Consulting Group, 2004). A *Biosphere Zapovednik* is a Zapovednik which is a certified part of the World network of Biosphere Reserves. Usually the Zapovednik territory functions as the core zone of the UNESCO Biosphere Reserve, while so-called biosphere polygons act as buffer and/or transition zone of the Biosphere Reserve (Williams, et al., 2001).

realization of the Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai" was established for the implementation of the agreement and met first in November 2013.

The establishment of the Great Altay TBR is believed by all partners to be an appropriate mechanism for developing effective strategies within local communities for the sustainable management of natural resources. Through improved sustainable resource management the transboundary cooperation aims to deliver effective biodiversity conservation of the large unique ecosystems spanning the administrative boundaries of the states in this area. During the project period the **Katon-Karagay Biosphere Reserve** was established in July 2014, on the basis of the territory of the Katon-Karagay State National Park. The international project presents the management plan and the nomination application document for the official designation as a UNESCO Transboundary Biosphere Reserve. The submission of the documents to UNESCO is set for September 2015. The establishment of the Great Altay TBR is regarded as a further step towards the envisioned quadrilateral TBR in the Altai region.

The aim of the management plan is to detail the steps to achieve the vision and goals of the Great Altay TBR, and to have one functional (transboundary) biosphere reserve.

1.2. Guiding principles

The management plan follows the principles of contemporary international biodiversity and ecosystem conservation such as the 'Convention on Biological Diversity' including the 'Aichi Biodiversity Targets' as well as general principles for biosphere reserves such as the '**Seville Strategy**', the '**Pamplona Recommendations**' and the '**Madrid Action Plan**'. These are explained shortly in the following paragraphs.

1.2.1 Contemporary conservation principles

Over the last two and half decades the world view on sustainable development has changed measurably for the better, and one of the positive outcomes of the growing awareness has been the establishment and ratification of the **Convention on Biological Diversity** (CBD) in 1992 (CBD Secretariat, n.d., a). In 2010 the CBD's Conference of the Parties revised and updated existing strategies resulting in the formulation of the Strategic Plan for Biodiversity 2011-2020 including the Aichi Biodiversity Targets (CBD Secretariat, n.d., b). This plan and the associated biodiversity targets are based on the rationales that biological diversity substantiate ecosystem functioning and that the provision of ecosystem functioning is essential for human wellbeing (CBD Secretariat, n.d., c).

The **Millennium Ecosystem Assessment** (MEA) was initiated in 2001 with the aim to assess the consequences of ecosystem change for human wellbeing. It was also designed to demonstrate evidence-based action through rigorous scientific application in the evaluation process, all of which is essential for enhancing conservation and sustainable use of ecosystems and their contribution to human wellbeing (Millenium Ecosystem Assessment, 2005). The MEA was the result of the development of a bold global framework built on modern scientific principles of ecological dynamics rather than the previous conventional paradigm of steady state and status quo. This marked an important step in dealing with global problems of climate change, uncertainty, and rapidly shifting socio-environmental conditions. What we now understand to be ecosystem-based management (and in the context of the current project, ecosystem-based conservation management), emphasises the fundamental principle that all ecosystems operate as complex , nested entities in which are embedded human social systems, and all are subject to uncertainty and indeterministic change. Following the MEA, the **Common International Classification of Ecosystem Services** (CICES) is derived from the work on environmental accounting undertaken by the European Environment

Agency (EEA). It was first proposed in 2009 as a way of describing ecosystem services. International standardisation of the description of ecosystem services was needed if ecosystem accounting methods were to be developed and comparisons were to be made. Experts involved with the 'Mapping and assessment of ecosystems and their services' (MAES) as part of the European Union's Biodiversity 2020 Strategy have also contributed to the CICES classification. CICES takes into account spatial relationships between the source of the service and the beneficiaries, and the degree to which users can be excluded or can compete for the service. The classification recognizes ecosystem services as provisioning, regulating and cultural services. Abiotic ecosystem services are not included because they are not dependent on living processes (European Environment Agency, 2015).

These approaches of connecting ecosystems and their services with human wellbeing are essential bases for the management plan (detailed information is provided in the following chapters).

1.2.2 General principles of biosphere reserves

In 1974**,** the concept of BRs was originated by a task force of United Nations Educational, Scientific and Cultural Organization's (UNESCO) Man and the Biosphere Programme (MAB) resulting in the launch of the World Network of Biosphere Reserves in 1976.

In 1984**,** an 'Action Plan for Biosphere Reserves' was endorsed by the UNESCO General Conference and by the Governing Council of United Nations Environment Programme (UNEP). In the following period the context of BRs changed significantly towards promoting an integrated approach regarding the conservation of biological diversity, sustainable use of its components and fair sharing of benefits coming from the utilisation of the resources. In order to evaluate the experience regarding the implementation of the Action Plan**,** an International Conference on Biosphere Reserves was organised in 1995 in Seville, Spain. This resulted in the development of the '**Seville Strategy**', which contains recommendations of components for BR management and the Statutory Framework of the World Network of Biosphere Reserves (WNBR) (UNESCO, 1996).

Five years later, in the year 2000, the '**Seville+5**' meeting was held in Pamplona, Spain. At this event special recommendations for TBRs were established, the so-called '**Pamplona Recommendations**' or '**Seville+5 Strategy**', which built up on the Seville Strategy. It now provides a general framework for action in transboundary conservation planning that ensures there is compliance with the MAB principles, particularly the goals of the Seville Strategy.

In addition, the '**Madrid Action Plan**', agreed upon in the year 2008, builds upon the Seville Strategy in which targets and actions on international, national and local level are set to establish BRs and TBRs successfully (UNESCO, 2008). The management plan for the Great Altay TBR follows these principles, particularly the Pamplona Recommendations. Table 1 provides an overview of these recommendations.

Table 1: Overview of the Pamplona Recommendations

Scope	Procedure for establishment of TBR	Functioning of TBR	Institutional Mechanisms	Responding to the Goals of the Seville Strategy
Goals	**One functional biosphere reserve**	**Effectively functioning TBR**	**Joint structure for coordination**	**I: Use BR to conserve natural and cultural diversity** **II: Utilise BR as models of land management and of approaches to sustainable development** **III: Use BR for research, monitoring, education and training**
Measure	• establishment of a BR on each side of border • identification of	• preparation, adoption and publication of zonation plan/	• representative coordinating structure • existence of a	**Goal I :** • coordination of regulatory protection and harmonisation measures • common or coordinated policies for

Scope	Procedure for establishment of TBR	Functioning of TBR	Institutional Mechanisms	Responding to the Goals of the Seville Strategy
Goals	**One functional biosphere reserve**	**Effectively functioning TBR**	**Joint structure for coordination**	**I: Use BR to conserve natural and cultural diversity** **II: Utilise BR as models of land management and of approaches to sustainable development** **III: Use BR for research, monitoring, education and training**
	local and national partners and establishment of working group to define basis and identify key issues for co-operation • official agreement between governmental authorities • nomination of various parts by respective State authorities • indication of main components of a plan for future co-operation • official designation by ICC MAB of UNESCO	map • implementation of zonation based on a common understanding of characteristics of zones • definition of common objectives and measures, work plan (considering elements of Seville Strategy), time table, and required budget • identification of and joint/ simultaneous application for potential funding sources • establishment of communication means • efforts towards harmonised management structures	permanent secretariat • focal point on each side for cooperation • general and regular meetings of coordinating structure and thematic groups for creating a discussion platform among stakeholders • joint staff teams for specific tasks • set up of association in order to promote TBR	threatened and protected species and ecosystems, and for degraded areas rehabilitation and restoration • coordinated action against illegal activities **Goal II:** • coordination of management practices (e.g. forestry, logging, etc.) • identification of possible perverse incentive and promotion of viable sustainable alternatives • elaboration and supporting of implementation of a joint tourism policy • promotion of partnership among various groups of stakeholders having the same interests, of participation of local communities, and of joint cultural events • developing of common strategies for planning based on research and monitoring **Goal III:** • joint activities on research and monitoring should be led by scientific boards and planned in joint sessions • joint activities in field of education and training • activities regarding information distribution and public awareness rising

Designating BRs and TBRs**,** supports countries to implement the results of the World Summit on Sustainable Development and in particular, the Convention on Biological Diversity and its Ecosystem Approach and to act as learning sites for the UN Decade on Education for Sustainable Development (UNESCO, 2015a).

1.3. Methodology and planning process

1.3.1 MARISCO methodology

The preparation work for Great Altay TBR is structured according to an ecosystem-based, adaptive and participatory management approach. The specific method applied during the process was a technique known as MARISCO, which was developed by the Centre of Econics and Ecosystem Management (founded by Eberswalde University for Sustainable Development, Germany and Writtle College, Great Britain) at the Eberswalde University for Sustainable Development. It is based on the

Open Standards for the Practice of Conservation, which was developed by the Conservation Measures Partnership (CMP).

The Open Standards is as set of standards and a framework for systematically planning for adaptive nature conservation. Apart from focussing on an ecosystem-based approach, MARISCO places greater emphasis on system dynamics and change, with a strong focus on the effects and problems relating to climate change. This includes additional working steps and activities, such as a spatial analysis, ecosystem diagnostics analysis and a detailed assessment of stresses perceived in the ecosystem. The methodology also includes scenario planning and vulnerability assessments in adaptive conservation management (Ibisch & Hobson, 2014). It allows several institutions from several levels of administration and civil society to gain an understanding for the systemic character of the ecosystems they live in and they make use of.

Box 3: MARISCO methodology

MARISCO is an acronym which stands for adaptive Management of vulnerability and RISk at COnservation sites. For detailed information about the whole methodology see "MARISCO: adaptive Management of vulnerability and RISk at COnservation sites, A guidebook for risk-robust, adaptive and ecosystem-based conservation of biodiversity", available at: www.marisco.training

The systematic 'step-by-step' procedure is transparent, strongly participatory and unconstrained by any lack of scientific or evidence-based knowledge (use of non-knowledge) and thus is open to all audiences with their diverse valuable information to offer. MARISCO is based on conservation objects and a systemic analysis of all factors and threats that generate stress in ecosystems. It also adopts the philosophy of adaptive management, following the principle that conservation management cannot be certain about relevant issues and the effectiveness of strategies and that management should represent planning, action and lifelong learning (Ibisch & Hobson, 2014).

As illustrated in Figure 2, the **MARISCO cycle** includes four major phases of management, which are again subdivided into 29 methodological steps:

- **I - Preparation and initial conceptualisation,**
- **II - Systematic vulnerability and risk analysis,**
- **III - Comprehensive evaluation, prioritisation and strategy formulation,**
- **IV - Implementation and (non-) knowledge management.**

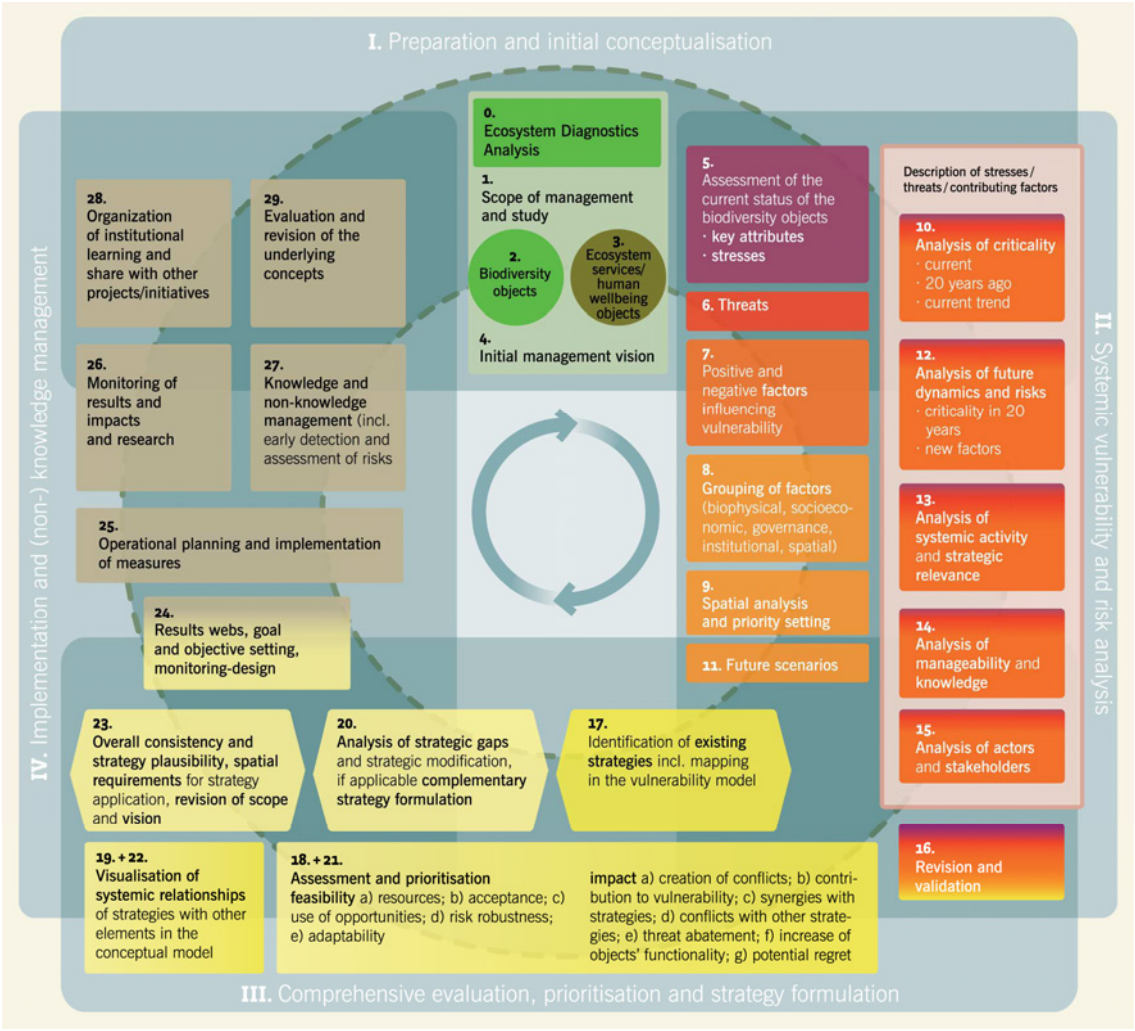


Figure 2: MARISCO cycle diagram depicting important methodological steps
Source: (Ibisch & Hobson, 2014)

The applied MARISCO methodology enables ongoing adaptation of strategies in a participatory process to reduce risks and vulnerabilities of the site and also takes in to account the need to build resilience in to local communities (Ibisch & Hobson, 2014). MARISCO also takes into consideration human wellbeing and ecosystem services as derived benefits from the larger ecosystem, as well as provide a visual representation of the various vulnerabilities of the system, thus making it possible to identify convenient entry points for proposed strategies.

1.3.2 Planning process and stakeholder participation

In September 2012, the management planning process was started by the formation of a core planning team, consisting of staff members of the protected area administrations of Katon-Karagay State National Park (Republic of Kazakhstan), the State Nature Biosphere Zapovednik Katunskiy and the Belukha Nature Park (Russian Federation). The administrations of Katon-Karagay State National Park and State Nature Biosphere Zapovednik Katunskiy also served as main contact and coordination institutions for the Katon-Karagay BR and the Katunskiy BR throughout the whole strategy development process.

The planning team was guided and supported by a consortium of international nature conservation experts from the Centre of Econics and Ecosystem Management and invited partners (World Wildlife Fund WWF Russia and Netherlands, BTE Consultancy for Tourism and Regional Development, HHP-Hage+Hoppenstedt Partner (Consultancy for Territorial and Environmental Development) as well as

by Dr. Thomas Schaaf, the former secretary of the UNESCO MAB-programme. A list of all workshops and meetings that were held during the planning process can be found in Annex 1.

The input to the management plan was delivered through a participatory process involving various stakeholders. Two MARISCO workshops were run with the participation of staff from the core planning team alongside a number of local stakeholder workshops involving local and regional authorities, non-governmental organizations (NGOs), scientists and land users. Comprehensive telephone and internet conferences with the protected area managers helped to complete the situation analysis and the strategy development. Additional information about the current ecological, socio-economic and legal-institutional situation in the TBR region was received through six thematic reports, produced by national experts from the Russian Federation and the Republic of Kazakhstan.

Key elements of the participatory planning process were a joint study tour to biosphere reserves in Germany (Schaalsee BR, Rhön BR, Schorfheide-Chorin BR) in April 2013 and three thematic workshops conducted in November 2012 in Manzherok (Republic of Altai/Russian Federation), in April 2013 in Eberswalde (Germany) and in February 2014 in Ust-Kamenogorsk (East Kazakhstan Province/Republic of Kazakhstan) following the steps of the MARISCO methodology. Additionally, two meetings of the Joint Commission for the realization of the Intergovernmental Agreement on the Establishment of the Transboundary Reserve “Altai” were contributing to the participatory process of planning.

I. Preparation and initial conceptualisation & II. Systematic vulnerability and risk analysis

The **Kick-off and initial “MARISCO-Workshop” (November 2012)** focused on phase I and II of the MARISCO cycle. The geographical scope of management and study was discussed; several conservation objectives were selected; and an initial management vision was jointly elaborated. In order to establish a sound state of knowledge and joint understanding of the status quo for the conservation objectives, a complex situation analysis was carried out, moderated by the German project partners. In this session, existing and potential stresses, threats and contributing factors were identified. Thereafter, all these elements were assessed according to states of criticality, dynamics, and level of knowledge and manageability.

Photo 4: Kick-off meeting in Gorno-Altaisk (left)
Photo 5: Initial MARISCO-Workshop in Manzherok (right)
Photographer: Pierre L. Ibisch

As part of the ecosystem diagnostics analysis all results were recorded in a **conceptual model** (Figure 3 and Annex 2), revealing the relationships and cause-effect dynamics of the ecological situation of the TBR. The final conceptual model forms the basis of chapter 2. All conservation objects, stresses, threats and contributing factors, complete with rating values for vulnerability and risks are outlined in the various steps of the method.

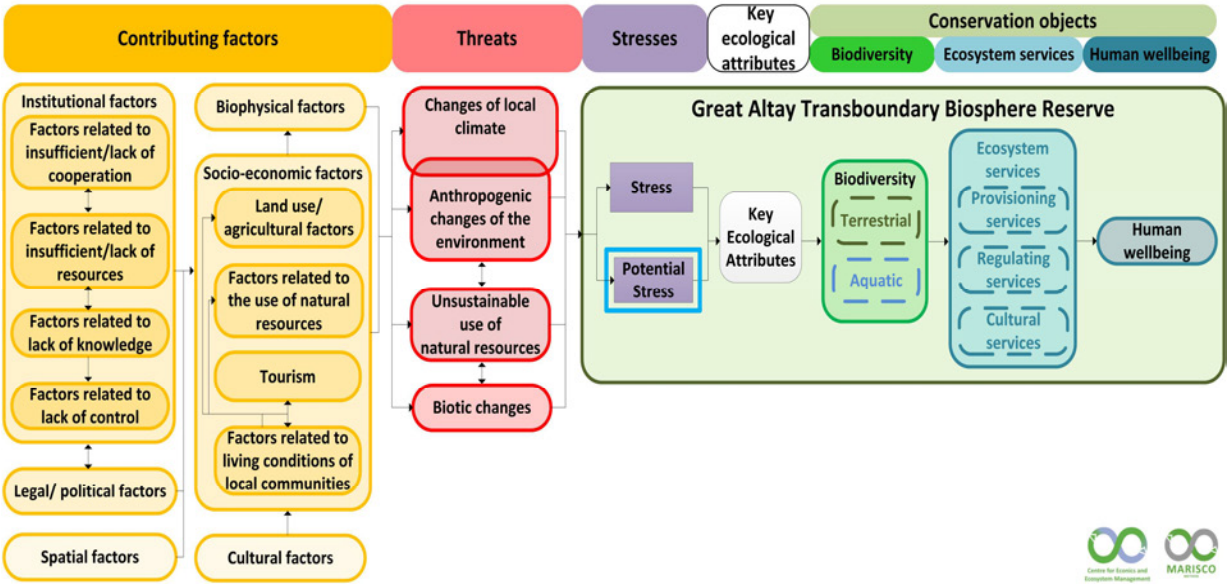


Figure 3: Simplified conceptual model of the Great Altay TBR

III. Comprehensive evaluation, prioritisation and strategy formulation

Following the MARISCO cycle, the **"Strategy-Workshop" (February 2014)** was held to analysis existing (national and transboundary) strategies and to systematically develop new strategies. All existing and new strategies were mapped into the conceptual model to make clear the specific factors, threats and stresses targeted in the analysis, and to identify any gaps in current management practises. Special attention was given to strategies which have a transboundary dimension and relevance for the present TBR management plan. As a result, a package of ten interlinked **transboundary strategies** was formulated. For each of these a result chain was drawn, which illustrates the desired effect and impact. Using this particular approach proved to be very effective during operational planning and management.

Photo 6: Strategy-Workshop in Ust-Kamenogorsk
Photo 7: Stakeholder-Workshop in Ust-Kamenogorsk
Photographer: Pierre L. Ibisch (left) and Anja Krause (right)

The ten interlinked strategies were also discussed during a series of local stakeholder workshops in the Kazakhstani and Russian part of the Great Altai TBR in autumn 2014. The name 'Great Altay TBR' was confirmed during the 2nd meeting of the Joint Commission for the realization of the Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai" in November 2014 (Smeshannaya Komissiya po realizatsii mezhpravitelstvennovo soglasheniya o sozdanii transgranichnovo reservata "Altai", 2014).

IV. Implementation and (non-) knowledge management

After the stakeholder workshops**,** the strategy results webs, their goals and objectives as well as operational planning and a detailed risk assessment were formulated, refined and discussed in an on-going participatory process amongst the project partners. At the same time**,** the information was incorporated into the management plan and the nomination dossier produced for the designation of the Great Altay TBR.

To allow participation and contribution of further stakeholders**,** interim results of the planning process were repeatedly presented, discussed and revised with the MAB Committees of the Republic of Kazakhstan and Russian Federation, national, regional and local State authorities, Non-governmental organizations, scientist from universities and local land-users on various occasions. The information generated included events like the 1st official project event in November 2012 in Gorno-Altaisk (Russian Federation), the 1st and 2nd meeting of the Joint Commission for the realization of the Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai" in November 2013 in Manzherok (Russian Federation) and in November 2014 in Ust-Kamenogorsk (Republic of Kazakhstan).

The results of the above described planning process formed the basis for the conservation design and strategy formulation of the present Great Altai TBR management plan. They are described in detail in chapter 3.

1.4. General geographical scope

The Great Altay TBR is situated in the centre of Eurasia in the South Siberian region and encompasses parts of the remote Altai Mountains (see Figure 1). In the Republic of Kazakhstan it is located in the East Kazakhstan province and stretches over large parts of the **Katon-Karagay district** and reaches into **Zyryan district** and **Kurchum district**. In the Russian Federation the Great Altay TBR stretches over the southern part of the **Altai Republic,** particularly the southern part of **Ust-Koksa district**.

Figure 4 on the following page provides an overview of the Great Altay TBR with a subsequent map of existing biosphere reserves within the geographical scope of the TBR (Figure 5).

The Great Altay TBR covers an entire area of 1,543,807 ha (15,438 km²), whereby 956,890 ha (9,569 km²) are located in the East Kazakhstan province (Republic of Kazakhstan) and 586,920 ha (5,869 km²) in the Altai Republic (Russian Federation)[6].

The length of the shared boundary between the Republic of Kazakhstan and the Russian Federation inside of the Great Altay TBR constitutes to 135 km.

[6] Area values have been calculated by the GIS expert of Eberswalde University on basis of the final TBR maps that were agreed upon by all partners in May 2015.

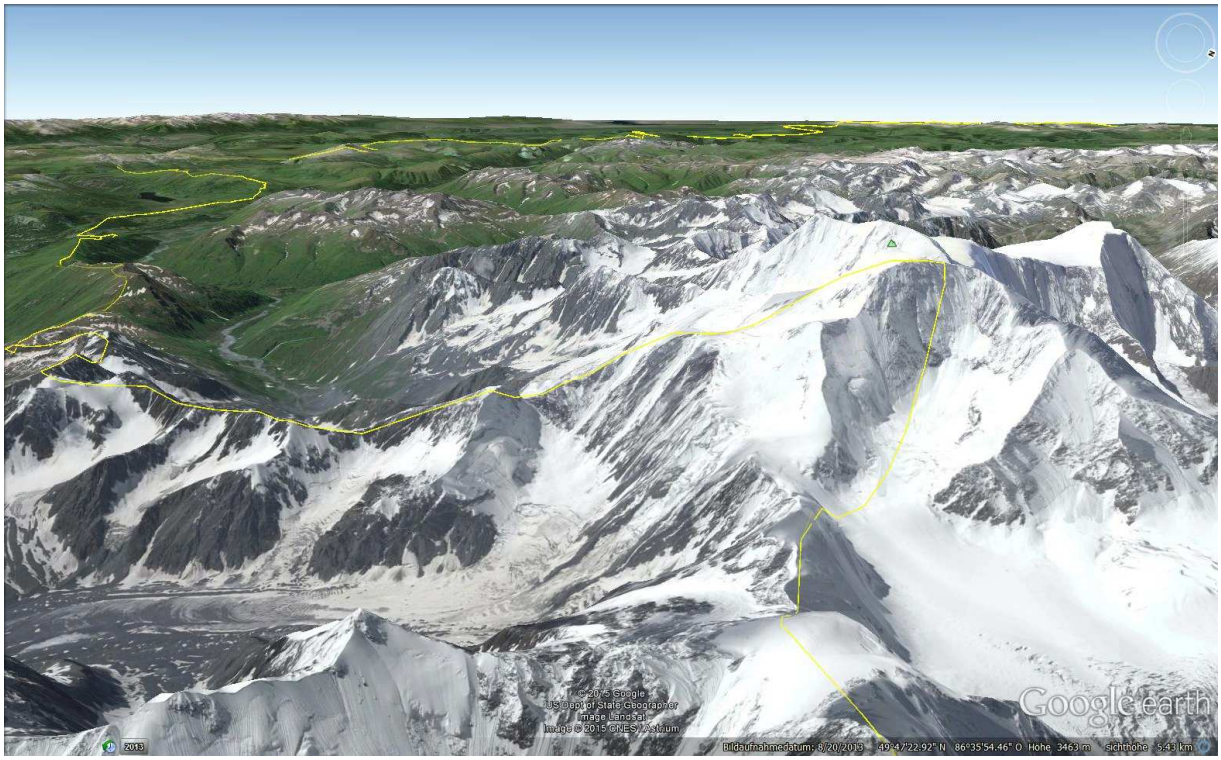


Photo 8: Course of the border line between the Kazakhstani and Russian part of the TBR and view onto Mount Belukha
Google Earth image

The following table lists down the Great Altay TBR coordinates:

Table 2: Coordinates of the Great Altay TBR

Cardinal points	Latitude		Longitude	
Most central point	49.522697	N49° 31' 21.709"	89.023295	E89° 1' 23.862"
Northernmost point	50.283519	N49° 31' 21.709"	85.614221	E89° 1' 23.862"
Southernmost point	48.887354	N48° 53' 14.474"	86.181452	E86° 10' 53.227"
Westernmost point	49.598421	N49° 35' 54.316"	84.878933	E84° 52' 44.159"
Easternmost point	49.232743	N49° 13' 57.875"	87.31247	E87° 18' 44.892"

Coordinate system: Asia North Albers Equal Area Conic; projection: Albers; datum: Pulkovo 1942

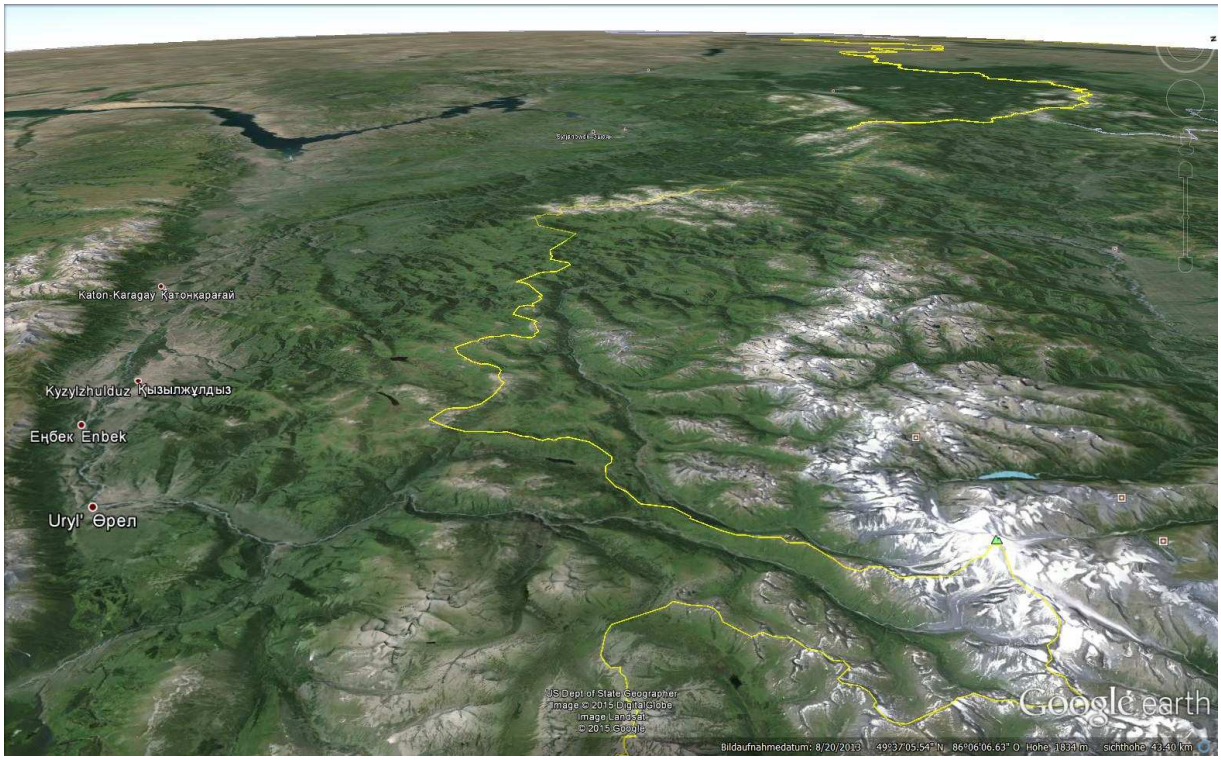


Photo 9: View on the Great Altay TBR with Belukha Mountain from East to West
Google Earth image

1.5. Existing conservation areas

The TBR builds on the two existing national biosphere reserves: Katunskiy BR and Katon-Karagay BR (see Figure 5). It encompasses several globally important conservation areas (Table 3, Table 4 and Figure 4).

The administrative institutions, which are in charge of the conservation sites, are described in the stakeholder analysis in chapter 2.5, and in the description of current management plans and practices in chapter 2.6. The relationship and connectivity of the Great Altay TBR with surrounding protected areas is described in more detail in chapter 2.7.

The territory of the Great Altay TBR includes a great variety of environmental conditions and ecological processes and supports a great variety of habitats and species. As part of the Altai-Sayan-Ecoregion, it belongs to one of the Global 200 Ecoregions (Olson & Dinerstein, 2002), a global ranking list of the World's most biologically outstanding terrestrial, freshwater and marine habitats. Figure 7 shows the spatial distribution of the identified ecosystem types of the Great Altay TBR and its surrounding.

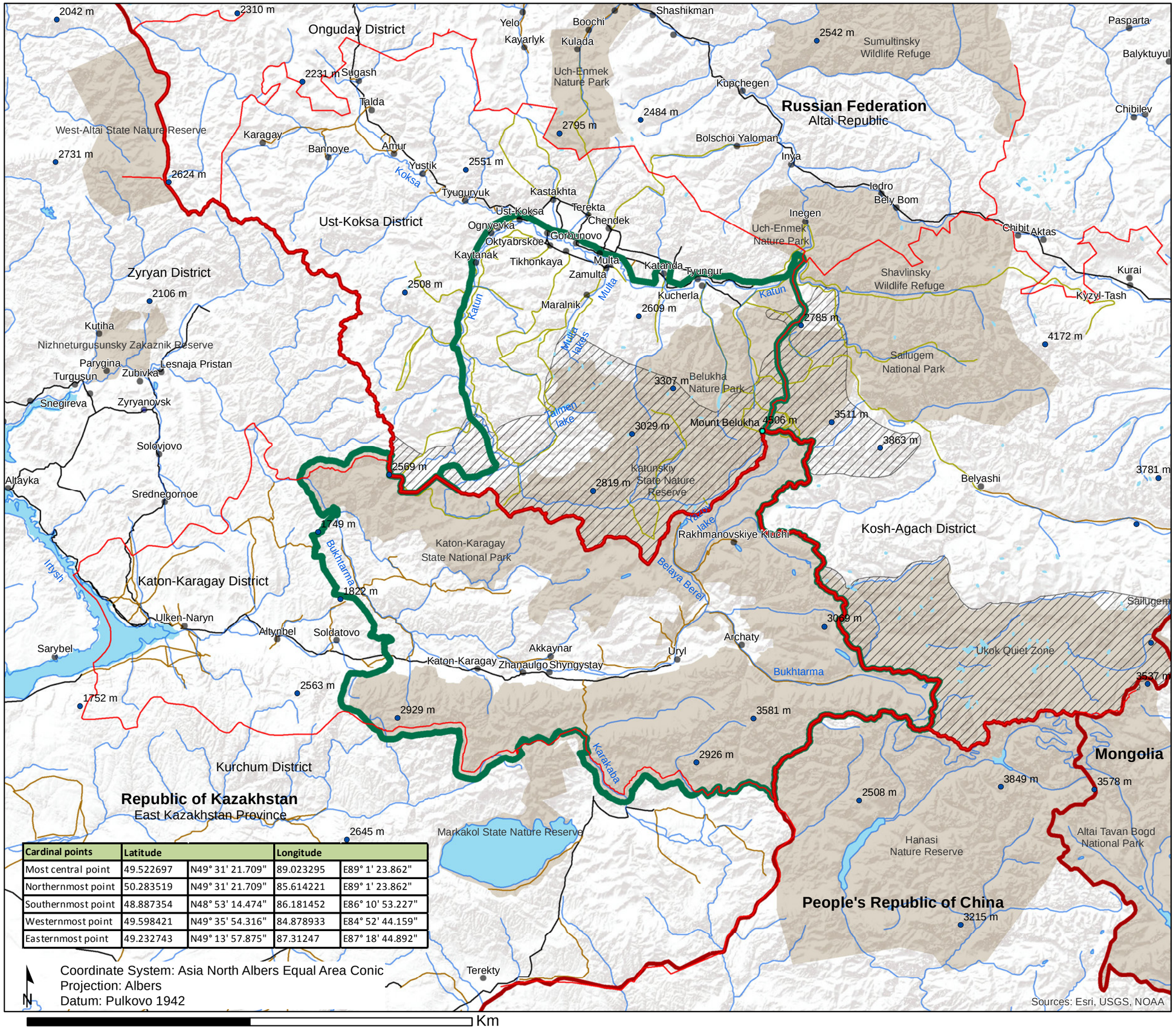
The first map on the page after shows the borders of the Great Altay TBR and the existing protected areas in and around the TBR.

Figure 4: Borders of the Great Altay TBR and the existing protected areas in and around the TBR

The second map on the following page shows the borders and the zonation scheme of the Katunskiy and the Katon-Karagay biosphere reserves.

Figure 5: Borders and zonation scheme of the Katunskiy and the Katon-Karagay BR

Great Altay Transboundary Biosphere Reserve - geographical scope and existing protected areas



Cardinal points	Latitude		Longitude	
Most central point	49.522697	N49° 31' 21.709"	89.023295	E89° 1' 23.862"
Northernmost point	50.283519	N49° 31' 21.709"	85.614221	E89° 1' 23.862"
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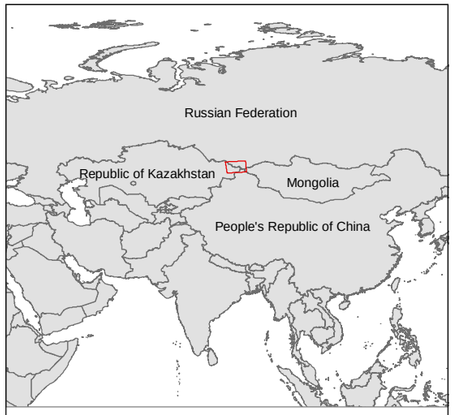
Coordinate System: Asia North Albers Equal Area Conic
Projection: Albers
Datum: Pulkovo 1942

0 30 60 120 Km

Sources: Esri, USGS, NOAA



- Peaks
- Settlements
- Rivers
- Paved road
- Unpaved road
- Trails
- District borders
- Country border
- Great Altay Transboundary Biosphere Reserve
- Golden Mountains of Altai WHS
- Protected areas
- Lakes

Source:
Data from OpenStreetMap, ODbL1.0, www.openstreetmap.org; WWF 2011; Natural Earth Data, www.naturalearthdata.com; ESRI; Administrations of Katunskiy BR + Katon-Karagay BR;
Map created by Monika Hoffmann and Julia Sauermann (CEEM/HNEE)
06/2015

DISCLAIMER: All boundaries shown (state, regional, protected area administrative boundaries) and the designations used do not imply official endorsement or validity. The map authors take no responsibility for the accuracy or correctness of the shown contents.

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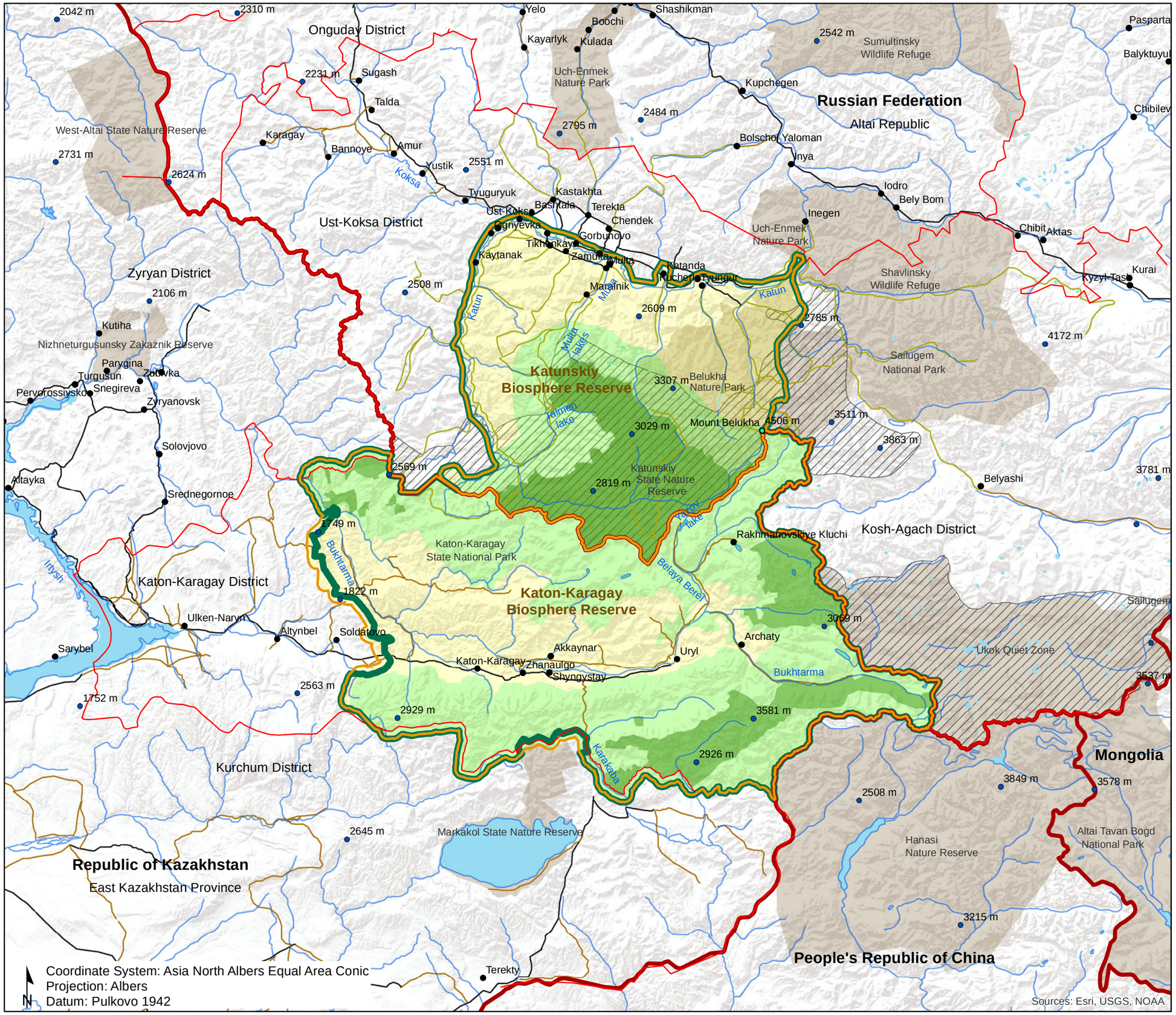
Centre for Econics and Ecosystem Management

Great Altay Transboundary Biosphere Reserve - existing biosphere reserves



- Settlements
- Peaks
- Existing National Biosphere Reserves
- District borders
- Country border
- Great Altay Transboundary Biosphere Reserve
- Rivers
- Trails
- Paved road
- Unpaved road
- Core zone
- Buffer zone
- Transition zone
- Lakes
- Golden Mountains of Altai WHS
- Protected areas

Source:
Data from OpenStreetMap, ODbL1.0, www.openstreetmap.org; WWF 2011; Natural Earth Data, www.naturalearthdata.com; ESRI; Administrations of Katunskiy BR + Katon-Karagay BR;
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Table 3: Existing conservation areas within the geographical scope in the Republic of Kazakhstan

Conservation area and status	Conservation recognition	Geographical location	Zonation	Size [ha]	Total size [ha]	Location inside the Great Altay TBR	Geographical overlap with the Great Altay TBR
Katon-Karagay State National Park	National	• within Republic of Kazakhstan • situated in upper part of Bukhtarma, Belaya Berel and Chyornaya Berel rivers • includes the Southern slope of Listvyaga ridge as well as the ridges of Bukhtarma river's left bank – Sarymsakty, Altayskiy Tarbagatay, Yuzhny Altay (South Altai)	Protected Zone	126,943	643,477 (6,435 km²)	Core zones & parts of buffer zone	Complete overlay
			Ecological Stabilization Zone	131,852		Buffer zone	Complete overlay
			Tourism and Recreational Zone	75,239		Buffer zone	Complete overlay
			Zone for Restricted Economic Activity	30,944		Buffer zone	Complete overlay
			Buffer Zone (2-3 km width)	46,774		Buffer zone	Complete overlay
Katon-Karagay Biosphere Reserve	International	• within Republic of Kazakhstan • situated in upper part of Bukhtarma, Belaya Berel and Chyornaya Berel rivers • includes the Southern slope of Listvyaga ridge as well as the ridges of Bukhtarma river's left bank – Sarymsakty, Altayskiy Tarbagatay, Yuzhny Altay (South Altai)	Core zones	126,432*	973,500 *	Core zones & parts of buffer zone	Complete overlay
			Buffer zone	564,768*		Buffer zone	Complete overlay
			Transition zones	282,300*		Transition zone	Complete overlay
Altay-Sayan Ecoregion	not applicable (no official status)	• territory encompasses areas of: Russian Federation (62% including Katunskiy Biosphere reserve), Mongolia (29%), Republic of Kazakhstan (5% including Katon-Karagay Biosphere reserve), People's Republic of China (4%)			106,500,000 (1,065,000 km²)		Complete overlay (TBR is much smaller in size)

* The area sizes have been provided by the MAB-Committee of the Republic of Kazakhstan on 18 February 2015.

Table 4: Existing conservation areas within the geographical scope in the Russian Federation

Conservation area and status	Conservation recognition	Geographical location	Zonation	Size [ha]	Total size [ha]	Location inside the Great Altay TBR	Geographical overlap with the Great Altay TBR
State Nature Biosphere Zapovednik Katunskiy	National	• within Russian Federation close to border of Republic of Kazakhstan • includes southern slopes of Katun Range and the northern slopes of Listvyaga Range	Core zone of Katunskiy BR	151,637	151,637	Core zone in the Russian part	Complete overlay
Katunskiy Biosphere Reserve	International	• within Russian Federation, close to borders of Republic of Kazakhstan and People's Republic of China • includes elevated Altai Mountains: Katun Ridge and northern slopes of Listvyaga Ridge	Core zones	151,637	586,922* (5,869 km²)*	Core zone	Complete overlay
			Buffer zone	144,630*		Buffer zone	Complete overlay
			Transition zones	290,655*		Transition zone	Complete overlay
Belukha Nature Park	National	• within Russian Federation on territory of Altai Republic • southern slope of Belukha mountain is situated in Republic of Kazakhstan (within Katon-Karagayskiy State National Park)		132,455**	132,455** (1324,55 km²)**	Parts of buffer and transition zone	Complete overlay
Golden Mountains of Altai World Heritage Site	International	• Southern Siberia of Russian Federation on territory of Altai Republic • State Nature Biosphere Zapovednik Altaiskiy on the Chulyshman Upland and Lake Teletskoe with its buffer zone • State Nature Biosphere Zapovednik Katunskiy and its buffer zone around Mt. Belukha • Ukok Quiet Zone on the Ukok Plateau	State Nature Biosphere Zapovednik Altaiskiy	1,047,340	1,732950 (17,329.50 km²)	Core zone and parts of buffer and transition zone	Partial overlay
			State Nature Biosphere Zapovednik Katunskiy & its buffer zone around Mt. Belukha	414,785			
			Ukok Quiet Zone	270,825			
Altay-Sayan Ecoregion	Not applicable (no official status)	• Territory encompasses areas of: Russian Federation (62% including Katunskiy BR), Mongolia (29%), Republic of Kazakhstan (5% including Katon-Karagay Biosphere reserve), People's Republic of China (4%)			106,500,000 (1,065,000 km²)		Complete overlay (TBR is much smaller in size)

* The Data have been calculated by the GIS expert of Eberswalde University on basis of the final TBR maps that were agreed upon by all partners in May 2015.
** The Data have been derived from (Altaye-Sayanskoe gornoye partnerstvo, 2014).

2. Systemic situation analysis[7]

2.1 Conservation objects

The following ecosystems and species groups, together with the human well-being objects they support (see below), were identified as biodiversity objects of the Great Altay TBR:

Ecosystems:

- Alpine and subalpine meadows
- Forests
- Forest-steppes and Steppes
- Aquatic ecosystems
- Glacial and nival ecosystems
- Tundra

Species:

- Game species
- Rare/endangered, endemic and relict species

Box 4: Conservation objects

Conservation objects are those elements of nature that are functionally important in maintaining the integrity of an ecosystem and that provide benefits in terms of goods and services for people. As there are many interrelations and interdependencies between ecosystems and human communities, the conservation objects are divided into biodiversity objects and (biodiversity-based) human wellbeing objects**. Biodiversity objects** are functional landscape ecosystems that embed small-scale ecosystems or populations/species. Human wellbeing arises from adequate access to the basic materials for a good life needed to sustain freedom of choice and action, health, good social relations and security (Haines-Young & Potschin, 2013). Some of the mentioned components of human wellbeing are derived from ecosystems through ecosystem services. These components are referred to as **human wellbeing (conservation) objects**. **Ecosystem services** are outputs of the ecosystems that most directly affect human wellbeing (Haines-Young & Potschin, 2013). Following the Common International Classification of Ecosystem Services (CICES) ecosystem services can be categorized into provisioning services, regulation and maintenance and cultural services (Haines-Young & Potschin, 2013). It is important to emphasize that the degradation of ecosystems and their functionality leads to a loss of ecosystem services that might make it difficult for people to satisfy their basic needs and might force them to exploit natural resources even increasingly, leading to a a fatal vicious cycle (Ibisch & Hobson, 2014). On the other way around, protection of ecosystem functionality ensures the maintenance of valuable ecosystem services and, thus, contributes to the maintenance or even improvement of human wellbeing.

The territory of the Great Altay TBR includes a great variety of environmental conditions and ecological processes and, thus, a great variety of habitats and species. As part of the Altai-Sayan-Ecoregion it belongs to one of the Global 200 Ecoregions (Olson & Dinerstein, 2002), a global ranking list of the World's most biologically outstanding terrestrial, freshwater and marine habitats. Figure 7 shows the spatial distribution of the identified ecosystem types of the Great Altay TBR and its surrounding.

The following page depicts the physical shape of the Great Altay TBR and its surrounding.

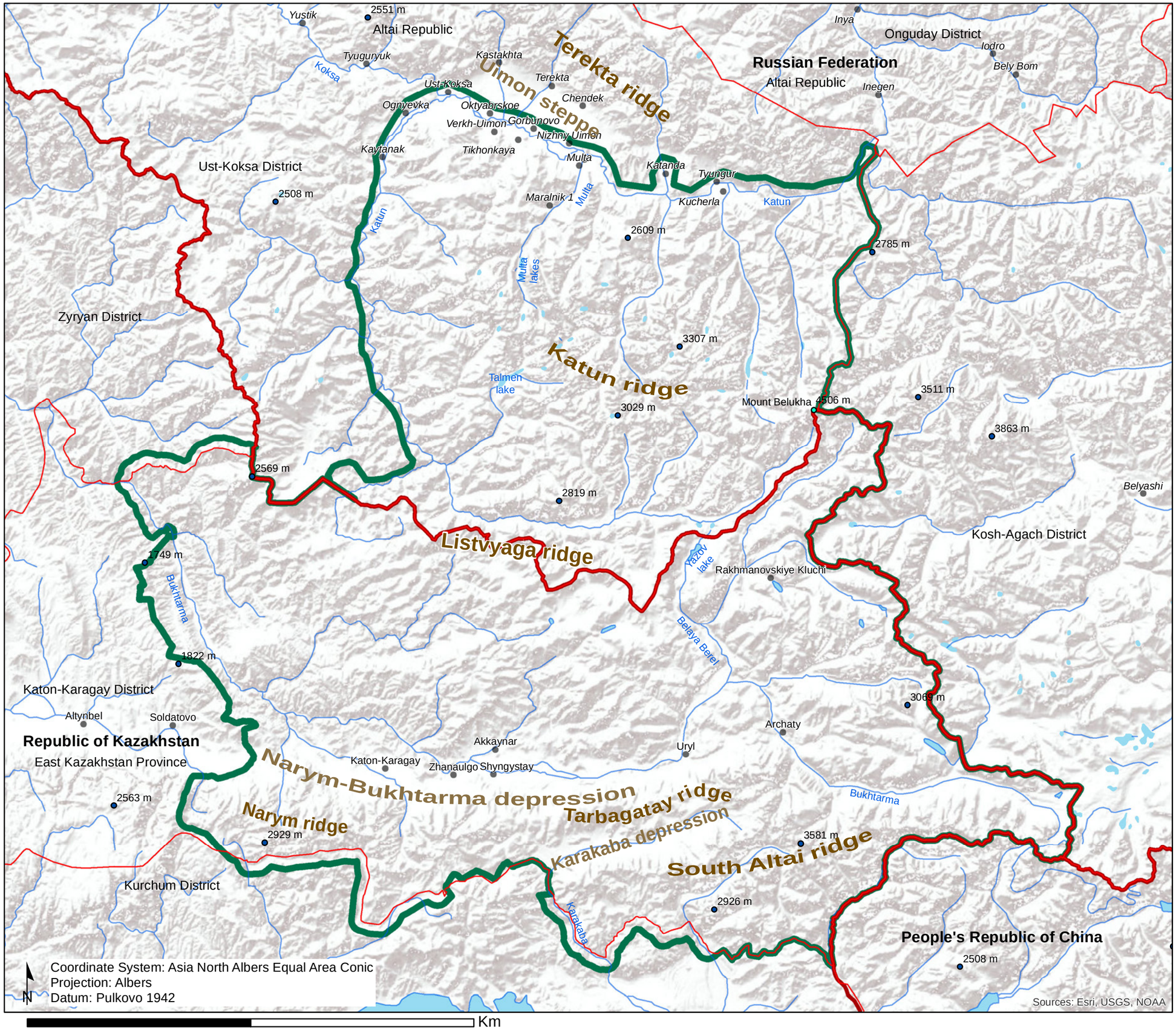
Figure 6: Physical map of the Great Altay TBR and its surrounding

The page after depicts the ecosystem types of the Great Altay TBR and its surrounding.

Figure 7: Distribution of ecosystem types of the Great Altay TBR and its surrounding

[7] The authors of this section are Anja Wünsch, Judith Kloiber, Anja Krause, Ulrike Gollmick, Raushan Krykbaeva, Alija Gabdullina, Tatjana Yashina & Pierre L. Ibisch

Great Altay Transboundary Biosphere Reserve - physical map



- Peaks
- Settlements
- Rivers
- District borders
- Country border
- Great Altay Transboundary Biosphere Reserve
- Lakes

Source:
Data from OpenStreetMap, ODbL1.0, www.openstreetmap.org; WWF 2011; Natural Earth Data, www.naturalearthdata.com; ESRI; Administrations of Katunskiy BR + Katon-Karagay BR;
Map created by Monika Hoffmann and Julia Sauermann (CEEM/HNEE)
06/2015

DISCLAIMER: All boundaries shown (state, regional, protected area administrative boundaries) and the designations used do not imply official endorsement or validity. The map authors take no responsibility for the accuracy or correctness of the shown contents.

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University of Applied Sciences

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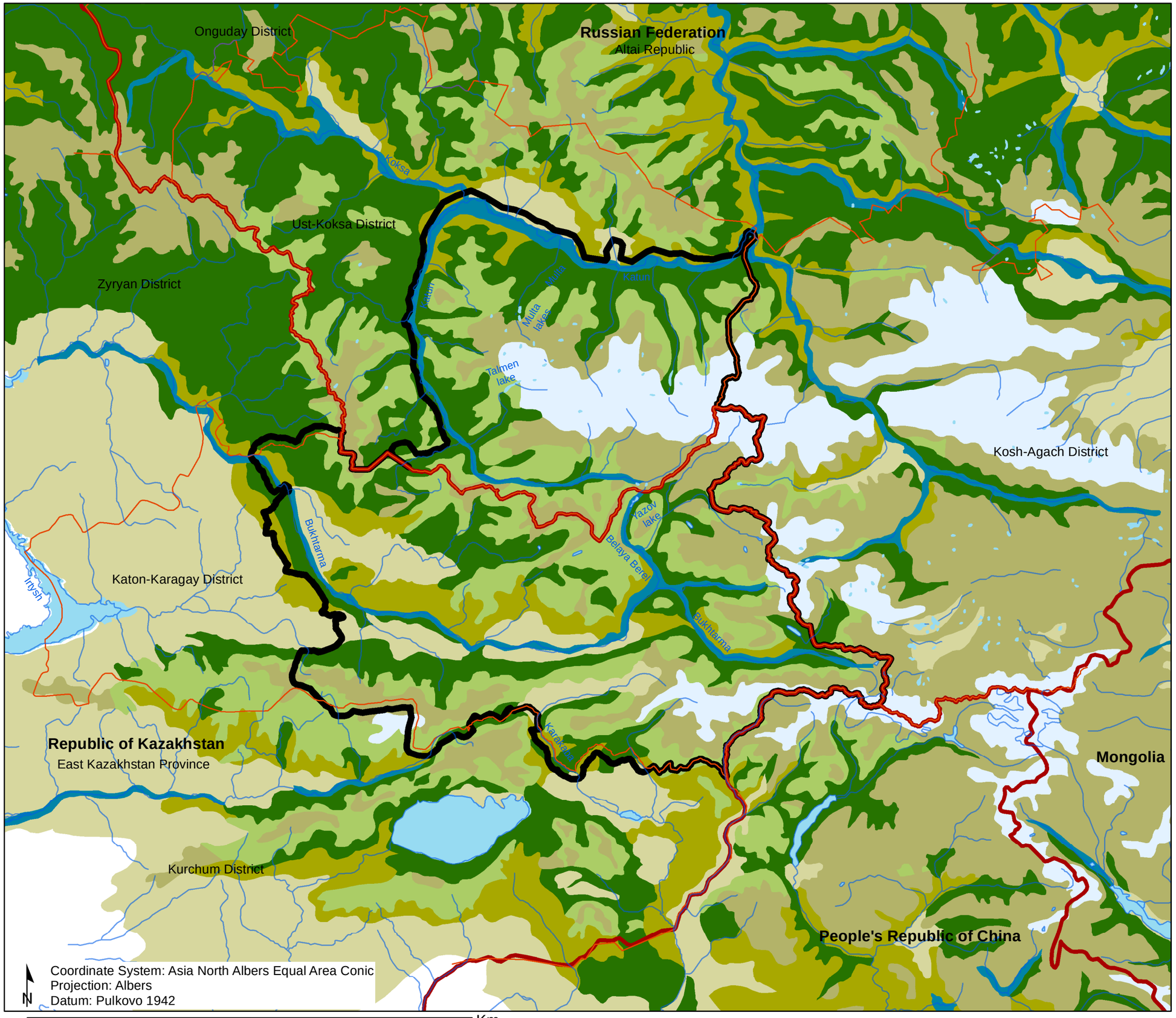
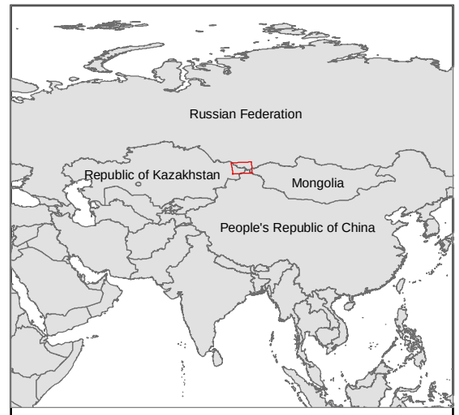
Great Altay Transboundary Biosphere Reserve - ecosystem types





Rivers

District borders

Country border

Great Altay Transboundary Biosphere Reserve

Ecosystem types

- Alpine and subalpine meadow
- Floodplains
- Forest
- Forest - steppe
- Glacial - nival
- Lakes
- Steppe
- Tundra

Source:
Dataedited and compiled by University Gorno Altaisk 2013; WWF 2011; OpenStreetMap, ODbL1.0, www.openstreetmap.org; Natural Earth Data, www.naturalearthdata.com; ESRI;
Map created by Monika Hoffmann and Julia Sauermann (CEEM/HNEE)
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Although the identified ecosystems encompass the most important ecological features (including habitats and species as nested objects) of the Great Altay TBR, it was decided to also add two groups of species as biodiversity objects since they traditionally receive special attention in the activities of the protected areas.

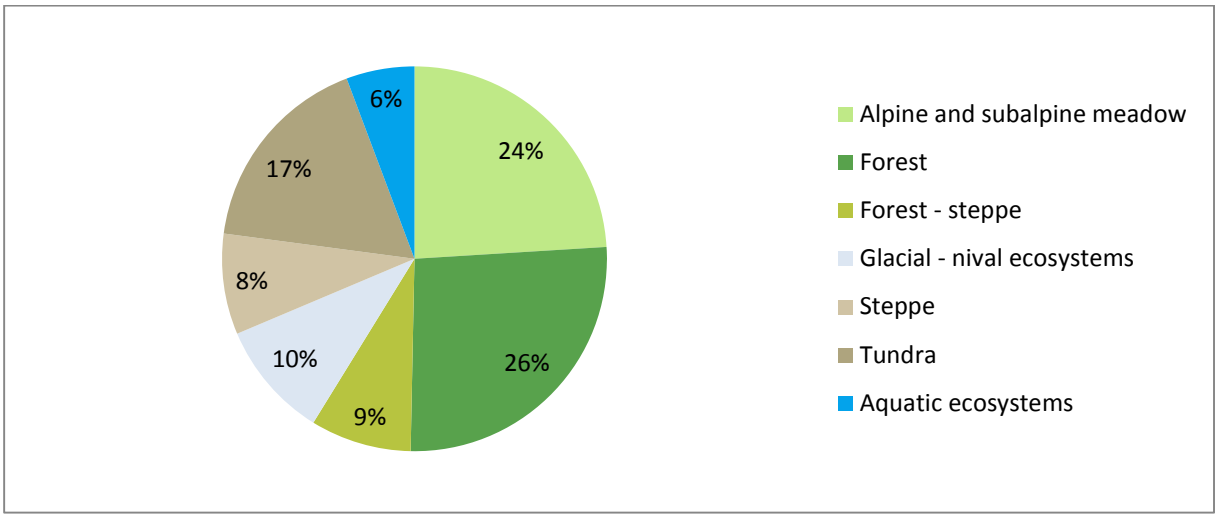


Figure 8: Percentages of the ecosystem types of the Great Altay TBR

In the following paragraphs short descriptions of the identified biodiversity objects are given.

2.1.1 Biodiversity objects

Alpine and subalpine meadows

Alpine and subalpine meadows spread over a relatively large part of the Great Altay TBR, encompassing about 24% of the TBR territory (Figure 8). Alpine meadows can be found in an altitude between 2,000 m and 2,500 m (RGU Katon-Karagayskiy gosudarstvenny natsionalny prirodny park, 2009), where temperatures are very low and snow covers the ground for long periods of the year. Tundra develops in alpine regions where the snow layer remains sparse and soil freezes quickly once the first snow falls. Subalpine meadows spread between 1,800-2,000 m in depressions and stream valleys where large amounts of snow accumulate and snow-free periods are very short. About 100 - 120 vascular plant species occur in the mountain-meadow alpine zone (RGU Katon-Karagayskiy gosudarstvenny natsionalny prirodny park, 2009).

Together with the mountain tundra**,** this ecosystem supports more than half of all the Red List plant species of the Great Altay TBR, including golden root (*Rhodiola rosea*) and Siberian trout lily (*Erythronium sibiricum*), the endemic species dwarf chives (*Allium pumilum)* and Altai bladder oxytrope (*Oxytropis altaica*) and the relict species Siberian macropodium (*Macropodium nivale)* (Artemov, 2014).
Alpine and subalpine meadows provide an important habitat for wildlife such as the Altai marmot (*Marmota baibacina*), meadow voles (*Microtus* ssp.) and tundra shrew (*Sorex tundrensis*). Altai snowcock (*Tetraogallus altaicus*) and birds of prey like the upland buzzard (*Buteo hemilasius*) can be observed. Wolf (*Canis lupus*), lynx (*Lynx lynx*), fox (*Vulpes vulpes*) and wolverine (*Gulo gulo*) sometime enter this mountain zone (State Committee for Environmental Protection of the Russian Federation, State Nature Zapovednik Katunskiy, 1999).

Alpine and subalpine meadows – if not situated in the core zones of the protected areas and if accessible – are used as pastures in the summertime. They are also natural habitats for medicinal plants such as golden root (*Rhodiola rose*a) and red root (*Hedysarum thenium*), that are traditionally used by the local population (Yashina & Klepikov, 2009). In addition, the attractive display of wild flowers in the meadows is a popular destination for visitors of the TBR. Some of the main tourist trails, e.g. at the Belukha massif, pass through the meadows.

Photo 10: Alpine meadow
Photographer: Sergey Starikov

Forests

Forests can be found from 600 m above sea level up to 2,300 m (see also Figure 7), with microclimatic variations corresponding to geographical position and slope exposition. The mountain forest zone covers about a quarter of the TBR territory. In general, forests distribution in the moister regions of the north-western Altai (including the northern parts of the Great Altay TBR), covers all slope aspects, while forested areas in the southern part of the TBR are mainly restricted to north-facing slopes (Klinge, et al., 2003).

Photo 11: Mountain forest
Photographer: Tatjana Yashina

Coniferous forests account for the biggest part of the total forested area with larch (*Larix sibirica*), Siberian stone pine (*Pinus sibirica*) and spruce (*Picea obovata*) as the dominant species. Deciduous forests are represented by small stands of birch (*Betula spp.*), laurel-leaf poplar (*Populus laurifolia*), Eurasian aspen (*Populus tremula*) and willows (*Salix sp.*). The coniferous mountain forests provide habitat for forest ungulates such as Siberian musk deer *(Moschus moschiferus*) and red deer (*Cervus elaphus*), as well as other mammals such as lynx (*Lynx lynx*) Altai pika (*Ochotona alpina*), brown bear (*Ursus arctos*) and stoat (*Mustela erminea*).

Local communities continue to rely on of the natural resources and products from the mountain forests including wood, pine nuts, medicinal plants, berries, mushrooms, meat, fur and deer antlers.

Forest-steppe and steppe

Steppe systems like high- and low-mountain steppes and forest steppes comprise 16% of the TBR territory (with more than 70% being situated in the transition zone). They are primarily found in the southern part of the TBR in the Narym-Bukhtarma intermountain depression and in the Karakaba river valley. The northern border of the TBR adjoins the wide Uimon steppe, situated on the left side of the river Katun (Figures 6 and 7).

Photo 12: Mountain steppe
Photographer: Pierre Ibisch

Steppes occur between altitudes of 400 - 2,000 m above sea level and are characterized by the occurrence of steppe shrubs and pine forests. Small insular groves of birch and aspen (the so-called *kolki* forests) have a high ecological value and are of great importance for agriculture (e.g. prevention of soil erosion). In the Kazakhstani part of the TBR, in altitudes of 700 - 1,800 m the forest-steppe appears with a combination of sparse spruce, mixed aspen and birch forest, meadow steppes and upland meadows with cereal (RGU Katon-Karagayskiy gosudarstvenny natsionalny prirodny park, 2009).

Among the dominant animal species are small rodents such as ground squirrels, hamsters and field voles. Ungulates like red deer (*Cervus elaphus*) and Siberian roe (*Capreolus pygargus*) graze in the forest steppes. Birds like common quail (*Coturnix coturnix*) and bee-eater (*Merops apiaster*) as well as reptiles like sand lizard (*Lacerta agilis*), Dione rat snake (*Elaphe dione*) and common European viper (*Vipera berus*) have been recorded here.

The steppes and forest steppes of the TBR have been used for a long time as pastures for horses, sheep and cattle and to a less extent for crop production (mainly in the south-western part of the TBR). The great majority of settlements and roads are situated within this ecosystem.

Aquatic ecosystems

The Great Altay TBR has a complex hydrological network, especially when compared to the eastern and southern parts of the Altai-Sayan Ecoregion, where the influence of the water-carrying air masses of the Atlantic decreases due to barrier effects of the western Altai Mountains. A big portion of the precipitation is stored in glaciers and snow. The Altai Mountains including the territory of the Great Altay TBR are considered to be the main “water reservoir” for the vast expanse of western Siberian lowlands (Yashina, 2008a).

Photo 13: Bukhtarma river
Photographer: Renat Eskazyuly

The main rivers of the TBR, the Bukhtarma and Katun, are tributaries to the Irtysh (a tributary of the Ob) and the Ob. The Ob drains towards the Arctic Ocean and is the seventh longest river in the world. Since Katun, Bukhtarma and many of their small tributaries receive much of their water from the glaciers and snowfields of the TBR and adjacent territories, seasonal and annual river discharge is strongly influenced by melting snow and glaciers.

There are more than 535 lakes in the core and buffer zone of the TBR, most of them small in size with a surface area of max. 1 km², situated above 2,000 m altitude and being mostly glacial moraine-dammed (RGU Katon-Karagayskiy gosudarstvenny natsionalny prirodny park, 2009) (Yashina, 2008a). There are a number of high-mountain bogs on the TBR territory, but they occupy a relatively small area (State Committee for Environmental Protection of the Russian Federation, State Nature Zapovednik Katunskiy, 1999), and have yet to be surveyed in detail.

Lakes and rivers of the Great Altay TBR are habitats for 19 fish species, including Arctic grayling (*Thymallus arcticus*), common roach (*Rutilus rutilus*), perch (*Perca fluviatilis*) and the red-listed species taimen (*Hucho taimen*) and blunt-snouted lenok (*Brachymystax tumensis*) (Chelyshev, 2014). Various water birds, European otter (*Lutra lutra*) and stoat (*Mustela erminea*) can be found around the rivers and lakes.

A number of the lakes, e.g. the Multa lakes and the Yasevoe Lake, are popular destinations for tourists. The wealth of fish in the rivers and lakes provides a valuable source of food for the local folk as well as attracts tourists interested in recreational fishing.

Glacial and nival ecosystems

Glacial and nival ecosystems, located at the summit of the Great Altay TBR mountain ridges above 2,800 m, cover about 10% of the TBR territory (37% of them being situated in the core zone). They are characterized by glaciers, snowfields as well as glacial landforms. Modern glaciers can be found in two main areas of the Great Altay TBR: at the western part of the Katun mountain ridge (including the Belukha massif), and at the borders with Russia, Kazakhstan and China (eastern extension of the South Altai mountain ridge).

There are about 338 glaciers covering 290 km² on the Katun ridge (Narozhniy & Zemtsov, 2011) with 169 glaciers alone at the Belukha massif (Yashina, 2008a).The total glacier area in the East Kazakhstan Province is about 106 km² (Belyanin & Votyashov, 2003), which is situated exclusively in the territory of the Kazakhstani part of the Great Altay TBR.

Glaciers and snowfields of the TBR are an important storage of fresh water, feeding many rivers such as the Bukhtarma, an important tributary of the Irtysh and the Katun. Vegetation in the nival zone is restricted to places where fine soil material accumulates in cracks and between rocks with plant species similar to the alpine tundra zone.

Photo 14: Glacier of the Belukha massif
Photographer: Tatjana Yashina

A few areas of the nival zone receive infrequent visits by animals. For instance, golden eagle *(Aquila chrysaetos)* and plain mountain finch (*Leucosticte nemoricola*) are seasonal migrants. Occasionally the Siberian ibex (*Capra sibirica*) and the snow leopard *(Panthera uncia*) enter this region (State

Committee for Environmental Protection of the Russian Federation, State Nature Zapovednik Katunskiy, 1999).

Tundra

The alpine tundra zone of the Great Altay TBR lies between altitudes of 2,500 m and 2,800 m above sea level (RGU Katon-Karagayskiy gosudarstvenny natsionalny prirodny park, 2009). The alpine tundra encompasses approximately 17% of the TBR territory, with more than 90% of its area situated within the core and buffer zone of the TBR. In contrast to the alpine meadows the alpine tundra develops where snow cover is sparse and soils freeze quickly in the beginning of the winter.

Photo 15: Alpine tundra
Photographer: Alija Gabdullina

Due to the harsh climatic conditions, strong, frequent winds and cold temperatures, soil formation and vascular plant growth on the rocky ground is very limited. Lichens and mosses cover huge parts of the ground. Where tundra soil is well developed perennial grasses (e.g. *Trisetum altaicum*) and sedges are common. In the lower part of the alpine zone dwarf birch (*Betula rotundifolia*) and willows (*Salix glauca* and *S. krylovii*) can be found.

In the very highest parts of the mountain tundra (stony tundra) minor changes in the topography such as micro-depressions and cracks provide microhabitats to tundra plants, e.g. Siberian saxifrage (*Saxifraga sibirica*), red brush (*Rhodiola quadrifida*) and whitlow grass (*Draba fladnizensis*) (State Committee for Environmental Protection of the Russian Federation, State Nature Zapovednik Katunskiy, 1999). There are similar animal species in the alpine tundra and in the alpine meadows.

Together with the alpine and subalpine meadows the mountain tundra zone is of great importance for Red-List plant species, many of them endemic species to the Altai-Sayan Ecoregion. Since these alpine ecosystems are mainly influenced and formed by abiotic, mainly climate-related factors, they are extremely sensitive to changes in the climatic conditions (Yashina & Artemov, 2011).

Box 5: Short description of Mount Belukha

Mount Belukha (4,506 m) is situated at the north-eastern border of the Great Altay TBR where the State border of the Republic of Kazakhstan and Russian Federation meet (Figure 6).

The Belukha massif encompasses many of the ecosystems identified as conservation objects for the Great Altay TBR: glacial and nival ecosystems, mountain tundra, aquatic ecosystems and alpine meadows including numerous rare animal and plant species. Due to its remoteness and difficult accessibility, the landscape of Belukha mountain massif is still quite pristine. To ensure its protection and the development of tourism, Belukha Nature Park was founded in 1997 on the territory of the Russian Federation, encompassing an area of 132,455 ha. Beside its beauty that attracts tourists mainly from East Kazakhstan and the Russian Altai, Mount Belukha is also a sacred site for the Altaian people, the Russian Old-Believers and for followers of Buddhism. The indigenous Altaians believe that lakes, rivers, springs, mountains and other natural physical objects have spirit owners that need to be honored and protected (Klubnikin, et al., 2000).

Photo 16: View on Mount Belukha from Katon-Karagay BR (left)
Photo 17: View on Mount Belukha from Katunskiy BR (right)
Photographer: Sergey Starikov (left) and Tatjana Yashina (right)

Game species

Currently there are five bird species and 23 mammals being hunted on the territory of the Great Altay TBR, including Eurasian elk (*Alces alces*), Siberian roe deer (*Capreolus pygargus*), Siberian ibex *(Capra sibirica)*, maral red deer (*Cervus elaphus*) and Siberian musk deer (*Moschus moschiferus*), mountain hare (*Lepus timidus*), lynx (*Lynx lynx*), brown bear (*Ursus arctos*), Altai marmot (*Marmota baibacina*), European otter (*Lutra lutra*), mountain weasel (*Mustela altaica)*, grey wolf (*Canis lupus*) and the western capercaillie (*Tetrao urogallus*) (Chelyshev, 2014).

Photo 18: Siberian ibex (*Capra sibirica*)
Photographer: Katon-Karagay State National Park

Some game species like wolf and mountain weasel can be found in nearly all ecosystem types: in river floodplains, in mountain steppe hills, in the forests as well as in the alpine and subalpine mountain zone. Other species are restricted to a specific environment: the Siberian ibex inhabits the

upper altitudinal mountain zones, i.e. the mountain tundra and the (sub)alpine meadows. The distribution of the lynx is restricted to woodland.

Distribution patterns and migration of the relevant game species within the Great Altay TBR have not been sufficiently studied to provide a clear understanding of the status of these animals.

Rare/endangered, endemic and relict species

The Great Altay TBR has about 1,332 vascular plant species belonging to 94 families (Artemov, 2014). 41 of them are endemic to the Altai mountain region, e.g. Bukhtarma grass (*Elymus buchtarmensis*), dwarf chives (*Allium pumilum*), Ludwig's Iris (*Iris ludwigii*), Altai sibiraea (*Sibiraea altaiensis*), alpine sandmat (*Euphorbia alpina*) and dandelion (*Taraxacum krylovii*).

Photo 19: Snow leopard (*Panthera uncia*)
Photographer: Katon-Karagay State National Park

Another 48 species, referred to as sub-endemic, are found in the Altai mountain region and one or two other restricted territories e.g. common valerian (*Valeriana dubia*), Altai eyebright (*Euphrasia altaica*) and Altai bladder oxytrope (*Oxytropis altaica*)(Artemov, 2014). Species like Altai daphne (*Daphne altaica*), Altai sibiraea (*Sibiraea altaiensis*) and Siberian macropodium (*Macropodium nivale*) are considered relict plant species (RGU Katon-Karagayskiy gosudarstvenny natsionalny prirodny park, 2009).

54 plant species are listed in at least one of the relevant Red Books (Red Book of the Republic of Kazakhstan, Red Book of Russian Federation, Red Book of the Republic of Altai*),* 16 of them are Red-Book-species both in Kazakhstan and in Russia: arnica (*Arnica iljinii*), yellow lady's-slipper (*Cypripedium calceolus*), spotted lady's-slipper (*Cypripedium guttatum*), large-flowered lady's-slipper *(Cypripedium macranthon*), common spotted orchid *(Dactylorhiza fuchsii*), Altai daphne (*Daphne altaica*), ghost orchid *(Epipogium aphyllum*), Siberian adder's-tongue (*Erythronium sibiricum*), maral root (*Fornicium carthamoides*), Altai gymnospermium (*Gymnospermium altaicum*), thick-root iris (*Iris tigridia*), peony (*Paeonia hybrida*), Altai rhubarb (*Rheum altaicum*), golden root (*Rhodiola rosea*), Altai sibiraea (*Sibiraea altaiensis*) and feather grass *(Stipa pennata)* (Artemov, 2014).

So far, 19 fish species, 3 amphibian species, 6 reptile species, 280 bird species, 70 mammal species have been recorded in the territory of the Great Altay TBR (Chelyshev, 2014). Of these, 2 fish species, 47 bird species and 12 mammal species are listed in at least one of the relevant Red Books (Red Book of the Republic of Kazakhstan, Red Book of Russian Federation, and Red Book of the Republic of Altai*)*. The following animal species living in the TBR territory are also listed in the IUCN Red List: snow leopard (*Panthera uncia*), yellow-breasted bunting (*Emberiza aureola*) and Egyptian vulture (*Neophron percnopterus*) as endangered species; taimen (*Hucho taimen*), Dalmatian pelican (*Pelecanus crispus*), eastern imperial eagle (*Aquila heliaca*) and musk deer (*Moschus moschiferus)* as vulnerable species. Four animal species, the pallas's fish-eagle (*Haliaeetus leucoryphus*), saker falcon (*Falco cherrug*), peregrine falcon *(Falco peregrinus)* and argali mountain sheep (*Ovis ammon*) are threatened with extinction both in the Russian Federation and the Republic of Kazakhstan according to the Red Books of both countries (Chelyshev, 2014).

Five bird species are considered endemic to the Altai-Sayan Ecoregion: Altai snowcock (*Tetraogallus altaicus*), sky lark (*Alauda arvensis alticola*), northern shrike *(Lanius excubitor mollis*), twite (*Acanthis flavirostris altaica*) and Godlewski's Bunting (*Emberiza godlewskii*) (Chelyshev, 2014).

Distribution areas of the red list and endemic plant and animal species as well as migration of relevant animal species have not been sufficiently studied so far for the territory of the Great Altay TBR.

2.1.2 Human wellbeing objects

The Altai Mountains have been inhabited by humans since ancient times. For centuries the area has been characterized by large movements of various nomadic tribes and ethnic groups. Nowadays, the prevailing ethnic groups in the TBR territory are Kazakhs (80 % of the population in the Kazakhstani part) and Russians (80% of the population in the Russian part). Additionally, **indigenous Altaian people** still make up a significant proportion of the population, e.g. about 20% in Ust-Koksa district (MO Ust-Koksinskiy rayon, 2009).

Altaian people are not a homogenous formation, but a family of tribes of Turk origin, e.g. the Telenguites, the Kizhi-Altaitsy, the Koumandintsky and the Toubolary (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eco Consulting Group, 2004). The Altaian people were originally nomadic, with a lifestyle based on hunting/trapping and pastoralism (mainly cattle, sheep, and goats).

Photo 20: Information board about culture and traditions of the Altaians (Ust-Koksa)
Photographer: Pierre L. Ibisch

All in all, there are about 24,500 people living in 41 settlements within the TBR, mainly in the river valleys of Katun, Bukhtarma and Belaya Berel. Another approx. 16,000 people live in close distance (less than 25 km) from the northern and the south-western TBR border in the territories of Ust-Koksa and Katon-Karagay district. The average population density is very low with 4.6 people/km^2 in Katon-Karagay district, and 1.4 people/km^2 in Ust-Koksa district (Jurchenkov, 2013) (Altaye-Sayanskoe

gornoye partnerstvo, 2014). Table 5 provides an overview of the settlements' population, locations and main features.

Photo 21: Typical settlement in the Kazakhstani part of the TBR
Photographer: Alexander Artemev

The isolated location in combination with a lack of economic opportunities and the general low standard of living has caused emigration from the TBR territory. In the Kazakhstani part of the TBR most of the young people leave their villages after graduation to work or study in other regions (Jurchenkov, 2013). It is expected that the percentage of rural population in the Altai Republic will further decrease in the upcoming 20 years (Altaye-Sayanskoe gornoye partnerstvo, 2014).

Clearly, UNESCO Biosphere Reserves were suggested as model regions promoting solutions to reconcile the conservation of biodiversity with its sustainable use (UNESCO, 2015a). Therefore, the UNESCO MAB-Programme stands for an integrated approach to sustainable development fully embracing nature conservation as well as human existence within ecosystems. By especially focussing on the human population of biosphere reserves, social and economic issues are fully addressed.


Photo 22: Subsistence wood harvesting in the forest steppe of Katon-Karagay BR (left)
Photo 23: Maral farming in the Katunskiy BR (right)
Photographer: Pierre L. Ibisch


Photo 24: Sheep herding in Katon-Karagay BR (left)
Photo 25: Hay production in Katon-Karagay BR (right)
Photographer: Alexander Artemev

The management of the Great Altay TBR shall also focus on sustainable development of the people living within or nearby the TBR and who depend on the use of its natural resources and ecosystem services to make a good living. Referring to these people the following goals related to *Human Wellbeing Objects* are envisioned:

- Local residents sufficiently benefit from *food and non-food materials* to ensure adequate food security and heated sheltering;
- Diverse opportunities to *receive income* add to the population's standard of living and wellbeing;
- The TBR promotes right conditions for humans' *physical and mental health*, including spiritual and religious needs. Not only local residents, but also visitors from outside (tourists) benefit from the outstanding natural assets for recreation and leisure;
- Enhanced *access to information* and a reasonable good level of *freedom and choice* raise the quality of local people's life;
- *Security of people* living within and nearby the TBR is maintained through prevention of natural disasters and the reduction of their impacts (fires, avalanches, landslides, floods, etc.).

Table 5: Overview of settlement characteristics within and nearby the Great Altay TBR

Territory	number of settlements	number of inhabitants	Additional information about the infrastructure
Settlement area of the Kazakhstani part of the TBR	28 (approximately another 19 settlements are situated within a 25km zone around the TBR in the East Kazakhstan Province)	19,155 (approximately another 7,600 people live within a 25km zone around the TBR in the East Kazakhstan Province)	- office of the administration of Katon-Karagay State National Park - the former municipal centre of the district (Katon-Karagay) - public transport (bus) to important settlement areas in the East Kazakhstan Province - 2 major tourist accomodations ”Rakhmanovsliy Kluchi” and “Nurbulak” - 837 agricultural companies - 26 schools with approx. 2210 pupils - hospitals in Katon-Karagay and Uryl and several smaller medical centers - historical-cultural museum in Berel, nature museum in the office of the National Park, Oralkhan Bokey Museum in Chingistay
Katon-Karagay district (Republic of Kazakhstan)	51	36,900	- 1462 agricultural companies - 30 tourist accommodations/resorts - 34 nursery schools and 46 secondary schools - central district hospital in Ulken Naryn and several smaller medical centers - municipal centre of Katon-Karagay district (Ulken Naryn) - museum of history and traditions in Ulken Naryn
Settlement area of the Russian part of the TBR	13 (approximately another 18 settlements are situated within a 25km zone around the TBR in the Altai Republic)	5,306 (approximately another 8,100 people live within a 25km zone around the TBR in the Altai Republic)	- 7 schools - lands of 5 livestock breeding companies - lands of 2 hunting companies - 7 maral red deer farms - Nicholas Roehrich Museum in Verkh Uimon, Museum of history and culture of Uimon valley in Verkh Uimon - 11 tourist accommodations and camp sites - office of the administration of Belukha Nature Park
Ust-Koksa district (Russian Federation)	42	16,794	- municipal centre of Ust-Koksa district (Ust-Koksa) - office of the administration of State Nature Biosphere Zapovednik Katunskiy - public transport (bus) to Gorno-Altaisk and Barnaul - 26 nursery schools and 30 secondary schools - central district hospital in Ust-Koksa and several smaller medical centers - 26 agricultural companies, 164 farms and 5951 subsistence farms - lands of 2 hunting companies - 18 tourist accommodations and camps sites (all within or in close vicinity of the TBR) - Ethnological Museum in Chendek

Source: (Jurchenkov, 2013), (Altaye-Sayanskoe gornoye partnerstvo, 2014), (Akim Katon-Karagayskovo rayona Vostochno-Kazakhstanskoy oblasti, n.d.) and (MO Ust-Koksinskiy rayon, 2009)

Those human wellbeing objects are derived from the ecosystems of the TBR through a great variety of ecosystem services (Table 6). The conceptual model in Annex 2 reveals the relationship between the biodiversity objects and the human wellbeing objects for the TBR.

Table 6: Ecosystem services of the Great Altay TBR

Biodiversity object (Ecosystem type)	Ecosystem services		
	Provisioning services	Regulation and maintenance	Cultural services
Glacial and nival ecosystems	water directly used for drinking water, irrigation, household and industrial purposes	maintenance of hydrological regime of the Altai rivers for water supply and discharge; maintenance of chemical composition and temperature regime of rivers and lakes to ensure favourable conditions for aquatic biota; regulation of local and regional climate	physical interactions with biota, ecosystems, landscapes: *walking, leisure fishing and hunting, hiking, rafting, bathing in thermal spring water, antlers baths* (and thus, tourism) as source of income for local people; subject matter for research, education and entertainment (and thus, tourism) as source of income for local people; historic records and cultural monuments; sense of place, inspiration for artistic representations; religious and spiritual interactions: spiritual and sacred sites (*e.g. Mount Belukha, river Katun*)
Tundra	meat of wild animals; medicinal plants		
Alpine and subalpine meadows	grass (fodder); medicinal plants	protection from erosion	
Forests	honey; medicinal plants; meat of wild animals; wild berries, pine nuts, pine resin; mushrooms; firewood, timber; antlers of deer; furs; chemicals derived from wild animals	water purification; maintenance of bio-geochemical conditions of soils (*nutrient storage, fertility, soil structure*), protection from erosion; flood control; protection from avalanches; air purification; pest control; regulation of local and regional climate; contribution to global climate regulation by carbon sequestration	
Steppes and forest steppes	grass (fodder), cereals and vegetables; honey; medicinal plants; meat, dairy products, skin and wool of reared animals; firewood	water purification; protection from erosion; maintenance of bio-geochemical conditions of soils (*nutrient storage, fertility, soil structure*)	
Aquatic ecosystems	fish; water directly used for drinking water, irrigation, household and industrial purposes; hydropower	water purification; maintenance of the hydrological regime and flood control	

The ecosystems of the Great Altay TBR provide their services not just to the local people and communities, but also to people in the adjacent territories, to tourists and researchers from all over the world and even to mankind on a global scale.

Since agriculture, very often in the form of small scale subsistence agriculture, and processing of livestock products are the most important branches of economy in the rural TBR region, local people depend very directly on a great variety of **materials, products and processes being provided by the ecosystems** of the Altai Mountains: grassy biomass of steppes and (sub)alpine meadows as fodder for reared animals; meat and dairy products from cattle, sheep and horses; meat and furs from wild animals; antlers from red deer; honey and other bee products; berries, mushrooms, medicinal plants, pine nuts and other non-timber forest products. Wood from the TBR mountains forests is used for heating by nearly all inhabitants and timber is the main building material for private houses in the region.


Photo 26: Fodder for livestock – one of the various ecosystem services of the Great Altay TBR
Photo 27: Regional food and medicinal products
Photographer: Sergey Starikov (left) and Pierre L. Ibisch (right)

Furthermore, the ecosystem services of the TBR **maintain and regulate physical, chemical and biological conditions and mediate material flows** that are of importance for human performance not only on a local level, e.g. the maintenance of the fertility and structure of soils to ensure productive pastures, the prevention of soil erosion on slopes of this mountainous region. The maintenance of the hydrological regime of the TBR rivers is a good example for an ecosystem service with a supra-regional importance: Bukhtarma and Katun contribute their water to the major rivers Irtysh and Ob whose waters are used by millions of people in the western Siberian lowlands for irrigation, energy production (hydropower) and as drinking water. Carbon sequestration by the Altai mountain forests even serves on a global level, helping to regulate climate change.

Finally, there are a number of non-material outputs of the TBR ecosystems that affect physical and mental states of local people as well as all kinds of visitors. Thus, there are various possibilities of physical interactions with biota, ecosystems, and landscapes of the TBR, e.g. walking, leisure fishing and hunting, hiking to the Mount Belukha, rafting on the Katun and the Bukhtarma, bathing in thermal spring water at Rakhmanovskiye Kluchi or antlers baths in one of the health resorts.

Furthermore it is possible to interact on a spiritual or an intellectual level with the ecosystems. The region of the Great Altay TBR is a subject matter for national and international research, (environmental) education as well as spiritual and religious enlightenment.

2.2 Status of biodiversity objects

2.2.1 Key ecological attributes

The following nine key ecological attributes (KEA) are considered important properties of the TBR ecosystems and their species that maintain function as well as adaptation and resilience to disturbance and change (see also Annex 2):

1. Connectivity
2. Continuous vegetation cover
3. Glaciers mass dynamics
4. River discharge dynamics
5. Species composition
6. Vertical mountain zoning
7. Viable population size
8. Water quality
9. Woody biomass

Box 6: Key ecological attributes (KEA), stresses, threats and contributing factors

Nature conservation focuses on the improvement and/or maintenance of the functionality of the ecosystems in the area of interest. Therefore, it is necessary to describe and assess the current status of the biodiversity objects to be able to evaluate the impact and success of the applied conservation activities.

Key ecological attributes (KEA) are identified for each of the biodiversity objects. KEA are defined as properties of ecosystems or species (groups) that maintain function as well as adaptation and resilience to disturbance and change (Ibisch & Hobson, 2014); e.g. *woody biomass* as a KEA for a forest ecosystem. If it comes to a degradation of key ecological attributes the resilience and adaptive capacity of biodiversity elements is impacted. In course of time, this could lead to a shift or even to a collapse of the system. Once the KEAs have been identified, appropriate indicators and respective rating scales need to be defined for measuring the status of the KEAs over time, e.g. *the amount of standing and lying deadwood* as an indicator for the KEA *woody biomass*. Thus, the current status as well as future desired status of the biodiversity objects can be determined in a very concrete way.

The status of the biodiversity objects can additionally be described by identifying relevant **stresses.** Stresses are described as a certain state, reaction or symptom of an ecosystem to anthropogenic threats; e.g. soil erosion as a stress caused by the threat overgrazing. They can be understood as degraded key ecological attributes. **Threats** are anthropogenic-induced forcing factors which likely have a direct or indirect impact on the natural structure and dynamics of an ecosystem (Ibisch & Hobson, 2014). Threats create stresses, which increase the vulnerability of biodiversity and eventually lead to degradation of the biodiversity objects. **Contributing factors** are defined as actions or activities conducted by humans which directly or indirectly lead to a threat. They are the root causes of the observed ecological problems.

2.2.2 Stresses

The status of the biodiversity objects of the Great Altai TBR is described by 15 stresses which are already observed or are expected to develop in the near future (Table 7). The table also shows the importance of each stress for the state of vulnerability of the influenced biodiversity object expressed through the criticality (C). Table 8 provides information on the strategic relevance (R_S) and the manageability (M) of each stress as well as on the level of knowledge (K) of the planning team about the various stresses. The assessment was done separately for the Russian and for the Kazakhstani part of the TBR by the respective protected area teams. This is due to the fact, that the national PA teams considered the available knowledge and experiences about the ecological, socio-

economic and legal-institutional situation on the other side of the state border as insufficient for a joint assessment for the whole TBR territory. Nevertheless, combined values were calculated as the arithmetic mean of both assessment values.

The list of stresses in both tables is ordered, firstly, by the combined value of their strategic relevance (arithmetic average of the values estimated separately for the Russian and for the Kazakhstani part of the TBR) and, secondly, by the combined value of their manageability and, thirdly, by the combined value of the level of knowledge.

Box 7: Assessment of stresses, threats and contributing factors

Identified stresses (as well as later on threats and their contributing factors) are assessed in terms of several criteria to allow a more considered and rational prioritisation of system elements for structuring effective conservation strategies. Three principal criteria were used to assess the stresses, threats and contributing factors:

- strategic relevance (R_S)
- manageability (M) and
- knowledge (K)

The **strategic relevance** is calculated from various (sub)criteria including: current, past and future criticality (C) and systemic activity (S_A) can be used to identify the most relevant elements of the conceptual model. The criticality is perceived as the importance of the stress, threat or contributing factor for the state of vulnerability of a biodiversity object. The systemic activity estimates the level/degree of influence of a threat or contributing factor (it is not estimated for stresses).The calculation of the strategic relevance helps in prioritising these elements according to their importance or severity.

To allow realistic and effective conservation strategies, the **manageability** of the stresses, threats and contributing factors is assessed. By reflecting on the level of **knowledge** of the planning team about the various stresses, threats and their contributing factors, knowledge gaps become more transparent and the interdisciplinary and trans-institutional nature of conservation planning is recognized.

Annex 3 provides more detailed information about the assessment methodology.

Table 7: Criticality (C) of the identified stresses

Stress	Criticality (C) for the Kazakhstani part of the TBR				Criticality (C) for the Russian part of the TBR			
	20 years ago	Current	Current trend	In 20 years	20 years ago	Current	Current trend	In 20 years
1. Reduction of freshwater sources	1	3	3	3	1	4	3	3
2. Deterioration of the aesthetic quality of the landscape	2	2	2	3	1	3	4	3
3. Soil degradation	2	3	3	3	2	3	2	2
4. Deterioration of the nesting conditions for birds	2	3	2	2	2	3	3	2
5. Shift of the tree line up- and downward	1	3	2	3	2	4	2	2
6. Migration routes disrupted/disturbed*	2	2	3	3	2	3	2	2
7. Reduction in the population number of species (except fish)	2	2	2	3	3	3	3	2
8. Changes in composition and age of forest trees	3	3	2	3	2	3	2	2
9. Change in composition of water fauna	1	3	2	2	2	3	2	2
10. Reduction/fragmentation of game species habitats	1	2	2	2	2	3	2	2
11. Dieback of conifers	1	2	2	2	1	3	2	2
12. Reduction/fragmentation of plant species habitats*	1	2	2	2	2	3	2	2
13. Loss of species*	2	3	2	2	2	3	2	2
14. Reduction in the population numbers of fish species	1	2	2	2	3	3	3	2
15. Deterioration of the quality of fresh water*	3	2	2	2	2	2	1	2

Key: 1 = lower than current/low/decreasing/ lower than current, 2 = equal to current/medium/stable/ equal to current, 3 = higher than current/high/gradually increasing/ higher than current, 4 = much higher than current/very high/rapidly increasing/ much higher than current, * = potential stress (currently not yet observed)

Table 8: Strategic relevance (R_S), manageability (M) and level of knowledge (K) of the identified stresses

Stress	Kazakhstani part of the TBR				Russian part of the TBR				Combined value for the whole TBR			
	R_S value	R_S final range	M	K	R_S value	R_S final range	M	K	R_S value	R_S final range	M	K
1. Reduction of freshwater sources	9	3	3	4	10	3	4	3	**10**	**3**	**4**	**4**
2. Deterioration of the aesthetic quality of the landscape	7	2	1	1	10	3	1	1	**9**	**3**	**2**	**1**
3. Soil degradation	9	3	2	3	7	2	2	2	**8**	**2**	**2**	**3**
4. Deterioration of the nesting conditions for birds	7	2	2	3	8	2	2	2	**8**	**2**	**2**	**3**
5. Shift of the tree line up- and downward	8	2	2	2	8	2	1	2	**8**	**2**	**2**	**2**
6. Migration routes disrupted/disturbed*	8	2	2	2	7	2	3	2	**8**	**2**	**2**	**2**
7. Reduction in the population number of species (except fish)	7	2	2	2	8	2	2	2	**8**	**2**	**2**	**2**
8. Changes in composition and age of forest trees	8	2	2	1	7	2	1	3	**8**	**2**	**2**	**2**
9. Change in composition of water fauna*	7	2	3	3	7	2	3	3	**7**	**2**	**3**	**3**
10. Reduction/fragmentation of game species habitats	6	1	3	3	7	2	3	3	**7**	**2**	**3**	**3**
11. Dieback of conifers	6	1	3	3	7	2	3	3	**7**	**2**	**3**	**3**
12. Reduction/fragmentation of plant species habitats*	6	1	3	3	7	2	3	3	**7**	**2**	**3**	**3**
13. Loss of species*	7	2	2	3	7	2	3	2	**7**	**2**	**2**	**3**
14. Reduction in the population numbers of fish species	6	1	2	2	8	2	2	2	**7**	**2**	**2**	**2**
15. Deterioration of the quality of fresh water*	6	1	2	3	5	1	3	2	**6**	**1**	**2**	**3**

Key: R_S = strategic relevance, **M** = manageability, **K** = level of knowledge, **1** = low/very manageable/well known, **2** = medium/somewhat manageable/somewhat known, **3** = high/poorly manageable/ not known, but theoretically knowable, **4** = very high/not manageable/not knowable, R_S-classes: **1:** value<= 6, **2:** 7=<value<=8, **3:** 9=<value<=10, **4:** value>=11; * = potential stress (currently not yet observed)

In general, the expert assessment results reflect that the landscapes, ecosystems and species of the Great Altay TBR are in a good state and still relatively undegraded. Nevertheless the assessment results for the stresses of the Great Altay TBR reveal the following two critical stresses for being important drivers of negative changes in the TBR ecosystems: the reduction of freshwater sources, and the deterioration of the aesthetic quality of the landscape.

However, many of the stresses rated as being moderately critical and less relevant (e.g. the reduction/fragmentation of plant species habitats), would be hardly manageable if their relevance increased in the future. Furthermore, it becomes obvious from the assessment results that there is still a considerable lack of knowledge about the characteristics, the relevance and the dynamics of many stresses.

More information on the identified stresses will be given in chapter 2.3 when describing the relevant threats and their impacts on the biodiversity objects.

2.3 Threats and contributing factors

2.3.1 Threats

Sixteen threats were identified that have a direct or indirect impact on the natural structure and dynamics of the TBR ecosystems (Table 9). They are grouped into four categories: changes of local climate (CLC); anthropogenic changes of the environment (ACE); unsustainable use of natural resources (UUNR) and biotic changes (BC). Corresponding to the stresses, Table 9 also shows the importance of each threat for the state of vulnerability of the influenced biodiversity object expressed through the criticality (C) and the (overall) systemic activity (S_A). Table 10 provides information on the strategic relevance (R_S) and the manageability (M) of each threat as well as on the level of knowledge (K) of the planning team about the various threats.

The list of threats in both tables is ordered, firstly, by the combined value of the strategic relevance (arithmetic average of the values estimated separately for the Russian and for the Kazakhstani part of the TBR), secondly, by the combined value of the manageability and, thirdly, by the combined value of the level of knowledge.

Table 9: Criticality (C) and systemic activity (S_A) of the identified threats

Threat	Category	Kazakhstani part of the TBR					Russian part of the TBR				
		Criticality (C)				Overall systemic activity (S_A)	Criticality (C)				Overall systemic activity (S_A)
		20 years ago	Current	Current trend	In 20 years		20 years ago	Current	Current trend	In 20 years	
1. Local climate change	CLC	1	3	3	3	4	1	3	4	3	4
2. Retreat of glaciers	CLC	1	3	3	3	3	1	3	3	3	3
3. Overgrazing	UUNR	2	3	2	2	3	2	4	3	3	3
4. Increase in flood events and magnitude	CLC	2	1	2	3	3	3	4	3	3	3
5. Change in hydrological regime of streams and rivers	CLC/ACE	2	2	3	2	2	3	4	3	3	2
6. Air pollution	ACE	2	3	3	2	2	2	3	2	4	2
7. Exploitation of timber species	UUNR	3	2	2	2	3	1	2	3	4	3
8. Linear barriers in the territory	ACE	2	2	3	3	2	3	3	3	4	2
9. Overexploitation of wild raw non-timber materials	UUNR	2	2	2	2	2	2	2	3	4	2
10. Litter pollution	ACE	1	2	2	3	3	1	2	4	3	3
11. Fires	ACE	2	3	2	2	2	2	3	3	3	2
12. Pests*	BC	2	2	2	3	2	2	3	3	3	2
13. Overexploitation of wild animal species	UUNR	2	2	2	2	2	2	3	3	4	2
14. Degradation of habitats along hiking trails	UUNR	1	1	2	2	3	1	2	4	3	3
15. Introduction of fish species into lakes	ACE	2	3	2	2	1	1	3	3	3	1
16. Water pollution	ACE	3	2	2	2	1	2	2	1	2	1

Key: ACE = Anthropogenic changes of the environment, **BC** = Biotic changes, **CLC** = Changes of local climate, **UUNR** = Unsustainable use of natural resources; Criticality ratings: **1** = lower than current/low/decreasing/ lower than current, **2** = equal to current/medium/stable/ equal to current, **3** = higher than current/high/gradually increasing/ higher than current, **4** = much higher than current/very high/rapidly increasing/ much higher than current; Systemic activity rating: **1** = low, 2 = medium, **3** = high, **4** = very high, * = potential threat (currently not yet observed)

Table 10: Strategic relevance (R_S) manageability (M) and level of knowledge (K) for the identified threats

Threat	Category	Kazakhstani part of the TBR				Russian part of the TBR				Combined value for the whole TBR			
		R_S value	R_S final range	M	K	R_S value	R_S final range	M	K	R_S value	R_S final range	M	K
1. Local climate change	CLC	13	3	3	4	14	4	3	1	**14**	**4**	**3**	**3**
2. Retreat of glaciers	CLC	12	3	4	4	12	3	4	2	**12**	**3**	**4**	**3**
3. Overgrazing	UUNR	10	2	3	4	13	3	4	3	**12**	**3**	**3**	**4**
4. Increase in flood events and magnitude	CLC	9	2	3	4	13	3	4	2	**11**	**3**	**4**	**3**
5. Change in the hydrological regime of streams and rivers	CLC/ACE	9	2	3	2	12	3	4	2	**11**	**3**	**4**	**2**
6. Air pollution	ACR	10	2	2	3	11	3	3	1	**11**	**3**	**3**	**2**
7. Exploitation of timber species	UUNR	9	2	2	2	12	3	3	2	**11**	**3**	**3**	**2**
8. Linear barriers in the territory	ACE	10	2	2	3	12	3	2	3	**11**	**3**	**2**	**3**
9. Overexploitation of wild raw non-timber materials	UUNR	8	2	2	3	11	3	2	3	**11**	**3**	**2**	**3**
10. Litter pollution	ACE	10	2	1	1	12	3	1	1	**11**	**3**	**1**	**1**
11. Fires	ACE	9	2	3	3	11	3	3	1	**10**	**2**	**3**	**2**
12. Pests*	BC	9	2	2	1	11	3	3	2	**10**	**2**	**3**	**2**
13. Overexploitation of wild animal species	UUNR	8	2	2	2	12	3	2	2	**10**	**2**	**2**	**2**
14. Degradation of habitats along hiking trails	UUNR	8	2	2	2	12	3	2	1	**10**	**2**	**2**	**2**
15. Introduction of fish species into lakes	ACE	8	2	3	3	10	2	3	2	**9**	**2**	**3**	**3**
16. Water pollution	ACE	7	1	2	3	6	1	4	2	**7**	**1**	**3**	**3**

Key: **R_S** = strategic relevance, **M** = manageability, **K** = level of knowledge, **ACE** = Anthropogenic changes of the environment, **BC** = Biotic changes, **CLC** = Changes of local climate, **UUNR** = Unsustainable use of natural resources, **1** = low/very manageable/well known, **2** = medium/somewhat manageable/somewhat known, **3** = high/poorly manageable/ not known, but theoretically knowable, **4** = very high/not manageable/not knowable, R_S-classes: **1:** value<= 7, **2:** 8=<value<=10, **3:** 11=<value<=13, **4:** value>=14; * = potential threat (currently not yet observed)

In contrast to the stress assessment, the strategic relevance of most of the threats shows much higher ratings. This is mainly due to the team's presumption that the importance of the identified threats for the state of vulnerability of the TBR ecosystems will increase in the upcoming years (expressed through high/very high values for current trend of criticality and for future criticality). There are significant differences between the assessments of the Kazakhstani and the Russian planning team members. The criticality parameters of the identified threats are rated higher by the planning team members of the Russian part of the TBR. Furthermore, there is a considerable difference between the planning teams of Katunskiy and Katon-Karagay Biosphere Reserve in terms of the self-assessment of the available knowledge about the various threats.

In general, *local climate change* is the threat which is considered being of very high strategic relevance for the conservation of the TBR ecosystems. The majority of the identified threats receive a criticality rate of '*high*'. These are, first of all, the threats related to climate change, i.e. *retreat of glaciers, increase in flood events and magnitude* and *changes in the hydrological regime of streams and rivers*. Obviously, these climate-related threats are poorly or not manageable at all on the local level, where the need for appropriate adaptation strategies becomes necessary. Further threats of high strategic relevance and poor manageability are *overgrazing*, *air pollution* and the *exploitation of timber species*. *Water pollution* is the only threat that receives a low strategic relevance rating. However, the level of knowledge about the characteristics, the relevance and the dynamics of this threat is also rated '*poor*'.

The following paragraphs provide brief descriptions of the identified threats and their related stresses.

Changes of local climate (CLC)

Data from meteorological stations within the Russian part of the Great Altay TBR show a significant increase of the average annual air temperature from +1.3 K at high elevations (2,000 m above sea level) and +2,2 K at lower elevations (998 m) during the last 50 years (Kharlamova & Ostanin, 2012). Temperatures in Eastern Kazakhstan increased by 1.3 K between the years 1913 and 2011 (Dulamsuren, et al., 2013). Precipitation rates for the same period show a slight increase in the average annual rainfall for the Russian part of the TBR, but the trend is less significant (Narozhniy & Zemtsov, 2011) (Kokorin, 2011). In eastern Kazakhstan precipitation shows no significant trend for the last 100 years (Dulamsuren, et al., 2013).

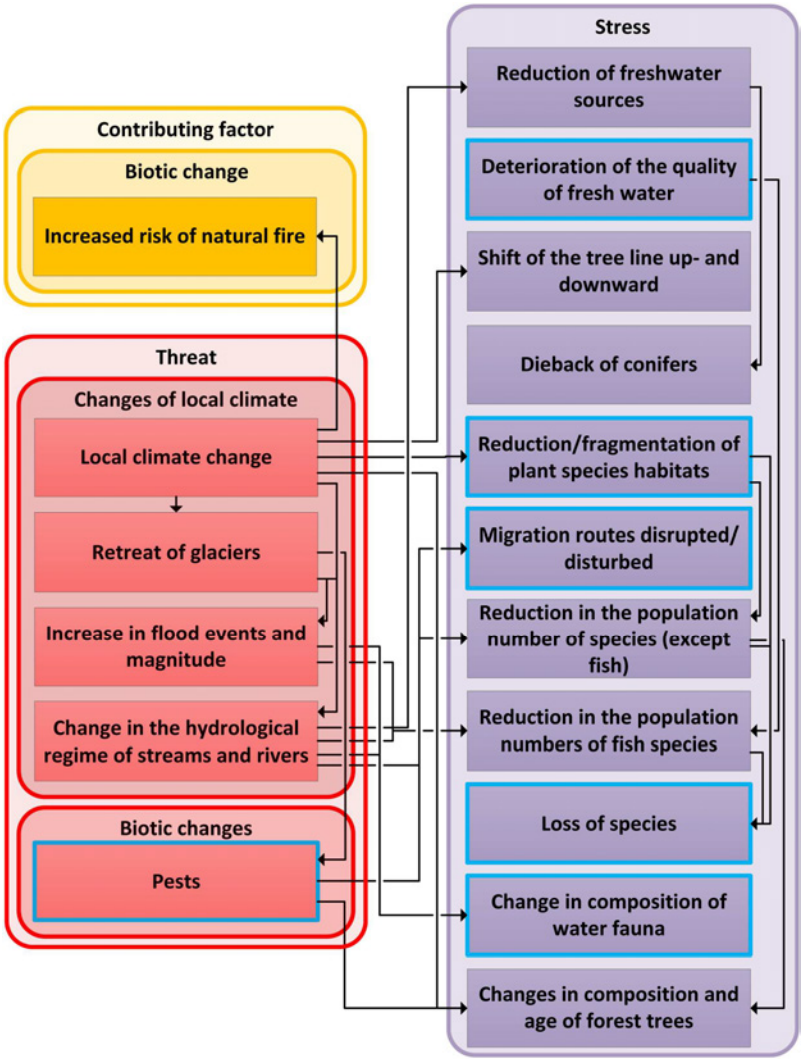


Figure 9: Dimensions of the threat local climate change and relationship to relevant stresses
(the blue frame indicates potential threats or stresses)

Increased temperatures intensify the *retreat of glaciers* in the Great Altay TBR. The total glacier area of the Katun ridge decreased by 9.1% respectively 28.8 km² and the glacier volume by 11.9% respectively 2.2 km³ between 1952 and 2008 (see photo 28). For the glaciers of the South Altai ridge (including the glaciers of the Karaalakhinskiye mountains) area reduction is even by 11.5% (6.6 km²) and volume reduction by 18.5% (0.57 km³) (Narozhniy & Zemtsov, 2011). Glacier melting dynamics have a big influence on the hydrology of high-altitudinal river catchments, since melt water makes up more than 50% of the total discharge of rivers in upper and middle-elevation zones (Yashina & Artemov, 2011). An intensification of glacier melting may result in an increase of the river discharges, especially in spring and early summer, increasing the *risk of dangerous flood events*. So far the wellbeing of the people living in the TBR wasn't negatively influenced by flood events. Nevertheless, 70% of all dangerous flood events that occurred between 1991 and 2008 in the south of Western Siberia hit the mountain regions of the Altai and of the Western part of the Sayan (Semenov, 2011). While initially, the melting of glaciers is going to increase the available water resources downstream, the continuation of this process will lead to a *reduction of the freshwater resources* stored in the Altai glaciers in the long run. Consequently, discharge rates of the Altai rivers may decrease causing possible negative effects for ecosystems and people in western Siberia.

Intensified glacier melting may also be responsible for changes in the chemical regime of rivers and lakes of the TBR. For example, it is presumed that the decrease of the pH of the Multa lakes by 1-2 units between 1930 and 2008 may be caused by the increased share of snow and glacial water in the water bodies (Efimova, et al., 2011). Hydro-chemical changes definitely affect the biota of rivers and lakes and may cause *changes in the composition of the water fauna*, but detailed research is still missing for the TBR territory.

Temperature rise in the mountain region of the Great Altay TBR also lead to changes in the terrestrial ecosystems. During the last 120 years the *upper treeline has shifted upwards* by 60-100 m in some places of the Katunskiy Biosphere Reserve (Mikhailov, 2010) (see photo 28). As a consequence the size of *alpine meadow and mountain tundra habitats reduced* which may increase the risk of habitat *fragmentation*.

Photo 28: Photo exhibition on the retreat of glaciers at the Belukha massif presented in the visitor center of State Nature Biosphere Zapovednik Katunskiy

This is especially critical since many currently endangered endemic plant species are limited to high-altitudinal zones and may face the risk of extinction (Yashina, 2011). It is predicted that there will be also changes to the distribution of the dominant conifer species larch (*Larix spp.)* and pine (*Pinus spp.*) and their climatypes in many regions of Siberia, including the Altai (Tchebakova, et al., 2010). *Changes in the composition and age of conifer forest communities* can be predicted as a consequence of increased atmospheric moisture deficit (Dulamsuren, et al., 2013). An *increased natural fire risk* may be another result of temperature rise and a possible higher aridity. Overall dynamics of *wildfires* in the Altai-Sayan Ecoregion show an significant increase in the number of wildfires and the area affected by wildfires between 2000 and 2009 (Shishikin, 2011).

Finally, it is presumed that local climate change may also be an influencing factor for the occurrence of ***forest pests*** and the *dieback of conifers* that was observed on the TBR territory in the last years. So far, systematic studies on the outbreak of pests does not take place in the TBR, but worldwide investigations indicate that boreal forests are expected to become victims of increased insect infestations due to warmer conditions (Biringer, 2003) (Tishkov et al., 2008). Massive drying of

conifers was studied in more detail for the mountain regions of the Eastern Sayan, revealing that increased populations of root fungal pathogens, caused amongst other factors by changes in the local climate, is an important driving factor for the dieback of conifers (Pavlov, et al., 2009).

Anthropogenic changes of the environment (ACE)

Human-induced ***fires*** are seen as a significant threat for the forest and steppe ecosystems of the Great Altay TBR. The big majority of fires occur in the buffer and transition zones of the TBR, being caused by careless handling of open fire. Nevertheless lightning plays a role as well. It is expected that the scope and the severity of fires in the Great Altay TBR will increase in the future, following the observed trend for the whole Altai-Sayan ecoregion (see Shishikin, 2011). This is explained by temperature rise and an atmospheric moisture deficit that increase the natural wildfire risk. Although fires are a natural and vital part of the functioning of forest ecosystem, they may become a threat to biodiversity if burning takes place on a large scale. Furthermore fires pose a serious danger for people and livestock if they get too close to the settlements.

The planning team expects that the increase in fires will lead to a *reduction of plant species habitats* (forest habitat), *changes in the composition and age of tree communities*, the *deterioration of the nesting conditions for birds* as well as an increase in the *emission of greenhouse gases*.

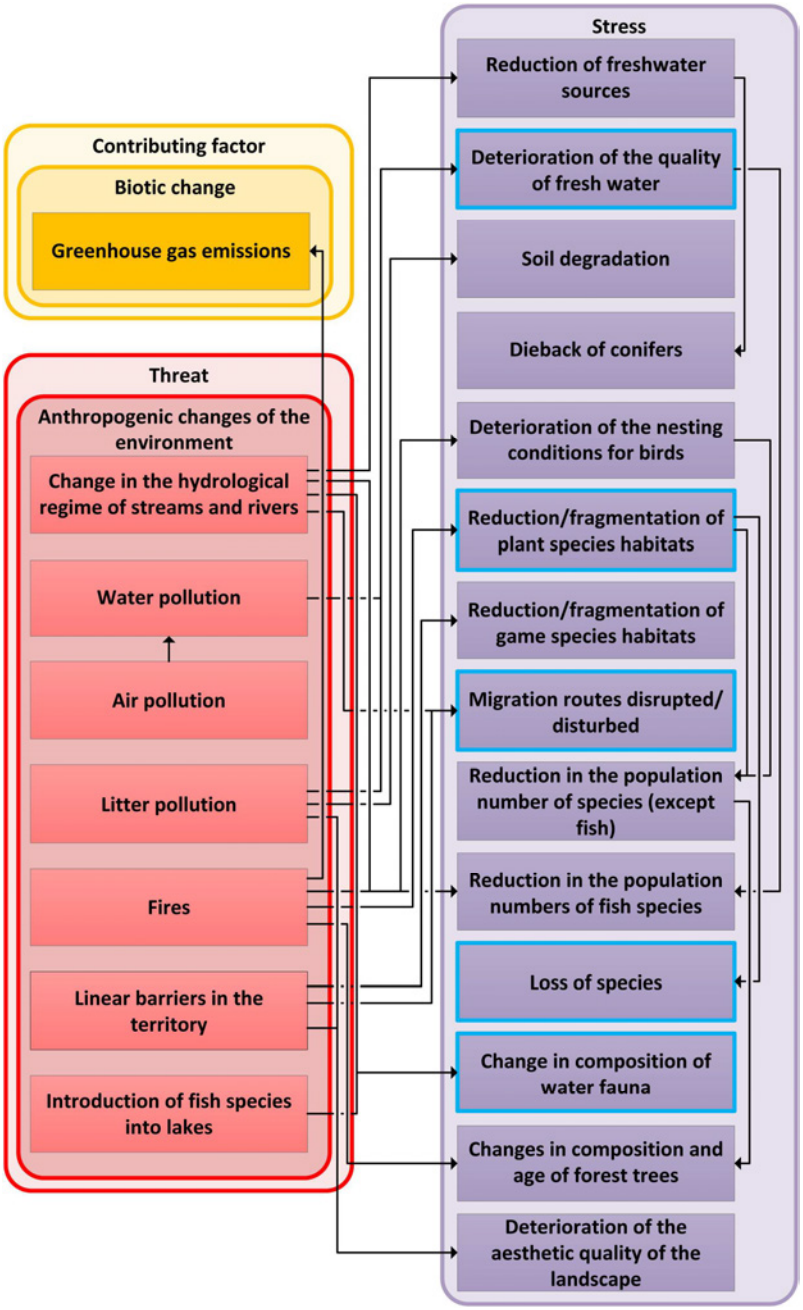


Figure 10: Dimensions of the threats related to anthropogenic changes of the environment and relationship to relevant stresses
(the blue frame indicates potential threats or stresses)

Fences of the maral farms form ***linear barriers*** *disrupt and disturb movement and migration routes* of big hoofed mammals such as roe and red deer and probably lead to a *reduction and fragmentation of game species habitats* (Yashina & Klepikov, 2009). Thus, it is presumed that the fences of the maral farms contribute to the *reduction of the population numbers* of roe and red deer in the Russian part of the TBR. However, until now the impacts of maral farms on the migration of big ungulates have

not been investigated for the TBR territory. Similar effects are suspected in case the state border between Kazakhstan and Russia will be fortified.

Litter pollution is another threat to ecosystems and landscapes of the Great Altay TBR. It is caused by tourists who leave their rubbish at the campsites and along the main hiking trails, especially in the Belukha Nature Park. First of all it leads to a *visual deterioration* that reduces the aesthetic quality of this unique landscape. In sensitive areas like lake and river shores littering can *degrade the quality of freshwater*, which might harm the water fauna. Furthermore, the official landfills situated close to every village, may contribute to a chemical degradation of soils and groundwater, since the waste is not sorted and landfills are rarely sealed. However, impacts of litter pollution on soils and water systems have not been examined for the Great Altay TBR.

Change in the hydrological regime of streams and rivers are not only caused by temperature rise and the changed melting dynamics of the glaciers, but may be a result of the construction of hydropower stations at the TBR rivers projected by the governmental authorities. So far there are no hydropower stations on the TBR territory, but according to the territorial plan of the Ust-Koksa district for 2008-2025 the construction of two small hydropower stations is planned at the Multa and the Terekta river until 2019 (MO Ust-Koksinskiy rayon, 2008). The construction of the dam could potentially disturb the hydrological regime of the Multa river and will have an impact on the freshwater fauna of the Lower Multa lake as well as of the river Multa (e.g. *disruption of migration routes*, *changes in the composition of aquatic species*, *reduction in the population numbers of fish species*).

Air and water pollution are considered further threats to the Great Altay TBR, but are not very well investigated so far. There is no industry which could harm the environment on or in close distance of the territory of the TBR, but there is some evidence that emissions from the non-ferrous metal industries of the industrial region of East Kazakhstan have an impact on air and water quality in the TBR. The air in the TBR has not been tested for air pollutants so far, but elevated concentrations of heavy metals such as zinc, copper, nickel and manganese in rainwater and elevated concentrations of lead in fresh snow were detected in the Multa river basin (Katun ridge) (Efimova, et al., 2011). Furthermore investigations revealed a pollution of the Altai glaciers with heavy metals like lead, copper and zinc (Galakhov, et al., 2002). Results of numerical modelling of the dynamics of air masses have shown that the source of the pollutants are the industrial complexes of Ust-Kamenogorsk, Zyryanovsk and Ridder (Galakhov & Mukhametov, 1999), which are situated in a distance of 200-400 km from the TBR territory. Further research is necessary to examine the impact of this *deterioration of the water quality* on the biodiversity of the TBR.

Water pollution by household and agricultural waste is considered a smaller problem, but has been more severe in the past, especially before the establishment of the Katon-Karagay State National Park.

The ***introduction of fish species*** into some lakes of the TBR may cause *changes in the composition of the water fauna*. The State program "Development of the fishery in the Altai Republic 2012-2020" focuses on the development of sport and commercial fishing to support tourism and the supply of the local population with fish products. In this context, the non-native species trout (*Salmo sp.*), peled (*Coregonus peled*) and muksun (*Coregonus muksun*) were introduced into Talmen and Lower Multa lake. However, the consequences for the lakes' native fauna have not been investigated yet.

Unsustainable use of natural resources (UUNR)

Overgrazing is considered a serious problem for the TBR and adjacent territories. Although overgrazing decreased significantly due to a decline in livestock farming after the collapse of the Soviet Union, it is still a problem that occurs mainly on the steppe pastures close to the settlements, but also on (sub)alpine meadows and in the sparse larch and pine forests where maral farms are situated and cattle is sent for grazing (Melchenko, 2001). So far overgrazing and its impacts have not been studied in detail for the territory of the TBR, but nevertheless the planning team observes and presumes various impacts on the ecosystems of the TBR.

Photo 29: Soil erosion caused by overgrazing in Katon-Karagay BR
Photographer: Alexander Artemev

Overgrazing is responsible for the degradation and destruction of the permanent vegetation cover of the (forest)steppes and (sub)alpine meadows in the TBR that may eventually lead to a *reduction of habitats of some plant species* due to a shrinking of grass vegetation. If the vegetation cover is destroyed, *soil degradation including soil erosion* can be observed (see photo 29).

Pasture degradation by overgrazing may cause economic problems to the local farmers who have difficulties with the provision of sufficient food for their livestock. The high concentration of livestock around small mountain streams in the forest zone may also lead to trampling of the stream bed and, thus, negative *changes in the hydrological regime of the streams*.

Overexploitation of wild animal species of the TBR is caused by poaching and overfishing. Local people are dependent on fish and meat and furs from wild animals; selling furs, antlers and musk glands may provide an additional income. Furthermore trophy hunting is very popular in the Altai. Poaching leads to a *reduction in population numbers* of certain wild animals in the buffer and transition zone of the Russian part of the Great Altay TBR. Especially on the territory of Belukha Nature Park declines of population numbers are observed for game species such as Siberian roe deer (*Capreolus pygargus*), *S*iberian ibex *(Capra sibirica)*, maral red deer (*Cervus elaphus*) and Siberian musk deer (*Moschus moschiferus*) (Yashina, 2007). Due to overexploitation the Siberian musk deer became already threatened in the Russian part of the TBR (Yashina, 2008a).

Overfishing decreased the numbers of the Arctic grayling (*Thymallus arcticus*) in almost every lake and river of the Russian part of the TBR and the blunt-snouted lenok (Brachymystax tumensis) has already disappeared there (Yashina, 2007) . In the Kazakhstani part of the TBR, population numbers of game and fish species are considered stable (Jurchenkov, 2013).

Poaching on rare and protected species such as the snow leopard (*Pantheria uncia*) is a problem in the Russian part of the TBR, especially on the territory of the Belukha Nature Park. The Pallas's cat (*Otocolobus manul*) has disappeared from the Russian part of the TBR already. The snow leopard is threatened by extinction in the Altai Republic and the whole Russian Federation. If the overexploitation of wild animals increases in the future, a *loss of particular species* on the territory of the TBR may become possible.

The biodiversity and the functionality of the TBR ecosystems is also threatened by ***overexploitation of wild raw non-timber materials***, e.g. berries, mushrooms, medicinal plants, mosses and pine nuts, caused by illegal and/or unregulated collection by the local population. Illegal mass harvest of pine nuts as well as protected medicinal plants like golden root (*Rhodiola rosea*), sweetvetch (*Hedysarum theinum*) and maral root (*Fornicium carthamoides*) has been observed within the transition zone in the Russian part of the TBR (Yashina, 2008a). In the Kazakhstani part moss harvesting for building purposes may threat rare plants such as sundews (*Drosera sp.*), bog cranberry (*Vaccinium oxycoccos*) and orchids (*Orchidaceae* sp.). However, comprehensive scientific research on the ecological impacts of the overexploitation in the TBR has not been carried out so far.

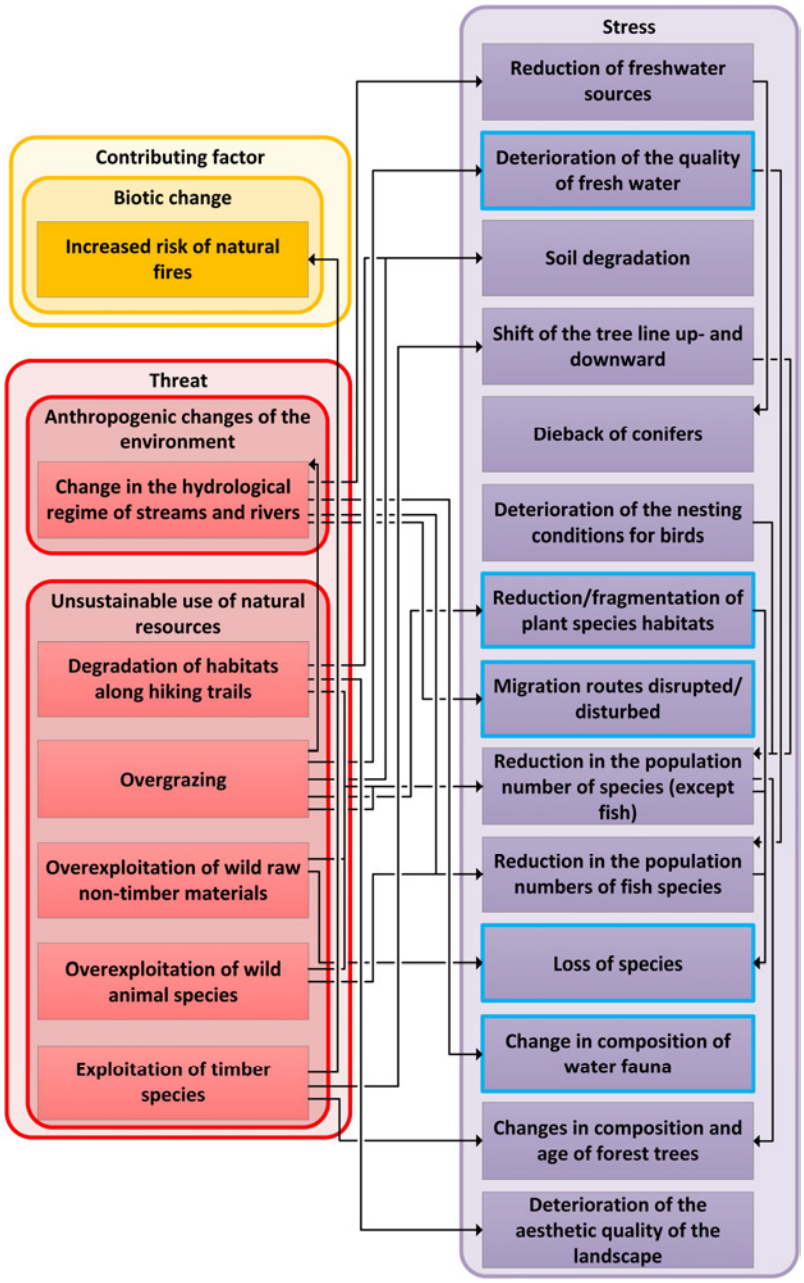


Figure 11: Dimensions of unsustainable use of natural resources and relationship to relevant stresses (the blue frame indicates potential threats or stresses)

Currently, the ***exploitation of timber species*** is not a big threat for the forest ecosystems of the Great Altay TBR. Forestry is restricted to few areas within the buffer- and transition zone of the TBR due to legal regulations, difficult access and lack of forest roads. Furthermore, all forests of the TBR belong to the category of protective forests (*защитные леса*) according to the forest laws of the Republic of Kazakhstan and Russian Federation, i.e. clear cutting is prohibited and only thinning and sanitary cuts are conducted. According to official data relatively constant annual amount of approximately 21,000 m³ of wood is annually cut on the territory of the Kazakhstani part of the TBR and about 2000-3000 m³ wood on the Russian part of the TBR. Nearly all wood obtained through sanitary and thinning cuts is used by the local population and local companies for fuel wood and to a lesser extent as timber. It is not exported to other regions or countries.

However, the actual amount of wood being cut is probably higher due to illegal logging by the local population. The detected annual amount of illegal logging is about 500 m³ in the Russian portion and 10 m³ in the Kazakhstani part of the TBR according to data from the administrations of State Nature Biosphere Zapovednik Katunskiy and Katon-Karagay State National Park. But the administrations presume that not all illegal logging activities are detected by responsible authorities. Illegal logging

occurs usually in easily accessible areas close to the settlements and the roads leading to an *upward shift of the lower tree line*.

The ***degradation of habitats along hiking trails*** is another threat caused by tourists visiting the TBR. So far, it is observed on a local level in the Russian part of the TBR in the river valleys of Multa, Kuragan, Kucherla, Akkem and Kazinikha (Yashina, 2008a). Horse hiking has become very popular for the last 20 years and increased the problem significantly. Besides the *visual deterioration of the landscape*, this threat leads to the degradation and destruction of the permanent vegetation cover causing even small-scale *soil erosion.* However, because of the continuous increase in tourist numbers the criticality of this threat may grow as well, eventually causing a *degradation of plant species habitats* and a *reduction in the population numbers of typical floral species.*

Biotic changes (BC)

The biodiversity of the TBR may become threatened by an increase in forest ***pest*** infestations due to ***local climate changes*** following investigations in other parts of the boreal forest belt (Biringer, 2003) (Tishkov et al., 2008). So far no increase in insect or fungi infestations has been observed on the territory of the TBR.

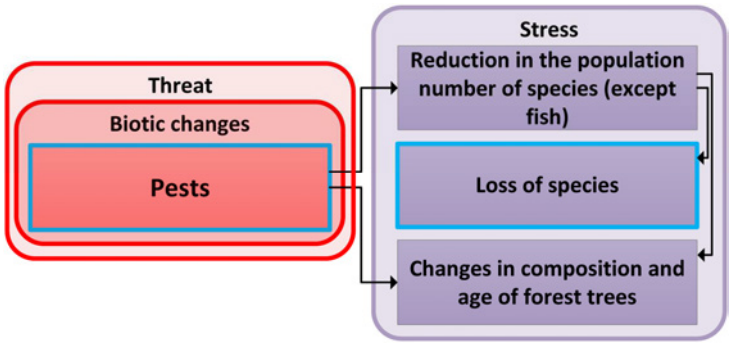


Figure 12: Dimensions of the biotic threats and relationship to relevant stresses
(the blue frame indicates potential threats or stresses)

However, systematic research on the correlation between pests and climate change has not been conducted yet. The most critical pests are siberian silk moth (*Dendrolimus superans sibiricus*), gypsy moth (*Lymantria dispar*), pine-tree lappet (*Dendrolimus pini*) and four-eyed fir bark beetle (*Polygraphus proximus*). If pest infestations increase, forest ecosystems of the TBR may be possibly faced with a *reduction in the population number of forest specie, a reduction of the distribution area* and *changes in the composition and age of forest trees*.

2.3.2 Contributing factors

Numerous human actions and activities contribute to the occurrence and development of the mentioned threats. These contributing factors belong to six main categories: (1) institutional factors; (2) legal/political factors; (3) cultural factors; (4) spatial factors; (5) socio-economic factors and (6) biophysical factors. Table 11 on the following pages provides an overview of all 75 identified contributing factors including their assignment to the mentioned categories and additional sub-categories. Nearly half of the factors are institutional factors, and another third are factors related to the socio-economic situation in the TBR territory.

Corresponding to the stresses and threats, Annex 4 contains information on the importance of each contributing factor for the state of vulnerability of the influenced biodiversity object expressed through the criticality and the systemic activity and on the strategic relevance, the manageability and the level of knowledge. Eight of the 75 contributing factors are considered being of high strategic relevance in terms of the whole TBR territory, while another seven factors have a low strategic relevance. Most of the identified contributing factors receive “medium” ratings.

Tables 12 and 13 show the criticality (C), systemic activity (S_A), strategic relevance (R_S) and manageability (M) of the eight most relevant contributing factors as well as the level of knowledge

(K) of the planning team about these factors. The list of contributing factors in both tables is ordered, firstly, by the combined value of the strategic relevance (arithmetic average of the values estimated separately for the Russian and for the Kazakhstani part of the TBR), secondly, by the combined value of the manageability and, thirdly, by the combined value of the level of knowledge.

Table 11: Contributing factors with their categories and sub-categories

Category	Sub-category	Contributing Factor	$R_{S\ KAZ}$	$R_{S\ RF}$
Institutional factors	Factors related to insufficient/ lack of cooperation	• Insufficient/lack of cooperation between forestry administration and protected area/ environmental authorities	1	1
		• Insufficient/lack of cooperation between maral farms, agricultural administration and protected area/environmental authorities	2	1
		• Insufficient/lack of cooperation between relevant authorities and protected area/ environmental authorities	2	2
		• Gaps in transboundary cooperation	3	3
		• Insufficient/lack of cooperation between tourism agencies, the responsible administrations and protected area/ environmental authorities	2	2
	Factors related to insufficient/ lack of resources	• Insufficient resources in the protected area administration (financial and human resources, physical infrastructure)	**3**	**3**
		• Forestry administration lack resources (financial and human, physical infrastructure)	**2**	**3**
		• Insufficient financial resources for the implementation of legislation in forestry	**2**	**2**
		• Agricultural administration lack resources (financial and human, physical infrastructure)	**2**	**2**
		• Lack of resources of relevant authorities outside protected areas (financial and human, physical infrastructure)	**2**	**2**
	Factors related to lack of knowledge	• Insufficient/lack of knowledge on plant populations and harvest capacity	2	2
		• Forestry administration lack knowledge on sustainable harvesting and processing of timber	1	1
		• Insufficient knowledge about the problems and risks associated with introduction of fish species into lakes	2	2
		• Lack of knowledge on the recreational capacity of the territory	2	2
		• Lack of knowledge of protected area staff to carry out public relations on the prevention of forest and steppe fires	2	1
		• Lack of knowledge on pasture management of maral farms	2	2
	Factors related to lack of control	• Insufficient/lack of pasture management	2	2
		• Deficiencies in the management of maral farms	1	1
		• Insufficient /lack of control over collection of wild raw non-timber materials	1	1
		• Insufficient control of wild animal use	1	2
		• Insufficient regulation/ control of logging and use of the forest	2	1
	Others	• Lack of environmental education by the protected area administration	2	2
		• Insufficient/lack of incorporation of existing knowledge and research from third parties	1	1
Legal / political factors		• Protected area administration lacks authority to regulate the use of natural resources outside protected areas	2	2
		• Inadequate legislation/ legal instruments concerning the regional protected areas	2	2
		• Discrepancy of legislation with principles of biosphere reserves	3	3
		• Obstructions on border line	2	2
		• Implementation of state border law	3	3
		• Inadequate agricultural fire protection regulations	1	1
		• Insufficient regulations and checks on tourism	1	2
		• Lack of programmes to support small businesses	2	1
		• Lack of quotas for the removal of plant species	2	2
		• No organisations for coal delivery	2	2
		• Russian state programme for fishery development	1	2
Cultural factors		• Carelessness of tourists and local inhabitants with open fires	1	2
		• Farmers' low level of awareness of environmental protection	3	3
		• Local inhabitants' low level of awareness of environmental protection	2	1

Category	Sub-category	Contributing Factor	$R_{S\ KAZ}$	$R_{S\ RF}$
		• Tourists, tourism companies and local tour guides' low level of awareness of environmental protection	2	2
		• Loss of traditional knowledge	2	1
		• Traditions of local population	2	2
Spatial factors		• Long distances for coal delivery	2	2
		• Difficult access to sites, especially for (legal) wood cutting	2	2
Socio-economic factors	Tourism	• Poor infrastructure for recreation	**3**	**3**
		• Non-local tourism companies dominate	**2**	**2**
		• Tourist companies do not share taxes in the local community	**1**	**2**
		• Little income from tourism for local people	**1**	**2**
		• Unregulated tourism	**2**	**2**
	Land use/ agricultural factors	• Agricultural fires	2	2
		• Maral farming	2	2
		• Livestock farming practise	2	2
		• Loss of a seasonal pasture rotation system (transhumance)	1	1
	Factors related to living conditions of local communities	• Low standard of living and lack of regular income for local population	**3**	**3**
		• Need of natural resources	**2**	**2**
		• Lack of alternative heating and building materials	**2**	**2**
		• Outdated equipment	**2**	**2**
		• Lack of appropriate equipment for wood processing	**2**	**1**
		• Economic limitations (financial, fuel, machinery, staff)	**2**	**2**
		• Market) demand for wild raw non-timber materials (mushrooms, herbs etc.), fishing tourism and antlers	**2**	**2**
		• Expensive hunting licences	**2**	**2**
		• Limited number of licenses for the removal of wild animals	**2**	**2**
		• High market price for coal and firewood	**2**	**2**
		• High demand for wood and timber	**2**	**2**
	Factors related to use of natural resources	• Unregulated and/or illegal collection of wild raw non-timber materials	2	2
		• Poaching	1	2
		• Unsustainable legal logging	2	2
		• Illegal logging	2	2
		• Global deforestation	2	2
	Others	• Change in land ownership	2	2
		• Commercial interest of individuals	2	2
		• Failure of industry to comply with environmental requirements (cars, equipment)	2	2
		• Construction of hydroelectric power stations	2	2
Biophysical factors		• Greenhouse gas emissions	2	2
		• Global climate change	2	2
		• Increased risk of natural fire	2	2

Table 12: Criticality (C) and systemic activity (S_A) of the most relevant contributing factors

Contributing factor	Category	Kazakhstani part of the TBR					Russian part of the TBR				
		Criticality (C)				Overall systemic activity (S_A)	Criticality (C)				Overall systemic activity (S_A)
		20 years ago	Current	Current trend	In 20 years		20 years ago	Current	Current trend	In 20 years	
1. Discrepancy of legislation with principles of biosphere reserves	Legal/political factors	2	3	2	3	4	2	3	2	3	4
2. Insufficient resources in protected area administration (financial, human resources, physical infrastructure)	Institutional factors	3	3	3	2	4	3	3	2	3	4
3. Poor infrastructure for recreation	Socio-economic factors	1	3	2	3	3	3	2	4	3	3
4. Forestry and forestry administration lack resources (financial and human, physical infrastructure)	Institutional factors	2	2	2	2	4	1	3	2	3	4
5. Low standard of living and lack of regular income for local population	Socio-economic factors	3	3	2	3	3	3	3	2	3	3
6. Implementation of state border law	Legal/political factors	1	3	2	3	3	1	3	2	3	3
7. Gaps in transboundary cooperation	Institutional factors	3	3	2	2	4	3	3	2	2	4
8. Farmers' low level of awareness of environmental protection	Cultural factors	2	3	2	3	3	2	2	3	3	3

Key: Criticality ratings: **1** = lower than current/low/decreasing/ lower than current, **2** = equal to current/medium/stable/ equal to current, **3** = higher than current/high/gradually increasing/ higher than current, **4** = much higher than current/very high/rapidly increasing/ much higher than current; Systemic activity rating: **1** = low, **2** = medium, **3** = high, **4** = very high

Table 13: Strategic relevance (R_S), manageability (M) and level of knowledge (K) of the most relevant contributing factors

Contributing factor	Category	Kazakhstani part of the TBR				Russian part of the TBR				Combined value for the whole TBR			
		R_S value	R_S final range	M	K	R_S value	R_S final range	M	K	R_S value	R_S final range	M	K
1. Discrepancy of legislation with principles of biosphere reserves	Legal/political factors	12	3	2	2	12	3	4	1	**12**	**3**	**3**	**2**
2. Insufficient resources in protected area administration (financial, human resources, physical infrastructure)	Institutional factors	12	3	2	2	12	3	2	1	**12**	**3**	**2**	**2**
3. Poor infrastructure for recreation	Socio-economic factors	11	3	2	2	12	3	2	1	**12**	**3**	**2**	**2**
4. Forestry and forestry administration lack resources (financial and human, physical infrastructure)	Institutional factors	10	2	2	2	12	3	4	3	**11**	**3**	**3**	**3**
5. Low standard of living and lack of regular income for local population	Socio-economic factors	11	3	3	2	11	3	2	2	**11**	**3**	**3**	**2**
6. Implementation of state border law	Legal/political factors	11	3	3	1	11	3	3	1	**11**	**3**	**3**	**1**
7. Gaps in transboundary cooperation	Institutional factors	11	3	2	2	11	3	2	2	**11**	**3**	**2**	**2**
8. Farmers' low level of awareness of environmental protection	Cultural factors	11	3	2	1	11	3	2	1	**11**	**3**	**2**	**1**

Key: R_S = strategic relevance, **M** = manageability, **K** = level of knowledge, **1** = low/very manageable/well known, **2** = medium/somewhat manageable/somewhat known, **3** = high/poorly manageable/ not known, but theoretically knowable, **4** = very high/not manageable/not knowable, R_S-classes: **1:** value <= 7, **2:** 8=<value<=10, **3:** 11=<value<=13, **4:** value >=14

The following paragraphs provide summarized information about the identified institutional, legal/political, socio-economic and cultural factors.

Institutional factors

Nearly half of the contributing factors are related to the acting and planning institutions themselves, e.g. to the protected area administrations, the forestry and hunting administrations, and the regional and local executive bodies (compare with chapter 2.5). These institutions often face a *lack in financial, human and infrastructural resources* that hinders a comprehensive, effective and proactive conservation and management of the TBR ecosystems and their valuable resources. One result is the *lack of control* of human activities in the buffer and core zone of the TBR. For example, in the Russian part of the TBR the staff of Belukha Nature Park consists of five persons only (rangers included), being responsible for the protection and development of more than 132,000 ha of high-mountain territory. Furthermore, the number of inspectors of the Russian Federal Forest Service and the Federal Service for the control of nature use, being responsible for the protection and use of natural resources in the buffer and transition zone of the Russian part of the TBR is extremely limited. Due to the remoteness and poor infrastructural and economic situation of the TBR territory as well as the poor salaries of protected area staff, it is very difficult to keep or recruit young, well-qualified personnel to work in the protected areas of the TBR.

Lack of cooperation between the various authorities and organizations is another institutional problem of the TBR management. This is especially crucial since lack of resources within one managing institution could be improved by sharing staff, information and equipment with another institution. So far, joint activities on the level of the national BRs are restricted to specific practical issues (e.g. fire prevention and fighting, combating poaching), but do not focus on comprehensive planning, implementation and evaluation of the protection and management of the ecosystems in the TBR territory. Only recently, joint public councils have been established in both the Katon-Karagay and Katunskiy BR, which consist of representatives of local authorities, non-governmental organizations (NGO), universities, land users and tourist companies (compare also with chapter 2.5). They will serve as an informal platform for exchange of information and the solution to concrete problems in the BRs. Transboundary cooperation in the field of nature conservation and sustainable development is still limited and mainly restricted to cooperation between the State Nature Biosphere Zapovednik Katunskiy and the Katon-Karagay State National Park. There is still little cooperation in these fields between private business stakeholders, NGOs and local governmental authorities of Ust-Koksa and Katon-Karagay districts. Fundamental preconditions for a successful and sustainable trans-institutional and transboundary management such as the establishment of joint institutional management structures, regular and frequent meetings and a joint data base are still missing due to a lack of resources and legal restrictions.

Obviously, the *lack of knowledge* about the status of the TBR biodiversity objects as well as the relevant stresses and threats are linked to the lack of qualified staff and financial resources in the acting and planning TBR institutions. Another factor is the lack of cooperation between the different authorities and organizations. There is also little knowledge about the ecological impacts of maral farms and the current pasture management in the buffer and transition zone of the TBR. So far, research on climate change and its impacts on ecosystems has been realized for some parts of the Great Altay TBR. Furthermore, results of research projects by international organizations are not always integrated into the current management activities of relevant authorities due to the fact that they are published in English and cannot be understood by key stakeholders. Sometimes, existing data on land use activities, especially spatial data, are not available in open sources or must not be shared with other institutions due to legal restrictions. In the absence of necessary monitoring results on relevant stresses, threats and their contributing factors, management decisions are rarely based on the most relevant and ecosystem based information resulting in continued overexploitation of species and other resources (Government of the Republic of Kazakhstan, UNDP, GEF, 2007).

Legal/ political factors

Political and legal factors concern processes related to legislation, power and governance. The *discrepancy of legislation with principles of biosphere reserves* both in the Russian Federation and in the Republic of Kazakhstan is one of the biggest problems for sustainable and effective management of the national and the transboundary BRs. The concept of UNESCO BRs has not been adequately integrated into the relevant national laws so far (see also chapter 2.4). The Federal Law on protected areas of the Russian Federation refers to state nature biosphere zapovedniks as state nature zapovedniks that received the status of a UNESCO BR[8]. It mentions so-called "biosphere polygons", a kind of semi-protected territory contiguous to state nature zapovedniks, that can be established to promote and develop approaches of sustainable nature use. However, there are no regulations on how to set up these biosphere polygons and how to regulate nature use within these territories. Thus, legal instruments on the incorporation of the concept of sustainable nature use in UNESCO Biosphere Reserves are absent (Grigoryan, 2014). In case of the Republic of Kazakhstan, the national legislation does not refer to UNESCO Biosphere Reserves at all (Chugunkov, 2013).

Another issue refers to the Russian protected areas of regional importance like Belukha Nature Park and Ukok Quiet Zone Nature Park. The protection regime of these regional protected areas is less strict than the protection regime in the strict nature reserves (*zapovednik*). Lands of the regional protected area belong to various land owners and the protected area administrations lack the competence to efficiently regulate and control the use of natural resources on these lands. Regional protected areas are managed and funded by the regional governments like the government of the Altai Republic, receiving limited budget for fulfilling their tasks. Nevertheless, the Ukok Quiet Zone Nature Park and some areas of the Belukha Nature Park are part of the serial Golden Mountains of Altai World Heritage Site and, thus, ensure the protection of the *Outstanding Universal Value* of their territories though appropriate management systems, as well as legislative and regulatory measures.

Amongst others, the missing legal framework leads to a lack of knowledge about the concept of BRs amongst the key stakeholders, a great uncertainty about the distribution of responsibilities within the different authorities, a *lack in trans-institutional cooperation* and to a *lack of financial resources* for the implementation of the BR concept. This is especially critical in case of the Katunskiy Biosphere Reserve, since fostering sustainable development is not included in the official governmental tasks of the administration of the State Nature Biosphere Zapovednik Katunskiy. According to the national law, the activities of the administration of State Nature Biosphere Zapovednik Katunskiy focus mainly on the territory of the State Nature Zapovednik, i.e. the core zone of the BR. Thus, activities that focus on the development of sustainable use of natural resources and trans-institutional cooperation in the Katunskiy BR are initiated and realized through the individual enthusiasm of the protected area managers and local environmental activists who search for alternative funding opportunities and alternative management approaches to overcome the obstacles in legislation. For example, in absence of appropriate governmental funding programmes, the Russian non-governmental organization "Altai-Sayan Mountain partnership" with support of the Worldwide Wildlife Fund (WWF Russia) and the Citi Foundation implemented a micro-credit program for the promotion of ecological and rural tourism in the Altai Republic.

The (*implementation of the) state border laws* of the Russian Federation and the Republic of Kazakhstan hinders practical activities in the field of nature conservation and management of the Great Altay territory and could become even more relevant if the state border was fortified. So far, the biggest problem is the missing official border crossing point on the territory of the Great Altay TBR. Local people, including staff of the protected areas, as well as visitors need to travel either to the seasonal border crossing "Karagay-Kordon" (accessible from mid-June to mid-October), situated in the north-western part of the Ust-Koksa-district, or even further north to an all-the-year border

[8] see footnote 5 on page 19.

crossing point in the Altai province (*Altayskiy Kray*). Thus, regular cooperation and exchange in terms of trade, culture, nature conservation as well as transboundary tourism is complicated.

Before the breakup of the Soviet Union there were several trails crossing the border between Russia and Kazakhstan on the territory of the Great Altay TBR. They served as popular hiking trails like the ones from Rakhmanovskiye Kluchi (Republic of Kazakhstan) to the foot of Mount Belukha or to the springs of the Katun River. Even longer ago, until the foundation of the Soviet Union, there were some old trade routes like the old cattle transport route between Mongolia and East Kazakhstan passing through the Ukok-Plateau or the route from the Uimon depression (Ust-Koksa district/Russian Federation) to East Kazakhstan and further on to China for selling maral antlers (Badenkov, et al., 2009). Nowadays it is illegal to use these trails and to cross the State border on the territory of the projected TBR. Current tourism development in the TBR territory is also complicated by the fact that tourists need to obtain a border permit in advance from the relevant authorities to enter the territory either of the Katunskiy or the Katon-Karagay BR.

Besides these administrative problems, nature conservation efforts may be threatened by a possible future construction of linear border facilities such as fences. So far there are no physical barriers at the State border on the TBR territory yet. Such barriers could eventually disturb movement and migration of wild animals such as roe and red deer, elk and brown bear.

Current developments in terms of transboundary nature conservation like the Intergovernmental Agreement of the Russian Federation and the Republic of Kazakhstan on the "Establishment of the Transboundary Reserve ‹Altai›" (signed on 15 September 2011) promise to mitigate the threat of border fortification and to revive and promote transboundary tourism, economy and cultural exchange.

Socio-economic factors

Poverty, a low standard of living and the lack of a regular income are serious problems to the people living in the TBR territory, but also to the TBR ecosystems. Unemployment is fairly visible in the TBR territory, since some people live on subsistence farming and on products provided directly by the TBR ecosystems like berries, mushrooms, fish and meat of wild animals. To obtain fuel for heating their houses, they collect firewood (sometimes illegally) since coal is too expensive. Selling firewood, medicinal plants, pine cones, honey, dairy products or furs helps to obtain some income. The lack of alternative income possibilities is due to the absence of industry, the collapse of the Soviet farming system and the less developed tourism in the region. A limited number of people benefits from profitable maral farming. Tourism development could improve the economic situation, but so far local residents are little involved in this sector. Instead non-local tourist companies dominate the market. The *difficult living conditions* of the local people are the most important reason for the overexploitation and illegal use of natural resources.

Furthermore, *current land use practises in the field of agriculture, forestry and tourism* pose threats onto the TBR ecosystems. Increasing livestock numbers combined with the lack of a seasonal pasture rotation system lead to overgrazing in the vicinity of the TBR settlements. Burning of crop residues on the fields in spring time and outdated machinery in agriculture and forestry causes fires that often take over adjacent protected areas. Maral farms create linear barriers to moving wild animals. Littering and destruction of habitats along hiking trails is also due to the poor recreational infrastructure. Additionally, projected infrastructure projects, namely the *construction of hydropower stations*, may contribute to the threat situation in the Great Altay TBR.

Cultural factors

There is an *insufficient level of awareness* for environmental protection amongst local people as well as tourists, tourist guides and tourist companies. According to the analysis of opinion polls, local

residents and visitors of the Belukha Nature Park have little knowledge about the existing rules and regulations. Some local tourist guides who accompany tourists on the territory of the TBR do not care about littering and, thus, set a bad example.

Furthermore, some *traditions of the local people* contribute to the development of threats for the TBR ecosystems. Although the fire danger is abundant, local farmers stick to the tradition of burning crop residues after the harvest. According to the administration of the Katon-Karagay State National Park, at least 10% of the fires on the territory of the National Park are fires that escaped from the adjacent agricultural fields.

On the other hand, the *loss of traditional knowledge*, values and beliefs also influences the threat situation in the TBR territory. An important example is the cutback or – in the Russian part of the TBR – even the abandonment of traditional seasonal pasture rotation systems since the middle of the 20th century. In these nomadic grazing system different steppe communities are used in rotation with open woodlands and alpine meadows (Smelansky & Tishkov, 2012) avoiding overgrazing and supporting pasture regeneration. Amongst the indigenous Altaians there is a traditional ecological knowledge that has been lost partially during the last centuries. Altaians maintain a very respectful and protective attitude towards nature since they believe that lakes, rivers, springs, mountains and other natural physical objects have spirit owners (Klubnikin et al., 2000).

2.4 National legislation, bilateral agreements and international conventions

Both in the Republic of Kazakhstan and in the Russian Federation various laws and governmental decrees focus on land use, environmental protection, protected areas and State border issues, which provide the legal basis for the establishment and management of protected areas, the sustainable use of natural resources and transboundary cooperation. The most relevant in terms of the Great Altay TBR are listed down in Tables 14-16.

Table 14: Laws and decrees of the government of the Russian Federation and the Altai Republic

Type of document	Date of origin	Spatial relevance regarding the Great Altay TBR
Federal Law “On specially protected natural territories”	14.03.1995	Protected areas on and around the Russian part of the TBR
Law of the Altai Republic “On specially protected natural territories an objects of the Altai Republic”	04.11.1994	Protected areas on and around the Russian part of the TBR
Decree of the Council of Ministers of the RSFSR “On the establishment of the State Nature Biosphere Zapovednik Katunskiy”	25.07.1991	State Nature Biosphere Zapovednik Katunskiy
Decree of the Altai Republic “On the establishment of the Belukha Nature Park”	10.06.1997	Belukha Nature Park
Decree of the Government of the Russian Federation “Concerning the conception of developing a system of specially protected natural territories of federal importance for the period up to 2020”	22.12.2011	Protected areas on and around the Russian part of the TBR
Decree of the Government of the Altai Republic “Concerning the approval	21.03.2013	Protected areas on

Type of document	Date of origin	Spatial relevance regarding the Great Altay TBR
of the scheme for the development and creation of specially protected natural territories in the Altai Republic until 2020"		and around the Russian part of the TBR
Federal Law "Concerning the international agreements of the Russian Federation"	15.07.1995	Transboundary Reserve "Altai"
Decree of the Government of the Russian Federation "Concerning the approval of a list of activities focusing on the implementation of the Concept for the development of transboundary cooperation in the Russian Federation"	03.07.2003	Transboundary Reserve "Altai"
Decree of the Government of the Russian Federation "Concerning the approval of the chairman of the Russian part of the Joint Committee created in accordance with the Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary reserve "Altai""	25.01.2013	Transboundary Reserve "Altai"
Decree No. 114 of the Ministry of Natural Resources and Ecology of the Russian Federation Ministry – Concerning the approval of members of the Russian part of the Joint Committee created in accordance with the Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary reserve "Altai""	01.04.2013	Transboundary Reserve "Altai"
Federal Forest Law	04.12.2006	entire Russian part of the TBR
Federal Water Law	03.06.2006	entire Russian part of the TBR
Federal Land Law	25.10.2001	entire Russian part of the TBR
Federal Law "On wildlife"	24.04.1995	entire Russian part of the TBR
Federal Law "Concerning the transfer of lands or land sections from one category into another"	21.12.2004	entire Russian part of the TBR
Federal Law "Concerning underground resources"	21.02.1992	entire Russian part of the TBR
Federal Law "Concerning natural medicinal resources, medicinal and healing locations and resorts"	23.02.1995	entire Russian part of the TBR
Federal Law "On the State border of the Russian Federation"	01.04.1993	entire Russian part of the TBR
Order of the Federal Security Service of Russia "On the delimitation of the border zone on the territory of the Altai Republic"	16.06.2006	entire Russian part of the TBR

Based upon (Grigoryan, 2014) and (Ostapovich, 2014)

Table 15: Laws and decrees of the government of the Republic of Kazakhstan

Type of document	Date of origin	Spatial relevance regarding the Great Altay TBR
Law of the Republic of Kazakhstan "On specially protected natural territories"	07.07.2006	Protected areas on and around the Kazakhstani part of the TBR
Decree of the Republic of Kazakhstan "On the establishment of the Katon-Karagay State National Park"	17.07.2001	Katon-Karagay State National Park
Decree of the Republic of Kazakhstan "Concerning the approval of a list of objects of the State nature-protection stock with national significance"	28.09.2006	entire Kazakhstani part of the TBR
Decree of the Republic of Kazakhstan "Concerning the approval of a list of	10.11.2006	entire Kazakhstani

Type of document	Date of origin	Spatial relevance regarding the Great Altay TBR
specially protected natural territories of national significance"		part of the TBR
Decree of the Government of the Republic of Kazakhstan "About the formation of the Kazakhstani part of the Joint the Joint Committee created in accordance with the Agreement between the Government of the Russian federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary reserve "Altai""	20.07.2012	Transboundary Reserve "Altai"
Law of the Republic of Kazakhstan "Concerning the State border of the Republic of Kazakhstan"	16.01.2013	entire Kazakhstani part of the TBR
Environmental Law of the Republic of Kazakhstan	09.01.2007	entire Kazakhstani part of the TBR
Forest Law of the Republic of Kazakhstan	08.07.2003	entire Kazakhstani part of the TBR
Water Law of the Republic of Kazakhstan	09.07.2003	entire Kazakhstani part of the TBR
Decree of the Republic of Kazakhstan "Concerning the approval of a list of fishery waterbodies (sections) with international and national significance"	03.11.2004	entire Kazakhstani part of the TBR
Land Law of the Republic of Kazakhstan	20.07.2003	entire Kazakhstani part of the TBR
Law of the Republic of Kazakhstan "On the protection, reproduction and use of wildlife"	09.07.2004	entire Kazakhstani part of the TBR
Decree of the Republic of Kazakhstan "Concerning the approval of a list of rare and threatened of extinction animal and plant species"	31.10.2006	entire Kazakhstani part of the TBR
Decree of the Government of the Republic of Kazakhstan "Concerning the approval of the structural programme "Zhasyl Damu" for the period 2010-2014"	10.09.2010	entire Kazakhstani part of the TBR

Based upon (Chugunkov, 2013) and (RGP Respublikanskiy tsentr pravovoy informatsii Ministerstva Yustitsii Respubliki Kazakhstan, 2009-2014)

Table 16: Relevant bilateral agreements and contracts

Type of document	Date of origin	Spatial relevance regarding the Great Altay TBR
Agreement between the Government of the Republic of Kazakhstan and the Government of the Russian Federation about cooperation in the field of preventing industrial accidents, catastrophes, natural disasters and the liquidation of their consequences	28.03.1994	entire TBR
Agreement between the Russian Federation and the Republic of Kazakhstan in the field of environmental protection, use of natural resources and the maintenance of the ecological safety on the neighboring territories	22.12.2004	entire TBR
Contract between the Republic of Kazakhstan and the Russian Federation on cooperation and collaboration in the protection of the Russian-Kazakhstani State border"	15.01.2005	Transboundary Reserve "Altai"
Contract between the Republic of Kazakhstan and the Russian Federation about the Russian-Kazakhstani State border	02.12.2005	entire TBR
Agreement between the Government of the Republic of Kazakhstan and the Government of the Russian Federation on cooperation in the field of joint control of the Russian-Kazakhstani State border	11.09.2009	entire TBR
Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary Reserve "Altai"	15.09.2011	Transboundary Reserve "Altai"
Protocol to the Agreement between the Government of the Republic of	19.09.2012	entire TBR

Type of document	Date of origin	Spatial relevance regarding the Great Altay TBR
Kazakhstan and the Government of the Russian Federation about cooperation in the field of preventing industrial accidents, catastrophes, natural disasters and the liquidation of their consequences from March, 28, 1994 relating to the simpliefied procedure for crossing the state border by emergency rescue services and groups		

Based upon (Chugunkov, 2013) and (RGP Respublikanskiy tsentr pravovoy informatsii Ministerstva Yustitsii Respubliki Kazakhstan, 2009-2014)

As described in chapter 2.4 there is a need for amendments to certain laws and regulations, especially to the State Border Laws and the Laws on specially protected natural territories of both countries to facilitate the activities of the Great Altay TBR (Chugunkov, 2013).

The establishment and management of the Katon-Karagay and the Katunskiy BR as well as of the Great Altay TBR contribute to the fulfillment of the following international environmental agreements:

1. Convention for the Protection of the World Cultural and Natural Heritage (Paris, 1972);
2. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington 1973);
3. Convention on Wetlands (Ramsar Convention, 1975);
4. Convention on Migratory Species (Bonn Convention, 1983);
5. The UN Framework Convention on Climate Change (Rio de Janeiro, 1992);
6. UN Convention on Biological Diversity (Rio de Janeiro, 1992);
7. The UN Convention to Combat Desertification (Paris, 1994);
8. Convention on Access to Information, Public Participation in Decision-Making and Access to Justice on Questions Concerning the Environment (Aarhus, 1998).

Furthermore, as members of the United Nations, both the Russian Federation and the Republic of Kazakhstan have ratified the Millennium Development Goals[9]. Appropriate management of the Great Altay TBR contributes to achieve these goals on a regional level in particular goal No. 7 “Ensure environmental sustainability”.

2.5 Relevant stakeholders

The establishment and the management of the Great Altay TBR is a trans-institutional task involving a great variety of governmental authorities, non-governmental organizations, business companies and other stakeholders at local, regional, national and international level. More detailed information and contact details can be obtained from the project reports (Chugunkov, 2013) and (Grigoryan, 2014).

2.5.1 Main stakeholder (groups) of the Kazakhstani part of the Great Altay TBR

Governmental stakeholders on the national, regional and local level

Administrative structures of the Republic of Kazakhstan in the field of nature conservation are centralized. The establishment and management of protected areas and the utilization of natural

[9] http://www.un.org/millenniumgoals

resources are regulated by national legislation, and decrees of the government of the Republic of Kazakhstan. The main national institution is the State Agency '**Committee of Forestry and Wildlife of the Ministry for Environment and Water Resources'**, being responsible for the protection, reproduction and use of forests and wildlife and the establishment and management of protected areas. On a regional level, the Committee is represented by **the Republican State Agency 'Territorial Inspectorate for Forestry and Wildlife of the East Kazakhstan Province**. The main stakeholder in the Kazakhstani part of the Great Altay TBR is the Republican State Agency '**Katon-Karagay State National Nature Park'**, which is responsible for nature protection and management in the core zones, in the bigger part of the buffer zone and in small portions of the transition zone (*kolki forests*) of the Kazakhstani part of the TBR. The park administration is directly subordinated to the Committee of Forestry and Wildlife. Since the Katon-Karagay SNP provides employment for about 500 local people it has also significant impact on the economic and social life in Katon-Karagay district. Furthermore the administration of the State National Park coordinates all activities of the Katon-Karagay BR.

The ***Akimat* of the East Kazakhstan province** is the executive state agency on regional level. Its administrative centre is located in Ust-Kamenogorsk. One of the TBR's key stakeholders of the regional level is the **State Agency 'Management of Natural Resources and Regulation of Nature Use in the East Kazakhstan Province**', which acts on behalf of the regional *Akimat.* It is authorised to carry out the functions of state management and control with regard to the protection of natural resources, forests, wildlife and regulation of the use of nature outside the protected areas. It has the right to act as administrator of nature use programmes. Amongst others, the '**State communal forestry agencies'** and the '**Operation Brigade for Protecting the Plant and Animal World**' are subordinated to this directorate (Chugunkov, 2013).

Local executive state bodies are represented by the ***Akimat*** of the Katon-Karagay district with its administrative centre in Ulken-Naryn, by the **Department of Land Relations of the Katon-Karagay district** and by the ***Akims*** (mayors) of the corresponding rural (sub)districts (Chugunkov, 2013). Seven rural (sub)districts of Katon-Karagay district form the transition zone and, to a smaller extent, the buffer zone of the Kazakhstani part of the TBR. Accordingly, the Akims of the following rural (sub)districts are important TBR stakeholders in terms of a successful regional economic and cultural development: Belkaragay rural district, Katon-Karagay rural district, Akkaynar rural district, Uryl rural district, Zhambyl rural district, Aksu rural district and Korobikhin rural district.

The **Committee of National Security of the Republic of Kazakhstan**, its corresponding regional agency in East Kazakhstan province as well as the operational **Border Service** in the Katon-Karagay district are considered important stakeholders in terms of the protection and management of the Russian-Kazakhstani border region. They are in charge of the implementation and control of all governmental laws and decrees considering the protection, fortification and crossing of the state border (see chapter 2.4).

Private business stakeholders

Stakeholders of the private sector are represented by individual businessmen and companies, mainly involved in the field of agriculture. There are 832 enterprises that carry out breeding of cattle, horses, sheep and maral red deer, processing of livestock and deer products and honey production (Jurchenkov, 2013). Other relevant business stakeholders belong to the tourism sector, including incoming tour operators (often located in Ust-Kamenogorsk) and local providers of touristic services like accommodations, guided tours, health treatments and the sale of souvenirs and natural medicinal products.

Non-governmental and scientific organizations

Within the territory of the Kazakhstani part of the TBR a number of non-governmental organizations (NGO) focus on sustainable development and nature protection. The most active NGOs are the **youth organisation 'Neosphera'**, the **Eco-Tourism Centre 'TEK'**, and the **public organisation 'Mametek'**. They already realized 15 projects on the development of ecological tourism, on environmental education, international environmental exchange, traditional apiculture, sustainable land use and some health projects for children (Chugunkov, 2013).

Various universities like the **East-Kazakhstan State University**, the **East-Kazakhstan Technical State University** or the **Pavlodar State University** are involved in fundamental and applied research of the ecosystems and land use of the Kazakhstani part of the Great Altay TBR.

Religious societies

The religious communities within the Great Altay TBR are primarily represented by Sunni Muslims. According to the legislation of the Republic of Kazakhstan each religious institution has a separate state registration. There are a total of eight religious associations in the territory of the Katon-Karagay district (Chugunkov, 2013).

Coordinating council of the Katon-Karagay biosphere reserve

The scientifc-technical council of the Katon-Karagay State National Park serves as the Coordinating Council of the Katon-Karagay Biosphere Reserve. It consists of the heads of the different departements of the Katon-Karagay SNP, invited experts and interested representatives of the above mentioned stakeholder groups. Head of the council is the general director of the State National Park – Erlan. K. Mustafin, the deputy head is the deputy general director – Raushan N. Krykbaeva and the secretary is the scientific employee N.A. Asylbaeva. The council meets regularly four times a year.

2.5.2 Main stakeholder (groups) of the Russian part of the Great Altay TBR

Governmental stakeholders on the national, regional and local level

In the Russian part of the TBR, the primary stakeholder is the **Ministry of Natural Resources and Ecology of the Russian Federation** and its **Department for State policy and regulation in the field of environmental protection**. Main stakeholder for the operational management in the TBR's core (Russian part) is the **Federal State Budgetary Organization "State Nature Biosphere Zapovednik Katunskiy"** (FSBO "SNBZ Katunskiy") established in 1991. The reserve's administration is directly subordinated to the above mentioned Federal Ministry's Department. The state control in terms of organisation and functioning of the reserve is carried out by the **Federal Service for Supervision of Natural Use**. In 1998 the State Nature Zapovednik Katunskiy has been included in the list of World Heritage Sites as part of the Golden Mountains of Altai World Heritage Site. Furthermore, in 2000, Katunskiy Zapovednik and adjacent territories were designated as Biosphere reserve by UNESCO with the territory of the Zapovednik as the biosphere reserve's core. The administration of the State Nature Biosphere Zapovednik Katunskiy, thereafter, became additionally in charge of the operational management of the World Heritage Site and, the reserve's director became the key coordinator of the planning and operational management of the Katunskiy BR. He is also the chair of the public council of Katunskiy BR (compare also with chapter 2.5.2).

On provincial level (Altai Republic) the **Ministry of Natural Resources, Ecology and property relations of the Altai Republic** is in charge of the protection and use of forests, water bodies and natural resources in the Altai Republic as well as of the establishment and management of protected areas of regional importance. Thus, the **Belukha Nature Park**, situated in the transition and buffer zone of the Great Altay TBR, was established in 1997. Like the State Nature Biosphere Zapovednik

Katunskiy the Belukha Nature Park is part of Golden Mountains of Altai World Heritage Site. Another important stakeholder, which is subordinated to the Ministry of Natural Resources, Ecology and property relations of the Altai Republic, is the **Ust-Koksinsky Forestry District administration**. It manages the state forest fund lands in the buffer and transition zones of the Russian part of the Great Altay TBR and controls the use of timber and non-timber forest resources (Grigoryan, 2014). The **Committee on the Protection, Use and Reproduction of Wildlife of the Altai Republic**, another governmental stakeholder on the regional level, is responsible for the management and control of the aquatic and hunting species in the Katunskiy BR's buffer and transition zones (Grigoryan, 2014).

The entire territory of the Katunskiy BR is located in the Border Security Zone of the Russian Federation. Economic activities and access to the border zone are controlled by the **Border Guard Service of the Federal Security Service of Russia in the Altai Republic**. Therefore, the Border Guard Services has to be consulted in terms of any transboundary planning and management activities.

On the local governmental level, the **Ust-Koksa district administration** is an important stakeholder regarding the planning and implementation of programmes for socio-economic development within the buffer zone and transition zone of the Russian part of the TBR. (Grigoryan, 2014). The territory of the Ust-Koksa district includes nine municipalities with four of them stretching over the territory of the Katunskiy BR (Ust-Koksa, Ognevka, Katanda and Verkh Uimon municipalities). The operational management of their territories including land property management and the maintenance of public infrastructure is organized by the rural district administrations. The Ust-Koksa district administration as well as the administrations of the four mentioned rural districts are represented in the public council of the Katunskiy BR. (Grigoryan, 2014).

Private business stakeholders

Very similar to the Kazakhstani part of the TBR private business stakeholders are mainly involved in agriculture, hunting and tourism. Lands of five livestock breeding companies, two hunting companies and seven maral red deer farms are included in the Russian part of the Great Altay TBR (Altaye-Sayanskoe gornoye partnerstvo, 2014). Furthermore, there are various tour operators, small-scale hotels and handcrafters offering their services to the visitors of the Katunskiy BR. So far, only private business stakeholders from the tourism sector are represented in the public council of the Katunskiy BR.

Non-commercial and scientific organizations

The **non-commercial organization "Altai-Sayan Mountain Partnership"** was established by the administration of the FSBO "SNBZ Katunskiy". The purpose of the organization is to develop and implement programmes supporting the capacity of protected areas, to support sustainable livelihoods of local communities as well as promoting environmental education. The Altai-Sayan Mountain Partnership has the opportunity to raise external funds to implement projects promoting sustainable development, scientific research and technical support. The organization is a member of the Public Council of the Katunskiy BR (Grigoryan, 2014).

Various scientific partners are involved in research and monitoring activities of the Katunskiy BR, e.g. the **Altai State University**, the **Gorno-Altaisk State University**, and several institutes of the **Siberian branch of the Russian Academy of Sciences** (Grigoryan, 2014). This is especially important since resources for scientific research within the administrations of State Nature Biosphere Zapovednik Katunskiy and Belukha Nature Park are limited (see chapter 2.3.2).

The public council of the Katunskiy biosphere reserve

In November 2014, the **public council of the Katunskiy Biosphere Reserve** was established, a non-judicial body that safeguards the involvement of various local stakeholders in sustainable socio-economic development activities in the BR's transition zone and the effective protection of the core zone of the BR. Amongst other tasks, the public council reviews current and projected socio-economic and environmental activities and develops recommendations and suggestions to the responsible authorities. It serves as a platform for discussion of complex issues regarding sustainable land use, sustainable economic development and environmental protection with the various stakeholders of the BR. The public council includes representatives from the administration of the Ust-Koksa district, the council of deputies of the Ust-Koksa district, the administrations of the Ust-Koksa rural district, the tourism business sector, the protected area administrations, non-governmental organizations and local inhabitants of high standing (Grigoryan, 2014).

2.5.3 Relevant national UNESCO committees

The **Commission of the Russian Federation for UNESCO** and the **National UNESCO and ISESCO Commission of the Republic of Kazakhstan** are, amongst others, responsible for the implementation and supervision of the World Heritage Convention and the UNESCO programme "Man and Biosphere". The **Kazakhstan National Committee of the UNESCO MAB-Programme** and the **Russian Committee of the UNESCO MAB-Programme** are the subordinated institutions that focus on the establishment of BRs. Up to date there are four national BRs within Kazakhstan: the Korgalzhin BR (designated in 2012), the Alakol BR (2013), the Ak-Zhayik BR (2014), the Katon-Karagay BR (2014) and the Aksu-Zhabagly BR (2015) (UNESCO, 2015c). The Katunskiy BR is one of currently 41 BRs in the Russian Federation.

The **Russian National World Heritage Committee** focuses on the implementation of the World Heritage Convention. The Golden Mountains of Altai World Heritage Site (1998) is one of currently ten World Natural Heritage Sites in the Russian Federation. It includes territories of the Great Altay TBR. One WNHS has been designated in the Republic of Kazakhstan so far (Saryarka – Steppes and lakes of Northern Kazkahstan, 2008). For several years there has been a process of preparing an extension nomination for the Golden Mountains of Altai World Heritage Site including territories of the Republic of Kazakhstan, Mongolia and the People's Republic of China. Amongst others, first territorial suggestions promote the inclusion of territories of the Katon-Karagay BR into the serial transboundary World Heritage Site (Butorin, 2013) (Chugunkov, 2013).

2.5.4 Joint commission on the implementation of the agreement between the government of the Russian Federation and the government of the Republic of Kazakhstan on the establishment of the transboundary reserve "Altai"

The Joint Commission was formed in the year 2013 including members of relevant national and regional authorities of the Republic of Kazakhstan and the Russian Federation, WWF Russia and the Russian Committee of the UNESCO MAB-Programme. The first Commission meeting took place on 27 November 2013 in Manzherok (Altai Republic) with participation of various invited guests, the second meeting on 24 November 2014 in Ust-Kamenogorsk (Republic of Kazakhstan). The joint commission meets annually and discusses and plans joint activities in the field of territory protection, environmental education, research, monitoring, sustainable nature use and eco-tourism between the State Nature Biosphere Zapovednik Katunskiy and the Katon-Karagay State Nature Park to allow for a more effective protection of the transboundary ecosystems.

2.5.5 International organizations and institutions

The **International Coordination Council "Altai – Our Common Home"** was formed in 2003 by the legislative bodies of the six territories of the Altai mountain region: Altai Krai and the Altai Republic (Russian Federation), the Eastern Kazakhstan Oblast (Republic of Kazakhstan), Xinjiang-Uigur autonomous region (People's Republic of China), and the Bayan-Ulgiisky and Khovdsky Aimaks (Mongolia). This sub-regional council is a voluntary, non-judicial body, which aims at the development of the border regions and the preservation of the ecological balance in the Altai Mountains. Conferences and seminars on the traditional economic and cultural connections among the Altai countries, on the shared cultural and natural heritage and on the improvement of living conditions in the border region are held under the auspices of the Coordination Council. Current projects focus on the development of tourism and, in particular, on transboundary touristic trail (Chugunkov, 2013) (Grigoryan, 2014).

The **United Nations Development Programme** (UNDP) supports the efforts of the Republic of Kazakhstan and the Russian Federation to preserve globally significant biodiversity. Between 2006 and 2012 two comprehensive, multi-year projects have been implemented through the UNDP in the Kazakhstani and Russian part of the Great Altay TBR: "Conservation of biodiversity in the Russian part of the Altai-Sayan Ecoregion" and "Conservation and sustainable use of biodiversity in the Kazakhstani region of the Altai-Sayan Ecoregion". Amongst other project results, new protected areas were established, population numbers and status of key animal species were assessed, additional protection measures for rare and endangered animal species were established, management plans for the protected areas were developed, protected area administrations were trained and provided with modern equipment, transboundary cooperation was strengthened and alternative livelihoods for local communities were initiated (Williams & Mogilyk, 2012) (Kasparek, 2011).

The **World Wildlife Fund** (WWF) commenced its conservation activities in the Altai-Sayan Ecoregion (ASER) in 1996 in Mongolia, then in the year 1998 in the Russian Federation (WWF, 2015a). The Altai-Sayan Ecoregion is one of the 35 global top priority sites for WWF and one of the five transboundary ecoregions that is supported in the framework of the Protected Areas for a Living Planet (PA4LP) project of WWF and the MAVA Foundation. There is a national WWF branch in the Russian Federation, while projects in the Republic of Kazakhstan are implemented through operational staff only. WWF was also involved in the multi-year UNDP projects on biodiversity conservation in the Altai-Sayan Ecoregion and developed the Altai-Sayan Ecoregion Conservation Strategy (WWF, 2012). Furthermore, the head of the Altai-Sayan programme of WWF Russia has been elected as member of the Joint Commission for the realization of the Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai" (see 2.5.4).

On the basis of the **Governmental Agreement between the Russian Federation and Germany on Environmental and Nature Protection** (dated 1992), the **German Federal Ministry for the Environmental, Nature Conservation and Building of Nuclear Safety** (BMUB) represented by the **German Federal Agency for Nature Protection** (BfN) supports various joint activities, projects and conferences, which focus on the elaboration of concepts and measures for the conservation and sustainable use of nature as well as the development of protected areas, mainly in the region of Lake Baikal, the Baltic Sea and the Altai Mountains (Federal Agency for Nature Conservation (BfN), 2012). In the framework of the International Climate Initiative (IKI) the BMUB funded a sub-project of the multi-year UNDP project on biodiversity conservation in the Russian part of the Altai-Sayan Ecoregion. Finally, the development of the present management plan was funded and technically supported by BMUB/BFN (compare with chapter 1).

2.6 Current development programmes, strategic and operational management plans and agreements

Currently, the protection and management of the ecosystems and natural resources of the territory of the Great Altay TBR as well as the socio-economic development of the border region is mainly organized on the country level (Tables 17 and 18). There are various strategic and operational management plans as well as socio-economic development programmes initiated and implemented by governmental and non-governmental institutions. Furthermore, to allow for a more effective management, trans-institutional cooperation is realized through contracts and agreements between the protected area administrations and other local authorities. For the last 10 years first transboundary initiatives and cooperation programmes have been established, especially between the administrations of the Altai protected areas (Table 19).

Table 17: Current relevant management documents for the Kazakhstani part of the Great Altay TBR

Type of document	Official status	Area of Intervention	Management issues
Management Plan of the Katon-Karagay State National Park for 2014-2018 (RGU Katon-Karagayskiy gosudarstvenny natsionalny prirodny park, 2015)	*Approved by …* the Decree of the Committee of Forestry and Wildlife of the Ministry for Agriculture of the RoK, No. 142, 25.05.2015 *Operated / implemented by…* the administration of the Katon-Karagay State National Park	core zone and bigger part of the buffer zone of the Kazakhstani part of the TBR (=territory of the Katon-Karagay State National Park); many activities also focus on the local population that lives within the transition zone of the TBR	- nature conservation, scientific research, monitoring - interaction with local population, e.g. involving them in nature protection activities - support of selected economic activities, e.g. use of timber and non-timber forest products, maral-breeding, beekeeping and ecological tourisms
Annual working plan of the Katon-Karagay State National Park for 2015 (including sub-plans of the different departments of the State Nature Park administration) (RGU Katon-Karagayskiy Gosudarstvenny Natsionalny Prirodny Park, 2014)	*Agreed by* the chairman of the Committee of Forestry and Wildlife of the Ministry for Agriculture of the RoK, 17.02.2015 *Approved by …* the general director of the Katon-Karagay State National Park *Operated / implemented by…* the administration of Katon-Karagay State National Park	see above	- territory control (patrolling plan; firefighting plan) - protection and restoration of forests and wildlife (forestry measures; provision of fodder for wild animals; hunting management) - Research and Monitoring - Environmental education and Public Relations - Tourism (Visitor management; training for local hosts)
Perspective Thematic Plan of Scientific Research in the Katon-Karagay State National Park for 2011-2016 (RGU Katon-Karagayskiy Gosudarstvenny Natsionalny Prirodny Park, 2010)	*Agreed by* the Ministry of education and science of the Republic of Kazakhstan, 29.10.2010 *Approved by …* the chairman of the Forestry and Hunting Committee of the Ministry for Agriculture of the RoK, 30.12.2010 *Operated / implemented by…* the scientific department of the Katon-Karagay State National Park (in cooperation with partners)	core zone and bigger part of the buffer zone of the Kazakhstani part of the TBR (=territory of the Katon-Karagay State National Park)	- Annual inventory and monitoring activities in the framework of the “Chronicles of Natures” - Inventory of the flora and of the vertebrates on the territory of the Katon-Karagay State National Park - Research on the snow leopard on the territory of the Katon-Karagay State National Park - Research on coleoptera - Impact of grazing on forest regeneration and biodiversity at the forest-steppe border of the Altai and Khangay - Long-term monitoring of climate change using lichen as indicators

Type of document	Official status	Area of Intervention	Management issues
Forest Inventory Plan of the Katon-Karagay State National Park for 2014-2029 (RGKP Kazakhskoye lesoustroitelnoye predpriyatie, 2014)	*Approved by …* the Decree of the Committee of Forestry and Hunting of the Ministry for Environment and Water Resources of the RoK 11.12.2013, No. 356 *Operated / implemented by…* the administration of the Katon-Karagay State National Park	all forest lands within the Kazakhstani part of the TBR	- inventory of all forest lands (forest type, age state, area size etc.) - defines areas where afforestation, hay making and grazing is allowed - defines the zonation scheme of the Katon-Karagay State National Park and serves as the basis for its management plan
Biological and economic feasibility study. Designation of hunting grounds on the territory of the Katon-Karagay State National Park (Assoziaziya okhotkhozyaystvennykh organizatsiy VKO, S. Milovazkiy, 2010)	*Approved by…* the Letter of the Forestry and Hunting Committee of the Ministry for Agriculture of the RoK, No. 367, 17.05.2011 *Operated/implemented by…* the administration of the Katon-Karagay State National Park	buffer zone of the Kazakhstani part of the TBR	- determination of places where hunting is allowed - determination of game species - determination of quotas
Correction of the feasibility study for the Katon-Karagay State National Park concerning the elaboration a general infrastruction development plan (Zentr distanzionnovo zonirovaniya i GIS “Terra”, 2009)	*Approved by…* The Decree of the Forestry and Hunting Committee of the Ministry for Agriculture of the RoK, No. 18, 12.01.2010 *Operated/implemented by…* the administration of the Katon-Karagay State National Park	core zone and bigger part of the buffer zone of the Kazakhstani part of the TBR (=territory of the Katon-Karagay State National Park)	- Assessment of the existing infrastructure (roads, ranger stations, guest houses etc.) - Positioning of the projected infrastructural objects of the Katon-Karagay SNP - Correction of the functional zonation of the Katon-Karagay SNP - rules of leasing land of the Katon-Karagay State National Park to local people for construction of guest houses
Annual cooperation plans of the Katon-Karagay State National Park with various partners for 2015	*Signed and implemented by…* the administration of Katon-Karagay State National Park, the Fire Protection Service of the Katon-Karagay district, major agricultural companies, the police departments and the border protection service	whole territory of the Kazakhstani part of the TBR	- in the field of fire control and firefighting - in the field of control and protection of forests and wildlife (fighting of illegal logging, fishing, hunting etc.)

Type of document	Official status	Area of Intervention	Management issues
Development Program for the Territories of the Katon-Karagay district for 2011-2015 (Otdel ekonomiki i byudzhetnovo planirovaniya Katon-Karagayskovo rayona, 2010)	*Approved by …* … *Operated / implemented by…* Akimat of the Katon-Karagay district	whole territory of Katon-Karagay district (including the Kazakhstani part of the TBR)	- Accelerated development of the regional economy based on the introduction of advanced technologies in the agro-industrial complex, tourist sector, industry, in investments, small businesses, trade and the environment - Development of the social sphere and human potential, increasing the quality of life level, provision of all types of quality social services - Modernisation of Infrastructure, allowing industrialisation of the economy and provision of high-quality residential, communal and transport services - Territorial Structuring - Development of a system of state local management and local government

Source: Partially based on (Chugunkov, 2013)

Table 18: Current relevant management documents for the Russian part of the Great Altay TBR

Type of document	Official status	Area of Intervention	Management issues
Governmental assignment for State Nature Biosphere Zapovednik Katunskiy for 2015 and the planning period 2016-2017 (Federalnoye gosudarstvennoye byudzhetnoe uchrezhdeniye "Gosudarstvenny prirodny biosferny zapovednik Katunskiy", 2014)	*Approved by …* the Ministry of Natural Resources and Ecology of the Russian Federation *Operated / implemented by…* FSBO “SNBZ Katunskiy”	core zone of the Russian part of the TBR (= territory of State Nature Biosphere Zapovednik Katunskiy); many activities also focus on the local population that lives within the transition zone of the TBR	- Protection of nature complexes in their natural state (fire prevention and fighting; installation of salt licks; litter collection) - Prevention of environmental law violations (patrolling for law enforcement) - Environmental education - Research (special focus on climate change; also applied research projects on behalf of the government of the Altai Republic) - Ecological monitoring (annual monitoring activities in the framework of the “Chronicles of Natures”; special focus on climate change and river hydrology)
Governmental assignment for Belukha Nature Park for 2015 and the planning period 2016-2017 (Byudzhetnoe uchrezhdenie	*Approved by …* Ministry of Forestry of the Altai Republic *Operated / implemented by…* administration of Belukha Nature Park	A big part of the buffer and transition zone of the Russian part of the TBR (=territory of the	- Protection of the environment and natural landscapes (patrolling for law enforcement, hunting management, provision of fodder for wild animals, monitoring of game species numbers etc.) - Establishment of appropriate conditions for tourism and recreation on the territory of the park (maintenance of trails signs

Type of document	Official status	Area of Intervention	Management issues
Respubliki Altay "Prirodny Park Belukha", 2014)		Belukha Nature Park)	etc.) - Protection of the recreational services of the Nature Park - Development and implementation of effective methods for nature protection and the maintenance of the ecological balance under tourism (monitoring of the stresses caused by tourism etc.)
Regulation on forest management of Ust-Koksa forest district (Ministerstvo prirodnykh resursov, ekologii i imushchestvennykh otnosheniy Respubliki Altay, 2011)	*Approved by …* the decree of the Ministry of Forestry of the Altai Republic on March 14, 2011 № 70 *Operated / implemented by…* the administration of the Ust-Koksa forest district	state forest lands within the buffer and transition zone of the Russian part of the TBR	- determination of main activities concerning the use, protection and reproduction of the state forests on the territory of the Ust-Koksa forest district
Regulation on Forest Management of the State Nature Biosphere Zapovednik Katunskiy (Ministerstvo prirodnykh resursov i ekologii Rossiyskoy Federatsii, 2009)	*Approved by …* the director of the department of State policy and regulation in the field of environmental protection and ecological safety of the Ministry of Natural Resources and Ecology of the Russian Federation, 2009 *Operated / implemented by…* FSBO “SNBZ Katunskiy”	state forest lands within the core zone of the Russian part of the TBR	- determination of main activities concerning the use, protection and reproduction of the state forests on the territory of the State Nature Biosphere Zapovednik Katunskiy
Concept for the Socio-Economic Development of Ust-Koksa district for 2008 – 2022 (MO Ust-Koksinskiy rayon, 2007)	*Approved by …* the Board of municipal deputies of Ust-Koksa district, 12.09.2007 *Operated / implemented by…* Ust-Koksa district administration	Ust-Koksa district including the whole Russian part of the TBR	- functional zonation of the district’s territory (e.g. industrial, administrative, settlement, building and touristic zones) - inventory and monitoring of the lands - establishment of recreational zones in rural districts - development of a network of major communication & transport routes - reconstruction and extension of existing public infrastructure (water supply, canalization, electricity, communication) - construction of a road from Tyungur to Inya and the road
Scheme of Territorial Planning of the Altai Republic	*Approved by …* the decree of the Government of the Altai Republic, 21.11.2012	Altai Republic (including the whole Russian part of the TBR)	- strategy for the development of the territory of the Altai Republic - functional zonation, administrative zonation (districts) - natural-ecological zones

Type of document	Official status	Area of Intervention	Management issues
(Ministerstvo regionalnovo razvitiya Respubliki Altay, 2008)	*Operated / implemented by…* Ministry of the economic development of the Altai Republic		- problematic territories and places - regulations of the development of urban areas - regulations on the use of the territories
Cooperation agreements and annual working plans of the State Nature Biosphere Zapovednik Katunskiy with various partners	*Signed and implemented by…* FSBO "SNBZ Katunskiy" and - the Police Station Ust-Koksa - the Committee for protection, use and reproduction of fauna of the Altai Republic - administration of Belukha Nature Park - Forest Service of Ust-Koksa district	whole Russian part of the TBR	- interagency anti-poaching brigade in order to protect the environment and wildlife in the territory of the State Nature Biosphere Zapovednik Katunskiy, the Belukha Nature Park and adjacent territory of the Ust-Koksa district - cooperation with the Forest Service of Ust-Koksa district in the field of fire protection and fire control
Non-governmental micro-credit program for local residents (Yashina, 2013)	*Implemented by…* the NGO "Altai-Sayan Mountain Partnership", WWF Russia and the Citi Foundation	Settlement area close to the protected areas in 4 districts of the Altai Republic (Onguday, Ust-Koksa, Ulagan and Kosh Agach) including settlements in the transition zone in the Russian part of the TBR	- interest-free loans are provided to a selected number of submitted projects - touristic infrastructure (guest houses, camp sites etc.) - touristic services (production of information material, construction of museums, provision of transport etc.) - local products (farming products, souvenirs, establishment of production sites etc.) - marketing and distribution of products and services (creation of websites, printing of information material etc.)

Source: partially based on (Grigoryan, 2014)

Table 19: Current relevant documents on transboundary management

Type of document	Official status	Area of Intervention	Management issues
Plan of Joint Actions of State Nature Biosphere Zapovednik Katunskiy and Katon-Karagay State National Park for 2014-2015 (Smeshannaya Komissiya po realizatsii mezhpravitelstvennovo soglasheniya o sozdanii transgranichnovo reservata "Altai", 2014)	*Signed and implemented by…* the Joint Commission on the Implementation of the intergovernmental Agreement on the establishment of the transboundary reserve "Altai", 24.11.2014	core zones and parts of the buffer zone of the TBR; many activities also focus on the local population that live within the transition zone of the TBR	- Increase the efficiency of nature protection activities in the border region - Development of the management plan for the projected Great Altay TBR - Coordination of activities in the field of scientific research and ecological monitoring - Conduction of activities in the field of environmental education
General Strategy for the Development and Management of the World Heritage „Golden Mountains of Altai" and its corresponding **Action Plan 2009-2015** (Natural Heritage Protection Fund, 2009) (Yashina, 2008b)	*Approved by …* Ministry of Natural Resources of the Altai Republic, administrations of State Nature Biosphere Zapovednik Katunskiy and State Nature Biosphere Zapovednik Altayskiy, 2009 *To be implemented – particularly on the territories overlapping the TBR - by …* administration of WHNS State Nature Biosphere Zapovednik Katunskiy, Belukha Nature Park, Ukok Quiet Zone Nature Park	whole territory of the World Heritage Site including the core zone and parts of the buffer and transition zone of the Russian part of the TBR	- Provision of long-term conservation of the outstanding universal value and integrity of the component parts of the World Heritage Site property - Extension of area and justification of additional criteria for the World Heritage Site property - Provision the information about value of the World Heritage Site property to wider public - Strengthening interregional and international cooperation - Strengthening the legal base for management of the WNHS property - Provision of financial sustainability of the World Heritage Site property - Optimization of management of the World Heritage Site property - Provision of adequate scientific & methodological support for implementation of the World Heritage Site Convention within the World Heritage Site property
Altai-Sayan Ecoregion Conservation Strategy (ASER Strategy) (WWF, 2012)	*Elaborated and implemented by…* **WWF Netherlands, WWF Russia and its Altai-Sayan Sub-office**	Altai-Sayan Ecoregion including the entire territory of the TBR	- Law Enforcement Strategy - Climate Adoption Strategy - Econet Strategy - Integrated River Basin Management Strategy - Community Based Natural Resource Management

2.7 Spatial relationship and connectivity

The Great Altay TBR is part of the Altai-Sayan Ecoregion, which encompasses a great variety of ecosystems. More than 200 protected areas of different legal status make up 16.5%, respectively 17.6 million ha, of the total area of the ecoregion (WWF, 2012) (WWF, 2015d). The global importance of this ecoregion was also recognized through the nomination of two World Natural Heritage Sites (the transboundary Uvs Nuur Basin World Heritage Site and the Golden Mountains of Altai World Heritage Site), six UNESCO biosphere reserves (including Katon-Karagay BR and Katunskiy BR) and four Ramsar Sites.

Table 20 lists down the ten protected areas, which are situated within a radius of 50 km of the Great Altay TBR borders (see also Figure 4). Seven of these protected areas are directly or indirectly connected to the territory of the Great Altay TBR through interjacent protected areas. Furthermore, areas of the territory of the Golden Mountains of Altai World Heritage Site overlap the eastern territory of the Great Altay TBR.

Table 20: Existing protected areas in the close surrounding of the Great Altay TBR borders

Country	Administrative unit	Protected area	Area size (ha)
Republic of Kazakhstan	Kurchum district	Markakol State Nature Zapovednik*	102,979[a]
	Zyryan district	Nizhneturgusunskiy Zakaznik Reserve	2,200[a]
		West-Altai State Nature Zapovednik	86,122[a]
Russian Federation	Onguday district	Uch-Enmek Nature Park*	81,123[b]
		Sumultinskiy Wildlife Refuge	255,352[b]
	Kosh-Agach district	Shavlinskiy Wildlife Refuge*	328,881[b]
		Sailugemskiy National Park (cluster „Argut“)*	80,730[b]
		Ukok Quiet Zone Nature Park*	254,204[b]
People’s Republic of China		Hanasi Nature Reserve*	220,162[c]
Mongolia	Bayan-Ölgii Province	Altai Tavan Bogd National Park*	1,566,500[d]

* direct or indirect – through interjacent protected areas– connection with the TBR territory; [a] (Akim Vostochno-Kazakhstanskoy Oblasti, 2012), [b] (Altaiskiy regionalny institut ekologii, 2015), [c] (China State Forestry Administration, et al., 2010), [d] (Bayan-Oylgiy Aimag, 2014)

Amongst others, the establishment of the Great Altay TBR focuses on the conservation of migratory species, especially ungulates and carnivores. For example, the snow leopard, an umbrella species for the high mountain areas of the Altai-Sayan Ecoregion, inhabits vast areas of the Altai-Sayan Ecoregion including parts of the Great Altai TBR (see WWF, 2012).

Several factors can be seen as favourable and promising in terms of an improved protection of migratory mammals and in terms of habitat connectivity in the TBR region and beyond:

- The significantly large area sizes of the existing protected areas;
- The high degree of connectivity of the existing protected areas;
- The absence of linear border infrastructure between the Republic of Kazakhstan and the Russian Federation;
- The establishment and joint management of the existing Golden Mountains of Altai World Heritage Site;
- The projected establishment and management of the Great Altay TBR (see chapter 3 and 4); and
- The projected extension of the existing World Heritage Site and BRs in the Altai Mountains (see chapter 6).

3. Conservation design and strategies[10]

Conservation design and the concrete management strategies of the Great Altay TBR are based on the results of the systemic situation analysis as well as on the specific requirements of the UNESCO MAB-Programme formulated in the Seville Strategy, the Seville+5 Strategy (Pamplona Recommendations) and the Madrid Action Plan.

3.1 Vision

The **Great Altay TBR** Vision, which is shared by the Republic of Kazakhstan and the Russian Federation, is:

The Great Altay TBR area is a highly preserved natural area with a unique biological, landscape, ethnic and cultural diversity, providing a large range of ecosystem services, which are important to local communities as well as to humankind at the regional and global levels. It is created to conserve and study its biotic and abiotic features in a transboundary context and to enhance both the material as well as the spiritual wellbeing of local communities.

The Great Altay TBR will be a model for sustainable development of border mountain areas.

It will be jointly managed by the Governments of the Republic of Kazakhstan and the Russian Federation with the participation of all stakeholders following an adaptive management approach. Thus, the management of the TBR and the activities of the local people will seek to adapt to existing and potential threats, including threats related to climate change.

3.2 Conservation goal

With regard to the status of the earlier defined conservation objects, the Great Altay TBR states to achieve the following **overarching** long-term **conservation goal** (see also Box 8):

By 2040, functional and resilient ecosystems of the Great Altay TBR support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard. They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.

As outlined in chapter 2.2.1 the state of resilience is indicated by the rating of the nine identified key ecological attributes: glaciers mass dynamics, vertical mountain zoning, viable population size, continuous vegetation cover, water quality, river discharge dynamics, woody biomass, connectivity, species composition. As the conservation goal is also aiming at a high variety of ecosystem services and wellbeing of the Altai population the following six development indicators will point out the

[10] The authors of this section are Anja Krause, Judith Kloiber, Anja Wünsch, Raushan Krykbaeva, Alija Gabdullina, Tatjana Yashina & Pierre L. Ibisch

state of human wellbeing: variety of ecosystem services, level of satisfaction among locals, diversity of income opportunities, humans' physical and mental health, access to information, freedom, choice, and security through disaster prevention.

With the designation of the Great Altay TBR the overarching goal will be further detailed into more **specific conservation goals** related to single ecosystem types or species (see strategy 2 in chapter 3.5.2).

Box 8: Conservation goals and objectives

Conservation goals are formal statements of the intended long-term management impact, describing a desired status for the conservation objects. Usually, they will refer to the biodiversity objects, but could also describe intended impacts on ecosystem services and human wellbeing objects. Goals must be impact-oriented, measurable, time limited, and specific. In order to meet the goal a set of **overall objectives** and **intermediate management objectives** must be accomplished. Correspondingly, **objectives** are formal statements of the intended short- and medium-term management result. In particular, the **intermediate objectives** must be management-result oriented, measurable, time-limited, specific, and practical (Ibisch & Hobson, 2014).

3.3 Overall objectives

The Great Altay TBR is established and managed in line with the concept of UNESCO Biosphere Reserves. Accordingly, the Great Altay TBR is a model for sustainable development of border mountain areas. It provides the general framework for action in the transboundary context.

In this effort, it is a strategic transboundary layer overarching both national BRs. While each national BR is already serving as learning site for sustainable development within the World Network of Biosphere Reserves, the TBR supports particularly a strengthened collaboration, cooperation and coordination between the adjacent states together with local communities.

As such, the Great Altay TBR is fulfilling the three functions of UNESCO BRs: **conservation function, development function** and **logistic support function**. In order to fulfil these complementary and mutually reinforcing functions an effective **institutional mechanism** including an applicable **legal frame** must be in place as pointed out in the Seville+5 recommendations (UNESCO, 2001).

Figure 13 illustrates a synthesis of the UNESCO BR institutional mechanism and legal frame as well as the three functions of the Great Altay TBR.

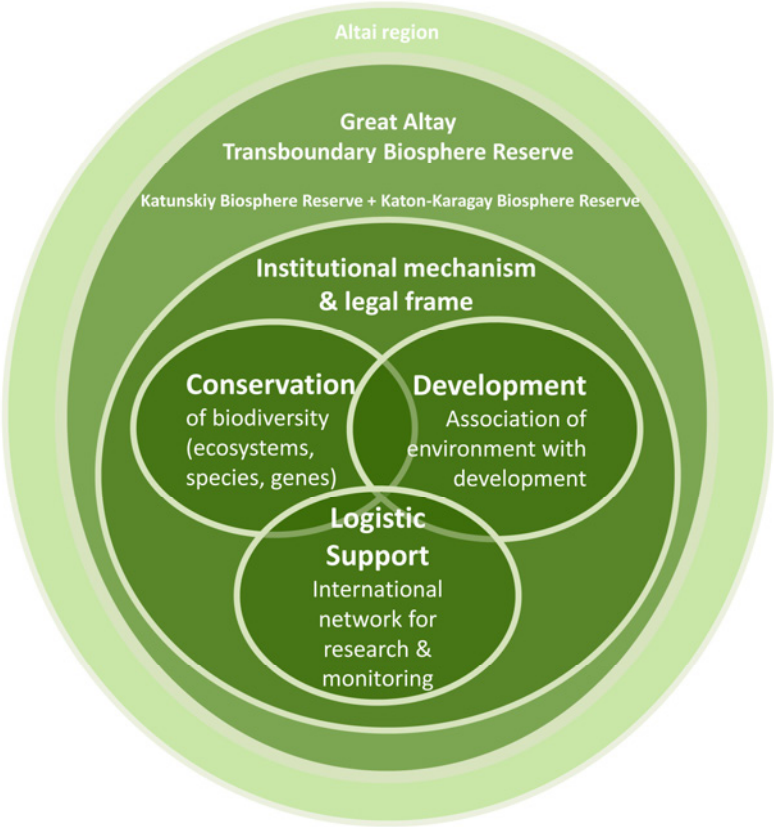


Figure 13: Functions of the Great Altay TBR correspondingly to the UNESCO BR concept

In order to meet the conservation goal and the UNESCO BR concept a set of **four overall objectives** are accomplished.

For the transboundary context of the Great Altay TBR it is necessary to reflect the **institutional mechanism and legal frame** in the following overall objective:

By 2040, the institutional and legal foundation and framework for the transboundary strategies of the Great Altay TBR are provided, which apply inside and reach beyond the transboundary biosphere reserve area.

Strategies and activities, which follow this overall objective, address institutional factors related to human and financial resources as well as legal and political factors.

The **UNESCO BR Conservation Function** is reflected in the following overall objective:

By 2040, natural and cultural diversity of the Great Altay TBR as well as its resources are studied and conserved in a transboundary context.

Strategies and activities, which contribute to this overall objective support a reduction of threats and interlinked stresses by an improved coordination of conservation activities through joint research, monitoring and evaluation, joint enforcement on policy level and specific joint conservation actions (e.g. in terms of fire prevention).

The **UNESCO BR Development Function** is corresponding with the following overall objective:

By 2040, an economic development is fostered, which is socio-culturally and ecologically sustainable. Cultural heritage is safeguarded and the identity of the Altai people is strengthened.

Strategies and activities, which follow this objective influence contributing factors related to culture, living conditions of local communities, land use and current tourism practices. By doing so, they contribute to the conservation of ecosystems, ecosystem services and human wellbeing.

The **UNESCO BR Logistic Support Function** is reflected in the following overall objective:

By 2040, cross-border cooperation is promoted by using the TBR for exchange of scientific information, joint education and training programs as well as raising public awareness and monitoring in a participatory and adaptive management approach.

Strategies for logistic support are supporting scientific research and cooperation, capacity building and public outreach by influencing contributing factors related to knowledge and cooperation.

In chapter 3.5, ten TBR strategies are presented, which support the fulfillment of these four overall objectives. Related to each of the ten strategies, intermediate objectives are formulated for intended short- and medium-term management results within a 5-year management frame.

3.4 Spatial design

Spatial design addresses the functional differentiation within the Great Altay TBR territory (zonation) as well as spatial and functional relationships to areas outside the TBR. Table 21 provides an overview of the different entities within the Great Altay TBR and the corresponding area sizes.

Table 21: Summary of different entities within the Great Altay TBR

	Kazakhstani part of the TBR	Russian part of the TBR
Corresponding BR	Katon-Karagay BR (973,500 ha)	Katunskiy BR (586,922 ha)
Included protected areas	Katon-Karagay State National Park (643,477 ha)	State Nature Biosphere Zapovednik Katunskiy (151,637 ha) Belukha Nature Park (132,455 ha)
Surface area of the TBR	956,885 ha	586,922 ha
Percentage of total TBR area	62%	38%
Total TBR area	**1,543,807 ha**	

Following the Seville Strategy, Sevilly+5 and the Madrid Action Plan, the Great Altay TBR consists of three functional zones, which are the core zone(s), buffer zone(s), and transition zone(s), which include the three functions and institutional mechanism and legal frame (see Figure 14).

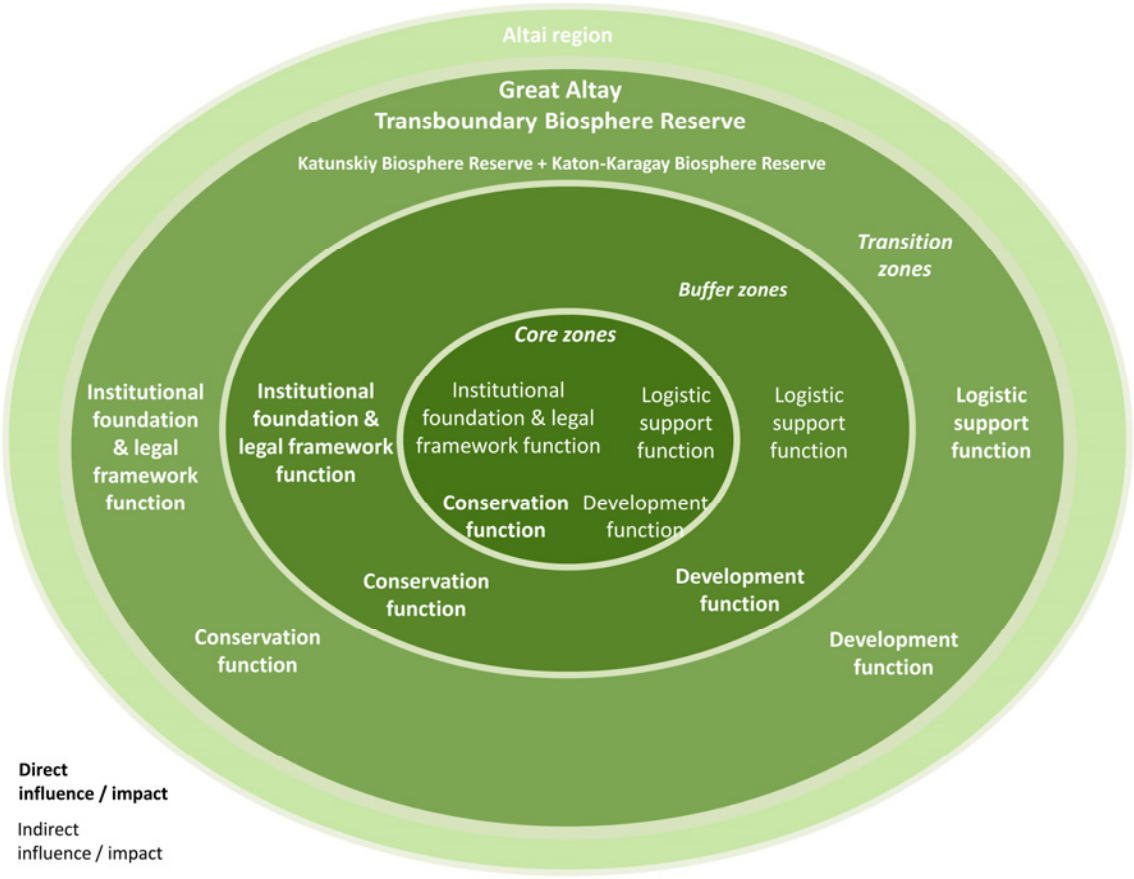


Figure 14: The influence of the Great Altay TBR functions in relation to its zonation

The zonation of the Great Altay TBR as shown in Figure 14 is based on the zonation schemes of the existing Katon-Karagay BR (Republic of Kazakhstan) and the Katunskiy BR (Russian Federation) including some amendments to allow for a more effective protection and management of the ecosystems of the border region (see also Figure 5).

General zonation development

The zonation of the Kazakhstani part of the TBR differs slightly from the zones of the Katon-Karagay BR in terms of area size and spatial distribution. The total area of the core zones is approximately 8,500 ha smaller than the core zones of the Katon-Karagay BR and the Katon-Karagay State Nature Park, the buffer zone is approx. 1,500 ha larger and the transition zone is approx. 10,000 ha smaller in area.

These differences are due to the following considerations:

The functional zonation of Katon-Karagay BR is based on the zonation scheme of the Katon-Karagay State National Park, which is defined in the Forest Inventory Plan in force. Thus, core zones of the Katon-Karagay BR are congruent with the core zones of the Katon-Karagay State National Park (Jashenko, 2013). When the nomination application for the Katon-Karagay BR was prepared in 2012/2013, results of the new Forest Inventory Plan (2012) of the Katon-Karagay State Nature Park had not been approved yet by the responsible authorities in the Republic of Kazakhstan. The new zonation scheme of the Katon-Karagay State National Park, which indicates – amongst others – amendments to the northwestern core zone section, became operative in December 2013 only. The amendments of the new zonation scheme were incorporated when developing the functional zonation of the Great Altay TBR. Thus, the core zones sections of the Kazakhstani part of the TBR are represented by the current core zones of the Katon-Karagay State National Park.

Three of the four core zone sections of the Katon-Karagay State National Park /BR are bordered by Russian territories, which are either not protected by the federal law on protected areas or have the conservation status of Nature Parks (see chapter 2.3.2). Therefore, a buffer of 2 km width was incorporated on the territory of the mentioned core zone sections when developing the zonation scheme of the Great Altay TBR. However, some of the directly adjacent Russian territories in the northwest of the TBR belong to the Golden Mountains of Altai World Heritage Site, which ensures the highest degree of international protection status and contributes well to the buffering of the Kazakhstani core zone sections (see figure 16).

Photo 30: View to the Southern Altai ridge
Photographer: Alija Gabdullina

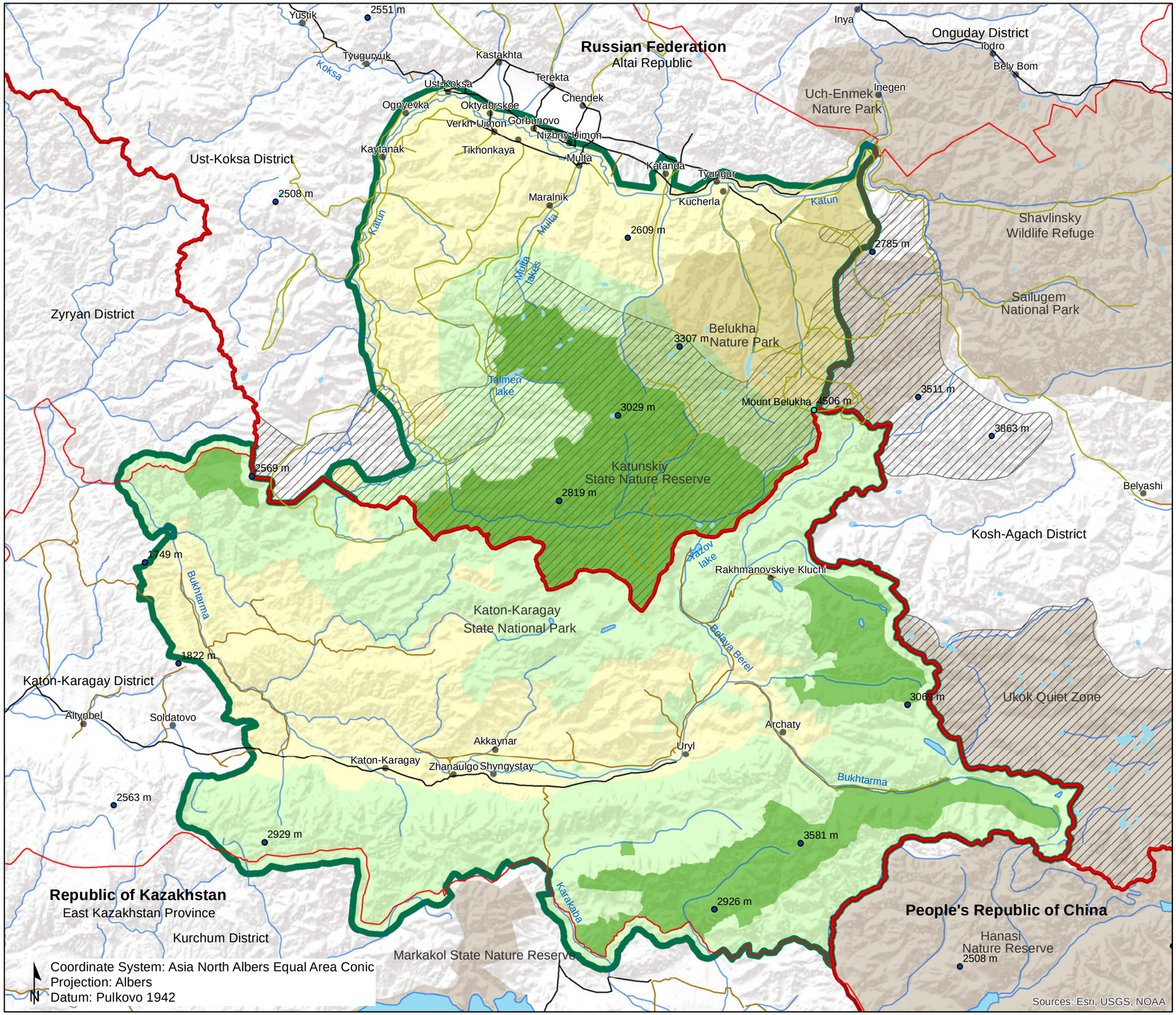
The map in Figure 15 depicts the zonation of the Great Altay TBR.

Figure 15: Zonation map of the Great Altay TBR

The map in Figure 16 depicts the zonation of the Great Altay TBR and its surrounding.

Figure 16: Zonation map of the Great Altay TBR with surrounding

Great Altay Transboundary Biosphere Reserve - zonation map



- Peaks
- Settlements
- Rivers
- Paved road
- Unpaved road
- Trails
- District borders
- Country border
- Great Altay Transboundary Biosphere Reserve
- Core zone
- Buffer zone
- Transition zone
- Golden Mountains of Altai WHS
- Protected areas
- Lakes

Source:
Data from OpenStreetMap, ODbL1.0, www.openstreetmap.org; WWF 2011; Natural Earth Data, www.naturalearthdata.com; ESRI; Administrations of Katunskiy BR + Katon-Karagay BR;
Map created by Monika Hoffmann and Julia Sauermann (CEEM/HNEE) 06/2015

DISCLAIMER: All boundaries shown (state, regional, protected area administrative boundaries) and the designations used do not imply official endorsement or validity. The map authors take no responsibility for the accuracy or correctness of the shown contents.

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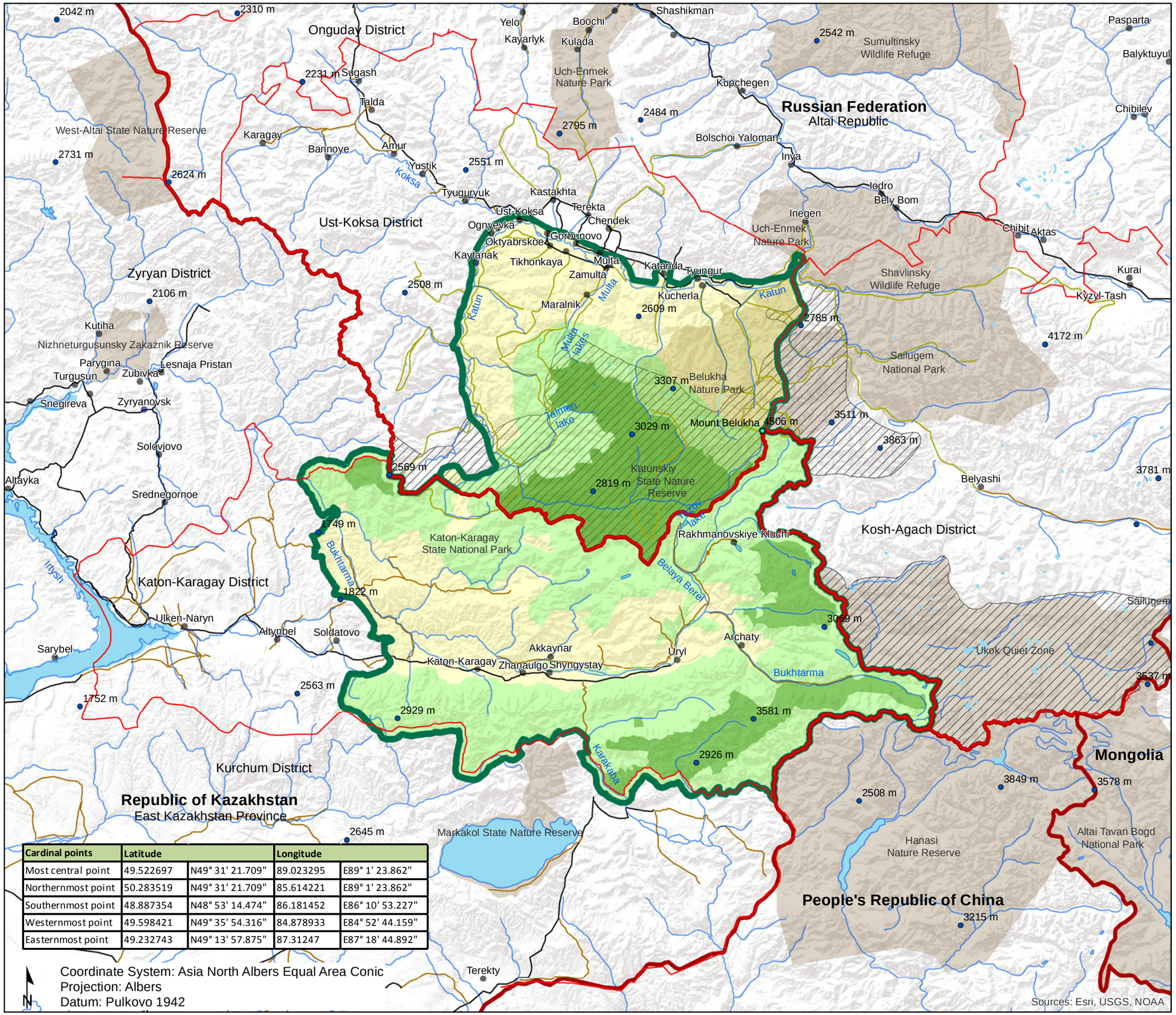
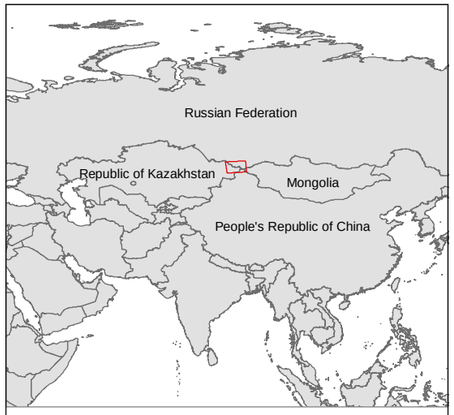
Great Altay Transboundary Biosphere Reserve - zonation map with surrounding protected areas





- Peaks
- Settlements
- Rivers
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- Trails
- District borders
- Country border
- Great Altay Transboundary Biosphere Reserve
- Core zone
- Buffer zone
- Transition zone
- Golden Mountains of Altai WHS
- Protected areas
- Lakes

Cardinal points	Latitude		Longitude	
Most central point	49.522697	N49° 31' 21.709"	89.023295	E89° 1' 23.862"
Northernmost point	50.283519	N49° 31' 21.709"	85.614221	E89° 1' 23.862"
Southernmost point	48.887354	N48° 53' 14.474"	86.181452	E86° 10' 53.227"
Westernmost point	49.598421	N49° 35' 54.316"	84.878933	E84° 52' 44.159"
Easternmost point	49.232743	N49° 13' 57.875"	87.31247	E87° 18' 44.892"

Coordinate System: Asia North Albers Equal Area Conic
Projection: Albers
Datum: Pulkovo 1942

N

0 30 60 120 Km

Sources: Esri, USGS, NOAA

Source:
Data from OpenStreetMap, ODbL1.0, www.openstreetmap.org; WWF 2011; Natural Earth Data, www.naturalearthdata.com; ESRI; Administrations of Katunskiy BR + Katon-Karagay BR;
Map created by Monika Hoffmann and Julia Sauermann (CEEM/HNEE)
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Core zone

There are five core zone sections with an overall area of 269,822 ha corresponding to 17% of the total TBR area (Table 22). They are devoted to long-term protection of the diverse landscapes, ecosystems and species of the Great Altay TBR as well as to the maintenance of the ecosystem services provided by such diversity (see also Table 6).

All core zone sections are protected by national legislation. The core zones of the Kazakhstani part of the TBR are related to the core zones (*заповедные зоны*) of the Katon-Karagay State National Park. The protection regime of the Katon-Karagay State National Park and the corresponding functional zonation is fixed in the law of the Republic of Kazakhstan "On specially protected natural territories", the decree of the Republic of Kazakhstan "On the establishment of the Katon-Karagay State National Park" and the approved Forest Inventory Plan of the Katon-Karagay State National Park for 2014-2029 (see also chapter 2.4 and 2.6).

The core zone of the Russian part of the TBR is protected as the Katunskiy State National Park (*заповедник*) according to the Federal Law "On specially protected natural territories" of the Russian Federation and the decree of the Council of Ministers of the RSFSR "On the establishment of the State Nature Biosphere Zapovednik Katunskiy".

According to the mentioned national laws and decrees all economic activities and recreational uses are prohibited in the core zones of the Great Altay TBR. Only scientific research and environmental monitoring (e.g. on climate change) takes place, generating knowledge for efficient conservation of the TBR biodiversity and its ecosystem services as well as for a sustainable economic and human development. Additionally, in the Russian core zone sections educational tourism is permitted, but restricted in terms of visitor numbers and visitor direction. There are no people living in the territory of the core zones, not even seasonally.

The lands of the core zone are state-owned being managed and controlled by the administrations of State Nature Biosphere Zapovednik Katunskiy and Katon-Karagay State Nature Park. The complete core zone of the Russian part of the TBR is part of the Golden Mountains of Altai World Heritage Site.

Buffer zone

The buffer zone of the Great Altay TBR covers 711,070 ha corresponding to 46% of the total TBR area (Table 22).

Its role is to prevent or minimize negative effects of human-induced activities onto the core zones of the TBR (buffering function), but it has also its own intrinsic function in terms of maintenance of biological diversity since it includes large areas that are very remote and little influenced by human activities. Thus, the buffer zone of the Kazakhstani part includes approximately 132,000 ha which belong to the *zone of ecological stabilization* of Katon-Karagay State National Park (see Table 3). According to the Law of the Republic of Kazakhstan "On specially protected natural territories" this zone has a strict protection regime prohibiting any economic or touristic activities with the exception of restricted ecological tourism and activities focusing on the restoration of destroyed or degraded natural complexes. Only recently, the rare and endangered species snow leopard (*Panthera unica*) and Pallas's cat (*Otocolobus manul*) have been recorded in the zone of ecological stabilization and in the zone for restricted economic activity (Chelyshev, 2015). Beside this ultimate conservation function, the TBR buffer zones provide also ecological corridors, which connect the five core zones sections of the TBR with each other as well as the TBR habitats with adjacent ecologically important sites (see 2.7).

There are no people living permanently in the Russian part of the TBR buffer zone, but two ranger stations of the State Nature Biosphere Zapovednik Katunskiy exist, of which one is in operation seasonally and one - permanently. In the Kazakhstani part of the TBR buffer zone about 100 people

live there in the villages of Karayryk and Rakhmanovskiye Klyuchi and about 50 people live seasonally, during the summer period, on the highland pastures.

Rangers as well as scientists conduct research projects in the buffer zone (e.g. on the distribution area and population numbers of the snow leopard) and environmental monitoring takes place (e.g. on the impacts of tourism and climate change on the natural systems). Both activities are generating valuable knowledge for efficient conservation of the TBR biodiversity and its services as well as for a sustainable economic and human development. Furthermore, sanitary cutting and thinning cuts as well as restoration of degraded forest stands are conducted to obtain a healthy forest. Local people and tourists use the accessible territories of the buffer zone as pastures, for haymaking, apiculture, the collection of non-timber forest products (NTFPs), for hiking, and fishing and hunting. Thus, the TBR buffer zone also contributes to the development function of the TBR.

Lands of the buffer zone are mainly state-owned, but management institutions differ significantly in the Kazakhstani and the Russian part of the TBR. In the Kazakhstani part of the TBR, more than 90% of the buffer zone belongs to the territory of the Katon-Karagay State National Park, hence including four different zones of the Katon-Karagay State National Park: the *ecological stabilization zone, the tourism and recreational zone, the zone for restricted economic a*ctivity and parts of the core zone of the Katon-Karagay State National Park (see Table 3). Less than 10% of the buffer zone of the Kazakhstani part is managed by local authorities of Katon-Karagay district, Kurchum district and Zuryan district and the akims of the corresponding rural districts.

In the Russian part of the TBR the buffer zone is managed and controlled by various institutions such as the Ust-Koksinskiy forest district administration, the administration of Belukha Nature Park and other local authorities of Ust-Koksa district. While the restrictions for economic activities in the buffer zone of the Kazakhstani part are stipulated in the Law of the Republic of Kazakhstan “On specially protected natural territories” and successive legal documents, such legal regulations are missing for the management of the buffer zone in the Russian part of the TBR. Although a big portion of the Russian buffer zone belongs to the Belukha Nature Park, the park administration has very limited power to restrict the use of natural resources and landscapes (see chapter 2.3.2).

However, currently, the remoteness and difficult accessibility of the buffer zones in the Russian part of the TBR impede more intensive economic activities and ensure sufficient buffering for the Russian core zone. Furthermore, nearly 75% of the Russian part of the TBR buffer zone belongs to the Golden Mountains of Altai World Heritage Site, which implies a strict protection regime for these Great Altay TBR areas.

Transition zone

The transition zone of the Great Altay TBR covers 562,915 ha corresponding to 37% of the total TBR area (Table 22). In this zone sustainable economic and human development is fostered and demonstration projects (e.g. on pasture rotation systems, development of rural tourism) are developed and implemented. There are about 24,400 people living in 38 settlements within the transition zone of the Great Altay TBR.

A big share of the transition zones consists of private-owned lands that are used for livestock grazing, red deer (maral) farming, fodder production and apiculture. Forestry activities include sanitary cutting and thinning cuts as well as restoration of degraded forest stands. Tourism, hunting, fishing and the collection of non-timber forest products (NTFPs) is widespread. Sustainable employment opportunities, e.g. in the field of environmental education, eco-tourism, nature protection and environmental rehabilitation are fostered and complement the conservation goals of the Great Altay TBR. For example, nearly 400 people, living in the Kazakhstani part of the transition zone, work in the administration of the Katon-Karagay State Nature Park securing protection and sustainable use of the ecosystems and species of the TBR.

Furthermore, there are also habitats in the transition zone that are receiving special protection, e.g. the so-called *kolki* forests in the Kazakhstani part. These are small insular groves in the steppe with high ecological value and great importance for agriculture.

Land use, infrastructure development as well as the use and protection of natural resources, plants and wildlife in the transition zone are managed by the responsible authorities of Katon-Karagay district, Ust-Koksa district, the East Kazakhstan province and the Altai Republic as well as by the Katon-Karagay State National Park (see also chapter 2.5).

Table 22: Surface areas and percentages of the functional zones of the Great Altay TBR

TBR zones	sections	included protected area	Country	surface area (ha)	Percentage of the total TBR area (%)	Percentage of total area of the corresponding TBR zone
Core zone	northern section	State Nature Biosphere Zapovednik Katunskiy (Zapovednik)	Russian Federation	151,637	10%	56%
	northwestern section	Katon-Karagay State National Park	Republic of Kazakhstan	7,770	7%	44%
	eastern section			35,940		
	southeastern section			73,870		
	small southern section			605		
	Total core zone			**269,822**	**17%**	**100%**
Buffer zone	northern section	Belukha Nature Park (partially)	Russian Federation	144,630	9%	20%
	southern section	Katon-Karagay State National Park (partially)	Republic of Kazakhstan	566,440	37%	80%
	Total buffer zone			**711,070**	**46%**	**100%**
Transition zone	northern section	Belukha Nature Park (partially)	Russian Federation	290,655	19%	52%
	southern section		Republic of Kazakhstan	272,260	18%	48%
	Total transition zone			**562,915**	**37%**	**100%**
	Total area of the Great Altay TBR			**1,543,807**		

The transition zone in the Russian part of the TBR is congruent with the updated transition zone of the Katunskiy BR, including the southern part of the Belukha Nature Park. About 10% of the Russian transition zone belongs to the Golden Mountains of Altai World Heritage Site. The transition zone of the Kazakhstani part of the TBR differs slightly from the transition zone of the Katon-Karagay BR due to the incorporation of the new zonation scheme of the Katon-Karagay State National Park.

3.5 Strategies

A comprehensive set of ten transboundary strategies with various sub-strategies is aligned along the overall objectives aiming to meet the conservation goal and to achieve the Great Altay TBR vision (chapter 3.1-3.3). The ten transboundary strategies are mutually connected and comprise concrete packages of intermediate objectives and corresponding (lines of) action, which contribute to the accomplishment of the overall conservation goal.

Box 9: Strategies and their activities

A **strategy** comprises a series of decisions related to the deployment of available resources (management) and the establishment of appropriate socio-institutional conditions (governance) that allow for effect action towards achieving desirable goals and objectives. They are intentional operational activities designed to correct and restore the function of the ecosystem following a negative impact brought about by human disturbance (Ibisch & Hobson, 2014). **Sub-strategies** describe the various tangible actions that are part of the strategy.

The following simplified results model visualizes the steps to be taken to achieve the TBR vision in the long-term in connection with the entry points of each strategy. The full version can be found in Annex 5.3.

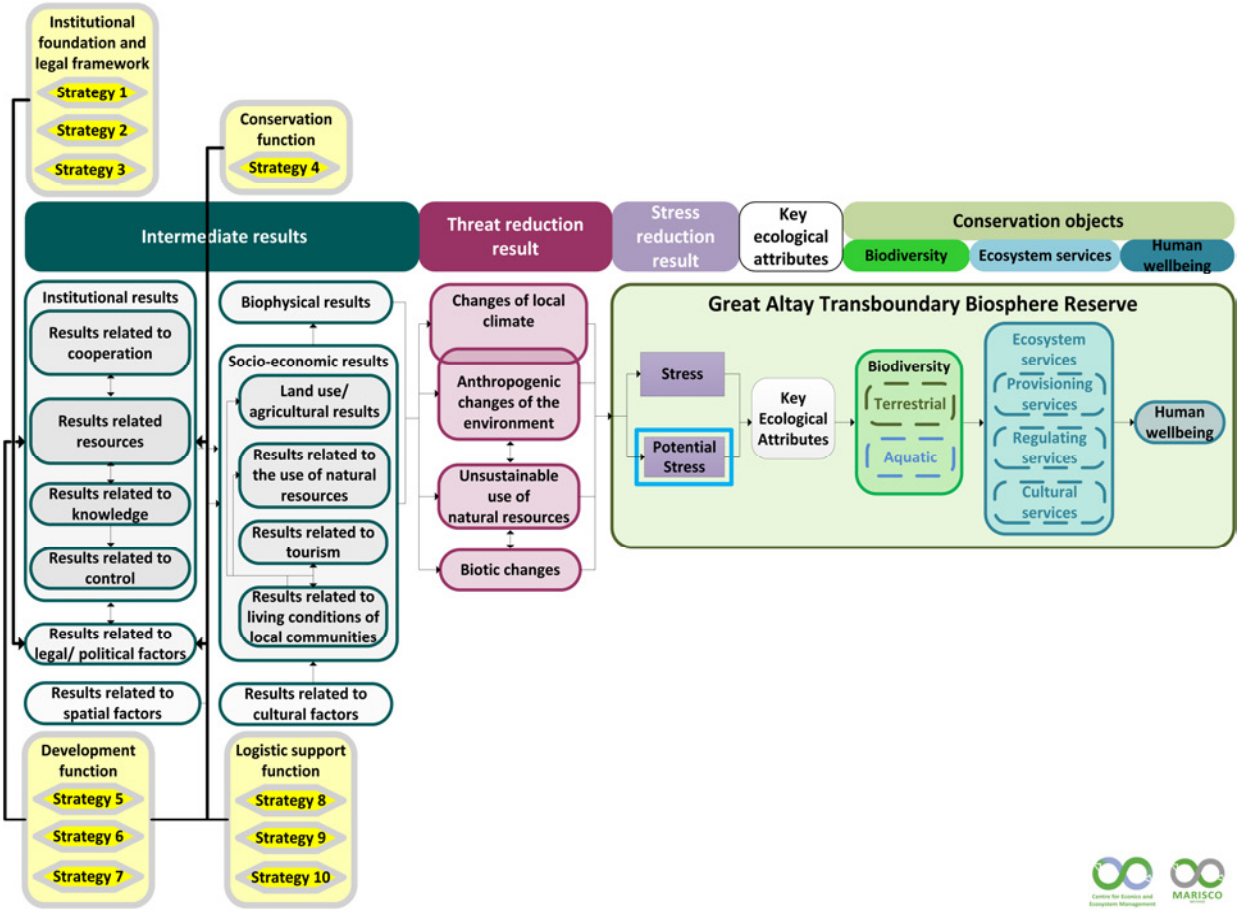

Figure 17: Simplified results model of the Great Altay TBR

However, the effectiveness and impacts of strategies need to be followed up and controlled. Wherever necessary, they might be corrected and redesigned. Therefore, the implementation and monitoring mechanism of the strategies and their respective sub-strategies must follow an adaptive management approach.

As outlined earlier, the Great Altay TBR strategies – as the TBR management plan as a whole - are overarching and framing the national strategies and actions of Katon-Karagay BR and Katunskiy BR with a focus on transboundary cooperation and relations. The existing strategies are not replaced by

the transboundary strategies of the Great Altay TBR, but are an add-on the overarching transboundary level. Some transboundary activities are already conducted jointly between the Katon-Karagay BR and Katunskiy BR (e.g. fire prevention, school exchanges), while others had been developed on the basis of the MARISCO situation analysis (chapter 2).

The presentation of each strategy (chapter 3.5.1 – 3.5.10) provides a brief description including a brief summary of what threats and factors they address. Thereafter, the main components of each strategy (referred to as sub-strategies) are outlined. A brief explanation on their set-up and effects is presented as 'theory of change'. Intermediate objectives state the steps towards each desired outcome. Each strategy's rationale and logic is visualized and clarified by a result web, which depicts the steps on how to achieve the overarching conservation goal.

Box 10: Results webs and theory of change

Results webs graphically illustrate systemically and logically linked assumptions that must be made for postulating the effects of strategies. They comprise the logical sequence of intermediate results to be achieved that, ultimately, would imply a positive impact on the biodiversity objects. Results webs also demonstrate the complex interrelationships existing within ecosystems and their nested human systems that may require an indirect approach to problem solving. They help to improve our understanding of the appropriateness and consistency of strategies. Results webs make operational planning more effective and help to identify concrete steps to be carried out and to make decisions on subsequent actions to be undertaken. These steps are depicted in the **theory of change** (Ibisch & Hobson, 2014).

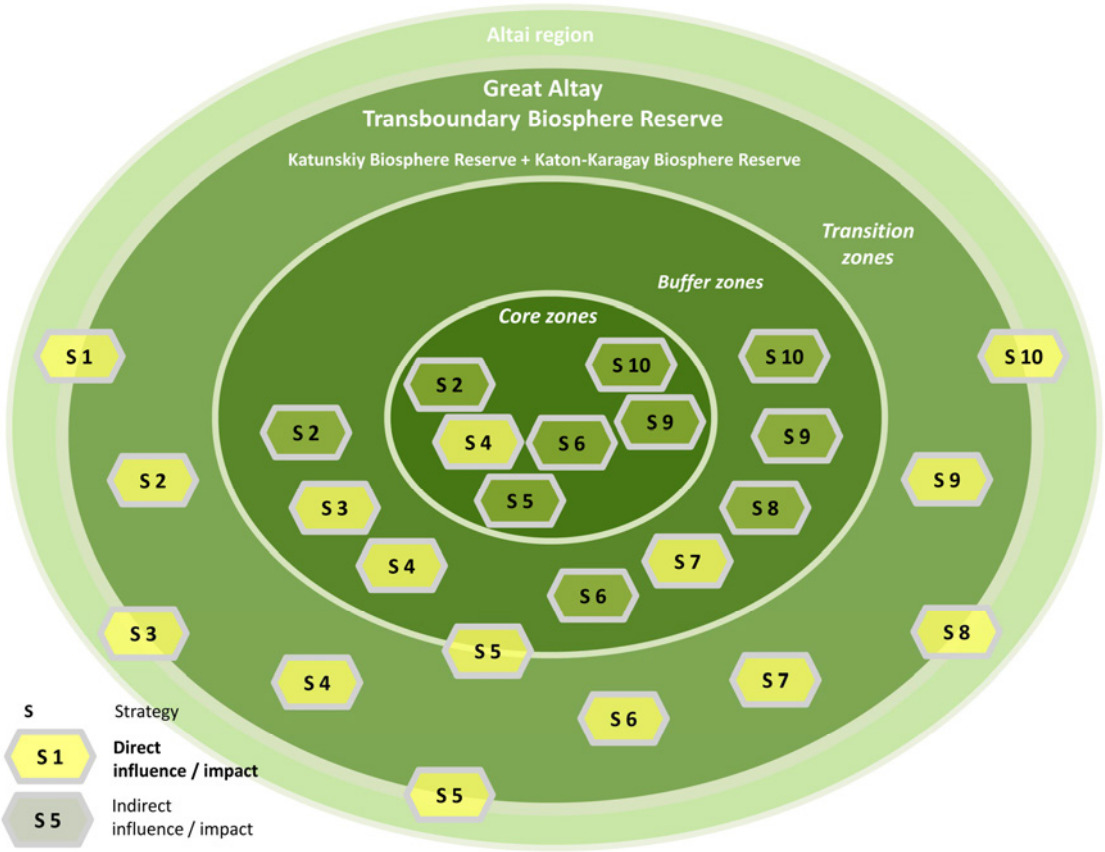

Figure 18: Functions of the Great Altay TBR in relation to its zonation

Although being mutually connected, the ten developed strategies can be clustered into the three TBR functions as defined in the UNESCO BR concept (compare with table 23 which provides an overview of all strategies in relation to the UNESCO BR functions and overall objectives). The first three strategies form the institutional and legal base for the other seven strategies to follow. The

conservation function group contains one strategy that targets ecosystem and biodiversity conservation. The development function contains three strategies, which are supporting sustainable development for the local communities. The logistic support function encompasses another three strategies to achieve public outreach.

Looking at the relationship between the TBR strategies and the TBR spatial zonation, Figure 18 illustrates various direct and indirect impacts of each strategy within the three TBR zones and beyond.

Table 23: Summary of the Great Altay TBR strategies and their relationship to the UNESCO BR functions and overall objectives of the TBR

The Great Altay Transboundary Biosphere Reserve will be a model for sustainable development of border mountain areas. It will provide the general framework for action in the transboundary context.		
INSTITUTIONAL FOUNDATION AND LEGAL FRAMEWORK		
Overall Objective: **Institutional and legal foundation of the Great Altay TBR and framework for the transboundary strategies is provided, which apply inside and reach beyond the transboundary biosphere reserve area.**		
Strategies: **S 1 'Establishment of a coordinating structure and management mechanisms for the TBR'** *Purpose:* Foster information exchange, transboundary thinking and joint actions / management planning to improve environmental protection and sustainable development of the region. **S 2 'Monitoring on outcome and impact levels in the TBR'** *Purpose:* Monitor outcomes and impacts of strategies in near real-time and consequently provide the basis for adaptive management measures if need be. **S 3 'Strengthening transboundary cooperation and management and enable and facilitate the transboundary exchange of documents and data'** *Purpose:* Adjust the border regime within the TBR to enhance cross-border cooperation, tourism development and regular exchange of documents and data.		
CONSERVATION FUNCTION	**DEVELOPMENT FUNCTION**	**LOGISTIC SUPPORT FUNCTION**
Overall Objective: **Natural and cultural diversity of the Great Altay TBR as well as its resources are studied and conserved in a transboundary context.**	*Overall Objective:* **An economic development, which is socio-culturally and ecologically sustainable in its mountainous context, is fostered. Cultural heritage is safeguarded and the cultural identity of Altay people is strengthened.**	*Overall Objective:* **Cross-border cooperation is promoted by using the TBR for exchange of scientific information, joint education and training programs as well as raising public awareness and monitoring in a participatory and adaptive management approach.**
Strategy: **S 4 'Coordination of transboundary biodiversity conservation'** *Purpose:* to create and secure cooperation mechanisms, which contribute to long term protection and restoration of natural complexes and biodiversity as well as understanding of cultural identities.	*Strategies:* **S 5 'Promotion of transboundary understanding and cultural exchange'** *Purpose:* to strengthen cultural identity and cross-border understanding of the local communities. **S 6 'Generation of alternative job opportunities and income'** *Purpose:* to foster the sustainable development potential of the region and the livelihoods of the local population. **S 7 'Development of regulated eco-cultural tourism'** *Purpose:* to improve human well-being through new income opportunities for local service providers, through increased direct benefits for local communities as well as through heightened awareness for the protection of the natural and cultural heritage.	*Strategies:* **S 8 'Scientific cooperation in the transboundary biosphere reserve and beyond'** *Purpose:* to build knowledge about conservation targets, opportunities and threats as a basis for appropriate management approaches. **S 9 'Increase of capacities related to education and training'** *Purpose:* to build capacities of the management of the TBR to address relevant fields of work and management issues and to take a lead in the management of the TBR. **S 10 'Development of external communication channels and public relations'** *Purpose:* to increase the visibility of the TBR and the Altay region and to create a common identity.

3.5.1 'Establishment of a coordinating structure and management mechanisms for the TBR'

Description – strategy (S 1)

An important step of cooperation was taken by signing the Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai" (2011) and Joint Action Plan (2013) for the establishment of a transboundary reserve 'Altai'[11]. The Joint Action Plan includes objectives in the field of nature protection in the border region, scientific research and monitoring as well as environmental education. With the designation of the Great Altay TBR the scope of objectives and tasks is enlarged (e.g. by including sustainable economic development and cultural exchange also) and might exceed the available existing resources and capacities of both, the administration of the Katon-Karagay BR and Katunskiy BR as well as of relevant stakeholders.

Strategy 1, which is important particularly during the establishment of the Great Altay TBR, is thought to react on the *insufficiency in cooperation* and the *lack of a joint coordination structure* as well as the *lack in financial, human and infrastructure resources* therefore (see chapter 2.3.2).

In other words, a vital and functioning TBR requires effective coordination and communication between all relevant stakeholders to achieve an equivalent transboundary operating structure and functioning TBR. To accomplish it, the Joint Commission on the implementation of the Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary Reserve "Altai" agreed upon the establishment of a management structure for the Great Altay TBR consisting of the **Great Altay TBR board**, **national executive structures** and **task groups** (see figure 19). Thereby, the role of the TBR board is assigned to the Joint Commission. (Smeshannaya Komissiya po realizatsii mezhpravitelstvennovo soglasheniya o sozdanii transgranichnovo reservata "Altai", 2014).

An annual general meeting of the **Great Altay TBR board** ensures the overall governing of the cooperation within the transboundary area. It forms a platform for joint analysis, discussion and decision making of all relevant stakeholders while bringing together both the administrations of Katon-Karagay BR and Katunskiy BR (represented by the Katon-Karagay State Nature Park, State Nature Biosphere Zapovednik Katunskiy and Belukha Nature Park)[12], the relevant authorities from municipal and district level (represented by Katon-Karagay Akimat and Ust-Koksa administration), the civil society (represented by NGOs and religious societies), the private sector (represented by key businessmen of the agricultural sector, handicrafts and tourism industry) and scientific experts (compare also with chapter 2.5).

The Great Altay TBR board advises and supervises the TBR work of the administrations of Katon-Karagay BR and Katunskiy BR as the implementing entities of the Great Altay TBR strategies. It agrees on the formation of specific Task and Expert Groups to prepare and undertake detailed tasks, plans or projects as part of the various Great Altay TBR strategies. The Great Altay TBR board chairs (directors of both, Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy respectively) are the central contact persons vis-a-vis for the International Council and National Committees of the UNESCO "Man and the Biosphere Programme". The Great Altay TBR board has an advisory and decisive role and will be overseeing external and internal communication, public relations as well as involvement of the public in the adaptive management planning.

[11] (Smeshannaya Komissiya po realizatsii mezhpravitelstvennovo soglasheniya o sozdanii transgranichnovo reservata "Altai", 2014)

[12] When the BR „Katon-Karagay" and the Katunskiy BR were established, it was decided not to create specific BR administrations. Instead the existing administrations of Katon-Karagay SNP and Katunskiy SNZ became in charge of coordinating all BR activities and stakeholders and serve as main contact institutions for the UNESCO MAB and the World Network of Biosphere Reserves. Therefore, in the management plan we refer to them as BR administrations.

Figure 19: Institutional Framework of the Great Altay TBR

Katon-Karagay BR and Katunskiy BR as the **implementing bodies** apply, coordinate, promote and support activities of the transboundary cooperation. In order to achieve it, Katon-Karagay State National Park and State Nature Biosphere Zapovednik Katunskiy make sure that one coordinator for TBR work and BR work respectively is assigned on each side or is newly employed to this specific task if current capacities are not sufficient. Experiences from two-state TBR establishments in Europe indicate that two coordinators are necessary with one coordinator in each country involved, because they represent the two cultures involved in the task (UNESCO, 2003). The task of the two coordinators is to manage the implementation of transboundary activities as part of the Great Altay TBR strategies. They lead the process to appoint joint Task and Expert Groups that work on specific TBR strategies or activities. Both the coordinators are the focal point for the collection and evaluation of information and are responsible for the preparation of documents/reports for the annual TBR board meeting.

Joint Task / Expert and Network Groups are formed to enable the implementation of the Great Altay TBR strategies. They are formed by relevant stakeholders of both countries involved (the Republic of Kazakhstan and Russian Federation) and are partly permanent groups to ensure and guide the implementation of the Great Altay TBR strategies. The joint Task / Expert and Network Groups report to both the coordinator, whereby for each formed group one of the coordinators is the main contact person with the other coordinator supporting.

Precondition for strategy implementation

- A Task Group 'Institutional Foundation' has been formed as part of strategy 1.

(Essential) Key intermediate results to be achieved according to the results web (see figure 20)

- Yearly Great Altay Board meetings are held successfully and effectively with various engaged participants;
- Cooperation among protected areas and environmental authorities is fostered and established;
- Cooperation with authorities and stakeholders is strengthened and effective;
- Transboundary cooperation is strengthened and further enhanced;
- Expert / Network / Joint Task Groups involve local stakeholders;
- Adequate funding opportunities for TBR activities are identified (donors, grants);
- Adaptive management is in place with regular reviews and the ongoing adaptive management plan is fostered and secured by both BRs;
- The effectiveness of activities under the Joint Action Plan is monitored with transparency;
- Networking / participation of local NGOs and interest groups is a vital part of TBR activities;
- The base for recommendations on how to regulate the use of natural resources outside protected areas through protected area administration is created;
- Coordination of regulatory measures on how to use natural resources outside protected areas is set up and working;
- Elaboration of recommendations for the improvement of legislation and legal instruments concerning the regional protected areas;
- Elaboration of recommendations on how to ease discrepancies of legislation with BRs.

Sub-strategies / fields of activities

To this end, strategy 1 foresees the implementation of the following sub-strategies:

S 1.1 Establish and foster Great Altay TBR board meetings as the governing body of the cooperation

After the designation of the TBR, the TBR board members and its chair are appointed at the TBR general meeting/commission meeting for a five year period and the Task Group 'Institutional Foundation' is formed. From 2018 onwards, board meetings are held annually and organized on an annually rotation cycle either in the Russian Federation or in the Republic of Kazakhstan. The Task Group 'Institutional Foundation' reports to the annual board meetings and acts independently in-between in cooperation with the implementing and supporting entities (Katon-Karagay BR and Katunskiy BR administrations). The Task Group is in charge of overseeing the successful implementation of strategy 1 and its sub-strategies 1.1 until 1.9.

S 1.2 Safeguard the Intergovernmental Agreement's objectives and the Joint Action Plan

As the Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai" from 2011 has been the first step of cooperation, both sides give priority to fulfill the Agreement's objectives and corresponding Joint Action Plan. Activities related to this Joint Action Plan are implemented and safeguarded under strategy 4 'Coordination of transboundary biodiversity conservation', strategy 8 'Scientific cooperation' and strategy 9 'Increase of capacities related to education and training'.

S 1.3 Monitor and evaluate the effectiveness of activities under the Joint Action Plan

As base for sub-strategy 1.5, both implementing teams (Katon-Karagay BR and Katunskiy BR administration) give priority to monitor and evaluate the activities and objectives as mentioned in the Intergovernmental Agreement. The TBR coordinators provide periodic monitoring reports to the TBR board. The task of the TBR board in turn is to prove the effectiveness of transboundary cooperation and to advise the governments involved on changes in the Agreement, most probably in accordance with the present strategic plan.

S 1.4 Adjustment (where necessary) of the Inter-governmental Agreement

In 2013, both sides agreed to join forces in adjustments of the Intergovernmental Agreement. The aim is to synchronize the Agreement's objectives and Joint Action Plan with the present management plan. Therefore, the TBR coordinators assist the TBR board in preparing all documents needed to revise the Intergovernmental Agreement. This also includes, that both governments involved consent to strengthen transboundary cooperation along with potential adjustments of the border regime within the TBR (as issued under strategy 3).

S 1.5 Assist to secure adequate funding for TBR activities

With the designation of a UNESCO TBR, the scope of bilateral communication and joint cooperation projects will be extended. Striving for institutional and financial sustainability, the TBR board requests the governments of the Republic of Kazakhstan and the Russian Federation to include annual operational costs related to TBR work into the budgets of Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy. The implementation of specific projects and activities as described under the Conservation (strategy 4) and Development Function (strategy 5, 6, and 7) most probably depends on external funding. TBR coordinators assist the TBR board in securing additional external funding through various donors, particularly on the international level (see also chapter 4.3).

S 1.6 Form specialized Expert/Network Groups and joint Task Groups

In order to work on the TBR strategies, the TBR coordinators are supported by specialized Expert/Network Groups and joint Task Groups (TG). The specialized Expert/Network Groups and joint Task Groups meet upon need (preferably more often than the Great Altay TBR board) in order to establish detailed projects to enable implementation of the TBR strategies. In a first step the following groups are formed:

- TG 'Institutional Foundation' to enable implementation of strategy 1;
- TG 'Monitoring on outcome and impact levels' to enable implementation of strategy 2;
- TG 'Legal Framework' to enable implementation of strategy 3.

Once the institutional set-up of the TBR is realized new Task Groups are formed related to specific strategies, projects or activities:

- TG 'Law Enforcement' to enable implementation of strategy 4,
- TG 'Climate Change' to enable implementation of strategy 4,
- TG 'Biodiversity Conservation' to enable implementation of strategy 4,
- TG 'Cultural and Historical Heritage' to enable implementation of strategy 5;
- TG 'Regional Products and Labelling' to enable implementation of strategy 5, 6 and 10;
- TG 'Socio-Economic Development' to enable implementation of strategy 6;
- TG 'Eco-Cultural Tourism Development' to enable implementation of strategy 7;
- TG 'Bilateral Data Handling and Research' to enable implementation of strategy 3 and 8;
- TG 'Environmental Education' to enable implementation of strategy 8 and 9.

S 1.7 Establish internal communication channels

Well-functioning communication channels between the members of the TBR board, the Katunskiy BR, Katon-Karagay BR and the Task as well as Expert Groups members is a core issue of cooperation. Due to the mountainous terrain with high altitudes and the remoteness of the TBR area regular communication is secured by phone, E-mail, and videoconferences. Nevertheless, the Great Altay TBR stakeholders follow up various opportunities to meet at least once a year (see also sub-strategy 1.1, and strategy 5, 9 and 10).

S 1.8 Establish an adaptive management

With the implementation of strategy 2, regular reviews (every three years) of the management planning are established. With this, an ongoing adaptive management plan with regular updates and adjustments is maintained.

S 1.9 Develop participatory management mechanisms with key stakeholders

Involvement of key stakeholders is ensured by three mechanisms:

a) Participation of stakeholders in the annual meetings of the BR councils and TBR general meeting;

b) Representation of stakeholder groups in the TBR board,

c) Involvement of relevant stakeholders in all Expert and Task Groups.

Intermediate Objectives

From 2017 onwards, key stakeholders join forces in the annual meeting of the Great Altay TBR. The members of the TBR board and two coordinators for operational TBR work are nominated. Experts and stakeholders for the first Task Groups are appointed.

By 2020, the governments of both countries synchronize the Agreement's objectives and Joint Action Plan with the present management plan. At the same time annual operational costs of the TBR work are taken into account of the Katon-Karagay BR and Katunskiy BR (Katon-Karagay SNP and Katunskiy SNBZ) budgets.

By 2020, TBR board members and coordinators participated in a fundraising training and worked out a fundraising plan for specific projects/activities related to conservation and development strategies. At least two project applications are addressed to external donors.

A successful implementation of strategy 1 does not automatically result in reaching the overall conservation goal as defined in chapter 3.2. But reaching the intermediate objectives is a core step of the TBR set-up phase. It forms the institutional basis for the implementation of all conservation and development strategies of the Great Altay TBR. It is therefore a prerequisite that feeds into all further fields of activities of the transboundary strategies of the Great Altay TBR.

Enabling of the following Great Altay TBR strategies

- Available resources enable the implementation of the strategies 1 to 10;
- Monitoring on outcome and impact levels is set up and applied (strategy 2);
- The recommendation, negotiation and ease of BR legislation and border regime is initiated (strategy 3);
- Law enforcement is established (strategy 4);
- Coordination of transboundary conservation is possible and activated (strategy 4);
- Promote transboundary understanding and cultural exchange (strategy 5);
- Generation of jobs and income is supported (strategy 6 and 7);
- Environmental education is an integral part of TBR activities (strategy 9);
- Scientific cooperation in the transboundary biosphere reserve and beyond is enabled (strategy 8);
- External communication channels are established, public relations are fostered (strategy 10).

The following page depicts the results web of strategy 1.

Figure 20: Results web of strategy 1


1. Establishment of a coordinating structure and management mechanisms for the TBR
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Results related to cooperation
1.1 Establish and foster Great Altay TBR Board meetings as the governing body of the cooperation
Yearly Great Altay Board meetings are held successfully and effectively with various engaged participants
Cooperation among protected areas and environmental authorities is fostered and established
1.2 Safeguard the Intergovernmental Agreement's objectives and the Joint Action Plan
Cooperation with authorities and stakeholders is strengthened and effective
1.7 Establish internal communication channels
Transboundary cooperation is strengthened and further enhanced
Interests of the TBR are represented on national level (relevant ministries) and international level (potential donors)
Promote transboundary understanding and cultural exchange (Strategy 5)
1.6 Form specialised Expert / Network Groups and Joint Task Groups
Expert / Network / Joint Task Groups are formed jointly
Expert / Network / Joint Task Groups involve local stakeholders
External communication channels are established and public relations are fostered (Strategy 10)
Intermediate objective: From 2017 onwards, key stakeholders join forces in the annual meeting of the Great Altay TBR Board and the Joint Action Plan. The members of the TBR Board and two coordinators for operational TBR work are nominated. Experts and stakeholders for the first Task Groups are appointed.
Cooperation is fostered and established among protected areas + forestry administration + environmental authorities
Cooperation among marai farms + protected areas + agricultural administration is fostered & established through Expert / Network and Joint Task Groups
Cooperation among protected areas + relevant and environmental authorities is fostered and established to ensure efficient ecosystem management
Cooperation among tourism agencies + protected areas + responsible administrations + environmental authorities is fostered & established via Expert/Network & Joint Task Groups
Intermediate objective: By 2020, TBR Board members and coordinators participated in a fundraising training and worked out a fundraising plan for specific projects/activities related to conservation and development strategies. At least two project applications are addressed to external donors.
Institutional results
Results related to resources
1.5 Assist to secure adequate funding for TBR activities
Adequate funding opportunities for TBR activities are identified (donors, grants)
Financial and human resources for protected areas administration are identified + secured for implementation of strategies and actions in the TBR
Resources for forestry and forestry administration in the TBR are identified and made available for implementation of strategies and actions in the TBR
Resources for activities outside protected areas in the TBR are identified and made available for implementation of strategies and actions in the TBR
Provide logistic support to all other strategies, but most importantly for Strategies 8, 9, 10
Available resources enable implementation of the Strategies 1 to 10
Results related to knowledge
Environmental education is an integral part of TBR activities as part of Strategy 9
Generation of jobs and income is supported (Strategy 6, 7)
Scientific cooperation in the transboundary biosphere reserve and beyond is enabled (Strategy 8)
Monitoring on outcome and impact levels (Strategy 2) is set up and applied
Results related to control
Law enforcement is established as part of Strategy 4
Capacity foundation for control through law enforcement is set
Joint enforcement policies for improved pasture management are developed, enabled and coordinated
Joint enforcement policies for improved management of maral farms are developed, enabled and coordinated
Joint enforcement policies for collection of wild raw non-timber materials are developed, enabled and coordinated
Joint enforcement policies for wild animal use are developed, enabled and coordinated
Joint enforcement policies for control of logging and use of the forest are developed, enabled and coordinated
Existing knowledge and research from third parties is incorporated into assessments, adaptation plans and measures
Cross-border wildfire prevention, containment and early extinguishing is carried out effectively
1.8 Establish an adaptive management
1.3 Monitor and evaluate the effectiveness of activities under the Joint Action Plan
Adaptive management is in place with regular reviews and the ongoing adaptive management plan is fostered and secured by both BRs
The effectiveness of activities under the Joint Action Plan is monitored and evaluated with transparency
Networking / participation of local NGOs and interest groups is a vital part of TBR activities
1.9 Develop participatory management mechanisms with key stakeholders
An Expert / Network / Joint Task Groups for bilateral data handling is formed
An Expert / Network / Joint Task Groups for law enforcement is formed
An Expert / Network / Joint Task Groups for the legal framework is formed
An Expert / Network / Joint Task Groups for climate change is formed
An Expert / Network / Joint Task Groups for regional products / labelling is formed
An Expert / Network / Joint Task Groups for the institutional foundation is formed
An Expert / Network / Joint Task Groups for monitoring on outcome & impact levels is formed
An Expert / Network / Joint Task Groups for biodiversity conservation is formed
Results related to legal/ political factors
The base for recommendations on how to regulate the use of natural resources outside protected areas through protected area administration is created
Coordination of regulatory measures on how to use natural resources outside protected areas is set up and working
Intermediate objective: By 2020, the governments of both countries synchronize the Agreement's objectives and Joint Action Plan with the present management plan. At the same time annual operational costs of the TBR work are taken into account of the Katon-Karagay BR and Katunskiy BR (Katon-Karagay SNP and Katunskiy SNP) budgets.
1.4 Adjustment (where necessary) of the Inter-governmental Agreement
Elaboration of recommendations for the improvement of legislation and legal instruments concerning the regional protected areas
The recommendation, negotiation and ease of BR legislation and border regime (Strategy 3) is initiated
Adequate legislation and legal instruments concerning the regional protected areas are developed
Elaboration of recommendations on how to ease discrepancies of legislation with biosphere reserves
Coordination of transboundary conservation (Strategy 4) is possible and activated
Discrepancy of legislation with principles of biosphere reserves is eased and commonalities are fostered
Results related to cultural factors
Tourists and local inhabitants environmental awareness about open fire risks is increased
Farmer's environmental awareness is increased
Local inhabitants environmental protection awareness is increased
Socio-economic results
Land use/ agricultural results
Agricultural fires are reduced
Maral farming is more sustainable with less impact onto the environment
Livestock farming practice is more sustainable with less impact onto the environment
The seasonal pasture rotation system (transhumance) is an attractive and revived practice
Results related to tourism
Tourism is in accordance with biosphere reserve principles and aligned with the carrying capacity of the ecosystem
Results related to the use of natural resources
The collection of wild raw non-timber materials is regulated
Poaching is reduced
Illegal logging is reduced
Changes of local climate
Anthropogenic changes of the environment
Water pollution is reduced
Litter pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Unsustainable use of natural resources
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Biotic changes
Great Altay Transboundary Biosphere Reserve
Overall Conservation Goal: By 2040, functional and resilient ecosystems of the Great Altay TBR support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard. They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.
The potential deterioration of the quality of fresh water is avoided
Soil degradation is reduced
The potential reduction/fragmentation of plant species habitats is avoided
Reduction/fragmentation of game species habitats is mitigated or reversed
The potential disruption/disturbance of migration routes is avoided
Reduction in the population number of species (except fish) is mitigated or reversed
The potential loss of species is avoided
Change in composition and age of forest trees is reduced
Deterioration of the aesthetic quality of the landscape is mitigated or reversed
Glaciers mass dynamics
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Terrestrial
Glacial and nival ecosystems
Belukha Mountain
Mountain tundra
Meadows
Steppes
Mountain forest ecosystems
Game species
Rare/endangered, endemic and relict species
Rivers
Lakes
Floodplains
Aquatic
Provisioning services
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products
Meat and other products from reared animals
Forestry products
Cereals and vegetables
Grass and hay as fodder for livestock
Regulating services
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Maintenance of the air quality (air purification)
Fixing carbon dioxide
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Cultural services
Sense of place
Subject matter for research, education and entertainment
Inspiration for artistic representations
Historic records and cultural monuments
Physical interaction with ecosystems
Religious and spiritual interactions
Material benefits (increasing the standard of living)
Receipt of income from employment
Physical and mental health
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR strategies
Strategies
Strategy entry point
Direct effect
Indirect effect
Essential key intermediate result
Key intermediate result
Potential effect
MARISCO
Centre for Econics and Ecosystem Management

3.5.2 'Monitoring on outcome and impact levels of the TBR strategies'

Description – strategy (S 2)

Strategy 2 has the aim to monitor impacts and outcomes of the Great Altay TBR strategies regularly and effectively as well as the key ecological attributes of the Great Altay TBR (see chapter 2.1.2). The strategy serves as an overlooking mechanism and includes monitoring of the implementation of the TBR strategies and their planned sub-strategies and activities. By doing so, it consequently provides the basis for adaptive management measures if need be. The outcome and impact levels of the defined intermediate objectives of each strategy and the overarching conservation and development goal of the Great Altay TBR are monitored and assessed against the key ecological attributes and provide the basis for adaptive management.

Working with the result chains of each strategy, which include the intermediate objectives and the overarching conservation and development goal of the Great Altay TBR, creates the possibility of an early warning system that recognises changes in the anticipated impacts and outcomes of each strategy. The recurrent evaluation and adjustments enable reaction to changing conditions of each Great Altay TBR strategy's implementation. Thus, monitoring on outcome and impact levels in comparison with the key ecological attributes conditions alerts to critically revise and adapt current management, whenever necessary, to reduce the risks that could complicate the implementation of the strategies or are caused by it.

The adaptive management of the Great Altay TBR is cyclical and constantly revises its conceptual design and effectiveness. Adaptive risk management as part of the adaptive management is a parallel and interlinked process that allows for checking in any phase of the project cycle where risks appear or where they may be generated by the implementation of strategies (Ibisch & Hobson, 2014). To enable ongoing adaptation of the Great Altay TBR strategies a monitoring plan contains the application of a reduced MARISCO exercise in time intervals of 3 years during the continuous management process. This is to reduce risks and vulnerabilities of the TBR and making it more resilient as a consequence.

Furthermore, by monitoring and adjusting the strategies the *factors related to insufficient/lack of cooperation* and *factors related to insufficient/lack of resources* are addressed. This is done through increased cooperation to monitor and adjust the steps and activities of each strategy, which then leads to an increased effectiveness of resource use of the Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy administrations as the implementing and supporting entities (see strategy 1) and relevant institutions involved.

Precondition for strategy implementation

- The coordinating structure & management mechanisms for the TBR are established as part of strategy 1;
- The joint Task Group 'Monitoring on Outcome & Impact Levels' is formed permanently and reports to the Great Altay TBR Board as part of strategy 1, the Task Group meets more often than the Great Altay TBR Board to monitor outcome and impact levels and proposes adaptive measures accordingly;
- Adequate funding for TBR activities is secured as part of strategy 1;
- Joint regulation and control mechanisms are developed as part of strategy 4;
- Existing regulation and control mechanisms are bundled as part of strategy 4.

(Essential) Key intermediate results to be achieved according to the results web (see figure 21)

- The joint Task Group 'Monitoring on Outcome & Impact Levels' enables transboundary cooperation as base for joint monitoring on outcome and impact levels in the TBR;

- An effective cooperation between protected areas, authorities and stakeholders is fostered;
- The indicators on impact levels are included into the monitoring plan with the Task Group;
- The indicators on outcome levels are included into the monitoring plan with the Task Group;
- The intervention points for an adaptive management of the TBR have been agreed upon jointly with the Task Group;
- The revision points for an adaptive management of the TBR have been agreed upon jointly with the Task Group;
- Emergency intervention points as exit strategy in case threat is imminent have been agreed upon jointly with the Task Group;
- The monitoring plan with strategies and their corresponding objectives / goals has been agreed upon jointly by both administrations, the Katon-Karagay SNP and SNBZ Katunskiy administrations as the implementing and supporting entities, together with the Task Group;
- Impacts of all strategies are monitored regularly and effectively according to the monitoring plan;
- Outcomes of all strategies are monitored regularly and effectively according to the monitoring plan;
- The monitoring plan is revised regularly and jointly with the Task Group.

Sub-strategies / fields of activities

To this end, strategy 2 foresees the implementation of the following sub-strategies:

S 2.1 Develop a monitoring plan of the strategies and their corresponding objectives

The entire process of monitoring is planned and documented with the help of a monitoring plan, which is developed jointly by the Katon-Karagay BR and Katunskiy BR administrations in cooperation with the permanent Task Group 'Monitoring on Outcome & Impact Levels'. The ongoing monitoring of operational activities of the Great Altay TBR strategies is considered to be an important part of documenting and measuring the outcomes and desired effects of the strategy (Ibisch & Hobson, 2014).

The recurrent adaptation process includes the revision and adaptation of the Great Altay TBR strategies. It also includes the adaptation of the national management plans of Katon-Karagay BR (Katon-Karagay State Nature Park respectively) and Katunskiy BR (State Nature Biosphere Zapovednik Katunskiy respectively) if the strategies of the national management plans prove counterproductive to achieve the set goals and objectives. For such process, the permanent Task Group meets more often than the Great Altay TBR Board to monitor outcome and impact levels and to propose adaptive measures accordingly. Every three years a reduced MARISCO exercise is conducted, which provides the tool for adaptation in a strongly participatory process.

Box 11: Monitoring

Monitoring is the periodic process of gathering data, which is then used to assess the status of defined indicators. This way, changes in certain elements or their performance can be monitored.

Comprehensive monitoring for conservation comprises several components:

- **Process monitoring** measures the progress of project implementation according to operational plans.
- **Impact monitoring** measures indicators to track the accomplishment of management goals and objectives.
- **General environmental monitoring** is used to observe environmental change without necessarily being related to strategic planning or project implementation (Ibisch & Hobson, 2014).

Monitoring the effectiveness of strategies through impacts and outcomes of each strategy, the overarching conservation and development goal of the Great Altay TBR as well as of the key ecological attributes depends on the identification of appropriate indicators, which are part of the monitoring plan. At the outset, it is important to find good indicators that are significant and also

cost-effective and reflect the impact and outcome levels. There may already be substantial data available from which the joint Task Group can draw down appropriate indicators. (Ibisch & Hobson, 2014). Otherwise the joint Task Group needs to develop the indicators by following a set of criteria.

The S-U-M criteria for good indicators define that indicators must be sensitive. This means that the change in indicator values must correlate consistently with changes in the condition to be managed, without showing any changes over time. Indicators must be unambiguous by making clear from the evidence and understanding that the indicator relates directly to the condition to be managed. Indicators must be measurable and it must be possible to take reliable measurements with reasonably simple and cost-efficient equipment or methods (Ibisch & Hobson, 2014).

Indicators for impact and outcome monitoring and also maybe process monitoring have to be incorporated into the results webs with at least one indicator per intermediate objective/goal of each strategy, the overarching conservation and development goal of the Great Altay TBR as well as of the key ecological attributes. The role of these impact and outcome indicators is to inform the managers about the meeting of the set objectives and goals for each strategy. If further information is needed beyond that provided by monitoring the objectives of the results webs, then additional indicators need to be incorporated into the results webs of each strategy (Ibisch & Hobson, 2014).

The identified indicators are then transferred into a table of the monitoring plan with the following information for each indicator:

- Monitoring method: How are the indicators being measured and which method is used?
- Responsible person: Who will do the measurement?
- Time: When will the data be collected and at what time intervals?
- Place: Where will the data be collected or the measurement been taken?

Table 24: Table of the monitoring plan with indicator matrix

Indicator	Method	Who	When	Where
Example				
Example				

Source: (Ibisch & Hobson, 2014)

S 2.2 Develop intervention and revision points for an adaptive management of the TBR

The intervention and revision points are established by the permanent Task Group 'Monitoring on Outcome & Impact Levels' as part of the monitoring plan in order to avoid negative impacts or perverse incentives of the strategies. As part of the monitoring plan they allow for adaptation of each strategy and risk-robust decision making, if necessary. The intervention and revision points refer to thresholds of the indicators of the impacts and outcomes of the intermediate objectives and sub-strategies that are crossed where the strategy implementation needs adjustments. Each indicator needs an identified threshold so that the intervention and revision points can be located. Intervention and revision points are also placed at each (essential) key intermediate result of the Great Altay TBR strategies.

S 2.3 Develop emergency intervention points as exit strategy in case increasing threat is imminent

Emergency intervention points are necessary to be developed with the permanent Task Group 'Monitoring on Outcome & Impact Levels' in case a threat is imminent and increasing and therefore threatening the success of a strategy or creating harmful impacts. They are developed as part of the management plan taking into account the thresholds of the indicators (see S 2.2). The exit strategy sets an ultimate threshold not to be crossed for each impact and outcome indicator of the objectives

and goals of the Great Altay TBR strategies after adjustments and revisions of the Great Altay TBR proved unsuccessful.

Intermediate Objectives

By 2018, the joint Task Group 'Monitoring on outcome and impact levels' has developed indicators of the impacts and outcomes of the Great Altay TBR strategies, the overarching conservation and development goal of the Great Altay TBR as well as of the key ecological attributes.

By 2020, the joint Task Group 'Monitoring on outcome and impact levels' has developed intervention and revision points for an adaptive management of the Great Altay TBR strategies in case of the beginning of negative impacts or perverse incentives of Great Altay TBR strategies. It has also developed an exit strategy for an adaptive management of the Great Altay TBR strategies in case a threat is imminent and increasing.

By 2021, the joint Task Group 'Monitoring on outcome and impact levels' has developed a monitoring plan to assess the impacts and outcomes of the Great Altay TBR strategies.

From 2021 onwards, besides meeting regularly, the joint Task Group 'Monitoring on outcome and impact levels' conducts a reduced MARISCO exercise in time intervals of three years to assess the impacts and outcomes of the Great Altay TBR strategies. The exercise includes ongoing adaptation of the Great Altay TBR strategies when necessary to ensure effectiveness of the transboundary strategies.

Strategy 2 provides the tool for monitoring on outcome and impact levels of the Great Altay TBR strategies as an essential part of adaptive management. By doing so it provides the base for the implementation of the other Great Altay TBR strategies.

Enabling of the following Great Altay TBR strategies

- The coordinating structure & management mechanisms for the TBR are effective (strategy 1);
- The monitoring on outcome and impact levels in the TBR is effective (strategy 2);
- The strengthening of transboundary cooperation and management is effective (strategy 3);
- The coordination of transboundary biodiversity conservation is effective (strategy 4);
- The promotion of transboundary understanding & cultural exchange is effective (strategy 5);
- The generation of alternative job opportunities and income is effective (strategy 6);
- The development of regulated eco-cultural tourism is effective (strategy 7);
- Scientific cooperation in the TBR and beyond is effective (strategy 8);
- The increase of capacities related to education and training is effective (strategy 9);
- The development of external communication channels and public relations is effective (strategy 10).

The following page depicts the result web of strategy 2.

Figure 21: Results web of strategy 2

2. Monitoring on outcome and impact levels of the TBR strategies
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Great Altay Transboundary Biosphere Reserve
Results related to institutional factors
Results related to cooperation
Results related to control
Results related to resources
Results related to knowledge
Results related to cultural factors
Results related to legal/ political factors
Socio-economic results
Results related to tourism
Results related to the use of natural resources
Land use/ agricultural results
Changes of local climate
Anthropogenic changes of the environment
Unsustainable use of natural resources
Biotic changes
Participation and cooperation between forestry administration and protected area/environmental authorities is fostered
Participation and cooperation between maral farms, agricultural administration and protected area/ environmental authorities is fostered
Participation and cooperation between relevant authorities and protected area/environmental authorities is fostered
Transboundary cooperation is further fostered
Transboundary cooperation is strengthened, stable and further enhanced
Transboundary cooperation is effective
An effective cooperation between protected areas, authorities and stakeholders is fostered
2.1 Develop a monitoring plan of the strategies & their corresponding objectives
2.2 Develop intervention and revision points for an adaptive management of the TBR
2.3 Develop emergency intervention points as exit strategy in case threat is imminent
The base for joint monitoring on outcome and impact levels in the TBR is created
Early warning systems that recognize changes in anticipated outcomes are created
The effectiveness of the adaptive management is monitored and evaluated with transparency
Adaptive management is in place with regular reviews and the ongoing adaptive management plan is fostered and secured by both BRs
The current TBR management plan is adapted (strategy and activity level) whenever necessary
Adapted strategies and activities effectively support the conservation objects of the TBR in the long term
The TBR strategies facilitate successfully the reduction of threats and stresses in the TBR territory on a strategic level in the long-term
Impacts of all strategies are monitored regularly and effectively according to the monitoring plan
Outcomes of all strategies are monitored regularly and effectively according to the monitoring plan
A more appropriate pasture management is implemented
A more appropriate management of maral farms is implemented
Improved control of the collection of wild raw non-timber materials
Improved control of the use of wild animals
Improved regulations and control of logging and use of the forest
Resources of protected areas administration, relevant authorities and administrations are enhanced and made available for TBR activities
The knowledge of protected areas administration, relevant authorities and administrations are enhanced through TBR activities
Existing knowledge and research from third parties is incorporated adequately
Environmental education by the protected area administration is enabled through recurrent activities and trainings
Tourists and local inhabitants handle open fires more carefully
Agricultural fire protection regulations are adequate
Regulations and checks on tourism are appropriate to local conditions
Improved regulation of tourism is jointly established
Poaching is reduced and less attractive as income source
Illegal logging is reduced
Agricultural fires are reduced
Maral farming is more sustainable with less impact onto the environment
Livestock farming practice is more sustainable with less impact onto the environment
Water pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild raw non-timber materials is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
The potential deterioration of the quality of fresh water is avoided
The potential reduction/fragmentation of plant species habitats is avoided
Reduction/fragmentation of game species habitats is mitigated or reversed
The potential disruption/disturbance of migration routes is avoided
Reduction in the population number of species (except fish) is mitigated or reversed
Reduction in the population number of fish species is mitigated or reversed
The potential loss of species is avoided
Change in composition and age of forest trees is reduced
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
Woody biomass
Connectivity
Species composition
Glacial and nival ecosystems
Mountain tundra
Meadows
Steppes
Mountain forest ecosystems
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Rivers
Lakes
Floodplains
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products
Meat and other products from reared animals
Forestry products
Cereals and vegetables
Grass and hay as fodder for livestock
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Maintenance of the air quality (air purification)
Fixing carbon dioxide
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Sense of place
Subject matter for research, education and entertainment
Inspiration for artistic representations
Historic records and cultural monuments
Physical interaction with ecosystems
Religious and spiritual interactions
Material benefits (increasing the standard of living)
Receipt of income from employment
Physical and mental health
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR Strategies
Strategies
Strategy entry point
Direct effect
Indirect effect
Essential key intermediate result
Key intermediate result
Potential effect
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3.5.3 'Strengthening transboundary cooperation and management and enable and ease the transboundary exchange of documents and data'

Description – strategy (S 3)

In the Republic of Kazakhstan as well as in the Russian Federation, one of the biggest problems for an effective management of BRs is, in general, the *discrepancy of legislation with principles of biosphere reserves*. This problem goes along with the facts that

- The executive management of Katon-Karagay BR is delegated to the administration of Katon-Karagay State Nature Park and the executive management of Katunskiy BR is delegated to State Nature Biosphere Zapovednik Katunskiy, respectively, without expanding their authorities in an adequate range;
- Legislation remains inadequate and legal instruments are lacking to regulate the use of natural recourses outside protected areas, particularly outside the core zone of the Katunskiy BR;
- A lack of cooperation and coordination between agencies on transboundary issues like cross-border trade, tourism, monitoring and evaluation exists.

Since the year 1991 the neighbouring districts of Ust-Koksa and Katon-Karagay are separated by national borders. Strategy 3 addresses the following situations:

- Since independency of the Republic of Kazakhstan and the Russian Federation both countries developed their own systems of protected area management including monitoring and mapping of data. In addition, the handling of data, which relate to border areas, became more restrictive. As a consequence, the exchange of information and know-how came to a hold;
- Within the TBR territory, there is neither a possibility for local people nor for visitors to cross the border. The closest border post is situated in Shemonaikha, some 110 km from Ust-Kamenogorsk. Former touristic routes connecting the northern with the southern parts of the Altai Mountains have been closed. Visitors from outside that wanted to enter the BRs require additional special border permits at both, the Kazakh and the Russian side.

Precondition for strategy implementation

- Cooperation is fostered & established among protected area administration & key stakeholders as part of strategy 1;
- A coordinating structure and management mechanisms are established as part of strategy 1;
- A Task Group on data handling has been formed jointly as part of strategy 1;
- The Task Group 'Legal Framework' has been formed jointly as part of strategy 1;
- Existing regulation & control mechanisms are developed and bundled jointly as part of strategy 4.

(Essential) Key intermediate results to be achieved according to the results web (see figure 22)

- The Task Group 'Bilateral Data Handling and Research' enables the implementation of adjusted bilateral data policies;
- A framework for data exchange for the TBR has been established;
- Transboundary exchange of documents and data has been enabled and eased jointly;
- The relevant national legal frameworks for the TBR and national BRs about their border regime are reviewed;
- Recommendations for adjustment of the national legal framework for the TBR are submitted to the respective governmental entity;

- The administration of the TBR and of the national BRs receive the authority to regulate natural resource use outside protected areas in the TBR territory;
- Legislation/legal instruments concerning the regional protected areas are being adjusted according to local conditions in the TBR territory;
- Discrepancies and commonalities of legislation with principles of BRs in the TBR territory are identified jointly;
- The sustainable use of natural resources and ecosystem services in the TBR territory as model region is enabled and secured jointly;
- Opportunities to allow small-scale border traffic for local residents are tried out as joint pilot project by the relevant authorities;
- The re-opening of selected cross-border touristic trails/routes is tried out as joint pilot project by the relevant authorities;
- Temporary/seasonal border posts are tried out as joint pilot project by relevant authorities;
- Facilitation of border traffic for registered tourist groups and individual tourists are tried out by the relevant authorities as joint pilot project;
- Opportunities to allow small-scale border traffic for local residents are tried out as joint pilot project by the relevant authorities;
- The pilot projects are successful and well accepted by respective governmental entities, local authorities and local communities in the TBR;
- The Great Altay TBR acts as transboundary model region for sustainable development in combination with biodiversity conservation and cooperation.

Sub-strategies / fields of activities

To this end, strategy 3 foresees the implementation of the following sub-strategies:

S 3.1 Review the national legal frameworks for the TBR, national BRs and border regimes. Develop the recommendations for adjustment of the national legal frameworks

Based on the Great Altay TBR reports on legal frameworks a set of recommendations is further worked out by the Task Group 'Legal Framework' in cooperation with the Katon-Karagay BR and Katunskiy BR central administrations as the implementing entities particularly for ease of implementation of the TBR concept and to reduce the discrepancy of legislation with principles of BRs. In a joint effort with each national MAB Committee, the TBR coordinators submit the recommendations to the respective government entities of both, the Republic of Kazakhstan and the Russian Federation, and the respective ministries in charge of nature conservation and border issues to provide a platform for informed decision making on recommended changes to the national legal framework at governmental and ministerial level.

S 3.2 Establish a framework for data exchange for the TBR

By strengthening transboundary cooperation and facilitating transboundary exchange of documents and data, sub-strategy 3.2 sets the legal framework, which is necessary for an establishment of a joint scientific data center (as described under S 8.2). Both sub-strategies, S 3.2 and S 8.2, are developed by the Task Groups 'Legal Framework' and 'Bilateral Data Handling and Research' in cooperation with the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities and are feeding into the various conservation and development strategies.

S 3.3 Initiate negotiations of opportunities to allow small-scale border traffic for residents of the Katon-Karagay and Ust-Koksa districts

Organizing any bilateral meetings or cross-border activities at the current state is very time consuming, expensive and complicated. Therefore, the TBR Board, in its function to represent the TBR Task Groups as well as ultimately all TBR inhabitants, is initiating negotiation of less expensive and more efficient opportunities with the respective governmental entities in both countries to

gather and conduct joint training seminars (e.g. strategy 9), to transfer knowledge (e.g. strategy 4, 6, and 8) or to meet for cultural events (strategy 5).

S 3.4 Initiate negotiation of re-opening of selected cross-border touristic trails/routes and temporary/seasonal border posts respectively and negotiate for facilitation of border traffic for registered tourist groups and individual tourists

As experience of other mountainous areas can testify (e.g. European Alps), cross-border tourism products including crossing of mountain ranges enjoy high popularity. Therefore, the TBR Board commissions a tourism expert to elaborate a feasibility study on the development of cross-border tourism (see sub-strategy 7.1). If feasibility is given, the TBR Board addresses the expert's recommendations to all relevant decision makers on provincial and national level and by doing so, initiates negotiation with the respective governmental entities in both countries.

Intermediate Objectives

By 2020, the governments of both the Republic of Kazakhstan and the Russian Federation negotiate on a legislation that incorporates the protected area status 'biosphere reserve' as recommended by the UNESCO MAB-Programme.

By 2020, the exchange of data and documents between the two BRs is facilitated.

By 2025, the governments of both the Republic of Kazakhstan and the Russian Federation agree on a legislation that incorporates the protected area status 'biosphere reserve' as recommended by the UNESCO MAB-Programme. The adjusted law provides BR administrations with respective legal instruments, staffing and financial resources required for national and transboundary BR work.

By 2025, the governments of both the Republic of Kazakhstan and the Russian Federation agree on a seasonal opening of one cross-border trail on the territory of the TBR. Local people have the opportunity to apply for a two-year permit for local border traffic. Local tourist companies gain the opportunity to apply for a permit that allows cross-border tours for registered tourist groups.

Just like strategy 1 and 2, strategy 3 does not automatically result in reaching the conservation goals. It feeds into many of the other strategies, wherever an eased border regime is a requirement. The successful implementation of strategy 3 does not automatically result in reaching the overall conservation goal as defined in chapter 2.2. But reaching the intermediate objectives is an important step towards achieving it.

Enabling of the following Great Altay TBR strategies

- Transboundary understanding and cultural exchange is enabled (strategy 5);
- Bilateral exchange of regional organic products is enabled (strategy 6);
- Regulated cross-border eco-cultural tourism is enabled (strategy 7);
- Scientific cooperation in the TBR and beyond is enabled (strategy 8);
- The increase in capacities related to education and training is enabled (strategy 9);
- External communication channels & public relations profit from data exchange (strategy 10).

The following page depicts the result web of strategy 3.

Figure 22: Results web of strategy 3


3. Strengthening transboundary cooperation and management and enable and ease the transboundary exchange of documents and data
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Results related to institutional factors
Results related to cooperation
Results related to resources
Results related to knowledge
Results related to control
Results related to cultural factors
Socio-economic results
Results related to legal/ political factors
Land use/ agricultural results
Results related to the use of natural resources
Results related to tourism
Changes of local climate
Anthropogenic changes of the environment
Unsustainable use of natural resources
Biotic changes
Great Altay Transboundary Biosphere Reserve
Overall Conservation Goal: By 2040, functional and resilient ecosystems of the Great Altay TBR support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard. They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.
Cooperation with relevant local, regional and national authorities as well as with NGOs is fostered
Cooperation with relevant local, regional and national authorities as well as with NGOs is established and set up
Cooperation with relevant local, regional and national authorities as well as with NGOs is strengthened
The cooperation between forestry administration and protected area administration authorities is improved
The Task Group enables transboundary cooperation as base for recommendations on handling bilateral data
The Task Group establishes recommendations on handling of bilateral data policies
The Task Group enables the implementation of adjusted bilateral data policies
3.2 Establish a framework for data exchange for the TBR
3.1 Review the national legal frameworks for the TBR, national BRs & border regimes incl. adjustment re-commendations
3.3 Initiate negotiation of opportunities to allow small-scale border traffic for local residents
3.4 Initiate negotiation of re-opening of selected cross-border tourist trails/routes
A framework for data exchange for the TBR has been developed jointly
A framework for data exchange for the TBR has been established
Transboundary exchange of documents and data has been enabled and eased jointly
Intermediate objective: By 2020, the exchange of data and documents between the two BRs is facilitated.
The Great Altay TBR acts as transboundary model region for sustainable development in combination with biodiversity conservation and cooperation
Agricultural fires are reduced
Fires are reduced
The linear barriers in the territory are avoided
Poaching is reduced and less attractive as income source
Illegal logging is reduced
Improved regulation of tourism is jointly established
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Soil degradation is reduced
Shift of tree line up- and downward is reduced
The potential loss of species is avoided
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
Woody biomass
Connectivity
Species composition
Terrestrial
Glacial and nival ecosystems
Mountain tundra
Meadows
Steppes
Mountain forest ecosystems
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Rivers
Lakes
Floodplains
Aquatic
Provisioning services
Regulating services
Cultural services
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products
Meat and other products from reared animals
Forestry products
Cereals and vegetables
Grass and hay as fodder for livestock
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Fixing carbon dioxide
Maintenance of the air quality (air purification)
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Sense of place
Subject matter for research, education and entertainment
Inspiration for artistic representations
Historic records and cultural monuments
Physical interaction with ecosystems
Religious and spiritual interactions
Material benefits
Receipt of income from employment
Physical and mental health
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR strategies
Strategies
Strategy entry point
Direct effect
Indirect effect
Essential key intermediate result
Key intermediate result
Potential effect
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3.5.4 'Coordination of transboundary biodiversity conservation'

Description – strategy (S 4)

The region of the TBR is internationally recognized for its conservation importance (see chapter 2) through the designation of the two adjacent national biosphere reserves Katon-Karagay in the Republic of Kazakhstan and Katunskiy in the Russian Federation and the unique situation of the various overlapping national and international conservation statuses (see chapter 1.4). Strategy 4 aims to create and secure cooperation mechanisms, which contribute to long term protection and restoration of natural complexes and biodiversity as well as understanding of cultural identities of this unique region.

Biodiversity is the diversity of ecosystems, natural communities and habitats as well as species and encompasses the variety of ways that species interact with each other and their environment. The strategy 4 targets biodiversity conservation based on the ecosystem approach for conservation and sustainable use of natural resources. It considers this unique situation by promoting to bundle conservation policies of the various national and international conservation statuses. Supporting the functioning of migratory routes and enhancing the adaptability towards climate change for key species are further focuses of this strategy. Existing emergency response measures such as fighting wild fire will be continued and further developed. The strategy also encompasses the development and harmonization of coordinated policy changes and joint legislative measures to foster pro-active conservation actions including legal enforcement.

The strategy addresses, inter alia, the *discrepancy of legislation with principles of biosphere reserves,* the *lack of knowledge on the recreational capacity of the territory* and the *unregulated and/or illegal collection of wild raw non-timber forest materials.*

Precondition for strategy implementation

- Cooperation is fostered & established among protected area administration & key stakeholders as part of strategy 1;
- A Task Group on law enforcement, a Task Group on climate change and a Task Group on biodiversity conservation has been formed as part of strategy 1;
- The transboundary exchange of documents and data is strengthened as part of strategy 3.

(Essential) Key intermediate results to be achieved according to the results web (see figure 23)

- Monitoring policies are jointly introduced;
- Sufficient information about vulnerabilities of biodiversity, habitats and ecosystems is available to allow for risk-robust decision making;
- Assessment reports enable the protected area administrations to conduct environmental education;
- Adaptation plans for cross-boundary migration of wild animal species are jointly developed;
- Conservation policies of the various (inter-)national conservation statuses are bundled as base for identification of commonalities of legislation with principles of biosphere reserves to reduce their discrepancies;
- Common or coordinated conservation or restoration policies are jointly developed based on the recommendations and existing adequate legislation and legal instruments;
- Active nature conservation / restoration measures are jointly carried out;
- Coordination of regulatory measures on how to use natural resources outside protected areas is set up and working;
- Adequate agricultural fire protection regulations are recommended and regulatory measures are coordinated;

- Long-term cross-border measures for wildfire fighting and prevention are developed;
- Resources for cross-border wildfire prevention, containment and early extinguishing are jointly provided and secured;
- Cross-border wildfire prevention, containment and early extinguishing are carried out effectively;
- Joint enforcement policies for improved pasture management, for improved management of maral farms, for collection of non-timber materials, for wild animal use and for control of logging and use of the forest are developed, enabled and coordinated.

Sub-strategies / fields of activities

To this end, strategy 4 foresees the implementation of the following sub-strategies:

S 4.1 Monitor ecosystems and key species

The ecosystems of the vast mountainous region of the Great Altay TBR are vulnerable against climate change and other human induced impacts. Furthermore, in the light of sustainable development of eco-cultural tourism the recreational capacity of the region is not yet well known. For these reasons, the Task Group 'Biodiversity Conservation' coordinates the joint long-term monitoring of identified ecosystems and key plant and animal species of the Great Altay TBR. The Task Group 'Biodiversity Conservation' introduces jointly monitoring policies that are applied in the Kazakhstani and Russian part of the Great Altay TBR to create the base for the assessment of the recreational capacity and the vulnerability towards anthropogenic impacts as part of the sub-strategies 4.2 and 4.7 that will be necessary as foundation for strategy 7 to develop regulated eco-cultural tourism.

S 4.2 Assess vulnerabilities of biodiversity, habitats and ecosystems as knowledge base for climate change adaptation measures

In view of the changing climate the assessment is a necessity for adaptation measures to be taken in the Great Altay TBR region and summarizes the vulnerabilities now and in the future. For doing so, the evaluation and usage of joint monitoring data of the sub-strategy 4.1 is coordinated by the Task Group 'Climate Change' in cooperation with the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities to assess the vulnerabilities of biodiversity, habitats and ecosystems. The assessment is part of comprehensive long-term climate change monitoring in relation with sub-strategy S 4.1.

S 4.3 Assess ecosystem services including their economic values

The Task Group 'Biodiversity Conservation' in close cooperation with the Task Group 'Climate Change' coordinates the development of an assessment of ecosystem services of the Great Altay TBR that also includes their economic values. The ecosystem services (see chapter 2.1.2, table 6) assessment is an important source to determine the recreational capacity of the territory as base for strategy 7 and the threshold of sustainable natural resource use. Furthermore, the assessment reports enable the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities to conduct environmental education as part of strategy 8 and 9 and to offer data for outreach and publicity of strategy 10.

S 4.4 Bundle conservation policies of the various (inter-)national conservation statuses

Sub-strategy 4.4 is an essential step to reduce the discrepancy of legislation with principles of BRs. The Task Group 'Biodiversity Conservation' in cooperation with the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities screen the various existing (inter-)national conservation statuses of the Great Altay TBR region as well as of animal and plant species to identify their commonalities. After the screening they bundle the conservation policies of the various (inter-)national conservation statuses according to their commonalities. By doing so, they create the base for identification of commonalities of legislation with principles of BRs from where recommendations

are developed and the discrepancies of legislation with principles of biosphere reserves are eased and the commonalities are fostered. By doing so, sub-strategy 4.4 feeds into to sub-strategy 4.9.

S 4.5 Develop common or coordinated conservation and restoration policies

Sub-strategy 4.5 addresses the discrepancy of legislation with principles of biosphere reserves. The Task Group 'Biodiversity Conservation' oversees the development of common or coordinated conservation and restoration policies as well as policies for restoration of degraded areas. The Task Group works together with the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities on recommendations about adequate legislation and legal instruments concerning the regional protected areas in both countries. Common or coordinated conservation or restoration policies are jointly developed based on the recommendations and existing adequate legislation and legal instruments of both countries. By doing so, active nature conservation and nature restoration are jointly carried out on Katon-Karagay BR and Katunskiy BR level.

S 4.6 Develop coordination of regulatory measures on nature protection

Sub-strategy 4.6 includes the coordination of the development of regulatory measures on nature protection and, in case of incompatibility, their harmonisation. It also entails the preparation of recommendations on how to use natural resources outside protected areas sustainably with assistance of the protected area administration. By doing so, the coordination of regulatory measures on how to use natural resources outside protected areas is established by Katon-Karagay BR and Katunskiy BR as the implementing entities together with the Task Group 'Biodiversity Conservation'.

S 4.7 Develop adaptation plans for species migration

Migration routes of wild animals are altered and hindered by large maral farm fences and are threatened by the potential development of a physical state boundary between the Republic of Kazakhstan and the Russian Federation. The Task Groups 'Law Enforcement' and 'Biodiversity Conservation' work together for this sub-strategy and cooperate with the Katon-Karagay BR and Katunskiy BR as the implementing entities to develop adaptation plans to allow species to migrate while minimizing the risks of invasive species, e.g. through the establishment of green corridors. This is done by the joint preparation of adaptation plans for migration of wild animal species, which also incorporates existing knowledge and research from third parties into assessments, adaptation plans and measures.

S 4.8 Develop cross-border cooperation in terms of fighting and preventing wildfires

Wildfires are an existing problem of the region with fires often appearing cross-border. The Task Groups 'Climate Change' and 'Biodiversity Conservation' in cooperation with other relevant authorities further develop existing cross-border cooperation in terms of fighting and preventing wildfires. In a first step long-term cross-border cooperation is established, followed by long-term cross-border programmes and, ultimately, long-term cross-border measures for wildfire fighting and prevention. The Task Groups 'Climate Change' and 'Biodiversity Conservation' also assist to secure jointly for sufficient and efficient resources for cross-border wildfire prevention, containment and early extinguishing. Therefore, sub-strategy 4.8 safeguards that cross-border wildfire prevention, containment and early extinguishing are carried out effectively.

S 4.9 Coordinate joint enforcement of protected areas policies

The Task Group 'Law Enforcement' tackles the insufficient control by coordinating joint enforcement of protected area policies, for example by joint development programmes for rangers and border patrolling (see chapter 3.5.9 - strategy 9). The coordination of joint enforcement of policies supports the improvement of pasture management, of maral farm management, of sustainable collection of wild raw non-timber materials as well as wild animal use and enhances the control of logging and use of the forest.

Intermediate objective

By 2020, the long-term monitoring policies that were introduced by the joint Task Group 'Biodiversity Conservation' are applied in the Kazakhstani and Russian part of the Great Altay TBR to monitor ecosystems and key species.

From 2020 onwards, the Task Groups 'Climate Change' and 'Biodiversity Conservation' assist to secure jointly for sufficient and efficient resources for cross-border wildfire prevention, containment and early extinguishing of wildfires and develop cross-border cooperation in terms of fighting and preventing wildfires.

By 2021, the vulnerabilities of biodiversity, habitats and ecosystems are assessed as knowledge base for climate change adaptation measures including the assessment of ecosystem services and their economic values.

By 2025, the Task Group 'Biodiversity Conservation' in cooperation with the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities has bundled conservation policies of the various (inter-)national conservation statuses and has developed common or coordinated conservation and restoration policies.

By 2023, the Task Group 'Law Enforcement' has developed joint enforcement of protected area policies. The Task Group 'Biodiversity Conservation' together with the Katon-Karagay BR and Katunskiy BR as the implementing entities are applying successfully regulatory measures on nature protection.

By 2024, the Task Groups 'Climate Change' and 'Biodiversity Conservation', together with the Katon-Karagay BR and Katunskiy BR as the implementing entities, have developed adaptation plans for ecosystems to allow species to migrate.

The successful implementation of strategy 4 does not automatically result in reaching the overall conservation goal as defined in chapter 2.2. But reaching the intermediate objectives is an important step towards achieving it.

Enabling of the following Great Altay TBR strategies

- Alternative job opportunities and income are generated (strategy 6);
- Regulated eco-cultural tourism is developed (strategy 7).

The following page depicts the result web of strategy 4.

Figure 23: Results web of strategy 4

4. Coordination of transboundary biodiversity conservation
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Institutional results
Results related to cooperation
Cooperation is fostered & established among protected area administration & key stakeholders (Strategy 1)
4.8 Develop cross-border cooperation for firefighting & prevention of wildfires
A Task Group on law enforcement has been formed (Strategy 1)
Long-term cross-border cooperation for wildfire fighting and prevention is developed
Long-term cross-border plans for wildfire fighting and prevention are developed
Long-term cross-border measures for wildfire fighting and prevention are developed
Resources for cross-border wildfire prevention, containment and early extinguishing are jointly provided and secured
A Task Group on climate change has been formed (Strategy 1)
Results related to knowledge
4.2 Assess vulnerabilities of biodiversity, habitats and ecosystems as knowledge base for climate change adaptation
Comprehensive long-term climate change monitoring is set up
Monitoring policies are jointly introduced
4.1 Monitor ecosystems and key species
A Task Group on biodiversity conservation has been formed (Strategy 1)
Vulnerability assessments about plant populations and harvest capacity also in view of climate change adaptation are available
Assessments about sustainable harvesting and processing of timber also in view of climate change mitigation and adaptation are available
Assessment about risks associated with introduction of fish species into lakes is available
Vulnerability assessments about the recreational value of the territory also in view of climate change adaptation are available
The ecological capacity of the area for recreation is determined
Vulnerability assessments about the pasture management of maral farms also in view of climate change adaptation & migration routes of wild animal species are available
Sufficient information about vulnerabilities of biodiversity, habitats and ecosystems is available to allow for risk-robust decision making
Intermediate objective: By 2020, the long-term monitoring policies that were introduced by the joint Task Group 'Biodiversity Conservation' are applied in the Kazakhstani and Russian part of the Great Altay TBR to monitor ecosystems and key species.
Intermediate objective: By 2024, the Task Groups 'Climate Change' and 'Biodiversity Conservation', together with the Katon-Karagay BR and Katunskiy BR as the implementing entities, have developed adaptation plans for ecosystems to allow species to migrate.
Intermediate objective: By 2021, the vulnerabilities of biodiversity, habitats and ecosystems are assessed as knowledge base for climate change adaptation measures including the assessment of ecosystem services and their economic values.
The transboundary exchange of documents and data is strengthened (Strategy 3)
4.7 Develop adaptation plans for species migration
Adaptation plans for cross-boundary migration of wild animal species are jointly developed
Existing knowledge and research from third parties is incorporated into assessments, adaptation plans and measures
4.3 Assess ecosystem services including economic value
Assessment reports enable the protected area administrations to conduct environmental education
4.9 Coordinate joint enforcement of protected areas policies
Intermediate objective: By 2023, the Task Group 'Law Enforcement' has developed joint enforcement of protected areas policies. The Task Group 'Biodiversity Conservation' together with the Katon-Karagay BR and Katunskiy BR as the implementing entities are applying successfully regulatory measures on nature protection.
Results related to control
Joint enforcement policies for improved pasture management are developed, enabled and coordinated
Joint enforcement policies for improved management of maral farms are developed, enabled and coordinated
Joint enforcement policies for collection of wild raw non-timber materials are developed, enabled and coordinated
Joint enforcement policies for wild animal use are developed, enabled and coordinated
Joint enforcement policies for control of logging and use of the forest are developed, enabled and coordinated
Intermediate objective: From 2020 onwards, the Task Groups 'Climate Change' and 'Biodiversity Conservation' assist to secure jointly for sufficient and efficient resources for cross-border wildfire prevention, containment and early extinguishing of wildfires and develop cross-border cooperation in terms of fighting and preventing wildfires.
Cross-border wildfire prevention, containment and early extinguishing is carried out effectively
Alternative job opportunities and income are generated (Strategy 6)
Regulated eco-cultural tourism is developed (Strategy 7)
Results related to legal/ political factors
4.6 Develop coordination of regulatory measures on nature protection
Recommendations on how to use natural resources outside protected areas sustainably with assistance of the protected area administration are prepared
Coordination of regulatory measures on how to use natural resources outside protected areas is set up and working
The protected area administration is informed about the outside regulations
Adequate agricultural fire protection regulations are recommended and regulatory measures are coordinated
The transboundary exchange of documents and data is strengthened (Strategy 3)
4.5 Develop common or coordinated conservation and restoration policies
Recommendations about adequate legislation and legal instruments concerning the regional protected areas are developed
Common or coordinated conservation or restoration policies are jointly developed based on the recommendations and existing adequate legislation and legal instruments
Adequate regulations and checks on tourism are recommended and regulatory measures are coordinated
4.4 Bundle conservation policies of the various (inter-)national conservation statuses
Conservation policies of the various (inter-) national conservation statuses are bundled as base for identification of commonalities of legislation with principles of biosphere reserves to reduce their discrepancies
Commonalities of legislation with principles of biosphere reserves are identified
Recommendations on how to ease discrepancies of legislation with biosphere reserves are developed
Discrepancy of legislation with principles of biosphere reserves is eased and commonalities are fostered
Active nature conservation / restoration are jointly carried out
Intermediate objective: By 2025, the Task Group 'Biodiversity Conservation' in cooperation with the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities has bundled conservation policies of the various (inter-)national conservation statuses and developed common or coordinated conservation and restoration policies.
Results related to cultural factors
Recommendations about open fire risk prevention for tourists and local inhabitants are developed
Regulatory measures for tourists and local inhabitants behavior with open fires are jointly coordinated and in place
Tourists and local inhabitants environmental awareness about open fire risks is increased
Environmental awareness gaps of farmer's are identified
Regulatory measures for farmers awareness of environmental protection are jointly coordinated and in place
Farmer's environmental awareness is increased
Environmental awareness gaps of local inhabitants' are identified
Regulatory measures for local inhabitants awareness of environmental protection are jointly coordinated and in place
Local inhabitants environmental protection awareness is increased
Environmental awareness gaps of tourists, tourism companies and local tour guides are identified
Regulatory measures for tourists, tourism companies and local tour guides awareness of environmental protection are jointly coordinated and in place
Biophysical results
Risk of natural fires is reduced
Socio-economic results
Land use/ agricultural results
Agricultural fires are reduced
Maral farming is more sustainable with less impact onto the environment
Livestock farming practice is more sustainable with less impact onto the environment
Tourism is in accordance with biosphere reserve principles and aligned with the carrying capacity of the ecosystem
Results related to tourism
The seasonal pasture rotation system (transhumance) is an attractive and revived practice
Results related to the use of natural resources
The collection of wild raw non-timber materials is regulated
Poaching is reduced
Illegal logging is reduced
Changes of local climate
Local climate change impacts are reduced
Impact of glacier retreat is reduced
The impact of change in the hydrological regime of streams and rivers is reduced
Anthropogenic changes of the environment
Change in the hydrological regime of streams and rivers is reduced
Water pollution is reduced
Air pollution is reduced
Litter pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Introduction of fish species into lakes is reduced
Unsustainable use of natural resources
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild raw non-timber materials is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Biotic changes
Potential pests are avoided
Great Altay Transboundary Biosphere Reserve
Overall Conservation Goal: By 2040, functional and resilient ecosystems of the Great Altay TBR support the transboundary biodiversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard. They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.
The potential deterioration of the quality of fresh water is avoided
Soil degradation is reduced
Shift of tree line up- and downward is reduced
Nesting conditions for birds are increased
The potential reduction/fragmentation of plant species habitats is avoided
Reduction/fragmentation of game species habitats is mitigated or reversed
The potential disruption/disturbance of migration routes is avoided
Reduction in the population number of species (except fish) is mitigated or reversed
Reduction in the population number of fish species is mitigated or reversed
The potential loss of species is avoided
The potential change in composition of water fauna is avoided
Change in composition and age of forest trees is reduced
Glaciers mass dynamics
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Biodiversity
Terrestrial
Glacial and nival ecosystems
Belukha Mountain
Mountain tundra
Meadows
Steppes
Mountain forest ecosystems
Game species
Rare/endangered, endemic and relict species
Aquatic
Rivers
Lakes
Floodplains
Ecosystem services
Provisioning services
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products
Meat and other products from reared animals
Forestry products
Cereals and vegetables
Grass and hay as fodder for livestock
Regulating services
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Maintenance of the air quality (air purification)
Fixing carbon dioxide
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Cultural services
Sense of place
Subject matter for research, education and entertainment
Inspiration for artistic representations
Historic records and cultural monuments
Physical interaction with ecosystems
Religious and spiritual interactions
Human wellbeing
Material benefits (increasing the standard of living)
Receipt of income from employment
Physical and mental health
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Strategy entry point
Direct effect
Indirect effect
Further TBR Strategies
Strategies
Essential key intermediate result
Key intermediate result
Potential effect
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3.5.5 'Promotion of transboundary understanding and cultural exchange'

Description - strategy (S 5)

The Kazakhstani and the Russian part of the transboundary territory are characterized by elevated parts of the Altai Mountains. Living at the base of the Altai's famous Belukha Peak, the highest point of the Altai and whole Siberia and flagship of the Great Altay TBR, provides a common identity of the population, which is located in the south of Katon-Karagay BR and in northern Katunskiy BR.

One of the most important objectives of both national BRs is the conservation of historic and cultural values. They include archaeological objects, small architecture constructions, ancient burial sites, but also cultural habits and traditional practices of natural resource use. In the transboundary context the last two issues are put into focus.

Photo 31: National horse race "Bayga" at Katon-Karagay BR (left)
Photo 32: Folk ensemble "Surdarushki" on a festival in Katon-Karagay BR (right)
Photographer: Sergey Starikov

Building on shared cultural values, strategy 5 thus envisions strengthening cultural identity and enhancing cross-border understanding of the local communities between both countries and thereby, supporting transboundary cultural exchange. As such, strategy 5 does not only address negative cultural impacts (as described as contributing factors in chapter 2.3.2) but it also increases directly human wellbeing e.g. in terms of 'better community relationships', 'access to information', 'physical and mental health', as described in chapter 2.1.2, through its sub-strategies and its subsequent activities. By doing so, the strategy reduces *gaps in transboundary cooperation* and the *insufficient / lack of cooperation between relevant authorities, protected area and environmental authorities* and various negatively appearing *cultural factors*.

Precondition for strategy implementation

- A coordinating structure and management mechanisms are established as part of strategy 1;
- A Task Group on regional products & labelling and a Task Group on cultural and historical heritage has been formed as part of strategy 1;
- Cooperation is fostered & established among protected area administration and key stakeholders as part of strategy 1;
- Adequate funding for joint cultural activities as part of TBR activities is ensured as part of strategy 1;
- Transboundary cooperation and management is strengthened as part of strategy 3;
- Negotiation to allow small-scale border traffic for local communities within the TBR is initiated as part of strategy 3;
- Negotiation to establish temporary / seasonal border posts within the TBR is initiated as part of strategy 3;

- Public relations & external communication channels are developed as part of strategy 10.

(Essential) Key intermediate results to be achieved according to the results web (see figure 24)

- Transboundary partnership and exchanges among various local stakeholder groups with similar interests are conducted jointly;
- Regional organic products like honey, herbal teas, water, maral products, balms etc. and labelling under the brand ‚Made in Great Altay TBR' are produced by local stakeholders;
- Regional fairs to promote organic products under the brand ‚Made in Great Altay TBR' are organized and conducted;
- Capacities and knowledge of local stakeholders are strengthened;
- The participation of local NGOs and local interest groups in TBR activities is secured;
- Cultural and heritage festivals are organized and conducted to enhance cultural exchange and to increase transboundary understanding;
- Cultural and heritage museum exchanges are organized and conducted and their cooperation is established;
- Joint cultural events are attractive and are recognized nationally and cooperation on cultural & heritage preservation is developed jointly in the long-term;
- New local market chains are built and lead to higher revenues.

Sub-strategies/fields of activities

To this end, strategy 5 foresees the implementation of the following sub-strategies:

S 5.1 Promote participation of local communities in the TBR activities, including local NGOs

Right from the beginning, local communities have been actively integrated into the TBR management planning (like with stakeholder-workshops in November 2014, see chapter 1.3.2). In line with the TBR/BR approach participation of stakeholders is continued. NGOs and social communities are encouraged to participate in the various formed Task Groups and to support the implementation of sub-strategies and their subsequent actions (see S 1.6). Moreover, they are actively involved when it comes to the revision of the management plan in a three-year turn (see S 1.9).

S 5.2 Promote joint cultural events and foster cooperation on cultural and historical heritage preservation

Joint cultural events will foster cross-border communication and building of partnerships, which will ultimately create benefits for all communities involved. The TBR board promotes at least one event per year and country (e.g. festivals like 'The gifts of Altay', 'Festival of Honey', 'Festival on Mountain Professions', 'Altay Food and Music Festival', 'Land of Snow Leopard Festival' etc.). The Katon-Karagay BR and Katunskiy BR administrations as the implementing entities assist in fundraising and overall coordination, while the joint Task Groups 'Cultural and Historical Heritage' and 'Regional Products and Labelling' (if not an already existing festival organizer) are coordinating the implementation on site. By organizing the participation in each other's festivals, transboundary partnerships between stakeholders with common interests in cultural and historical heritage preservation are strengthened (see also S 5.4).

S 5.3 Organize regional fairs to promote organic products

The TBR coordinators invite farmers and local producers from the TBR to exhibit their products (honey, herbal teas, water, maral products, balms, etc.) on regional fairs. Ideally, there is one fair taken place in Katon-Karagay and one in Ust-Koksa annually. As long as cross-border exchange is very costly the fairs are conducted together with the cultural events (S 5.2). Once border-crossing is eased for the local populations of the Great Altay TBR they can be independent from the cultural events. Local farmers and producers who participate in the fairs are invited to sell their products under the

brand 'Made in the Great Altay TBR' (in accordance with strategy 10) and to make new contacts with merchants. With this, sub-strategy 5.3 also supports strategies 6 and 7 by creating a common brand and expanding local market chains.

S 5.4 Promote transboundary partnership among various interest groups

The TBR coordinators encourage active locals to build partnerships with peers from their neighbouring country. This sub-strategy addresses stakeholders with similar interests. Initially, joint cultural events (S 5.2) and regional fairs (S 5.3) provide a platform to meet and make contacts. Later on, exchange of active peers is promoted and taken into the portfolio of strategy 9 (e.g. domestic animal holder exchange, indigenous/traditional faith exchange, old believer exchange, bee keeper exchange, horse keeper exchange, teacher exchange).

Intermediate Objectives

From 2020 on, at least one festival is promoted annually in the Kazakhstani part and one in the Russian part of the Great Altay TBR. A delegation of at least ten stakeholders of cultural communities/institutions/NGOs and at least 20 entrepreneurs (farmers/producers/merchants) participate in their neighbour's event.

By 2023, at least ten representatives of the Great Altay TBR of at least five active interest groups take part in exchange visits to their peers in the neighbouring country.

By 2025, at least 20 regional products, which received the brand 'Made in Great Altay TBR' are available for sale in the BR info centers, touristic complexes and local shops. The new cross-border market chains contribute to 20% increase of revenues for TBR branded products.

The successful implementation of strategy 5 does not automatically result in reaching the overall conservation goal as defined in chapter 2.2. But reaching the intermediate objectives is an important step towards achieving it.

Enabling of the following Great Altay TBR strategies

- Alternative job opportunities and income are fostered (strategy 6);
- Regulated eco-cultural tourism is fostered as part of cultural exchanges & understanding (strategy 7).

The following page depicts the result web of strategy 5.

Figure 24: Results web of strategy 5

5. Promotion of transboundary understanding and cultural exchange
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Great Altay Transboundary Biosphere Reserve
Results related to institutional factors
Results related to cooperation
Results related to resources
Results related to control
Results related to knowledge
Socio-economic results
Land use / agricultural results
Results related to the use of natural resources
Results related to tourism
Results related to living conditions of local communities
Results related to legal/ political factors
Results related to cultural factors
Changes of local climate
Anthropogenic changes of the environment
Unsustainable use of natural resources
Biotic changes
Glaciers mass dynamics
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Water pollution is reduced
Litter pollution is reduced
Fires are reduced
Overgrazing is reduced
Soil degradation is reduced
Glacial and nival ecosystems
Mountain tundra
Meadows
Steppes
Mountain forest ecosystems
Rivers
Lakes
Floodplains
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Fresh water used for various purposes
Hydropower
Fish
Forestry products
Cereals and vegetables
Water purification
Flood control
Protection from avalanches
Pest control
Sense of place
Historic records and cultural monuments
Access to information
Freedom
Choice
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR Strategies
Strategies
Essential key intermediate result
Key intermediate result
Strategy entry point
Direct effect
Potential effect
Indirect effect
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3.5.6 'Generation of alternative job opportunities and income'

Description - strategy (S 6)

The purpose of strategy 6 is to foster human wellbeing through income opportunities, which are ecological and socio-cultural sustainable on the one hand while mitigating negative impacts of unsustainable land use and natural resources on the other hand.

Today, receiving income from employment belongs to the basic needs of human wellbeing. In the Great Altay TBR territory, the main sectors of employment are logging and wood processing, antler dear keeping, meat and dairy cattle breeding, goat, sheep and horse breeding, beekeeping, production of food grain, collecting medicinal and subject-specific raw materials, and tourism. However, the employment rate is around 50% of the total population only.

The strategy 6 includes measures to analyse, promote and exchange experiences of sustainable economic practices. For example, promising fields of sustainable income generation are traditional handicrafts (felting, wood carving or bee wax products), bee keeping, and sustainable collection and cultivation of medicinal plants as well as sustainable ways of hunting. By doing so, it improves the *insufficient/lack of cooperation*, the *lack of programmes*, and the *lack of knowledge* among the relevant stakeholders on a large-scale, which are identified as major causes for unsustainable use of natural resources.

Moreover, a TBR branding (sub-strategy 5.3) and labeling (sub-strategy 10.3), based on quality and sustainability criteria, will support entrepreneurs to ask for higher prices and to market certified products on a larger market.

Photo 33: Demonstration project on alternative energy supply in Katunskiy BR (left)
Photo 34: Installation of solar batteries at the ranger stations of the Katunskiy Zapovednik (right)
Photographer: Tatjana Yashina

Precondition for strategy implementation

- A Task Group on regional products has been formed jointly as part of strategy 1;
- Adequate funding for TBR activities is secured as part of strategy 1;
- Outcome and impact levels of implemented strategies in the TBR are monitored as part of strategy 2;
- Legal framework is assessed and relevant adjustments are negotiated as part of strategy 3;
- Transboundary cooperation and management is strengthened, stable & further enhanced as part of strategy 3;
- Regulated eco-cultural tourism is developed as part of strategy 7;
- Research on impacts, regulations and monitoring mechanisms is conducted as part of strategy 8;

- Scientific cooperation in the transboundary biosphere reserve & beyond is developed as part of strategy 8;
- Participatory training programmes for various stakeholder groups are launched as part of strategy 9;
- Funding for TBR activities is secured through external communication channels & public relations as part of strategy 10.

(Essential) Key intermediate results to be achieved according to the results web (see figure 25)

- Common strategies for alternative job opportunities based on research and monitoring about market opportunities and about common regional products & services are developed and promoted jointly;
- Best practices & implementation of demonstration projects for sustainable resource management are promoted and applied jointly and are in use;
- Small businesses are supported through appropriate programmes;
- Possible adverse effective incentives are identified;
- For those involved in alternative job opportunities & income the standard of living is improved and provides access to regular income for local population.

Sub-strategies/fields of activities

To this end, strategy 6 foresees the implementation of the following sub-strategies:

S 6.1 Develop common strategies for alternative job opportunities based on research and monitoring

The Task Group 'Socio-Economic Development' brings together representatives of Katon-Karagay BR and Katunskiy BR as well as the private and communal sectors. Regular meetings of the Task Group in both countries provide a platform for dialogues aiming to improve cooperation between the various stakeholders. During Task Group meetings current strategies supporting regional economic development (e.g. market opportunities and common regional products/services like traditional handicrafts and sustainable use and commercialisation of medicinal plants and herbs, bee keeping and hunting) are reviewed and periodically monitored. The Task Group members discuss best practices, develop new strategies and suggest to the TBR board those strategies that should be promoted and supported (see S 6.3).

S 6.2 Identify and mitigate possible adverse incentives through the promotion of viable and sustainable alternatives

Given that negative outcomes and impacts of the current strategies for economic development are monitored (as a result of strategy 2), the TBR coordinators initiate a workshop with experts/consultants in order to identify viable sustainable practices. The recommendations of experts feed into sub-strategy 6.1 and 6.3.

S 6.3 Promote best practices and implementation of demonstration projects for sustainable resource management on private and communal level

After best practices and promising strategies for sustainable economic activities (e.g. in terms of forestry, efficient use of energy resources, use of renewables, waste management and recycling, sustainable hunting, traditional handicrafts, use of medicinal plants, sustainable agriculture and pasture management, maral farming or bee keeping) have been identified (sub-strategy 6.1), the Task Group 'Socio-Economic Development' and both the TBR coordinators elaborate on selected pilot demonstration projects. Information on pilot projects is shared through joint training sessions including exchange visits (sub-strategy 9.3) and a touring exhibition including 10 information boards and a documentary film (sub-strategy 10.6).

Intermediate Objectives

By 2020, research on household food security (baseline-study) is conducted and current strategies of income generation are monitored. Best practices feed into the development of (new) strategies for alternative job opportunities in at least five main economic domains.

By 2021, at least three pilot demonstration projects have been identified for each, the Kazakhstani and the Russian part of the Great Altay TBR. Funding for implementing the proposed demonstration projects and associated promotion activities is secured jointly.

By 2025, at least six pilot demonstration projects are successfully implemented. At least 20 promoters took part in two exchange visits. A touring exhibition has been presented in at least six locations (three in each country). Several hundred local inhabitants gained better knowledge on sustainable economic practices and alternative income opportunities.

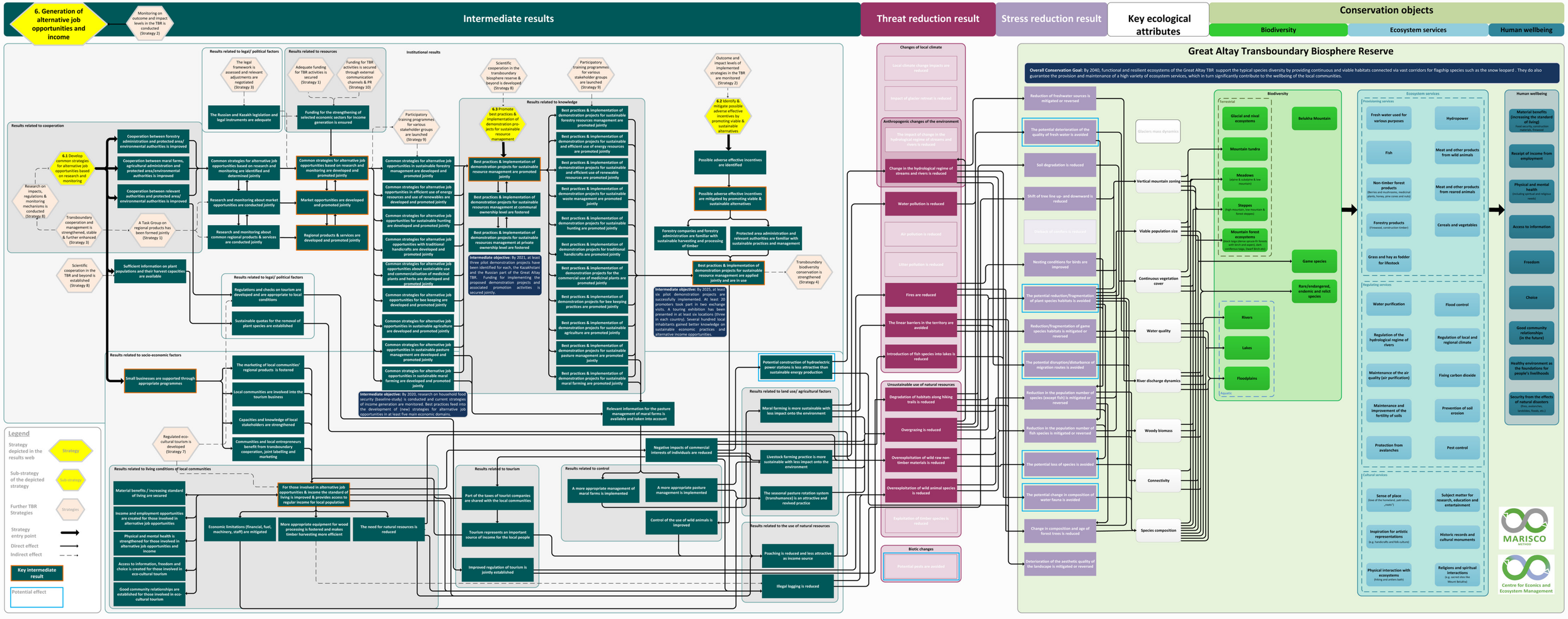
As strategy 6 directly brings benefits to the living standard of local people, it is highly expected that this strategy will be highly accepted among relevant stakeholders. Even more, it raises awareness and acceptance for nature conservation by building knowledge and bringing up alternatives in terms of sustainable economic activities.

Enabling of the following Great Altay TBR strategies

- Transboundary biodiversity conservation is strengthened (strategy 4);
- Participatory training programmes for various stakeholder groups are launched (strategy 9).

The following page depicts the result web of strategy 6.

Figure 25: Results web of strategy 6


6. Generation of alternative job opportunities and income
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Great Altay Transboundary Biosphere Reserve
Overall Conservation Goal: By 2040, functional and resilient ecosystems of the Great Altay TBR support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard . They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.
Institutional results
Results related to legal/ political factors
The legal framework is assessed and relevant adjustments are negotiated (Strategy 3)
The Russian and Kazakh legislation and legal instruments are adequate
Results related to resources
Adequate funding for TBR activities is secured (Strategy 1)
Funding for TBR activities is secured through external communication channels & PR (Strategy 10)
Funding for the strengthening of selected economic sectors for income generation is ensured
Results related to cooperation
Research on impacts, regulations & monitoring mechanisms is conducted (Strategy 8)
6.1 Develop common strategies for alternative job opportunities based on research and monitoring
Transboundary cooperation and management is strengthened, stable & further enhanced (Strategy 3)
A Task Group on regional products has been formed jointly (Strategy 1)
Cooperation between forestry administration and protected area/ environmental authorities is improved
Cooperation between maral farms, agricultural administration and protected area/environmental authorities is improved
Cooperation between relevant authorities and protected area/ environmental authorities is improved
Common strategies for alternative job opportunities based on research and monitoring are identified and determined jointly
Research and monitoring about market opportunities are conducted jointly
Research and monitoring about common regional products & services are conducted jointly
Common strategies for alternative job opportunities based on research and monitoring are developed and promoted jointly
Market opportunities are developed and promoted jointly
Regional products & services are developed and promoted jointly
Participatory training programmes for various stakeholder groups are launched (Strategy 9)
Common strategies for alternative job opportunities in sustainable forestry management are developed and promoted jointly
Common strategies for alternative job opportunities in efficient use of energy resources and use of renewables are developed and promoted jointly
Common strategies for alternative job opportunities for sustainable hunting are developed and promoted jointly
Common strategies for alternative job opportunities with traditional handicrafts are developed and promoted jointly
Common strategies for alternative job opportunities about sustainable use and commercialisation of medicinal plants and herbs are developed and promoted jointly
Common strategies for alternative job opportunities for bee keeping are developed and promoted jointly
Common strategies for alternative job opportunities in sustainable agriculture are developed and promoted jointly
Common strategies for alternative job opportunities in sustainable pasture management are developed and promoted jointly
Common strategies for alternative job opportunities in sustainable maral farming are developed and promoted jointly
Intermediate objective: By 2020, research on household food security (baseline-study) is conducted and current strategies of income generation are monitored. Best practices feed into the development of (new) strategies for alternative job opportunities in at least five main economic domains.
Results related to knowledge
Scientific cooperation in the transboundary biosphere reserve & beyond is developed (Strategy 8)
6.3 Promote best practices & implementation of demonstration projects for sustainable resource management
Best practices & implementation of demonstration projects for sustainable resource management are promoted jointly
Best practices & implementation of demonstration projects for sustainable resources management at communal ownership level are fostered
Best practices & implementation of demonstration projects for sustainable resources management at private ownership level are fostered
Intermediate objective: By 2021, at least three pilot demonstration projects have been identified for each, the Kazakhstani and the Russian part of the Great Altay TBR. Funding for implementing the proposed demonstration projects and associated promotion activities is secured jointly.
Participatory training programmes for various stakeholder groups are launched (Strategy 9)
Best practices & implementation of demonstration projects for sustainable forestry resources management are promoted jointly
Best practices & implementation of demonstration projects for sustainable and efficient use of energy resources are promoted jointly
Best practices & implementation of demonstration projects for sustainable and efficient use of renewable resources are promoted jointly
Best practices & implementation of demonstration projects for sustainable waste management are promoted jointly
Best practices & implementation of demonstration projects for sustainable hunting are promoted jointly
Best practices & implementation of demonstration projects for traditional handicrafts are promoted jointly
Best practices & implementation of demonstration projects for the commercial use of medicinal plants are promoted jointly
Best practices & implementation of demonstration projects for bee keeping practices are promoted jointly
Best practices & implementation of demonstration projects for sustainable agriculture are promoted jointly
Best practices & implementation of demonstration projects for sustainable pasture management are promoted jointly
Best practices & implementation of demonstration projects for sustainable maral farming are promoted jointly
Outcome and impact levels of implemented strategies in the TBR are monitored (Strategy 2)
6.2 Identify & mitigate possible adverse effective incentives by promoting viable & sustainable alternatives
Possible adverse effective incentives are identified
Possible adverse effective incentives are mitigated by promoting viable & sustainable alternatives
Forestry companies and forestry administration are familiar with sustainable harvesting and processing of timber
Protected area administration and relevant authorities are familiar with sustainable practices and management
Best practices & implementation of demonstration projects for sustainable resource management are applied jointly and are in use
Transboundary biodiversity conservation is strengthened (Strategy 4)
Intermediate objective: By 2025, at least six pilot demonstration projects are successfully implemented. At least 20 promoters took part in two exchange visits. A touring exhibition has been presented in at least six locations (three in each country). Several hundred local inhabitants gained better knowledge on sustainable economic practices and alternative income opportunities.
Results related to legal/ political factors
Regulations and checks on tourism are developed and are appropriate to local conditions
Sustainable quotas for the removal of plant species are established
Sufficient information on plant populations and their harvest capacities are available
Scientific cooperation in the TBR and beyond is established (Strategy 8)
Results related to socio-economic factors
Small businesses are supported through appropriate programmes
The marketing of local communities' regional products is fostered
Local communities are involved into the tourism business
Capacities and knowledge of local stakeholders are strengthened
Communities and local entrepreneurs benefit from transboundary cooperation, joint labelling and marketing
Regulated eco-cultural tourism is developed (Strategy 7)
Results related to living conditions of local communities
For those involved in alternative job opportunities & income the standard of living is improved & provides access to regular income for local population
Material benefits / increasing standard of living are secured
Income and employment opportunities are created for those involved in alternative job opportunities
Physical and mental health is strengthened for those involved in alternative job opportunities and income
Access to information, freedom and choice is created for those involved in eco-cultural tourism
Good community relationships are established for those involved in eco-cultural tourism
Economic limitations (financial, fuel, machinery, staff) are mitigated
More appropriate equipment for wood processing is fostered and makes timber harvesting more efficient
The need for natural resources is reduced
Results related to tourism
Part of the taxes of tourist companies are shared with the local communities
Tourism represents an important source of income for the local people
Improved regulation of tourism is jointly established
Results related to control
A more appropriate management of maral farms is implemented
A more appropriate pasture management is implemented
Control of the use of wild animals is improved
Negative impacts of commercial interests of individuals are reduced
Potential construction of hydroelectric power stations is less attractive than sustainable energy production
Results related to land use/ agricultural factors
Maral farming is more sustainable with less impact onto the environment
Livestock farming practice is more sustainable with less impact onto the environment
The seasonal pasture rotation system (transhumance) is an attractive and revived practice
Results related to the use of natural resources
Poaching is reduced and less attractive as income source
Illegal logging is reduced
Changes of local climate
Local climate change impacts are reduced
Impact of glacier retreat is reduced
Anthropogenic changes of the environment
The impact of change in the hydrological regime of streams and rivers is reduced
Change in the hydrological regime of streams and rivers is reduced
Water pollution is reduced
Air pollution is reduced
Litter pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Introduction of fish species into lakes is reduced
Unsustainable use of natural resources
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild raw non-timber materials is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Biotic changes
Potential pests are avoided
Reduction of freshwater sources is mitigated or reversed
The potential deterioration of the quality of fresh water is avoided
Soil degradation is reduced
Shift of tree line up- and downward is reduced
Dieback of coniferss is reduced
Nesting conditions for birds are improved
The potential reduction/fragmentation of plant species habitats is avoided
Reduction/fragmentation of game species habitats is mitigated or reversed
The potential disruption/disturbance of migration routes is avoided
Reduction in the population number of species (except fish) is mitigated or reversed
Reduction in the population number of fish species is mitigated or reversed
The potential loss of species is avoided
The potential change in composition of water fauna is avoided
Change in composition and age of forest trees is reduced
Deterioration of the aesthetic quality of the landscape is mitigated or reversed
Glaciers mass dynamics
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Biodiversity
Terrestrial
Glacial and nival ecosystems
Mountain tundra
Meadows (alpine & subalpine & low mountain)
Steppes (high-mountain, low mountain & forest-steppes)
Mountain forest ecosystems (dark taiga (dense spruce fir forests with birch and aspen), dark coniferous taiga, linear birch strip)
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Aquatic
Rivers
Lakes
Floodplains
Ecosystem services
Provisioning services
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products (Berries and mushrooms, medicinal plants, honey, pine cones and nuts)
Meat and other products from reared animals
Forestry products (Firewood, construction timber)
Cereals and vegetables
Grass and hay as fodder for lifestock
Regulating services
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Maintenance of the air quality (air purification)
Fixing carbon dioxide
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Cultural services
Sense of place (love of the homeland, patriotism, „roots")
Subject matter for research, education and entertainment
Inspiration for artistic representations (e.g. handicrafts and folk culture)
Historic records and cultural monuments
Physical interaction with ecosystems (hiking and antlers bath)
Religions and spiritual interactions (e.g. sacred sites like Mount Belukha)
Human wellbeing
Material benefits (increasing the standard of living)
Food security, non-timber materials, firewood
Receipt of income from employment
Physical and mental health
(including spiritual and religious needs)
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters
(fires, avalanches, landslides, floods, etc.)
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR Strategies
Strategies
Strategy entry point
Direct effect
Indirect effect
Key intermediate result
Potential effect
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3.5.7 'Development of regulated eco-cultural tourism'

Description – strategy (S 7)

For several decades the Altai High Mountains are well known by mountaineers as well as recreationists as a tourist destination. Various trails once connected the Kazakhstani Katon-Karagay district with the Russian Kosh-Agach and Ust-Koksa districts. However, since the independence of the former Soviet Republic the border between these districts had been closed for incoming tourists as well as for local residents. Nowadays, tourism occurs only in either part of the TBR without crossing the state border between the Republic of Kazakhstan and the Russian Federation.

Nevertheless, the development of eco-cultural tourism has been identified as one of the most promising income-generating strategies within both national BRs. On top of this, enabling a flow of cross-border tourists would provide a higher variety of potential tourist products. A market analysis and international trends indicate that there is a (growing) demand for transboundary tourist products.

The presented strategy aims to provide benefits and new job opportunities through strengthened development of eco-cultural tourism. However, unregulated tourism growth might also lead to negative impacts on the TBRs conservation target. Thus, in order to ensure sustainable development of the sector a comprehensive approach is favoured. That means that not only border posts and tourist routes should be revitalized and new cross-border products elaborated.

A well designed eco-tourism development project is based on a feasibility study. Given a positive result, it includes, for example, the elaboration of a sustainable tourism concept, visitor management and monitoring mechanisms, networking and cooperation between tourism stakeholders, exchange of know-how and capacity building, market analysis and subsequent marketing activities. By doing so, the strategy improves the *insufficient/lack of cooperation between tourism agencies, the responsible administrations and protected area/environmental authorities*, the *lack of knowledge on the recreational capacity of the territory* as well as *unregulated tourism.*

Photo 35: Hiking – a great potential of the Great Altay TBR (left)
Photo 36: Horse-back riding in Katunskiy BR (right)
Photographer: Alexander Kobzev (left) and Tatjana Yashina (right)

Precondition for strategy implementation

- A Task Group on eco-cultural tourism has been formed jointly as part of strategy 1;
- A coordinating structure and management mechanisms for the TBR are established as part of strategy 1;
- Respective funding is available as part of strategy 1;

- A monitoring plan with strategies & their corresponding objectives is established as part of strategy 2;
- Transboundary cooperation and management is strengthened as part of strategy 3.

(Essential) Key intermediate results to be achieved according to the results web (see figure 27)

- A feasibility study for the development of cross-border tourism is elaborated and established jointly;
- A sustainable concept for cross-border tourism is elaborated jointly;
- The potential implementation of state border law is eased and mitigated;
- Local tourism service providers are strengthened;
- For those involved in eco-cultural tourism the standard of living is improved and provides access to regular income for local population.

Sub-strategies/field of activities

To this end, strategy 7 foresees the implementation of the following sub-strategies:

S 7.1 Conduct a feasibility study for the development of cross-border tourism

The TBR board commissions a tourism expert who cooperates with the Task Group 'Eco-Cultural Tourism Development' and conducts a feasibility study for the development of regulated eco-cultural and cross-border tourism. The tasks of the expert (group) include

a) To identify and involve local/regional tourism stakeholders;

b) To analyse the demand for products across the border;

c) To assess the demand and to propose selected cross-border tourism products;

d) To outline economic and cultural benefits; and

e) To determine negative environmental impacts of cross-border tourism and potential mechanisms to mitigate and regulate these impacts.

S 7.2 Negotiate framework conditions that are a prerequisite for enabling cross-border tourism

Given that the feasibility study recommends the development of cross-border tourism, the TBR board, supported and advised by the Task Group 'Eco-Cultural Tourism Development' forwards the results of the study to relevant stakeholders and joins forces to initiate negotiation of re-opening of selected cross-border trails/routes and seasonal border posts respectively. In parallel, it initiates negotiation for facilitation of border traffic for registered tourist groups and possibly for individual tourists (see also sub-strategy 3.4).

S 7.3 Elaborate transboundary tourism projects and secure respective funding

Based on the outcomes of sub-strategies 7.1 and 7.2 the Task Group 'Eco-tourism Development' elaborates a proposal for a comprehensive tourism project. This project most probably includes the following components:

- To develop a visitor management concept with transboundary settings (define sightseeing destinations, routes and recreational zones);
- To create visitor information points, signboards and entrance points to enable channeling and controlling of tourism flow;
- To promote guest houses and small-scale hotels within and around the TBR;
- To build cooperation with PA staff (e.g. working seasonally as guide);

- To involve local communities, private farmers and producers by building new market chains (selling local food products or local handicrafts/souvenirs in tourist complexes, offering cultural performances to tourist groups, etc.); and
- To provide training for tour operators, guides and other contributing tourism service providers;
- To elaborate a marketing strategy in the long-term (including a tourist map for the TBR with information and regulations outlined on the back page, presentation of products on a joint website, etc.).

Intermediate Objectives

By 2021, a feasibility study for the development of sustainable cross-border eco-cultural tourism is conducted. Its results are discussed at the annual TBR board meeting and lead to the development and implementation of a joint sustainable eco-cultural tourism project.

By 2025, successful implementation of the joint sustainable eco-cultural tourism project leads to a (transboundary) tourism network, which is attracting and serving rising numbers of tourists by taking the carrying capacity of the Great Altay TBR region into account.

By 2025, new jobs in the tourism sector have been created and direct revenues among local tourism service providers have risen. Local farmers, producers and craftsmen benefit from new local and regional market chains.

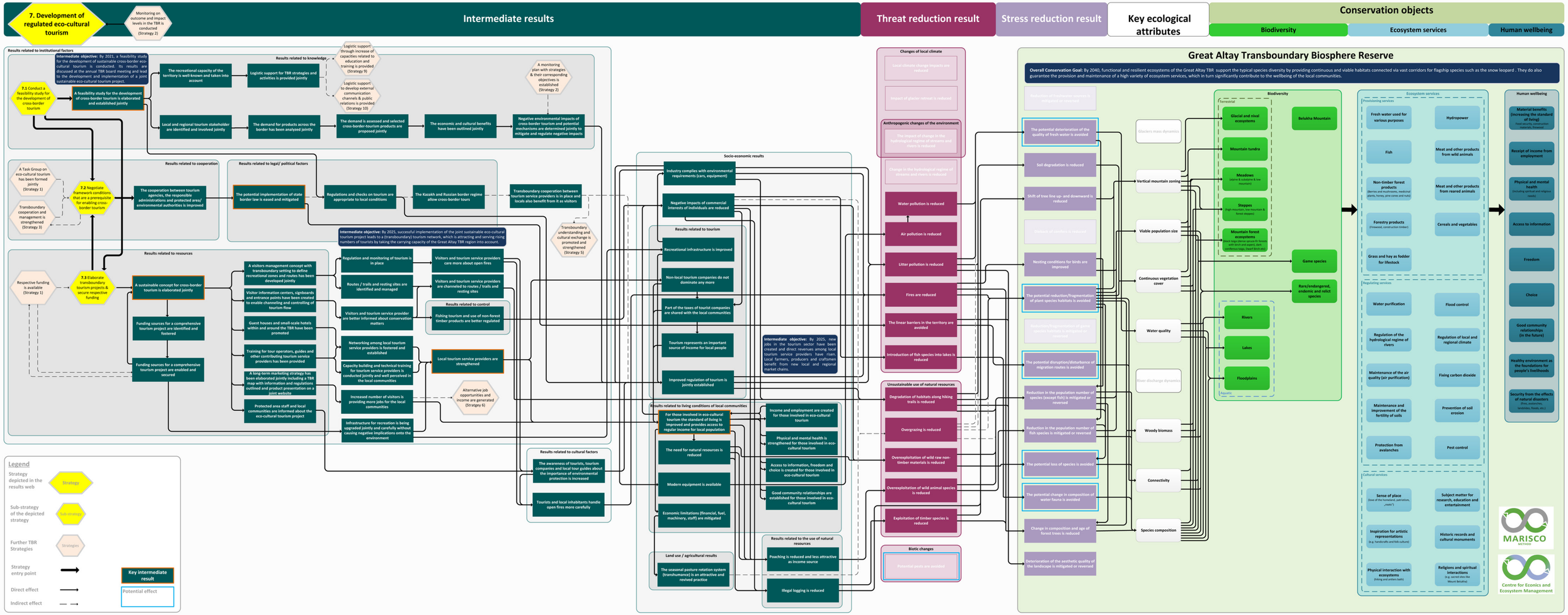
The successful implementation of strategy 7 does not automatically result in reaching the overall conservation goal as defined in chapter 2.2. But, as it applies to all Great Altay TBR strategies, reaching the intermediate objectives is an important step towards achieving it.

Enabling of the following sub-strategies

- A monitoring plan with strategies & their corresponding objectives/goals is established (strategy 2);
- Transboundary understanding & cultural exchange is promoted & strengthened (strategy 5);
- Alternative job opportunities and income are generated (strategy 6);
- Logistic support through increase of capacities related to education and training is provided (strategy 9);
- Logistic support to develop external communication channels & public relations is provided (strategy 10).

The following page depicts the result web of strategy 7.

Figure 26: Results web of strategy 7


7. Development of regulated eco-cultural tourism
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Results related to institutional factors
Intermediate objective: By 2021, a feasibility study for the development of sustainable cross-border eco-cultural tourism is conducted. Its results are discussed at the annual TBR board meeting and lead to the development and implementation of a joint sustainable eco-cultural tourism project.
7.1 Conduct a feasibility study for the development of cross-border tourism
A feasibility study for the development of cross-border tourism is elaborated and established jointly
Results related to knowledge
The recreational capacity of the territory is well-known and taken into account
Logistic support for TBR strategies and activities is provided jointly
Logistic support through increase of capacities related to education and training is provided (Strategy 9)
Logistic support to develop external communication channels & public relations is provided (Strategy 10)
A monitoring plan with strategies & their corresponding objectives is established (Strategy 2)
Local and regional tourism stakeholder are identified and involved jointly
The demand for products across the border has been analyzed jointly
The demand is assessed and selected cross-border-tourism products are proposed jointly
The economic and cultural benefits have been outlined jointly
Negative environmental impacts of cross-border tourism and potential mechanisms are determined jointly to mitigate and regulate negative impacts
Results related to cooperation
A Task Group on eco-cultural tourism has been formed jointly (Strategy 1)
Transboundary cooperation and management is strengthened (Strategy 3)
7.2 Negotiate framework conditions that are a prerequisite for enabling cross-border tourism
The cooperation between tourism agencies, the responsible administrations and protected area/ environmental authorities is improved
Results related to legal/ political factors
The potential implementation of state border law is eased and mitigated
Regulations and checks on tourism are appropriate to local conditions
The Kazakh and Russian border regime allow cross-border tours
Transboundary cooperation between tourism service providers is in place and locals also benefit from it as visitors
Transboundary understanding and cultural exchange is promoted and strengthened (Strategy 5)
Intermediate objective: By 2025, successful implementation of the joint sustainable eco-cultural tourism project leads to a (transboundary) tourism network, which is attracting and serving rising numbers of tourists by taking the carrying capacity of the Great Altay TBR region into account.
Results related to resources
Respective funding is available (Strategy 1)
7.3 Elaborate transboundary tourism projects & secure respective funding
A sustainable concept for cross-border tourism is elaborated jointly
Funding sources for a comprehensive tourism project are identified and fostered
Funding sources for a comprehensive tourism project are enabled and secured
A visitors management concept with transboundary setting to define recreational zones and routes has been developed jointly
Visitor information centers, signboards and entrance points have been created to enable channeling and controlling of tourism flow
Guest houses and small-scale hotels within and around the TBR have been promoted
Training for tour operators, guides and other contributing tourism service providers has been provided
A long-term marketing strategy has been elaborated jointly including a TBR map with information and regulations outlined and product presentation on a joint website
Protected area staff and local communities are informed about the eco-cultural tourism project
Regulation and monitoring of tourism is in place
Routes / trails and resting sites are identified and managed
Visitors and tourism service provider are better informed about conservation matters
Networking among local tourism service providers is fostered and established
Capacity building and technical training for tourism service providers is conducted jointly and well perceived in the local communities
Increased number of visitors is providing more jobs for the local communities
Infrastructure for recreation is being upgraded jointly and carefully without causing negative implications onto the environment
Visitors and tourism service providers care more about open fires
Visitors and tourism service providers are channeled to routes / trails and resting sites
Results related to control
Fishing tourism and use of non-forest timber products are better regulated
Local tourism service providers are strengthened
Alternative job opportunities and income are generated (Strategy 6)
Socio-economic results
Industry complies with environmental requirements (cars, equipment)
Negative impacts of commercial interests of individuals are reduced
Results related to tourism
Recreational infrastructure is improved
Non-local tourism companies do not dominate any more
Part of the taxes of tourist companies are shared with the local communities
Tourism represents an important source of income for local people
Improved regulation of tourism is jointly established
Intermediate objective: By 2025, new jobs in the tourism sector have been created and direct revenues among local tourism service providers have risen. Local farmers, producers and craftsmen benefit from new local and regional market chains.
Results related to living conditions of local communities
For those involved in eco-cultural tourism the standard of living is improved and provides access to regular income for local population
The need for natural resources is reduced
Modern equipment is available
Economic limitations (financial, fuel, machinery, staff) are mitigated
Income and employment are created for those involved in eco-cultural tourism
Physical and mental health is strengthened for those involved in eco-cultural tourism
Access to information, freedom and choice is created for those involved in eco-cultural tourism
Good community relationships are established for those involved in eco-cultural tourism
Land use / agricultural results
The seasonal pasture rotation system (transhumance) is an attractive and revived practice
Results related to the use of natural resources
Poaching is reduced and less attractive as income source
Illegal logging is reduced
Results related to cultural factors
The awareness of tourists, tourism companies and local tour guides about the importance of environmental protection is increased
Tourists and local inhabitants handle open fires more carefully
Changes of local climate
Local climate change impacts are reduced
Impact of glacier retreat is reduced
Anthropogenic changes of the environment
The impact of change in the hydrological regime of streams and rivers is reduced
Change in the hydrological regime of streams and rivers is reduced
Water pollution is reduced
Air pollution is reduced
Litter pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Introduction of fish species into lakes is reduced
Unsustainable use of natural resources
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild raw non-timber materials is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Biotic changes
Potential pests are avoided
Great Altay Transboundary Biosphere Reserve
Overall Conservation Goal: By 2040, functional and resilient ecosystems of the Great Altay TBR support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard . They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.
Reduction of freshwater resources is reduced or reversed
The potential deterioration of the quality of fresh water is avoided
Soil degradation is reduced
Shift of tree line up- and downward is reduced
Overuse of coastlines is reduced
Nesting conditions for birds are improved
The potential reduction/fragmentation of plant species habitats is avoided
Reduction/Disappearance of plant species habitats is reversed
The potential disruption/disturbance of migration routes is avoided
Reduction in the population number of species (except fish) is mitigated or reversed
Reduction in the population number of fish species is mitigated or reversed
The potential loss of species is avoided
The potential change in composition of water fauna is avoided
Change in composition and age of forest trees is reduced
Deterioration of the aesthetic quality of the landscape is mitigated or reversed
Glaciers mass dynamics
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Biodiversity
Terrestrial
Glacial and nival ecosystems
Mountain tundra
Meadows (alpine & subalpine & low mountain)
Steppes (high-mountain, low mountain & forest-steppes)
Mountain forest ecosystems (dark taiga (dense spruce fir forests with birch and aspen), dark coniferous taiga, Dwarf birch stands)
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Rivers
Lakes
Floodplains
Aquatic
Ecosystem services
Provisioning services
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products (Berries and mushrooms, medicinal plants, honey, pine cones and nuts)
Meat and other products from reared animals
Forestry products (Firewood, construction timber)
Cereals and vegetables
Grass and hay as fodder for lifestock
Regulating services
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Maintenance of the air quality (air purification)
Fixing carbon dioxide
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Cultural services
Sense of place (love of the homeland, patriotism, „river")
Subject matter for research, education and entertainment
Inspiration for artistic representations (e.g. handicrafts and folk culture)
Historic records and cultural monuments
Physical interaction with ecosystems (Hiking and antlers bath)
Religions and spiritual interactions (e.g. sacred skin the Mount Belukha)
Human wellbeing
Material benefits (increasing the standard of living)
Food security, construction materials, firewood
Receipt of income from employment
Physical and mental health
Defusing spiritual and religious needs
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters
(fires, avalanches, landslides, floods, etc.)
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR Strategies
Strategies
Strategy entry point
Direct effect
Indirect effect
Key intermediate result
Potential effect
MARISCO METHOD
Centre for Econics and Ecosystem Management

3.5.8 'Scientific cooperation in the transboundary biosphere reserve and beyond'

Description - strategy (S 8)

The ecosystems of the Altai Mountains provide numerous goods and services to its residents (compare with ecosystem services, as outlined in the conceptual model). However, the sustainable use of these benefits is challenging in the face of climate change, environmental degradation as well as social and political changes. To cope with these changes, strategy 8 will contribute to knowledge generation on how the natural systems work, and on how to maintain the ecosystem services and resilient ecosystems while, at the same time, using these systems to create income, employment and wealth.

In the year 2004, in view of these transboundary challenges, the administrations of both, Katon-Karagay State Nature Park and Katunskiy BR started to conduct joint activities related to research and capacity building[13]. For example, research on climate change and its impacts on ecosystems are currently realized for some parts of the TBR only. Furthermore, knowledge about ecological impacts of maral farms and current pasture management, on both sides needs to be deepened (compare also with chapter 2.3.2). Strategy 8 seeks to reduce the *gaps in transboundary cooperation*, the *insufficient / lack of incorporation of existing knowledge and research from third parties* and the *lack of resources* and *knowledge.*

With the designation of the Great Altay TBR, scientific cooperation between the staff of both national BRs is fostered and a base for sharing data on an equal level is built. Even more, the TBR supports network building with national and international scientists and research institutions, NGOs as well as with other partners within the World Network of Biosphere Reserves. It provides access to scientific information for students, scientists and the public in general.

Precondition for strategy implementation

- Joint Task Groups for bilateral data handling and environmental education are established as part of strategy 1;
- Cooperation is fostered & established among protected area administration & key stakeholders as part of strategy 1;
- Transboundary cooperation and management is strengthened as part of strategy 3;
- Transboundary exchange of documents and data is enabled and eased as part of strategy 3;
- Coordination of transboundary conservation is possible and activated as part of strategy 4;
- Assessments of the territory for transboundary biodiversity conservation are conducted as part of strategy 4.

(Essential) Key intermediate results to be achieved according to the results web (see figure 27)

- Common data collection formats, indicators, monitoring and evaluation methods are enabled and accepted in the long-term;
- Transboundary cooperation for scientist partnerships is strengthened and set up;
- Equal standards of resources like staffing and equipment for GIS-works enable data exchange and comparison and joint implementation of strategies;
- A joint data centre is established in long-term, including maps & geographical information;

[13] Including: joint ecological expedition to establish the monitoring of the Alpine ecosystems (2005); joint research of avifauna of adjacent territories of Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy (2006); collaborations in the programme "Conservation of the rare and migrating species on trans-border protected area "Altai" on basis of the Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy (2009).

- Exchange of university students to share novelty knowledge has been established jointly;
- The creation of a scientific consortium together with universities/institutes is fostered;
- Partnerships with research institutes to develop joint mapping and GIS is established jointly;
- The PA administration is enabled to provide environmental education to local people;
- Existing knowledge and research from third parties is incorporated adequately;
- Research gaps like the recreational capacity of the territory are addressed jointly;
- Selected scientific information is shared jointly and publicly;
- The recreational capacity of the territory is well known and taken into account;
- A catalogue with research topics and joint research programmes is in use as base to implement joint research programmes.

Sub-strategies/fields of activities

To this end, strategy 8 foresees the implementation of the following sub-strategies:

S 8.1 Strengthen scientific partnerships through joint research programmes

Past and current fields of research need to be reviewed and new actions need to be defined as base for bilateral scientific cooperation between the two BRs. To achieve it, the TBR coordinators in cooperation with the Task Groups 'Bilateral Data Handling and Research' and 'Environmental Education' conduct a workshop to collect, exchange and review existing research in a first step and to identify gaps of knowledge and research. The next step contains the development of a catalogue of research topics. Given that funding is secured, joint research programmes are implemented in the next step.

S 8.2 Develop common data collection formats, indicators, monitoring and evaluation methods

Recent meetings and joint research activities brought to light that practices of protected area management, and specifically methodologies and available resources for data collection differ significantly between the two countries involved. Data and geographical information are therefore hardly comparable or incomplete. To tackle this situation sub-strategy 8.2 strives for a synchronization of formats, indicators, monitoring and evaluation methods in general (see also strategy 2).

S 8.3 Prepare a concept for the establishment of a joint data centre

Building upon sub-strategies 8.1 and 8.2, a concept for the establishment of a joint data centre (geographical information science centre) is prepared. At current stage, GIS resources on the Kazakhstani part are less developed than on the Russian part. Therefore, the establishment of a joint data centre for geographical information science in the Kazakhstani part of the Great Altay TBR is most effective to achieve equal levels. In this effort, strengthening cooperation and partnership with universities/research institutes is most probably the appropriate approach. While participating in a joint training on application and use of Geographical Information Systems (GIS), the TBR coordinators together with the Task Group 'Biodiversity Conservation' and representatives/scientists of research institutes/universities discuss options of partnerships. Thereafter, a detailed concept of the centre is worked out and addressed to relevant supporters.

S 8.4 Provide research opportunities to scientists and students of partnering universities and academic institutions of each country

Sub-strategy 8.5 takes place on the national as well as transboundary level. It includes that both BRs offer to support study tours of university students to provide opportunities for student internships and/or to support and supervise student/scientists research projects.

S 8.5 Publicly share selected scientific information

Sharing scientific information with a broader (public) audience belongs to the principle ideas of BRs (compare also with strategy 10). In conjunction with scientific cooperation and research, three concrete actions are taken: the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities of the TBR team get actively involved as part of scientific conferences and webinars (sub-strategy 8.1), results of common research are published on the TBR website (sub-strategy 8.4, and see also strategy 10) and the 'State of Conservation Report' is jointly prepared and published on the TBR website (sub-strategy 8.4).

S 8.6 Create a scientific consortium with universities and institutes

In the mid-term, a scientific consortium is formed and brings together universities and institutes of the region. As such, participation of the Gorno-Altayskiy University, Bijskiy University, Altai State University, East Kazakhstan State University and the East Kazakhstan Technical University, the Institute for Water and Environmental Problems and the Altay Regional Institute of Ecology is highly welcomed.

Intermediate Objectives

By 2020, gaps of scientific knowledge are identified and fed into a catalogue of the most important research topics. Thereafter, at least two (new) joint research programmes are initiated.

By 2021, stakeholders of both countries involved, which are concerned with collecting and handling of data, agree on common formats and indicators. Furthermore, they agree on a detailed concept of the joint data centre.

From 2025 on, results of common research programmes as well as the 'State of Conservation Report' are published on the TBR website. Additionally, the results are presented on scientific conferences and/or webinars.

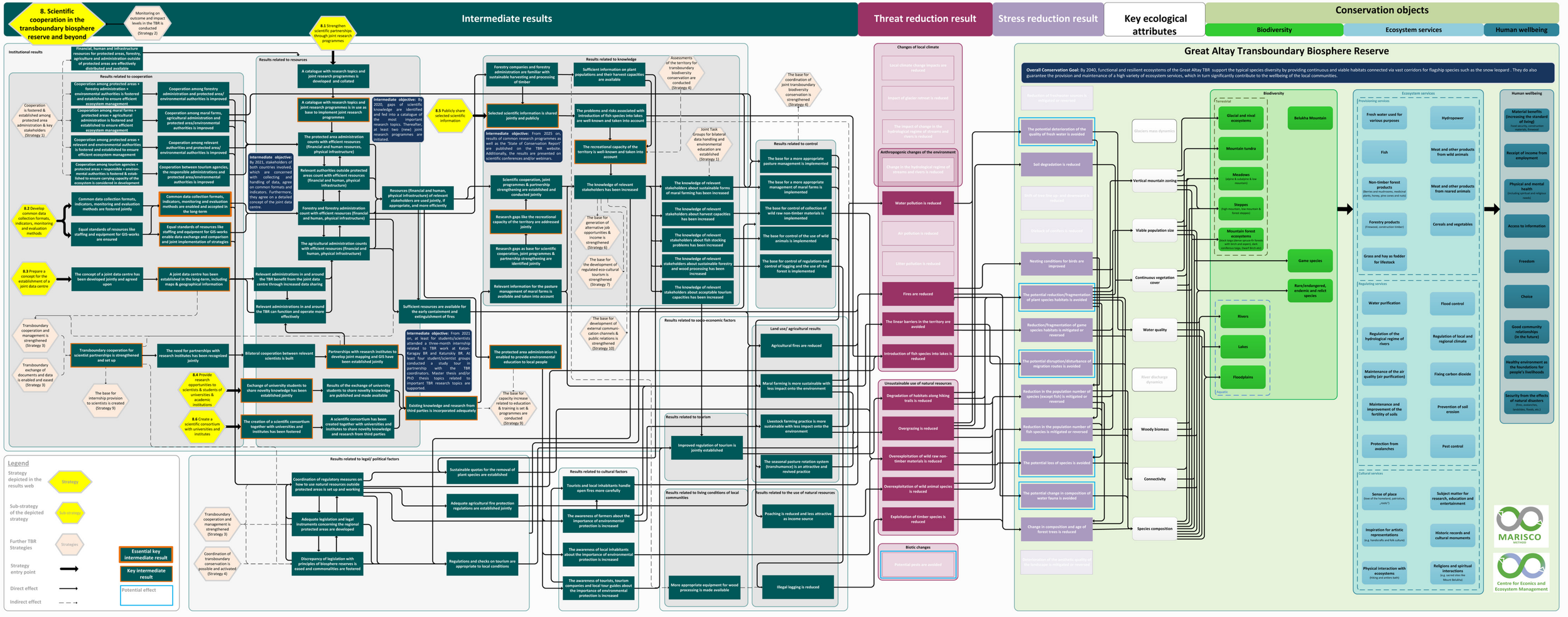
From 2021 on, at least for students/scientists attended a three-month internship related to TBR work at Katon-Karagay BR and Katunskiy BR. At least four student/scientist groups conducted a study tour in partnership with the TBR coordinators. Master thesis and/or PhD thesis topics related to important TBR research topics are supported.

Enabling of the following Great Altay TBR strategies

- The base for coordination of joint transboundary biodiversity conservation is strengthened (strategy 4);
- A base for generation of alternative job opportunities & income is strengthened (strategy 6);
- The base for the development of regulated eco-cultural tourism is strengthened (strategy 7);
- The base for internship provision to scientists is created (strategy 9);
- The base for capacity increase related to education & training is set & programmes are conducted (strategy 9);
- The base for development of external communication channels & public relations is strengthened (strategy 10).

The following page depicts the result web of strategy 8.

Figure 27: Results web of strategy 8


8. Scientific cooperation in the transboundary biosphere reserve and beyond
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Great Altay Transboundary Biosphere Reserve
Overall Conservation Goal: By 2040, functional and resilient ecosystems of the Great Altay TBR support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard . They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.
Institutional results
Financial, human and infrastructure resources for protected areas, forestry, agriculture and administration outside of protected areas are effectively distributed and available
Results related to cooperation
Cooperation is fostered & established among protected area administration & key stakeholders (Strategy 1)
Cooperation among protected areas + forestry administration + environmental authorities is fostered and established to ensure efficient ecosystem management
Cooperation among forestry administration and protected area/ environmental authorities is improved
Cooperation among mural farms + protected areas + agricultural administration is fostered and established to ensure efficient ecosystem management
Cooperation among mural farms, agricultural administration and protected area/environmental authorities is improved
Cooperation among protected areas + relevant and environmental authorities is fostered and established to ensure efficient ecosystem management
Cooperation among relevant authorities and protected area/ environmental authorities is improved
Cooperation among tourism agencies + protected areas + responsible + environmental authorities is fostered & established to ensure carrying capacity of the ecosystem is considered in development
Cooperation between tourism agencies, the responsible administration and protected area/environmental authorities is improved
8.2 Develop common data collection formats, indicators, monitoring and evaluation methods
Common data collection formats, indicators, monitoring and evaluation methods are enabled and accepted in the long-term
Equal standards of resources like staffing and equipment for GIS-works are ensured
Equal standards of resources like staffing and equipment for GIS-works enable data exchange and comparison and joint implementation of strategies
8.3 Prepare a concept for the establishment of a joint data centre
The concept of a joint data centre has been developed jointly and agreed upon
A joint data centre has been established in the long-term, including maps & geographical information
Transboundary cooperation and management is strengthened (Strategy 3)
Transboundary exchange of documents and data is enabled and eased (Strategy 3)
Transboundary cooperation for scientist partnerships is strengthened and set up
The need for partnerships with research institutes has been recognized jointly
The base for internship provision to scientists is created (Strategy 9)
8.4 Provide opportunities to scientists & students of universities & academic institutions
8.6 Create a scientific consortium with universities and institutes
Results related to resources
8.1 Strengthen scientific partnerships through joint research programmes
A catalogue with research topics and joint research programmes is developed and collated
A catalogue with research topics and joint research programmes is in use as base to implement joint research programmes
Intermediate objective: By 2020, gaps of scientific knowledge are identified and fed into a catalogue of the most important research topics. Thereafter, at least two (new) joint research programmes are initiated.
The protected area administration counts with efficient resources (financial and human resources, physical infrastructure)
Relevant authorities outside protected areas count with efficient resources (financial and human, physical infrastructure)
Intermediate objective: By 2021, stakeholders of both countries involved, which are concerned with collecting and handling of data, agree on common formats and indicators. Furthermore, they agree on a detailed concept of the joint data centre.
Forestry and forestry administration count with efficient resources (financial and human, physical infrastructure)
The agricultural administration counts with efficient resources (financial and human, physical infrastructure)
Resources (financial and human, physical infrastructure) of relevant stakeholders are used jointly, if appropriate, and more efficiently
Relevant administrations in and around the TBR benefit from the joint data centre through increased data sharing
Relevant administrations in and around the TBR can function and operate more effectively
Sufficient resources are available for the early containment and extinguishment of fires
Exchange of university students to share novelty knowledge has been established jointly
Results of the exchange of university students to share novelty knowledge are published and made available
The creation of a scientific consortium together with universities and institutes has been fostered
A scientific consortium has been created together with universities and institutes to share novelty knowledge and research from third parties
Bilateral cooperation between relevant scientists is built
Partnerships with research institutes to develop joint mapping and GIS have been established jointly
Intermediate objective: From 2021 on, at least for students/scientist attended a three-month internship related to TBR work at Katzen Karagay BR and Katunskiy BR. At least four student/scientist groups conducted a study tour in partnership with the TBR coordinators. Master thesis and/or PhD thesis topics related to important TBR research topics are supported.
Existing knowledge and research from third parties is incorporated adequately
8.5 Publicly share selected scientific information
Intermediate objective: By 2020, gaps of scientific knowledge are identified and fed into a catalogue of the most important research topics. Thereafter, at least two (new) joint research programmes are initiated.
Intermediate objective: From 2025 on, results of common research programmes as well as the 'State of Conservation Report' are published on the TBR website. Additionally, the results are presented on scientific conferences and/or webinars.
Results related to knowledge
Forestry companies and forestry administration are familiar with sustainable harvesting and processing of timber
Sufficient information on plant populations and their harvest capacities are available
Assessments of the territory for transboundary biodiversity conservation are conducted (Strategy 4)
Selected scientific information is shared jointly and publicly
The problems and risks associated with introduction of fish species into lakes are well-known and taken into account
The recreational capacity of the territory is well-known and taken into account
The base for coordination of joint transboundary biodiversity conservation is strengthened (Strategy 4)
Joint Task Groups for bilateral data handling and environmental education are established (Strategy 1)
The knowledge of relevant stakeholders has been increased
Scientific cooperation, joint programmes & partnership strengthening are established and conducted jointly
Research gaps like the recreational capacity of the territory are addressed jointly
Research gaps as base for scientific cooperation, joint programmes & partnership strengthening are identified jointly
Relevant information for the pasture management of mural farms is available and taken into account
The base for generation of alternative job opportunities & income is strengthened (Strategy 6)
The base for the development of regulated eco-cultural tourism is strengthened (Strategy 7)
The base for development of external communication channels & public relations is strengthened (Strategy 10)
The knowledge of relevant stakeholders about sustainable forms of mural farming has been increased
The knowledge of relevant stakeholders about harvest capacities has been increased
The knowledge of relevant stakeholders about fish stocking problems has been increased
The knowledge of relevant stakeholders about sustainable forestry and wood processing has been increased
The knowledge of relevant stakeholders about acceptable tourism capacities has been increased
Results related to control
The base for a more appropriate pasture management is implemented
The base for a more appropriate management of mural farms is implemented
The base for control of collection of wild raw non-timber materials is implemented
The base for control of the use of wild animals is implemented
The base for control of regulations and control of logging and the use of the forest is implemented
The protected area administration is enabled to provide environmental education to local people
The base for capacity increase related to education & training is set & programmes are conducted (Strategy 9)
Results related to socio-economic factors
Land use/ agricultural results
Agricultural fires are reduced
Maral farming is more sustainable with less impact onto the environment
Livestock farming practice is more sustainable with less impact onto the environment
The seasonal pasture rotation system (transhumance) is an attractive and revived practice
Results related to tourism
Improved regulation of tourism is jointly established
Results related to living conditions of local communities
More appropriate equipment for wood processing is made available
Results related to the use of natural resources
Poaching is reduced and less attractive as income source
illegal logging is reduced
Results related to cultural factors
Tourists and local inhabitants handle open fires more carefully
The awareness of farmers about the importance of environmental protection is increased
The awareness of local inhabitants about the importance of environmental protection is increased
The awareness of tourists, tourism companies and local tour guides about the importance of environmental protection is increased
Results related to legal/ political factors
Coordination of regulatory measures on how to use natural resources outside protected areas is set up and working
Adequate legislation and legal instruments concerning the regional protected areas are developed
Discrepancy of legislation with principles of biosphere reserves is eased and commonalities are fostered
Transboundary cooperation and management is strengthened (Strategy 3)
Coordination of transboundary conservation is possible and activated (Strategy 4)
Sustainable quotas for the removal of plant species are established
Adequate agricultural fire protection regulations are established jointly
Regulations and checks on tourism are appropriate to local conditions
Changes of local climate
Local climate change impacts are reduced
Impact of glacier retreat is reduced
The impact of change in the hydrological regime of streams and rivers is reduced
Anthropogenic changes of the environment
Change in the hydrological regime of streams and rivers is reduced
Water pollution is reduced
Soil degradation is reduced
Air pollution is reduced
Litter pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Introduction of fish species into lakes is reduced
Unsustainable use of natural resources
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild raw non-timber materials is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Biotic changes
Potential pests are avoided
Reduction of freshwater resources is mitigated or reversed
The potential deterioration of the quality of fresh water is avoided
Soil degradation is reduced
Shift of tree line up- and downward is reduced
Treeline of coniferss is reduced
Nesting conditions for birds are improved
The potential reduction/fragmentation of plant species habitats is avoided
Reduction/fragmentation of game species habitats is mitigated or reversed
The potential disruption/disturbance of migration routes is avoided
Reduction in the population number of species (except fish) is mitigated or reversed
Reduction in the population number of fish species is mitigated or reversed
The potential loss of species is avoided
The potential change in composition of water fauna is avoided
Change in composition and age of forest trees is reduced
Glaciers mass dynamics
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Biodiversity
Terrestrial
Glacial and nival ecosystems
Mountain tundra
Meadows (alpine & subalpine & low mountain)
Steppes (high-mountain, low mountain & forest-steppes)
Mountain forest ecosystems (dark taiga (dense spruce fir forests with larch and aspen), dark coniferous taiga, Dwarf birch and
Aquatic
Rivers
Lakes
Floodplains
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Ecosystem services
Provisioning services
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products (Berries and mushrooms, medicinal plants, honey, pine cones and nuts)
Meat and other products from reared animals
Forestry products (Firewood, construction timber)
Cereals and vegetables
Grass and hay as fodder for lifestock
Regulating services
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Maintenance of the air quality (air purification)
Fixing carbon dioxide
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Cultural services
Sense of place (love of the homeland, patriotism, „roots")
Subject matter for research, education and entertainment
Inspiration for artistic representations (e.g. handicrafts and folk culture)
Historic records and cultural monuments
Physical interaction with ecosystems (hiking and antlers bath)
Religions and spiritual interactions (e.g. sacred sites like Mount Belukha)
Human wellbeing
Material benefits (increasing the standard of living)
Food security, recreational materials, firewood
Receipt of income from employment
Physical and mental health (including spiritual and religious needs)
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters (fires, avalanches, landslides, floods, etc.)
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR Strategies
Strategies
Strategy entry point
Direct effect
Indirect effect
Essential key intermediate result
Key intermediate result
Potential effect
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3.5.9 'Increase of capacities related to education and training'

Description - strategy (S 9)

While Strategy 8 aims to determine gaps of know-how and to build (new) knowledge, Strategy 9 supports capacity building through education and training and reduces *factors related to lack of knowledge* and *lack of knowledge* therefore. Target groups are protected area staff, school pupils and teachers, NGOs, entrepreneurs and as well as local people in general. The enhancement of capacities will address both conservation and development issues while following the overall concept of economic, cultural and environmental sustainability.

With signing the Intergovernmental Agreement on the Establishment of the Transboundary Reserve "Altai" in the year 2011 and the Joint Action Plan in 2013, both parties agreed in a transfer of knowledge. Accordingly, cooperation in this field already started in recent years.[14] The designation of the Great Altay TBR sets a platform to intensify efforts in terms of joint trainings and exchange projects.

Photo 37: Joint training on management of recreational stresses in protected areas (left)
Photo 38: Example of educational information provided in Katon-Karagay BR (right)
Photographer: Raushan Krykbaeva

Precondition for strategy implementation

- A Task Group has been formed jointly to increase capacities related to education & training as part of strategy 1;
- Transboundary cooperation is strengthened, stable & further enhanced as part of strategy 3;
- Alternative job opportunities and income are generated as part of strategy 6.

(Essential) Key intermediate results to be achieved according to the results web (see figure 28)

- Cooperation with schools and youth organizations and youth exchanges are fostered jointly;
- Training and education activities for TBR staff are conducted effectively and successfully;

[14] e.g.: In 2010, on the basis of Katon-Karagay State Nature Park, an international training on the monitoring of recreational stresses in protected areas was conducted. Representatives of the State Nature Biosphere Zapovednik Katunskiy, State Nature Zapovednik Markakolskiy, West Altai State Nature Zapovednik and Katon-Karagay State Nature Park took part in the training. In 2013 and 2015, working meeting on exchange of experience of rangers of the State Nature Biosphere Zapovednik Katunskiy and Katon-Karagay State Nature Park took place.

- Training and education activities for various stakeholder groups and local communities are conducted effectively and successfully;
- TBR related staff possess skills, knowledge and access to information related to TBR issues and has the capacities to apply it;
- The protected area administration conducts specific environmental education for local people to achieve increased awareness of environmental problems caused by cultural habits.

Sub-strategies/field of activities

To this end, strategy 9 foresees the implementation of the following sub-strategies:

S 9.1 Build capacities of the TBR team

Building capacities of TBR board members, staff and task groups as part of the TBR team (consisting of board representatives, coordinators and active task group members) is a fundamental matter of concern, which is addressing the lack of knowledge and skills. Exchange visits combined with technical training through external advisors at the level of 'Task Groups' will form the core of activities of this strategy. It is therefore planned for the Task Group 'Environmental Education' in cooperation with the TBR core team to arrange the following activities:

- General training workshops with key stakeholders on the TBR concept;
- Technical training and exchanges on fire prevention and control;
- Technical training on how to tackle environmental law violations;
- Knowledge transfer in terms of specific occurrence and distribution of species and how anthropogenic changes affect the sites;
- Expert training and exchange visits related to fund-raising for transboundary activities;
- Language lessons for BR staff in Russian, Kazakh and English to enable document exchange and to be able to interact with foreign visitors.

In addition, the TBR team benefits from the integration into the World Network of Biosphere Reserves, which provides access to information on how other TBRs work and what the 'best practices' are.

S 9.2 Establish cooperation with schools

To address and integrate the younger population in TBR works existing cooperation with local schools (teachers and children) and youth organisations is expanded further. As such, sub-strategy 9.2 supports bilateral youth exchanges, joint competitions among pupils or simultaneous action on common national holidays or international environmental days (e.g. World Wildlife Day, World Water Day, etc.).

S 9.3 Launch of participatory training programmes for various stakeholder groups

Sub-strategy 9.3 goes in line with sub-strategy 6.1 'Promote best practices and implementation of demonstration projects for sustainable resource management'. Based on selected best practices and promising strategies for sustainable economic activities[15] and works out pilot demonstration projects, information is shared through joint participatory training sessions including exchange visits. General issues such as 'establishing micro enterprises', 'sustainability considerations' or 'legal matters' add to the portfolio of trainings, if need be.

[15] e.g. in terms of forestry, efficient use of energy resources, use of renewables, waste management and recycling, sustainable hunting, traditional handicrafts, use of medical plants, sustainable agriculture and pasture management, maral farming or bee keeping

Intermediate Objectives

From 2025 onwards, TBR stakeholders regularly participate in joint trainings and workshops. General knowledge on how to manage a TBR and technical skills related to specific tasks (supporting all other strategies) are build.

By 2021, one school from Katon-Karagay BR and one from Katunskiy BR participate in a bilateral youth exchange. All school pupils within the TBR are invited to participate in a joint competition. Pupil's results are exhibited at joint cultural festivals.

From 2023 onwards, private and communal stakeholders benefit from training programmes offered for five main economic domains. Exchange visits to five pilot demonstration projects add to the training's portfolio.

Enabling of the following Great Altay TBR strategies

- Implementation of joint activities to coordinate transboundary biodiversity conservation is enabled (strategy 4);
- Transboundary understanding and cultural exchange is promoted (strategy 5);
- Implementation of joint activities to promote transboundary understanding & cultural exchange is enabled (strategy 5);
- Implementation of joint activities to generate alternative job opportunities & income is enabled (strategy 6);
- Implementation of joint activities to develop regulated eco-cultural tourism is enabled (strategy 7);
- Regulated eco-cultural tourism is developed (strategy 7);
- The external communication channels & PR are established & create, strengthen & increase the common identity (strategy 10).

The following page depicts the result web of strategy 9.

Figure 28: Results web of strategy 9

9. Increase of capacities related to education and training
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Great Altay Transboundary Biosphere Reserve
Results related to institutional factors
Results related to cooperation
Results related to knowledge
9.1 Build capacities of the TBR team
9.3 Launch of participatory training programmes for various stakeholder groups
9.2 Establish cooperation with schools & youth organizations + support youth exchanges
Capacities / gaps of know-how of protected area staff of both BR's is jointly assessed
Capacities / gaps of know-how of various stakeholder groups including local communities are jointly assessed
Training and education activities for various stakeholder groups and local communities are developed jointly
Internship programmes for scientists and students of partnering universities and institutes of Kazakhstan and Russia are developed jointly
Exchanges, joint training courses and technical meetings for managers and field staff are developed jointly
Language training amongst both BR's staff are organized and developed jointly
Training and education activities for locals involved in fire prevention/ fighting are conducted successfully
Cooperation with schools and youth organizations and youth exchanges are fostered jointly
Cooperation with school teachers and school children is enabled and conducted
Cooperation with youth organizations is enabled and conducted
Youth exchanges are enabled, conducted and are popular
Training and education activities for various stakeholder groups and local communities are conducted effectively and successfully
Various stakeholder groups strengthened and increased their skills and knowledge
Training and education activities for managers and field staff are conducted effectively and successfully
Protected area staff strengthened and increased their skills, knowledge & cooperation among both BR's
The acceptance and support for the need to preserve the TBR's unique biological, landscape and ethnic and cultural diversity is enhanced
The common identity in the Altai region is fostered and further strengthened
TBR related staff possess skills, knowledge and access to information related to TBR issues and has the capacities to apply it
Sufficient information on plant populations and their harvest capacities are available and accessible
Forestry companies and forestry administration are familiar with sustainable harvesting and processing of timber
Relevant information for the pasture management of maral farms is available and taken into account
A more appropriate management of maral farms is understood and enabled
Results related to control
Results related to legal/ political factors
Sustainable quotas for the removal of plant species are established
Regulations and checks on tourism are appropriate to local conditions
Socio-economic results
Results related to tourism
Improved regulation of tourism is jointly established
Land use / agricultural results
Livestock farming practice is more sustainable with less impact onto the environment
Results related to living conditions of local communities
Results related to the use of natural resources
Poaching is reduced and less attractive as income source
More appropriate equipment for wood processing is available
Illegal logging is reduced
Results related to cultural factors
Changes of local climate
Anthropogenic changes of the environment
Change in the hydrological regime of streams and rivers is reduced
Water pollution is reduced
Litter pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Introduction of fish species into lakes is reduced
Unsustainable use of natural resources
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Biotic changes
Soil degradation is reduced
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Glacial and nival ecosystems
Mountain tundra
Meadows
Steppes
Mountain forest ecosystems
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Rivers
Lakes
Floodplains
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products
Meat and other products from reared animals
Forestry products
Cereals and vegetables
Grass and hay as fodder for livestock
Water purification
Flood control
Regulation of local and regional climate
Fixing carbon dioxide
Prevention of soil erosion
Protection from avalanches
Pest control
Sense of place
Historic records and cultural monuments
Receipt of income from employment
Access to information
Freedom
Choice
Legend
Strategy depicted in the results web
Sub-strategy of the depicted strategy
Further TBR Strategies
Strategy entry point
Direct effect
Indirect effect
Key intermediate result
Potential effect
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3.5.10 'Development of external communication channels and public relations'

Description – strategy (S 10)

Spreading the word about the TBR is key for a modern and active conservation site management. Public relations and awareness rising, thus, form an important part of the TBR's logistic function and help to reduce the *lack of knowledge*. Through external communication channels and media campaigns a broader public is addressed and informed about the TBR rationale and objectives. By doing so, common understanding will be developed about the importance of the Altai ecosystems and large range of ecosystem services, which are vital to local communities as well as to humanity on a regional and global level. Ultimately, acceptance and support will be built for the need to preserve the TBR's unique biological, landscape and ethnic and cultural diversity.

A joint public relation programme including a TBR website, communication means and promotional materials supports this endeavour while the organisation of exhibits and events in and around the TBR will attract a national and international audience.

Precondition for strategy implementation

- A Task Group has been formed jointly to develop external communication channels & public relations as part of strategy 1;
- Funding is secured to carry out TBR activities as part of strategy 1.

(Essential) Key intermediate results to be achieved according to the results web (see figure 29)

- Conduct training and provide information to TBR staff to carry out public relations;
- A common logo is jointly established and accepted by relevant stakeholders and a common design for published material about the TBR is jointly established and in use;
- A joint label for regional products & services incl. sustainability and quality criteria has been established and is in use;
- A common interactive website has been set up jointly;
- Virtual visibility of the TBR is strengthened;
- Information material is collated jointly and distribution channels are identified;
- The TBR is promoted and made visible in the local, national and international context;
- Funding sources for TBR related activities are recognized, secured & enabled;
- The joint newsletter is developed and published;
- Exhibitions and events around the TBR activities are conducted in cooperation with relevant stakeholder groups.

Sub-strategies/field of activities

To this end, strategy 10 foresees the implementation of the following sub-strategies:

S 10.1 Develop a common public relations strategy

Currently, there is no common approach for external communication and public relations for the transboundary cooperation of the Katon-Karagay BR and Katunskiy BR administrations. While being designated by UNESCO as a transboundary BR, both parties join efforts to promote the TBR and to inform the public about the values and heritage of the Great Altay. To this effort, a common public relation strategy is developed. Its purpose is to increase the visibility of the TBR, to raise awareness and to build a common identity. Additional channels will be identified and mobilized to target specific stakeholder groups.

S 10.2 Develop and promote a common logo and corporate design for the TBR

A common logo and design, which is used for all published material (online and offline), is raising the visibility of the TBR and is strengthening a common identity among the TBR staff and among the population later on.

S 10.3 Develop and promote a joint label for regional products and services

By developing and promoting a joint label for regional products with the label 'Made in Great Altay TBR' logistical support is provided for sub-strategies 5.3 and 6.3. The label is coordinated by the Task Group 'Regional Products and Labelling'. The Task Group is in charge of elaborating a set of sustainability and quality criteria, which are communicated to the public. Products, which meet the criteria will benefit from TBR promotional work and new market chains. They are proved and checked on a regular basis.

S 10.4 Set up, promote, support and regularly update a common interactive internet site

In order to present the Great Altay TBR to a broader audience an interactive internet website is created. It combines informational and promotional elements to raise interest for the area by e.g. highlighting environmental attractions and by promoting ecological and cultural tourism.

S 10.5 Produce information material

Besides online publications, printed materials like a joint brochure, booklet, tourist map incl. a coordinated zonation plan of the TBR add to the information available for local people as well as for visitors. The decision on what kinds of materials are produced is based on the results of the common public relation strategy (see sub-strategy 10.1).

S 10.6 Organize exhibits and events around the TBR

Joint events and touring exhibitions including documentary films contribute to the conservational and developmental strategies as outlined earlier. They provide the possibility to inform, raise awareness and share best practices with specific stakeholder groups and a broad audience in general.

S 10.7 Develop and publish a joint newsletter for the Great Altay TBR

Annually, a joint newsletter is developed and distributed to households within the TBR. It is published in Russian as well as in Kazakhstani language, aiming to inform but also to activate the local population for TBR related work.

Intermediate Objectives

From 2020 on, local products, which meet sustainability and quality criteria, receive a joint label. Producers are benefitting from new market chains and higher revenues, while the identity of locals with the TBR is increasing.

From 2022 on, the common public relation strategy feeds into various online (website) and offline (flyer, booklet, newsletter, etc.) communication channels. High level of awareness and recognition of the Great Altay TBR is ensured by using a joint logo and corporate design.

By 2025, the visibility of the TBR has increased significantly.

Enabling of the following Great Altay TBR strategies

- Leads to the enhancement of all other strategies;
- Funding is secured to carry out TBR activities (strategy 1);
- Transboundary understanding and cultural exchange is promoted (strategy 5).

The following page depicts the result web of strategy 10.

Figure 29: Results web of strategy 10

10. Development of external communication channels and public relations
Monitoring on outcome and impact levels in the TBR is conducted (Strategy 2)
Intermediate results
Threat reduction result
Stress reduction result
Key ecological attributes
Conservation objects
Biodiversity
Ecosystem services
Human wellbeing
Results related to institutional factors
Results related to knowledge
Results related to resources
Results related to cooperation
A Task Group has been formed jointly to develop external communi-cation channels & public relations (Strategy 1)
10.1 Develop a common public relations strategy
Conduct training and provide information to TBR staff to carry out public relations
Staff of protected area is enabled to carry out public relations about TBR related fields to raise awareness and to promote the TBR
Staff of protected area carries out effectively public relations about TBR related fields
Staff of protected area is enabled to carry out public relations on the prevention of forest and steppe fires
Staff of protected area carries out effectively public relations on the prevention of forest and steppe fires
The TBR is promoted and made visible in the local, national and international context
Acceptance and support for the need to preserve the TBR's unique biological, landscape & ethnic and cultural diversity is fostered
Interest of donors is increasing and opportunities for other funding arise
Funding sources for TBR related activities are recognized, secured & enabled
The funding base is strengthened to implement the TBR strategies
Funding is secured to carry out TBR activities (Strategy 1)
10.6 Organise exhibits & events around the TBR
Exhibitions and events around the TBR activities are fostered in cooperation with relevant stakeholder groups
Exhibitions and events around the TBR activities are conducted in cooperation with relevant stakeholder groups
Awareness about the TBR is raised on regional and national level
Transboundary understanding and cultural exchange is promoted (Strategy 5)
Monitor the outcome and impact levels in the TBR (Strategy 2)
Strengthen transboundary cooperation&enable transboundary exchange of documents&data (Strategy 3)
Conduct joint activities for the coordination of transboundary biodiversity conservation (Strategy 4)
Conduct joint activities for the generation of alternative job opportunities & income (Strategy 6)
Conduct joint activities for the development of regulated eco-cultural tourism (Strategy 7)
Enable scientific cooperation in the transboundary biosphere reserve and beyond (Strategy 8)
Increase the capacities related to education and training (Strategy 9)
10.4 Set up, promote, support & regularly update a common interactive website
A common interactive website has been promoted
A common interactive website has been set up jointly
The common interactive website is regularly being updated
The common interactive website promotes eco-cultural tourism
The common interactive website highlights environmental attractions of the TBR
The common interactive website highlights environmental attractions and conservation of the TBR
Virtual visibility of the TBR is strengthened
The highlighted environmental attractions and conservation educate and inspire local stakeholders
The common interactive website is well used by stakeholders
10.2 Develop and promote a common logo and coprorate design for the TBR
A common logo is jointly established and accepted by relevant stakeholders and a common design for published material about the TBR is jointly established and in use
Visibility of the TBR is strengthened and increased
Intermediate objective: From 2020 on, local products, which meet sustainability and quality criteria, receive a joint label. Producers are benefitting from new market chains and higher revenues, while the identity of locals with the TBR is increasing.
10.3 Develop and promote a joint label for regional products and services
A joint label for regional products & services incl. sustainability and quality criteria has been established and is in use
A common identity among the local communities in the Altai region is introduced and fostered
A joint label for regional products & services incl. sustainability and quality criteria is in use and is being recognized among relevant stakeholders
Intermediate objective: From 2022 on, the common public relation strategy feeds into various online (website) and offline (flyer, booklet, newsletter, etc.) communication channels. High level of awareness and recognition of the Great Altay TBR is ensured by using a joint logo and corporate design.
Intermediate objective: By 2025, the visibility of the TBR has increased significantly.
The awareness about the TBR is raised among the local communities and relevant stakeholders
Through PR the acceptance and support for the need to preserve the TBR's unique biological, landscape & ethnic and cultural diversity is strengthened
Through public relations and outreach the protected area administration is providing environmental education
10.5 Produce information material
Information material is collated jointly and distribution channels are identified
A tourist map and a coordinated zonation plan have been produced and are well used by stakeholders
Brochures and books about the TBR have been produced and are distributed and available
10.7 Develop and publish a joint newsletter for the TBR
The joint newsletter is developed and published
Results related to cultural factors
Tourists and local inhabitants handle open fires more carefully
The awareness of farmers about the importance of environmental protection is increased
The awareness of local inhabitants about the importance of environmental protection is increased
The awareness of tourists, tourism companies and local tour guides about the importance of environmental protection is increased
Socio-economic results
Results related to tourism
Improved regulation of tourism is jointly established
Land use / agricultural results
Maral farming is more sustainable with less impact onto the environment
Livestock farming practice is more sustainable with less impact onto the environment
Results related to the use of natural resources
Poaching is reduced and less attractive as income source
Legend
Strategy depicted in the results web
Strategy
Sub-strategy of the depicted strategy
Sub-strategy
Further TBR Strategies
Strategies
Essential key intermediate result
Key intermediate result
Strategy entry point
Direct effect
Indirect effect
Potential effect
Changes of local climate
Local climate change impacts are reduced
Impact of glacier retreat is reduced
The impact of change in the hydrological regime of streams and rivers is reduced
Anthropogenic changes of the environment
Change in the hydrological regime of streams and rivers is reduced
Water pollution is reduced
Air pollution is reduced
Litter pollution is reduced
Fires are reduced
The linear barriers in the territory are avoided
Introduction of fish species into lakes is reduced
Unsustainable use of natural resources
Degradation of habitats along hiking trails is reduced
Overgrazing is reduced
Overexploitation of wild raw non-timber materials is reduced
Overexploitation of wild animal species is reduced
Exploitation of timber species is reduced
Biotic changes
Potential pests are avoided
Great Altay Transboundary Biosphere Reserve
Overall Conservation Goal: By 2040, functional and resilient ecosystems of the Great Altay TBR support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard . They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.
Reduction of freshwater sources is mitigated or reversed
The potential deterioration of the quality of fresh water is avoided
Soil degradation is reduced
Shift of tree line up- and downward is reduced
Dieback of conifers is reduced
Nesting conditions for birds are improved
The potential reduction/fragmentation of plant species habitats is avoided
Reduction/fragmentation of game species habitats is mitigated or reversed
The potential disruption/disturbance of migration routes is avoided
Reduction in the population number of species (except fish) is mitigated or reversed
Reduction in the population number of fish species is mitigated or reversed
The potential loss of species is avoided
The potential change in composition of water fauna is avoided
Change in composition and age of forest trees is reduced
Deterioration of the aesthetic quality of the landscape is mitigated or reversed
Glaciers mass dynamics
Vertical mountain zoning
Viable population size
Continuous vegetation cover
Water quality
River discharge dynamics
Woody biomass
Connectivity
Species composition
Biodiversity
Terrestrial
Glacial and nival ecosystems
Mountain tundra
Meadows (alpine & subalpine & low mountain)
Steppes (high-mountain, low mountain & forest steppes)
Mountain forest ecosystems (black taiga (dense spruce-fir forests with birch and aspen), dark coniferous taiga, Dwarf Birch etc)
Belukha Mountain
Game species
Rare/endangered, endemic and relict species
Aquatic
Rivers
Lakes
Floodplains
Ecosystem services
Provisioning services
Fresh water used for various purposes
Hydropower
Fish
Meat and other products from wild animals
Non-timber forest products (Berries and mushrooms, medicinal plants, honey, pine cones and nuts)
Meat and other products from reared animals
Forestry products (Firewood, construction timber)
Cereals and vegetables
Grass and hay as fodder for lifestock
Regulating services
Water purification
Flood control
Regulation of the hydrological regime of rivers
Regulation of local and regional climate
Maintenance of the air quality (air purification)
Fixing carbon dioxide
Maintenance and improvement of the fertility of soils
Prevention of soil erosion
Protection from avalanches
Pest control
Cultural services
Sense of place (love of the homeland, patriotism, „roots")
Subject matter for research, education and entertainment
Inspiration for artistic representations (e.g. handicrafts and folk culture)
Historic records and cultural monuments
Physical interaction with ecosystems (hiking and antlers bath)
Religions and spiritual interactions (e.g. sacred sites like Mount Belukha)
Human wellbeing
Material benefits (increasing the standard of living) Food security, construction materials, firewood
Receipt of income from employment
Physical and mental health (including spiritual and religious needs)
Access to information
Freedom
Choice
Good community relationships (in the future)
Healthy environment as the foundations for people's livelihoods
Security from the effects of natural disasters (fires, avalanches, landslides, floods, etc.)
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3.6 Risk assessment

General risk management

The ecosystem-based conservation approach recognizes the Great Altay TBR as a socio-ecological system with complex drivers of change, as well as with inherent risks and vulnerabilities. Many of the problems encountered today in the management of conservation areas are unexpected and fast acting and need a rapid response and adaptive approach with the help of proactive and preventive measures. Therefore, the adaptive management of the on-hand management plan provides for adaptive risk management. As part of adaptive management the Great Altay TBR strategies are designed to be risk-robust to deal with uncertainty and non-knowledge in order to avoid ineffectiveness or even failure.

Risk management comprises of risk search and perception, risk assessment and risk response. Risk search and perception is the first important step for identifying or anticipating as many potential risks as possible to the overall conservation goal. Risk assessment as the following stage describes the identification and monitoring of risks that can be dynamic and interacting also. It also analyses the potential failure of strategies due to existing and/or probable threats/risks. Furthermore, it analyses risky (unwanted, hardly foreseeable) outcomes generated through implementing the Great Altay TBR strategies. Finally, risk response deals with the recognition and management of the identified or anticipated risks that may potentially evolve into real threats (Ibisch & Hobson, 2014).

Feasibility and impact of the Great Altay TBR strategies

As part of risk assessment, the ten Great Altay TBR strategies are verified against their feasibility and impact (see tables 25 and 26). The tables 25 and 26 indicate a risk-robust package of Great Altay TBR strategies, which will probably not be threatened by risks while having a significant positive impact onto the ecosystems and its people. However, the ten Great Altay TBR strategies provide for enhanced efficiency of resources and capacities with the first three strategies being especially designed to tackle the foundation and set up of the TBR. Tables 25 and 26 depict that the feasibility and impact of the strategies is expected to achieve good and very good results for the Great Altay TBR ecosystems.

Box 12: Feasibility and impact

Feasibility is the degree to which a strategy is likely to be implemented under the prevailing conditions within the management area. Factors likely to influence feasibility include the availability of given resources and also risks, restrictions and conflicts with or between actors and stakeholders.

The **impact** of a conservation strategy is related to any change within or outside the management area that can be attributed to the strategic action and that influences either directly or indirectly the conservation objects. Positive impacts are ultimately related to the maintenance or improvement of the status of the defined conservation objects. Negative impacts would lead to an increase in stresses, threats or their contributing factors (Ibisch & Hobson, 2014).

The explanation of the feasibility and impact assessment tables can be found in Annex 6.

As part of adaptive management the strategy 2 - 'Monitoring on outcome and impact levels' targets risk reduction and effectiveness of the Great Altay TBR strategies over time (see chapter 3.5.2) in order to reduce existing and/or potential risks that may occur during their implementation and to adjust the strategies when necessary.

Adding on to that, the results webs of the ten Great Altay TBR strategies contain (essential) key intermediate results, which indicate important steps that need to be achieved during the management process in order to implement the strategies successfully and effectively.

Table 25: Assessment of feasibility of the transboundary strategies

No.	Transboundary strategy	FEASIBILITY				
		Necessary resources	Level of acceptance from relevant stakeholders	Probability of benefiting from external factors (especially opportunities)	Probability of harmful risks	Adaptability to change
1	Establishment of a coordinating structure and management mechanisms for the TBR	Some resources available	Good acceptance	High	Probably not threatened by risks	Rather adaptable
2	Monitoring on outcome and impact levels in the TBR	Only limited resources available				
3	Strengthening transboundary cooperation and management and enable and ease the transboundary exchange of documents and data	Some resources available	Fairly low acceptance			Not adaptable without significant additional resources
4	Coordination of transboundary biodiversity conservation		Good acceptance			Very adaptable
5	Promotion of transboundary understanding and cultural exchange	Only limited resources available	Very good acceptance	Very high		Rather adaptable
6	Generation of alternative job opportunities and income			High	Probably threatened by risks	
7	Development of regulated eco-cultural tourism		Good acceptance	Very high		
8	Scientific cooperation in the transboundary biosphere reserve and beyond	Some resources available	Very good acceptance		Probably not threatened by risks	
9	Increase of capacities related to education and training	Only limited resources available	Good acceptance	High		
10	Development of external communication channels and public relations			Very high		

Table 26: Assessment of the impact of the transboundary strategies

		IMPACT						
No.	**Transboundary strategy**	**Creation of social, political and institutional conflicts**	**Creation of new risks increasing the vulnerability of conservation objects**	**Synergies with other strategies**	**Conflicts with other strategies**	**Threat abatement effectiveness**	**Direct increase of functionality of biodiversity objects**	**Level of potential regret**
1	**Establishment of a coordinating structure and management mechanisms for the TBR**	Medium risk	Medium risk	Very high probability	Low probability	Very highly effective	Positive	Medium-regret strategy
2	**Monitoring on outcome and impact levels in the TBR**	Very low risk					Very positive	
3	**Strengthening transboundary cooperation and management and enable and ease the transboundary exchange of documents and data**	Medium risk	Low risk	High probability	Medium probability			No-regret strategy
4	**Coordination of transboundary biodiversity conservation**	Very low risk		Very high probability	Low probability			
5	**Promotion of transboundary understanding and cultural exchange**			High probability				
6	**Generation of alternative job opportunities and income**	Medium risk	Medium risk		Medium probability	Highly effective	Positive	
7	**Development of regulated eco-cultural tourism**							
8	**Scientific cooperation in the transboundary biosphere reserve and beyond**	Very low risk	Low risk	Very high probability	Low probability	Very highly effective	Very positive	
9	**Increase of capacities related to education and training**	Medium risk	Medium risk	High probability		Highly effective	Positive	
10	**Development of external communication channels and public relations**	Very low risk		Very high probability			Very positive	

4. Operational planning guidelines[16]

4.1 Legal framework

General frame

The overall legal cornerstone for transboundary cooperation in the territory of the Great Altay TBR was laid in 2011 with the

- Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary reserve “Altai”;

and the

- Protocol to the Agreement between the Government of the Republic of Kazakhstan and the Government of the Russian Federation about cooperation in the field of preventing industrial accidents, catastrophes, natural disasters and the liquidation of their consequences from 28 March in the year 1994 relating to the simplified procedure for crossing the state border by emergency rescue services and groups (signed in 2012).

Thereafter, the following documents added to the framework of transboundary management of the Great Altay TBR:

- Statute of the Joint Commission for the implementation of the between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary reserve “Altai” (2013);

and the

- Plan of Joint Actions of State Nature Biosphere Zapovednik Katunskiy and Katon-Karagay State National Park for 2014-2015 concerning the implementation of the intergovernmental agreement on the establishment of the Transboundary reserve “Altai” (2014).

All aspects of transboundary management must be in accordance with the overall framework for governance in both, the Kazakhstani and the Russian part of the Great Altay TBR. The main components of governance are

In the Kazakhstani part:

- Management Plan of the Katon-Karagay State National Park and respective sub-plans of the different departments of the State Nature Park administration. The spatial scope of management includes the core zone and bigger parts of the buffer zone; specific activities also address the local population living within the Katon-Karagay BR;
- Development Programme for the Territories of the Katon-Karagay district for 2011-2015 - for the transition zone.

In the Russian part:

- Governmental assignment for State Nature Biosphere Zapovednik Katunskiy for 2015 and the planning period 2016-2017. It spatially focuses on the core zone but it includes activities that relate also to the transition and buffer zones;
- Concept for the Socio-Economic Development of Ust-Koksa district for 2008-2022 - for transition and buffer zones of the BR;

[16] The authors of this section are Judith Kloiber, Anja Krause, Raushan Krykbaeva, Alija Gabdullina, Tatjana Yashina & Pierre L. Ibisch

- Regulation on forest management of Ust-Koksa forest district – for transition and buffer zones of Katunskiy BR;
- Governmental assignment for Belukha Nature Park for 2015 and the planning period 2016-2017.

Governance of the transition zones

One of the biggest challenges for an effective management of TBRs and BRs is, in general, the discrepancy of legislation with principles of biosphere reserves. In chapter 2.3.2 it was outlined that 'the Federal Law on protected areas' e.g. of the Russian Federation refers to State Nature Biosphere Zapovedniks as State Nature Zapovedniks that received the status of a UNESCO BR. It mentions so-called 'biosphere polygons'. However, there are no regulations on how to set up these biosphere polygons and how to regulate natural resource use within these territories. Thus, legal instruments on the incorporation of the concept of sustainable natural resource use in UNESCO BRs are absent (Grigoryan, 2014). So far, the legislation of the Republic of Kazakhstan does not reflect the international status of UNESCO BRs in its laws and regulations (Chugunkov, 2013). This accounts for BRs as well as for TBRs, particularly for responsibility and management approaches within transition zones including respective sustainable governmental funding.

Out of this reason, the Public Councils of Katon-Karagay BR and Katunskiy BR as well as the Joint Commission Meetings are autonomous structures. Participation of stakeholders in meetings is voluntarily and not paid for.

The legal framework for transboundary exchange of documents and data and the conditions of interpersonal exchange is based on the following (most important) documents:

In the Kazakhstani part:

- Law of the Republic of Kazakhstan "Concerning the State border of the Republic of Kazakhstan" (2013).

In the Russian part:

- Federal Law "On the State border of the Russian Federation" (1993);
- Order of the Federal Security Service of Russia "On the delimitation of the border zone on the territory of the Altai Republic" (2006).

Bilateral contracts and agreements:

- Contract between the Republic of Kazakhstan and the Russian Federation about the Russian-Kazakhstani State border (2005);
- Agreement between the Government of the Republic of Kazakhstan and the Government of the Russian Federation on cooperation in the field of joint control of the Russian-Kazakhstani State border (2009);
- Protocol to the Agreement between the Government of the Republic of Kazakhstan and the Government of the Russian federation about cooperation in the field of preventing industrial accidents, catastrophes, natural disasters and the liquidation of their consequences from March, 28, 1994 relating to the simplified procedure for crossing the state border by emergency rescue services and groups (2012).

Transboundary exchange

The assessment of the current situation (see chapter 2) and development of strategies (see chapter 3) has highlighted that a facilitation of both, exchange of documents and data as well as opportunities of interpersonal exchange is desirable, if not a precondition for successful implementation of some of the sub-strategies.

In response to this problem, both sides agreed to develop recommendations for respective adjustments of the national legal framework and to initiate negotiation with relevant decision makers in either country (compare also with strategy 3).

4.2 Institutional mechanism

As the present management plan was elaborated in preparation for the designation of the Great Altay TBR, it was decided to devote a single strategy (S 1) to the establishment of the coordinating structure and management mechanism for the TBR once it is designated. The aim is to build a sustainable institutional mechanism as a fundamental base for the implementation of all other strategies.

The joint structure devoted to the TBR's coordination is based on the Joint Commission on the implementation of the Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary Reserve "Altai"[17].

With the successful designation the **'Great Altay TBR board'** needs to be established, which is a follow up of the Joint Commission. The annual general meeting of the TBR board ensures the overall governing of the cooperation within the transboundary area. It forms a platform for joint analysis, discussion and decision making. The board advises and supervises the TBR work of Katon-Karagay BR and Katunskiy BR. Participation in the board is voluntarily. However, costs associated to the conduction of the annual meetings (travel reimbursements and material costs) need to be reimbursed.

The '**Coordinating Council of Katon-Karagay BR'** (see 2.5.1) and '**Public Council of Katunskiy BR'** (see 2.5.2) are devoted to discuss and recommend on BR activities in either country and to plan and implement joint TBR work. They ensure a broad involvement of relevant stakeholders in planning, decision making and implementation.

Responsibility for the management of the TBR work is shared by the two **directors of the protected area administrations** – in charge of the core zone and (parts of) the buffer zone, and by the **heads of the municipal district administrations** – in charge of the transition zones.

Two technical coordinators are assigned to perform TBR related work. They are responsible to stimulate and implement activities supporting the ten strategies as described. Ideally, with the designation of the Great Altay TBR two new full-time positions (one in each BR) are set up.

[17] The Joint Commission was formed in the year 2013 including members of relevant national and regional authorities of the Republic of Kazakhstan and the Russian Federation, WWF Russia and the Russian Committee of the UNESCO MAB-Programme. The first Commission meeting took place on 27 November 2013 in Manzherok (Altai Republic) with participation of various invited guests, the second meeting on 24 November 2014 in Ust-Kamenogorsk (Republic of Kazakhstan). So far, the joint commission focused on the implementation of joint activities in the field of territory protection, environmental education, research, monitoring, sustainable nature use and eco-tourism between the State Nature Biosphere Zapovednik Katunskiy and the Katon-Karagay State Nature Park.

Figure 30: Key features of the Great Altay TBR institutional structures

4.3 Operative planning

4.3.1 Planning matrix

The following TBR planning matrix provides an overview of the overarching conservation and development goals and the overall objectives to be achieved in a timeframe of 20 years:

Table 27: Planning matrix of the Great Altay TBR - Conservation Goal & Overall Objectives

Conservation Goal & Overall Objectives	Indicators	Source of verification	Assumption
***Overarching conservation and development goal**:* By 2040, functional and resilient ecosystems of the of the Great Altay Mountain support the typical species diversity by providing continuous and viable habitats connected via vast corridors for flagship species such as the snow leopard. They do also guarantee the provision and maintenance of a high variety of ecosystem services, which in turn significantly contribute to the wellbeing of the local communities.	*Conservation indicators:* - Glaciers mass dynamics - Connectivity - Continuous vegetation cover - River discharge dynamics - Species composition - Vertical mountain zoning - Viable population size - Water quality - Woody biomass	- Report on monitoring & evaluation	- Peace and stability in the Republic of Kazakhstan and the Russian Federation - Successful designation of the Great Altay TBR
	Development indicators: - Level of satisfaction among locals - Variety of ecosystem services - Diverse income opportunities - Humans' physical and mental health - Access to information, freedom, choice - Security through disaster	- Survey on household food security and satisfaction of household members	

Conservation Goal & Overall Objectives	Indicators	Source of verification	Assumption
	prevention		
Overall objectives: The Great Altay TBR is a model for sustainable development of border mountain areas. It provides the general framework for action in the transboundary context: **Institutional mechanism and legal frame:** - Institutional and legal foundation of the Great Altay TBR and framework for the transboundary strategies is provided, which apply inside and reach beyond the transboundary biosphere reserve area; **Conservation function:** - Natural and cultural diversity of the Great Altay TBR as well as its resources are studied and conserved in a transboundary context; **Development function:** - An economic development is fostered, which is socio-culturally and ecologically sustainable. Cultural heritage is safeguarded and the identity of the Altai people is strengthened; **Logistic support function:** - Cross-border cooperation is promoted by using the TBR for exchange of scientific information, joint education and training programs as well as raising public awareness and monitoring in a participatory and adaptive management approach.	- Amount of TBR projects/ activities funded by state or external budgets; - Amount of successful negation for improved frame conditions; - Reduced environmental footprints of locals (and tourists); - Secured human wellbeing among local population living within the TBR; - Level of awareness among the population about the TBR, its vision and goals; - Amount of stakeholder (groups) actively participating in TBR planning processes and implementation of activities	- Approvals by state committees and third parties to fund TBR activities; - Adjusted agreement and relevant laws; - TBR activity & monitoring report, minutes of annual board meetings; - Survey on household food security and satisfaction of household members (or stakeholder groups); - Official (statistical) data on socio-economic situation; - Publications; - Media reporting about events	- Consent of the governments of the Republic of Kazakhstan and the Russian Federation to extend the objectives of the Inter-governmental Agreement on the Establishment of the Transboundary Reserve “Altai” and Joint Action Plan

The following TBR planning matrix provides the intermediate objectives of the strategies of the institutional foundation and legal framework including their sub-strategies to be achieved in a short-term timeframe of five years:

Table 28: Planning matrix of the Great Altay TBR - Institutional foundation and legal framework

Institutional foundation and legal framework	Indicators	Source of verification	Assumption
Intermediate objectives - Strategy 1 (S 1): • From 2017 onwards, key stakeholders join forces in the annual meeting of the Great Altay TBR. The members of the TBR board and two coordinators for operational TBR work are nominated. Experts and stakeholders for the first Task Groups are appointed. • By 2020, the governments of both countries synchronize the Agreement's objectives and Joint Action Plan with the present management plan. At the same time annual operational costs of the TBR work are taken into account of the Katon-Karagay BR and Katunskiy BR (Katon-Karagay SNP and Katunskiy SNBZ) budgets. • By 2020, TBR board members and coordinators participated in a fundraising training and worked out a fundraising plan for specific projects/activities related to conservation and development strategies. At least two project applications are addressed to external donors.	- Regular (at least annual) TBR meetings; - Establishment of TBR board and assignment of two coordinators; - Establishment of Task Groups and functioning internal communication; - Intergovernmental Agreement & both national BRs/protected areas budgets; - Fundraising training and respective fundraising concept; - Number of project applications addressed to external donors	- Minutes/Resolution of the annual meeting; - Adjusted agreement and relevant laws; - New job agreements and (revised) Terms of References; - Report on fundraising training and respective fundraising concept	- Consent of the governments of the Republic of Kazakhstan and the Russian Federation to extend the objectives of the Inter-governmental Agreement on the Establishment of the Transboundary Reserve "Altai" and Joint Action Plan incl. necessary financial resources for operational costs of TBR work; - Common understanding and willingness of BRs/protected areas and stakeholders to strengthen bilateral cooperation and to join forces for the TBR vision
Intermediate objectives - Strategy 2 (S 2): • By 2018, the joint Task Group 'Monitoring on outcome and impact levels' has developed indicators of the impacts and outcomes of the Great Altay TBR strategies, the overarching conservation and development goal of the Great Altay TBR as well as of the key ecological attributes. • By 2020, the joint Task Group 'Monitoring on outcome and impact levels' has developed intervention and revision points for an adaptive management of the Great Altay TBR strategies in case of the beginning of negative impacts or perverse incentives of Great Altay TBR strategies. It has also developed an exit strategy for an adaptive management of the Great Altay TBR strategies in case a threat is imminent and increasing. • By 2021, the joint Task Group 'Monitoring on outcome and impact	- Indicators of the Great Altay TBR strategies impacts; - Indicators of the Great Altay TBR strategies outcomes; - Indicators of the overall conservation goal; - Thresholds of impact and outcome levels of the Great Altay TBR strategies for intervention and revision points; - Exit strategy formulation.	- TBR strategies monitoring and evaluation report; - Minutes of annual board meetings; - Reduced MARISCO exercises; - 'State of Conservation' Report	

Institutional foundation and legal framework	Indicators	Source of verification	Assumption
levels' has developed a monitoring plan to assess the impacts and outcomes of the Great Altay TBR strategies. • From 2021 onwards, besides meeting regularly, the joint Task Group 'Monitoring on outcome and impact levels' conducts a reduced MARISCO exercise in time intervals of three years to assess the impacts and outcomes of the Great Altay TBR strategies. The exercise includes ongoing adaptation of the Great Altay TBR strategies when necessary to ensure effectiveness of the transboundary strategies.			
Intermediate objectives - Strategy 3 (S 3): • By 2020, the governments of both the Republic of Kazakhstan and the Russian Federation negotiate on a legislation that incorporates the protected area status 'biosphere reserve' as recommended by the UNESCO MAB-Programme. • By 2020, the exchange of data and documents between the two BRs is facilitated. • By 2025, the governments of both the Republic of Kazakhstan and the Russian Federation agree on a legislation that incorporates the protected area status 'biosphere reserve' as recommended by the UNESCO MAB-Programme. The adjusted law provides BR administrations with respective legal instruments, staffing and financial resources required for national and transboundary BR work. • By 2025, the governments of both the Republic of Kazakhstan and the Russian Federation agree on a seasonal opening of one cross-border trail on the territory of the TBR. Local people have the opportunity to apply for a two-year permit for local border traffic. Local tourist companies gain the opportunity to apply for a permit that allows cross-border tours for registered tourist groups.	- Legal instruments, staffing and financial recourses of national/transboundary BR(s); - Amount of (high quality) documents/ data available at joint data base; - Founding of joint data centre; - Amount of successful negotiation for improved framework conditions; - Amount of TBR border traffic.	- Relevant legislations that include BR status; - TBR border regime and relevant legislation;	
Strategies/Sub-strategies - Strategy 1 (S 1): **S 1 - 'Establishment of a coordinating structure and management mechanisms for the TBR'** S 1.1 Establish and foster Great Altay TBR board meetings as the governing body of the cooperation S 1.2 Safeguard the Intergovernmental Agreement's objectives and the Joint Action Plan			***Main actors:*** - TBR board & coordinators; - Stakeholder (groups); - Task Group

Institutional foundation and legal framework	Indicators	Source of verification	Assumption
S 1.3 Monitor and evaluate the effectiveness of activities under the Joint Action Plan S 1.4 Adjustment (where necessary) of the Inter-governmental Agreement S 1.5 Assist to secure adequate funding for TBR activities S 1.6 Form specialized Expert/Network Groups and joint Task Groups S 1.7 Establish internal communication channels S 1.8 Establish an adaptive management S 1.9 Develop participatory management mechanisms with key stakeholders			'Institutional Foundation'.
Strategies/Sub-strategies - Strategy 2 (S 2): **S 2 - 'Monitoring on outcome and impact levels of the TBR strategies'** S 2.1 Develop a monitoring plan of the strategies and their corresponding objectives/goals S 2.2 Develop intervention and revision points for an adaptive management of the TBR S 2.3 Develop emergency intervention points as exit strategy in case increasing threat is imminent			***Main actors:*** - Task Group 'Monitoring on Outcome and Impact Levels'
Strategies/Sub-strategies - Strategy 3 (S 3): **S 3 - 'Strengthening transboundary cooperation and management and enable and ease the transboundary exchange of documents and data'** S 3.1 Review the national legal frameworks for the TBR, national BRs and border regimes. Develop the recommendations for adjustment of the national legal frameworks S 3.2 Establish a framework for data exchange for the TBR S 3.3 Initiate negotiations of opportunities to allow small-scale border traffic for residents of the Katon-Karagay and Ust-Koksa districts S 3.4 Initiate negotiation of re-opening of selected cross-border touristic trails/routes and temporary/seasonal border posts respectively and negotiate for facilitation of border traffic for registered tourist groups and individual tourists			***Main actors:*** - TBR board & coordinators; - Task Group 'Legal Framework'; - National MAB committees; - Local authorities

The following TBR planning matrix provides the intermediate objectives of the strategies of the conservation function including their sub-strategies to be achieved in a short-term timeframe of five years:

Table 29: Planning matrix of the Great Altay TBR - Conservation Function

Conservation Function	Indicators	Source of verification	Assumption
Intermediate objectives - Strategy 4 (S 4): • By 2020, the long-term monitoring policies that were introduced by the joint Task Group 'Biodiversity Conservation' are applied in the Kazakhstani and Russian part of the Great Altay TBR to monitor ecosystems and key species. • From 2020 onwards, the Task Groups 'Climate Change' and 'Biodiversity Conservation' assist to secure jointly for sufficient and efficient resources for cross-border wildfire prevention, containment and early extinguishing of wildfires and develop cross-border cooperation in terms of fighting and preventing wildfires. • By 2021, the vulnerabilities of biodiversity, habitats and ecosystems are assessed as knowledge base for climate change adaptation measures including the assessment of ecosystem services and their economic values. • By 2025, the Task Group 'Biodiversity Conservation' in cooperation with the Katon-Karagay BR and Katunskiy BR administrations as the implementing entities has bundled conservation policies of the various (inter-)national conservation statuses and has developed common or coordinated conservation and restoration policies. • By 2023, the Task Group 'Law Enforcement' has developed joint enforcement of protected area policies. The Task Group 'Biodiversity Conservation' together with the Katon-Karagay BR and Katunskiy BR as the implementing entities are applying successfully regulatory measures on nature protection. • By 2024, the Task Groups 'Climate Change' and 'Biodiversity Conservation', together with the Katon-Karagay BR and Katunskiy BR as the implementing entities, have developed adaptation plans for ecosystems to allow species to migrate.	- Successful implementation of monitoring policies; - Approval and successful implementation of common or coordinated conservation and restoration policies; - Successful implementation of efficient joint wildfire prevention and early extinguishing; - Number of rangers that enforce jointly nature protection; - Amount and quality of assessment reports and adaptation plans	- TBR ecosystems and key species monitoring report and work documentations; - Vulnerability assessment report of biodiversity, habitats and ecosystems; - Assessment report of ecosystem services and their economic values; - Report about commonalities of conservation and restoration policies; - Adaptation plan for species migration; - Media reporting about events and activities	- Common understanding and willingness of BRs/protected areas and stakeholders to strengthen bilateral cooperation and to join forces for the TBR vision - Border regime is eased for transboundary exchange
Strategies/Sub-strategies - Strategy 4 (S 4): **S 4 - 'Coordination of transboundary biodiversity conservation'** S 4.1 Monitor ecosystems and key species			***Main actors:*** - TB board & coordinators; - Protected area

Conservation Function	Indicators	Source of verification	Assumption
S 4.2 Assess vulnerabilities of biodiversity, habitats and ecosystems as knowledge base for climate change adaptation measures S 4.3 Assess ecosystem services including their economic values S 4.4 Bundle conservation policies of the various (inter-)national conservation statuses S 4.5 Develop common or coordinated conservation and restoration policies S 4.6 Develop coordination of regulatory measures on nature protection S 4.7 Develop adaptation plans for species migration S 4.8 Develop cross-border cooperation in terms of fighting and preventing wildfires S 4.9 Coordinate joint enforcement of protected areas policies			research departments; - Task Group 'Biodiversity Conservation'; - Task Group 'Climate Change'; - Task Group 'Law Enforcement'

The following TBR planning matrix provides the intermediate objectives of the strategies of the development function including their sub-strategies to be achieved in a short-term timeframe of five years:

Table 30: Planning matrix of the Great Altay TBR - Development Function

Development Function	Indicators	Source of verification	Assumption
Intermediate objectives - Strategy 5 (S 5): • From 2020 on, at least one festival is promoted annually in the Kazakhstani part and one in the Russian part of the Great Altay TBR. A delegation of at least ten stakeholders of cultural communities/institutions/NGOs and at least 20 entrepreneurs (farmers/producers/merchants) participate in their neighbour's event. • By 2023, at least ten representatives of the Great Altay TBR of at least five active interest groups take part in exchange visits to their peers in the neighbouring country.	- Number of joint cultural events and number of stakeholders, entrepreneurs and locals participating; - Number of interest groups and active members participating in exchange visits;	- TBR work documentations; - Promotion material about TBR labelled products; - Media reporting about events and activities.	- Absence of human induced conflicts or natural disasters; - Local authorities join and support cultural exchange; - Border regime is eased for transboundary exchange;
• By 2025, at least 20 regional products, which received the brand 'Made in Great Altay TBR' are available for sale in the BR info centers, touristic complexes and local shops. The new cross-border market chains contribute to 20% increase of revenues for TBR branded products.	- Number and quality of labelled regional products		- Offered events meet the interest of local population

Development Function	Indicators	Source of verification	Assumption
Intermediate objectives - Strategy 6 (S 6): • By 2020, research on household food security (baseline-study) is conducted and current strategies of income generation are monitored. Best practices feed into the development of (new) strategies for alternative job opportunities in at least five main economic domains. • By 2021, at least three pilot demonstration projects have been identified for each, the Kazakhstani and the Russian part of the Great Altay TBR. Funding for implementing the proposed demonstration projects and associated promotion activities is secured jointly. • By 2025, at least six pilot demonstration projects are successfully implemented. At least 20 promoters took part in two exchange visits. A touring exhibition has been presented in at least six locations (three in each country). Several hundred local inhabitants gained better knowledge on sustainable economic practices and alternative income opportunities.	- Approval and successful implementation of pilot demonstration projects; - Number of promoters participating in exchange visits; Number of locals reached by touring exhibitions; - Employment, new market chains and increased income generated through (alternative/new) economic activities	- Baseline study on household food security; - TBR monitoring report and work documentation; - Official (statistical) data on socio-economic situation; - Post project surveys and income analysis.	- Border regime is eased for transboundary exchange; - Offered products and services meet the interest of consumers
Intermediate objectives - Strategy 7 (S 7): • By 2021, a feasibility study for the development of sustainable cross-border eco-cultural tourism is conducted. Its results are discussed at the annual TBR board meeting and lead to the development and implementation of a joint sustainable eco-cultural tourism project. • By 2025, successful implementation of the joint sustainable eco-cultural tourism project leads to a (transboundary) tourism network, which is attracting and serving rising numbers of tourists by taking the carrying capacity of the Great Altay TBR region into account. • By 2025, new jobs in the tourism sector have been created and direct revenues among local tourism service providers have risen. Local farmers, producers and craftsmen benefit from new local and regional market chains.	- Approval and successful launching of joint tourism project; - (transboundary) tourism network attracting and serving rising numbers of tourists; - Employment, new market chains and increased income related to eco-tourism development	- Tourism feasibility study and project proposal; - TBR monitoring report and work documentation; - Official data on tourism arrivals/ overnight stays; - Post project surveys and income analysis.	- Border regime is eased for transboundary tourism; - Offered services meet the interest (and means) of the targeted tourists

Development Function	Indicators	Source of verification	Assumption
Strategies/Sub-strategies - Strategy 5 (S 5): **S 5 - 'Promotion of transboundary understanding and cultural exchange'** S 5.1 Promote participation of local communities in the TBR activities, including local NGOs S 5.2 Promote joint cultural events and foster cooperation on cultural and historical heritage preservation S 5.3 Organize regional fairs to promote organic products S 5.4 Promote transboundary partnership among various interest groups			***Main actors:*** - TBR board & coordinators; - Task Group 'Cultural and Historical Heritage'; - Task Group 'Regional Products and Labelling'; - Local NGOs
Strategies/Sub-strategies - Strategy 6 (S 6): **S 6 - 'Generation of alternative job opportunities and income'** S 6.1 Develop common strategies for alternative job opportunities based on research and monitoring S 6.2 Identify and mitigate possible adverse incentives through the promotion of viable and sustainable alternatives S 6.3 Promote best practices and implementation of demonstration projects for sustainable resource management on private and communal level			***Main actors:*** - TBR board & coordinators, - Task Group 'Socio-Economic Development' incl. public sector (e.g. forestry, water supply, waste management) and private entrepreneurs (e.g. farmers, producers); - Task Group 'Regional Products and Labelling'
Strategies/Sub-strategies - Strategy 7 (S 7): **S 7 - 'Development of regulated eco-cultural tourism'** S 7.1 Conduct a feasibility study for the development of cross-border tourism			***Main actors:*** - TBR board & coordinators,

Development Function	Indicators	Source of verification	Assumption
S 7.2 Negotiate framework conditions that are a prerequisite for enabling cross-border tourism S 7.3 Elaborate transboundary tourism projects and secure respective funding			- Task Group 'Eco-Cultural Tourism Development'.

The following TBR planning matrix provides the intermediate objectives of the strategies of the logistic support function including their sub-strategies to be achieved in a short-term timeframe of five years:

Table 31: Planning matrix of the Great Altay TBR - Logistic Support Function

Logistic Support Function	Indicators	Source of verification	Assumption
Intermediate objectives - Strategy 8 (S 8): • By 2020, gaps of scientific knowledge are identified and fed into a catalogue of the most important research topics. Thereafter, at least two (new) joint research programmes are initiated. • By 2021, stakeholders of both countries involved, which are concerned with collecting and handling of data, agree on common formats and indicators. Furthermore, they agree on a detailed concept of the joint data centre.	- Number of joint cultural events and number of stakeholders, entrepreneurs and locals participating; - Founding of joint data centre; - Number of students/scientists benefiting from internships, study tours or advise;	- TBR work documentations; - Documentation of joint data centre; - Documentation/minutes of scientific council; - List of publications and presentations of research results incl. 'State of Conservation Report'	- Local authorities, partnering universities and research institutions and donors join and support the activities
• From 2021 on, at least for students/scientists attended a three-month internship related to TBR work at Katon-Karagay BR and Katunskiy BR. At least four student/scientist groups conducted a study tour in partnership with the TBR coordinators. Master thesis and/or PhD thesis topics related to important TBR research topics are supported. • From 2025 on, results of common research programmes as well as the 'State of Conservation Report' are published on the TBR website. Additionally, the results are presented on scientific conferences and/or webinars.	- Founding of scientific council		

Logistic Support Function	Indicators	Source of verification	Assumption
Intermediate objectives - Strategy 9 (S 9): • From 2025 onwards, TBR stakeholders regularly participate in joint trainings and workshops. General knowledge on how to manage a TBR and technical skills related to specific tasks (supporting all other strategies) are build. • By 2021, one school from Katon-Karagay BR and one from Katunskiy BR participate in a bilateral youth exchange. All school pupils within the TBR are invited to participate in a joint competition. Pupil's results are exhibited at joint cultural festivals. • From 2023 onwards, private and communal stakeholders benefit from training programmes offered for five main economic domains. Exchange visits to five pilot demonstration projects add to the training's portfolio.	- Amount and quality of TBR team trainings and workshops; number of stakeholders participated; - Amount and quality of school exchanges; number of pupil participated; - Amount of conducted competitions and number of competition entries; - Number and quality of training programmes and exchange visits	- TBR work documentation; - Evaluation of trainings and workshops, school exchanges, and exchange visits; - Feedback sheets of respective participants	- Local authorities and school directors join and support the initiative
Intermediate objectives - Strategy 10 (S 10): • From 2020 on, local products, which meet sustainability and quality criteria, receive a joint label. Producers are benefitting from new market chains and higher revenues, while the identity of locals with the TBR is increasing. • From 2022 on, the common public relation strategy feeds into various online (website) and offline (flyer, booklet, newsletter, etc.) communication channels. High level of awareness and recognition of the Great Altay TBR is ensured by using a joint logo and corporate design. • By 2025, the visibility of the TBR has increased significantly.	- Common logo & cooperate design, joint interactive internet site; information material, joint newsletter; - Regular conduction of exhibits and events; number of visitors reached	- TBR work documentation; - Respective materials; - Media reporting about the TBR.	- Local authorities and school directors join and support the initiative
Strategies/Sub-strategies - Strategy 8 (S 8): **S 8 - 'Scientific cooperation in the transboundary biosphere reserve and beyond'** S 8.1 Strengthen scientific partnerships through joint research programmes S 8.2 Develop common data collection formats, indicators, monitoring and evaluation methods S 8.3 Prepare a concept for the establishment of a joint data centre S 8.4 Provide research opportunities to scientists and students of partnering universities and academic institutions of each country			***Main actors:*** - TBR board & coordinators; - Protected area research departments, - Task Group 'Bilateral Data Handling';

Logistic Support Function	Indicators	Source of verification	Assumption
S 8.5 Publicly share selected scientific information S 8.6 Create a scientific consortium with universities and institutes			- Task Group 'Environmental Education'; - Scientific institutions; - Expert groups.
Strategies/Sub-strategies - Strategy 9 (S 9): **S 9 - 'Increase of capacities related to education and training'** S 9.1 Build capacities of the TBR team S 9.2 Establish cooperation with schools S 9.3 Launch of participatory training programmes for various stakeholder groups			***Main actors:*** - TBR board & coordinators; - Task Group 'Environmental Education'; - Schools; - Youth organisations, - Task Group 'Socio-economic Development'; - Private sector stakeholders; - Public sector stakeholders.
Strategies/Sub-strategies - Strategy 10 (S 10): **S 10 - 'Development of external communication channels and public relations'** S 10.1 Develop a common public relations strategy S 10.2 Develop and promote a common logo and corporate design for the TBR S 10.3 Develop and promote a joint label for regional products and services S 10.4 Set up, promote, support and regularly update a common interactive internet site S 10.5 Produce information material S 10.6 Organise exhibits and events around the TBR S 10.7 Develop and publish a joint newsletter for the Great Altay TBR			***Main actors:*** - TBR coordinators; - BR/protected area communication departments; - Task Group 'Regional Products/Labelling'

4.3.2 Time schedule

The following table provides the implementation schedule of the Great Altay TBR strategies with their respective sub-strategies for the next short-term timeframe of five years:

Table 32: Planning matrix of the Great Altay TBR

Strategy – Sub-strategy	2016				2017				2018				2019				2020				2021				2022				2023				2024				2025			
Strategy 1 - 'Establishment of a coordinating structure and management mechanisms for the TBR'																																								
S 1.1 Establish and foster Great Altay TBR board meetings as the governing body of the cooperation																																								
S 1.2 Safeguard the Intergovernmental Agreement's objectives and the Joint Action Plan																																								
S 1.3 Monitor and evaluate the effectiveness of activities under the Joint Action Plan																																								
S 1.4 Adjustment (where necessary) of the Inter-governmental Agreement																																								
S 1.5 Assist to secure adequate funding for TBR activities																																								
S 1.6 Form specialized Expert/Network Groups and joint Task Groups																																								
S 1.7 Establish internal communication channels																																								
S 1.8 Establish an adaptive management																																								
S 1.9 Develop participatory management mechanisms with key stakeholders																																								
Strategy 2 - 'Monitoring on outcome and impact levels in the TBR'																																								
S 2.1 Develop a monitoring plan of the																																								

Strategy – Sub-strategy	2016				2017				2018				2019				2020				2021				2022				2023				2024				2025			
strategies and their corresponding objectives/goals																																									
S 2.2 Develop intervention and revision points for an adaptive management of the TBR																																								
S 2.3 Develop emergency intervention points as exit strategy in case increasing threat is imminent																																								
Strategy 3 - 'Strengthening transboundary cooperation & management and enable and ease the transboundary exchange of documents and data'																																								
S 3.1 Review the national legal frameworks for the TBR, national BRs and border regimes. Develop the recommendations for adjustment of the national legal frameworks																																								
S 3.2 Establish a framework for data exchange for the TBR																																								
S 3.3 Initiate negotiations of opportunities to allow small-scale border traffic for residents of the Katon-Karagay and Ust-Koksa districts																																								
S 3.4 Initiate negotiation of re-opening of selected cross-border touristic trails/routes and temporary/seasonal border posts respectively and negotiate for facilitation of border traffic for registered tourist groups and individual tourists																																								
Strategy 4 - 'Coordination of transboundary biodiversity conservation'																																								
S 4.1 Monitor ecosystems and key species																																								
S 4.2 Assess vulnerabilities of biodiversity, habitats and ecosystems as knowledge base																																								

Strategy – Sub-strategy	2016				2017				2018				2019				2020				2021				2022				2023				2024				2025			
for climate change adaptation measures																																								
S 4.3 Assess ecosystem services including their economic values																																								
S 4.4 Bundle conservation policies of the various (inter-)national conservation statuses																																								
S 4.5 Develop common or coordinated conservation and restoration policies																																								
S 4.6 Develop coordination of regulatory measures on nature protection																																								
S 4.7 Develop adaptation plans for species migration																																								
S 4.8 Develop cross-border cooperation in terms of fighting and preventing wildfires																																								
S 4.9 Coordinate joint enforcement of protected areas policies																																								
Strategy 5 - 'Promotion of transboundary understanding and cultural exchange'																																								
S 5.1 Promote participation of local communities in the TBR activities, including local NGOs																																								
S 5.2 Promote joint cultural events and foster cooperation on cultural and historical heritage preservation																																								
S 5.3 Organize regional fairs to promote organic products																																								
S 5.4 Promote transboundary partnership among various interest groups																																								

Strategy 6 - 'Generation of alternative job opportunities and income'
S 6.1 Develop common strategies for alternative job opportunities based on research and monitoring
S 6.2 Identify and mitigate possible adverse incentives through the promotion of viable and sustainable alternatives
S 6.3 Promote best practices and implementation of demonstration projects for sustainable resource management on private and communal level
Strategy 7 - 'Development of regulated eco-cultural tourism'
S 7.1 Conduct a feasibility study for the development of cross-border tourism
S 7.2 Negotiate framework conditions that are a prerequisite for enabling cross-border tourism
S 7.3 Elaborate transboundary tourism projects and secure respective funding
Strategy 8 - 'Scientific cooperation in the transboundary biosphere reserve and beyond'
S 8.1 Strengthen scientific partnerships through joint research programmes
S 8.2 Develop common data collection formats, indicators, monitoring and evaluation methods
S 8.3 Prepare a concept for the establishment of a joint data centre
S 8.4 Provide research opportunities to

Strategy – Sub-strategy	2016				2017				2018				2019				2020				2021				2022				2023				2024				2025			
scientists and students of partnering universities and academic institutions of each country																																								
S 8.5 Publicly share selected scientific information																																								
S 8.6 Create a scientific consortium																																								
Strategy 9 - 'Increase of capacities related to education and training'																																								
S 9.1 Build capacities of TBR team																																								
S 9.2 Establish cooperation with schools																																								
S 9.3 Launch of participatory training programmes for various stakeholder groups																																								
Strategy 10 - 'Development of external communication channels and public relations'																																								
S 10.1 Develop a common public relations strategy																																								
S 10.2 Develop and promote a common logo and corporate design for the TBR																																								
S 10.3 Develop and promote a joint label for regional products and services																																								
S 10.4 Set up, promote, support and regularly update a common interactive internet site																																								
S 10.5 Produce information material																																								
S 10.6 Organise exhibits and events around the TBR																																								
S 10.7 Develop and publish a joint newsletter for the Great Altay TBR																																								

The following diagram depicts the long-term perspective of the strategies of the Great Altay TBR implementation:

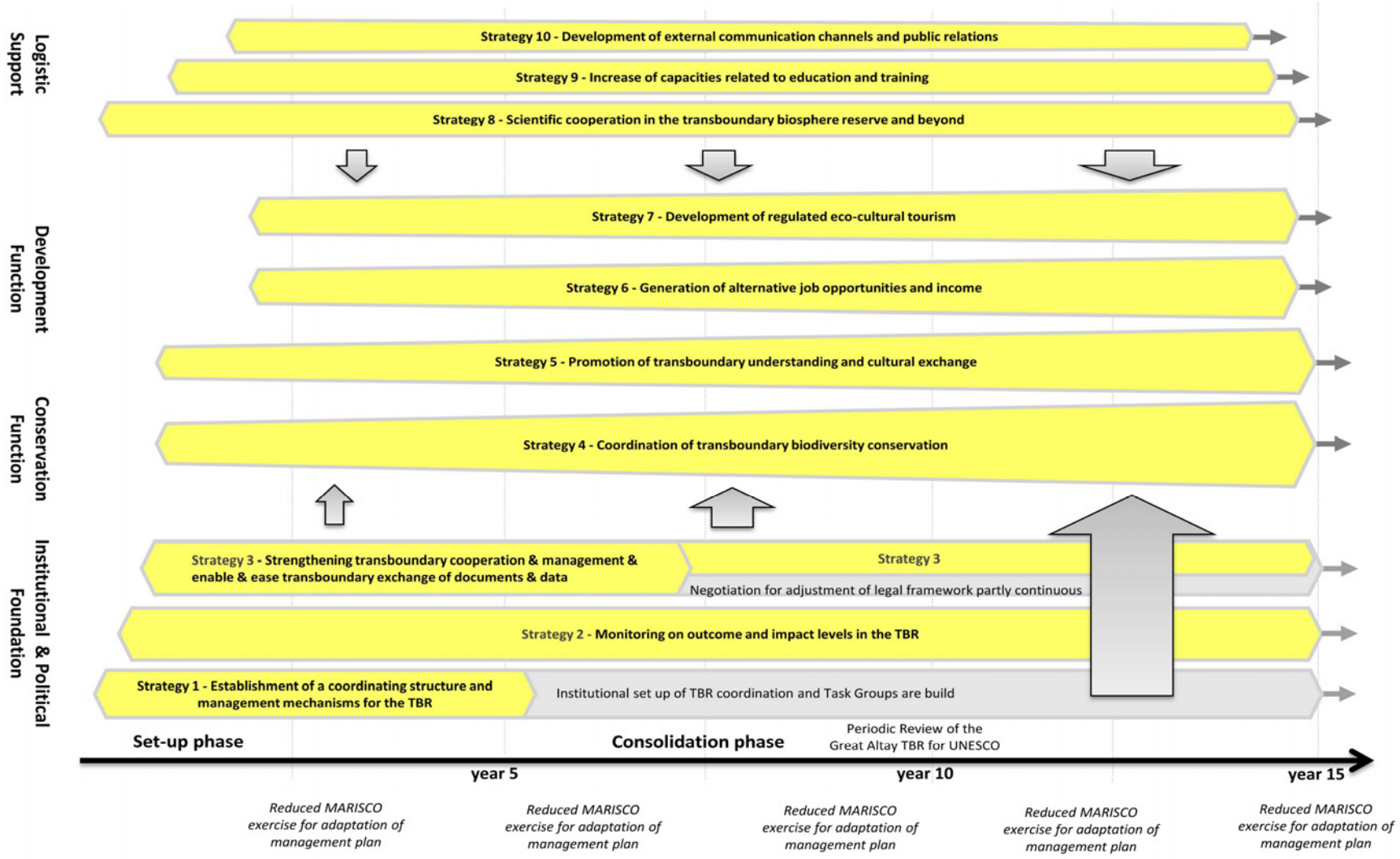


Figure 31: Long-term perspective of the Great Altay TBR management

4.4 Financial matters

4.4.1 Operational costs of the coordinating structure

The following facts and assumptions feed into the calculation of annual operational costs:

Personnel, working places incl. related equipment and consumables

Participation in the **'Great Altay TBR board',** '**Public Council of Katunskiy BR'** and '**Coordinating Council of Katon-Karagay BR'** is voluntarily and not paid.

The two **directors of Katon-Karagay State National Park and State Nature Biosphere Zapovednik Katunskiy administrations** and the **heads of the municipal district administrations of Katon-Karagay and Ust-Koksa** are formally in charge for the management of the TBR work within their respective area of responsibility. Their efforts are included into their scope of responsibilities and taken into the current state budgets provided by the respective governmental structures.

The assessment of the current situation and development of strategies emphasises the necessity that two **technical coordinators** (one per country) should be assigned to perform TBR related work. Ideally, two new full-time positions are set-up. Respective salaries and coverage of working equipment should be incorporated into state funding through the national state agencies devoted to protected area management (given an adjustment of legislations of the BR/TBR status).

Annually, about four **students/scientists** are invited to conduct a 3-month internship and assist with TBR related work. The Katon-Karagay BR and Katunskiy BR administrations (Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy, respectively)[18] provide thematic support and a working space. Ideally, each student/scientists receives a basic reimbursement of expenditures.

Monitoring on the conservation status is conducted by the respective **monitoring departments** of the Katon-Karagay BR and Katunskiy BR administrations. In addition, surveys on socio-economic development (household food security and satisfaction) and other required studies should be made by **external consultants**.

Financial administration of the regular operation of TBR work is ensured through the **administration departments** of Katon-Karagay BR and Katunskiy BR administrations. In case of common-donor-projects financial administration is done by the external recipient of the project funds and included into the projects overhead costs.

It is assumed that any other **premises, work equipment and consumables** are provided without extra charges by the Katon-Karagay BR and Katunskiy BR administrations (Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy, respectively). If possible, contributions are acquired through donor projects.

Meetings and travelling

Costs associated to the **conduction of bilateral meetings** (travel reimbursements and material costs) need to be covered. Ideally, the following bilateral meetings, trainings and/or exchanges take place on a regular base.

[18] see footnote 12

Table 33: Meetings and travelling costs for the conduction of bilateral meetings

	Participants	Frequency	Lump sum
Meeting of TBR board	5 members per country	Annually, rotating	2,500 Euro per year
Exchange on management and working level	2 PA directors, 2 district heads, 2 coordinators	Annually, rotating	1,500 Euro per year
Training on fundraising	2 coordinators, 1 consultant	Annually, rotating	2,000 Euro per year
Training and exchange of staff	5 staff per country, 1 trainer	Annually, rotating	3,500 Euro per year
Meetings of about 4 Task Groups	5 members per country, 2 external experts	Annually, rotating	14,000 Euro per year

Ideally, the organizational costs of these meetings are entirely incorporated in governmental funding. However, partial coverage through external funds might be possible, if meetings are associated to common-donor financed projects.

Internal and external communication

- **Internal communication** will be done predominantly through electronic mail and phone. A lump sum of 200 Euro/annually per coordinator should be taken into account.
- Regular maintenance of **common interactive internet side**, including internal sub-sides.
- **Public Relation work:** For marketing and promotion purposes a minimum sum of 200 Euro up to 500 Euro per year should be available. This amount has to cover amongst others: advertisements, maintenance of a web-site and organization of competitions.
- The **publication of a newsletter** (once a year) has been calculated separately because printing costs (300 Euro per edition) are relatively high in the Republic of Kazakhstan and the Russian Federation.

Table 34: Annual operating cost forecast for the TBR coordination and logistic support work

Position	Explanations	Share of Kazakhstani part	Share of Russian part
TBR board membership and TBR management	• Katon-Karagay BR and Katunskiy BR administrations (Katon-Karagay State Nature Park and State Nature Biosphere Zapovednik Katunskiy, respectively); • District heads	To be covered by current budgets	To be covered by current budgets
Salaries of technical coordinators	• New full-time job, 800 Euro per month	9,600.00	9,600.00
Salaries of support staff	• Science education and monitoring departments; • Finances & administration	To be covered by current budgets	To be covered by current budgets
Support of interns	• Four students / scientists per year with 200 Euro per month	2,400.00	2,400.00

Other overhead costs	• Working places; • Equipment; • Consumables	To be covered by current budgets	To be covered by current budgets
Meetings and Travelling	• TBR board meeting; • Management exchange; • Coordinators meetings; • About four Task Group meetings (see above)	11,250.00	11,250.00
Communication	• Lump sum for internal communication; • TBR internet site; • PR work; • Newsletter	2,000.00	2,000.00
Total of operational costs		**25,250.00**	**25,250.00**

The calculation in table 34 outlines that in any case the Great Altay TBR - like many other TBRs worldwide - depends on the current budgets of the national protected areas. With the designation as TBR it is desirable to require additional funding from state budgets to take over the operating costs related to the institutional set-up and logistic support function. Above estimation on operational cost amounts to a share of rounded 25,000.00 Euro for both sides each.

In order to implement specific activities as described under the Conservation (Strategy 4) and Development Function (Strategy 5, 6 and 7) additional funding is required by various external donors. Partially, operational cost might be also covered by those externally funded projects, which include overhead expenditures. However, it can be assumed that in case of common-donor-projects the work load will increase proportionally also.

4.4.2 Potential donors and fundraising concept

The following table provides an overview of measures and estimated costs that most probably need to be considered under the frame of fundraising activities.

Table 35: Estimated costs for the implementation of the TBR strategies and sub-strategies

Measures	Amount	Kazakhstani part - minimum costs in Euro	Russian part - maximum costs in Euro	Potential donor
Survey on socio-economic development (household food security and satisfaction) (S 1, S 2, S 6)		5,000.00	5,000.00	To be determined (ideally through state budget)
Assessment reports and adaptation plans (S 4)		5,000.00	5,000.00	To be determined (ideally through state budget, or WWF, GEF/UNDP, BfN)
Organization of joint cultural event/festival, incl. exchange of 10 key stakeholders and 20 entrepreneurs in	1 time annually rotating	50,000.00	50,000.00	To be determined (e.g. ideally through state

Measures	Amount	Kazakhstani part - minimum costs in Euro	Russian part - maximum costs in Euro	Potential donor
parallel to the festival (S 5, S 9)				budget cultural funds)
Bilateral exchange visits of 10 representatives of most **active interest groups** (S 5, S 9)	1 time annually, rotating	5,000.00	5,000.00	To be determined
Brand & label "Made in Great Altay TBR": development of label criteria, information campaign, regional fair in parallel with festival, new market chains (S 5, S 10)	Bilateral project	10,000.00	10,000.00	To be determined (e.g. GEF/UNDP, WWF)
Support of **demonstration plots for sustainable economic practices,** bilateral exchange of information incl. a touring exhibition (S 6)	Bilateral project	50,000.00	open	To be determined (e.g. GEF/UNDP, WWF)
Feasibility study on cross-border tourism development (S 7)	1 external consultant	10,000.00	10,000.00	To be determined
Cross-border tourism development project, given a positive result of feasibility study in facilitated border conditions	International project	200,000.00	open	To be determined
Scientific partnerships through joint research	Several research projects	50,000.00	50,000.00	To be determined
Conceptualization of a common data center (S 8)	1 external consultant	10,000.00	10,000.00	To be determined
Publication of common 'State of Conservation Report' (S 8, S 2)		500.00	2,000.00	To be determined
Publications of other common research results (S 8)	Various	10,000.00	10,000.00	To be determined
Exchange of teachers and school pupil (e.g. 5 adults, 25 kids)	1 time annually , rotating	7,500.00	7,500.00	To be determined
Development of common public relation strategy, incl. common logo/cooperate design	1 external consultant	5,000.00	5,000.00	To be determined (ideally through state budget)

As mentioned in the table above there are a few international donors active in the Altai region. They might become a cooperation partner and donor for the implementation of specific strategies or selected activities.

Following paragraphs provide a short profile of the most promising international partners:

The **World Wildlife Fund** (WWF) commenced its conservation activities in the Altai-Sayan Ecoregion (ASER) in 1996 in Mongolia, then in the year 1998 in the Russian Federation (WWF, 2015a). The Altai-Sayan Ecoregion is one of the 35 global priority places of WWF and one of the five transboundary ecoregions that is supported in the framework of the Protected Areas for a Living Planet (PA4LP) project of WWF and the MAVA Foundation. There is a national WWF branch in the Russia Federation, while projects in the Republic of Kazakhstan are implemented through operational staff only. WWF was also involved in the multi-year UNDP projects on biodiversity conservation in the Altai-Sayan Ecoregion and developed the Altai-Sayan Ecoregion Conservation Strategy (WWF, 2012). Furthermore, the head of the Altai-Sayan branch of WWF Russia has been elected as member of the Joint Commission on the implementation of the Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on the establishment of the Transboundary Reserve “Altai” (see 2.5.4).

The **United Nations Development Programme** (UNDP) supports the efforts of the Republic of Kazakhstan and the Russian Federation to preserve globally significant biodiversity. Between 2006 and 2012 two comprehensive, multi-year projects have been implemented through the UNDP in the Kazakhstani and Russian part of the Great Altay TBR: “Conservation and sustainable use of biodiversity in the Russian part of the Altai-Sayan Ecoregion” and “Conservation and sustainable use of biodiversity in the Kazakhstani region of the Altai-Sayan Ecoregion”. Amongst other project results, new protected areas were established, population numbers and status of key animal species were assessed, additional protection measures for rare and endangered animal species were established, management plans for the protected areas were developed, protected area administrations were trained and provided with modern equipment, transboundary cooperation was strengthened and alternative livelihoods for local communities were initiated (Williams & Mogilyk, 2012) (Kasparek, 2011).

On the basis of the **Governmental Agreement between the Russian Federation and Germany on Environmental and Nature Protection** (dated 1992), the **German Federal Ministry for the Environmental, Nature Conservation and Building of Nuclear Safety** (BMUB) represented by the **German Federal Agency for Nature Protection** (BfN) supports various joint activities, projects and conferences, which focus on the elaboration of concepts and measures for the conservation and sustainable use of nature as well as the development of protected areas, mainly in the region of Lake Baikal, the Baltic Sea and the Altai Mountains (Federal Agency for Nature Conservation (BfN), 2012). In the framework of the International Climate Initiative (IKI) the BMUB funded a sub-project of the multi-year UNDP project on biodiversity conservation in the Russian part of the Altai-Sayan Ecoregion. Finally, the development of the present management plan was funded and supported by BMUB/BFN (compare with chapter 1).

5. Coherence[19]

Strategic coherence and compliance with guiding principles

As explained in the previous chapters the Great Altay TBR strategies are coherent with the Seville Strategy, Seville+5 and the Madrid Action Plan.

The establishment of the Great Altay TBR follows the recommendations for TBRs, which were developed by UNESCO in 2002 (UNESCO, 2001), through:

- Both established biosphere reserves, which are Katon-Karagay BR and Katunskiy BR, on each side of the state border before the development of the Great Altay TBR;
- The identification of local and national stakeholders and establishment of a Joint Commission consisting of various those stakeholders to define the basis and identify key issues for cooperation;
- The signing of an official agreement between the governmental authorities of both countries involved regarding the TBR;
- The development of the Great Altay TBR management plan as a plan for cooperation in the future.

Furthermore, the establishment of the Great Altay TBR follows the recommendations for the functioning of TBRs, which were designed by UNESCO in 2002 (UNESCO, 2001) through:

- "The preparation and adoption of a zonation plan for the whole area and implementation of the zonation by strict protection of core areas, delimitation of the buffer zones and coordinated objectives for the transition areas; this implies that the countries concerned have a common understanding of the characteristics of each of the zones, and that similar management measures are in place for each zone;
- The publication of a joint map of the zonation;
- The definition of common objectives and measures, operational planning, time table, and required budget; this should be a demand driven process, based on perceived needs or management requirements. The operational planning takes into account the elements listed under the goals of the Seville Strategy.
- The identification of potential funding sources for the operational planning and joint or simultaneous application for these funds;
- The establishment of a means of communication between the coordinators/managers of the different parts of the TBR, including electronic mail when feasible;
- The efforts towards harmonised management structures on each side".

Coherence among the ten strategies

The Great Altay TBR strategies enable and enhance each other. They are interlinked with each other through various synergies. Each of the strategies contains (essential) key intermediate results that need to be achieved in order to allow a fully functioning TBR with effectively implemented strategies.

Especially the strategies of the institutional foundation and legal framework, which are strategy 1, 2 and 3 are important as foundation and need to be developed and achieved as first step in order to enable the proper implementation and functioning of the other seven strategies. With the implementation of the Great Altay TBR strategies as an add-on overarching strategic layer, framing the existing Katon-Karagay BR and Katunskiy BR strategies the efficiency of the existing BR strategies is enhanced.

[19] The authors of this section are Anja Krause, Judith Kloiber, Raushan Krykbaeva, Alija Gabdullina, Tatjana Yashina & Pierre L. Ibisch

The developed Great Altay TBR strategies have their entry points for implementation especially at institutional and legal contributing factors in order to establish transboundary cooperation and communication and to provide the frame for the transboundary biosphere reserve (see also Annex 5.1 and 5.2 – conceptual model with strategies).

Strategy coherence in relation to the contributing factors

Some contributing factors are beyond the reach of the Great Altay TBR strategies influence like global climate change, global deforestation and change in land ownership. Table 36 illustrates the contributing factors that are not covered by Great Altay TBR strategies. These factors need to be addressed, for instance, on a global scale or on BR level. Most of these contributing factors are rated as not manageable or poorly manageable on the Great Altay TBR level. On the other hand, the strategic relevance (see chapter 2.2.2, box 7) of these contributing factors is medium only, which indicates that their influence in the Great Altay TBR is relatively low.

Strategy coherence in relation to the threats and stresses

Out of the 16 threats that affect the Great Altay TBR ecosystems, the threats that most likely will not be reduced by the Great Altay TBR strategies are *local climate change, retreat of glaciers* and *increase in flood events and magnitude***.** On the other hand, out of the 15 stresses identified of the Great Altay TBR ecosystems the stress that most likely will not be reduced is *dieback of conifers*, which all relate to global climate change.

The Great Altay TBR strategies cannot reduce all threats; especially the mentioned threats caused by global climate change, and stress that result from such threats. Table 37 depicts, which threat will be reduced by which strategy, while table 38 illustrates, which stress will be reduced by which strategy.

Table 36: Contributing factors that are not covered by strategies and their strategic relevance (R_S)

Contributing factor	Group	Sub-group	Kazakhstani part of the TBR			Russian part of the TBR			Combined for the whole TBR		
			R_S	M	K	R_S	M	K	R_S	M	K
Global climate change	Biophysical factors	Biophysical factors	2	4	2	2	**4**	**2**	**2**	**4**	**2**
Greenhouse gas emissions	Biophysical factors	Biophysical factors	2	4	2	2	**4**	**2**	**2**	**4**	**2**
Russian state programme for fishery development	Legal/ political factors	Legal/ political factors	1	4	4	2	**4**	**3**	**2**	**4**	**4**
No organisations for coal delivery	Legal/ political factors	Legal/ political factors	2	3	1	2	**3**	**3**	**2**	**3**	**2**
Global deforestation	Socio-economic factors	Factors related to the use of natural resources	2	4	2	2	**4**	**2**	**2**	**4**	**2**
Unsustainable legal logging	Socio-economic factors	Factors related to the use of natural resources	2	3	2	2	**2**	**2**	**2**	**3**	**2**
Expensive hunting licenses	Socio-economic factors	Factors related to living conditions of local communities	2	3	2	2	**4**	**2**	**2**	**4**	**2**
High market price for coal and firewood	Socio-economic factors	Factors related to living conditions of local communities	2	3	1	2	**3**	**2**	**2**	**3**	**2**
(Market) demand for wild raw non-timber materials, fishing tourism and antlers	Socio-economic factors	Factors related to living conditions of local communities	2	3	2	2	**3**	**2**	**2**	**3**	**2**
Limited number of licenses for the removal of wild animals	Socio-economic factors	Factors related to living conditions of local communities	2	3	2	2	**3**	**2**	**2**	**3**	**2**
High demand for wood and timber	Socio-economic factors	Factors related to living conditions of local communities	2	1	1	2	**2**	**1**	**2**	**1**	**2**
Change in land ownership	Socio-economic factors	Socio-economic factors	2	2	2	2	**4**	**2**	**2**	**3**	**2**
Lack of alternative heating and building materials	Socio-economic factors	Factors related to living conditions of local communities	2	3	2	2	**3**	**2**	**2**	**3**	**2**
Long distances for coal delivery	Spatial factors	Spatial factors	2	3	1	2	**4**	**1**	**2**	**4**	**1**
Difficult access to sites, especially for (legal) wood cutting	Spatial factors	Spatial factors	2	2	1	2	**4**	**1**	**2**	**3**	**1**

Key: R_S = strategic relevance, M = manageability, K = level of knowledge, 1 = low/very manageable/well known, 2 = medium/somewhat manageable/somewhat known, 3 = high/poorly manageable/ not known, but theoretically knowable, 4 = very high/not manageable/not knowable

Table 37: Threats that will be reduced by Great Altay TBR strategies

Threat	Threat reduction result	Group	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	Total number of strategies that influence the threat
Local climate change	Local climate change impacts are reduced	Changes of local climate											**0**
Retreat of glaciers	Impact of glacier retreat is reduced												**0**
Increase in flood events and magnitude	The impact of change in the hydrological regime of streams and rivers is reduced												**0**
Change in the hydrological regime of streams and rivers	Change in the hydrological regime of streams and rivers is reduced	Changes of local climate, anthropogenic changes of the environment				●		●			●		**3**
Water pollution	Water pollution is reduced	Anthropogenic changes of the environment	●	●		●	●	●	●	●	●	●	**9**
Air pollution	Air pollution is reduced								●				**1**
Litter pollution	Litter pollution is reduced		●			●	●		●		●	●	**6**
Fires	Fires are reduced		●	●	●	●	●	●	●	●	●	●	**10**
Linear barriers in the territory	Linear barriers in the territory are avoided		●	●	●	●		●	●	●	●	●	**9**
Introduction of fish species into lakes	Introduction of fish species into lakes is reduced					●		●	●	●	●		**5**
Degradation of habitats along hiking trails	Degradation of habitats along hiking trails is reduced	Unsustainable use of natural resources	●	●	●	●	●	●	●	●	●	●	**10**
Overgrazing	Overgrazing is reduced		●	●	●	●	●	●	●	●	●	●	**10**
Overexploitation of wild raw non-timber materials	Overexploitation of wild raw non-timber materials is reduced		●	●	●	●	●	●	●	●	●	●	**10**
Overexploitation of wild animal species	Overexploitation of wild animal species is reduced		●	●	●	●	●	●	●	●	●	●	**10**
Exploitation of timber species	Exploitation of timber species is reduced		●	●	●	●	●	●	●	●	●		**9**
Pests*	Potential pests are avoided	Biotic changes				●							**1**
	Total number of influences per strategy		**9**	**8**	**7**	**12**	**8**	**10**	**11**	**9**	**11**	**8**	

Key: S = strategy, ● = direct influence, ● = indirect influence, * = potential threat (currently not yet observed)

Table 38: Stresses that will be reduced by Great Altay TBR strategies

Stress	Stress reduction result	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	Total number of strategies that influence the stress
Reduction of freshwater sources	Reduction of freshwater sources is mitigated or reversed						●			●		**2**
Deterioration of the quality of freshwater*	The potential deterioration of the quality of fresh water is avoided	●	●	●	●	●	●	●	●	●	●	**10**
Soil degradation	Soil degradation is reduced	●		●	●	●	●	●	●	●	●	**9**
Shift of tree line up- and downward	Shift of tree line up- and downward is reduced			●	●		●	●		●		**5**
Dieback of conifers	Dieback of conifers is reduced											**0**
Deterioration of the nesting conditions for birds	Nesting conditions for birds are improved				●	●	●	●	●	●	●	**7**
Reduction / fragmentation of plant species habitats*	The potential reduction/fragmentation of plant species habitats is avoided	●	●	●	●	●	●	●	●	●	●	**10**
Reduction / fragmentation of game species habitats	Reduction/fragmentation of game species habitats is mitigated or reversed	●	●	●	●		●		●	●	●	**8**
Migration routes disrupted / disturbed*	The potential disruption/disturbance of migration routes is avoided	●	●	●	●		●	●	●	●	●	**9**
Reduction in the population number of species (except fish)	Reduction in the population number of species (except fish) is mitigated or reversed	●	●		●	●	●	●	●	●	●	**9**
Reduction in the population numbers of fish species	Reduction in the population number of fish species is mitigated or reversed		●		●	●	●	●	●	●	●	**8**
Loss of species*	The potential loss of species is avoided	●	●	●	●	●	●	●	●	●	●	**10**
Change in composition of water fauna*	The potential change in composition of water fauna is avoided				●		●	●	●	●	●	**6**
Changes in composition and age of forest trees	Change in composition and age of forest trees is reduced	●	●		●	●	●	●	●	●	●	**9**
Deterioration of the aesthetic quality of the landscape	Deterioration of the aesthetic quality of the landscape is mitigated or reversed	●					●	●				**3**
	Total number of influences per strategy	**9**	**8**	**7**	**12**	**8**	**14**	**12**	**11**	**13**	**11**	

Key: S = strategy, ● = direct influence, ● = indirect influence, * = potential stress (currently not yet observed)

6. Outlook[20]

General site development

In case of designation and establishment, the Great Altay Transboundary Biosphere Reserve will be the first of its kind in Asia[21]. It will act as a model region for biodiversity and ecosystem conservation in close interlinkage with sustainable development of local communities in the transboundary Altai region, South Siberia.

Following the concept of adaptive management and lifelong learning (see chapter 1.3.1), the management of the Great Altai TBR shall be adjusted and improved according to the monitoring results (see chapter 3.5.2) and according to requirements formulated by UNESCO. For example, amendments to the zonation scheme of the Katon-Karagay BR and, thus, of the TBR may become necessary due to the results of research on the rare and endangered species snow leopard (*Panthera unica)* and Pallas's Cat (*Otocolobus manul*) on the territory of the Katon-Karagay State National Park. Only recently, both species have been recorded in the southeastern TBR territories that are currently included in its buffer zone (Chelyshev, 2015). Further research is necessary to decide whether the current protection regime of the (T)BR buffer zone is sufficient or if an extension of the core zone areas is required.

Photo 39: Heading towards a common future
Photographer: Alexander Artemev

Concerning the Russian part of the TBR, a process is on the way considering the extension of the Katunskiy BR into the adjacent western area, which is designated as part of the Golden Mountains of Altai World Heritage Site to allow for a better protection of the adjacent core zone area of Katon-Karagay BR.

[20] The authors of this section are Anja Wünsch, Anja Krause, Raushan Krykbaeva, Alija Gabdullina, Tatjana Yashina & Pierre Ibisch

[21] According to the UNESCO regions, where the Republic of Kazakhstan is part of the Asian region and the Russian Federation part of the European region, it will be even the first Asian-European Transboundary Biosphere Reserve.

Model for other potential future TBRs

The Great Altay TBR can serve as an example for the other transboundary protected areas that have been officially designated by the Russian Federation and its neighbouring countries in the framework of the *Action Plan for the Implementation of the Concept for the Development of the Network of Protected Areas with Federal Importance until 2020* (Administraziya Presidenta Rossiskoy Federazii, 2012). Perspectively, these transboundary protected areas could be developed into UNESCO TBRs as well. For example, the Russian-Mongolian transboundary protected area „Ubsunorskaya Kotlovina ", which was established in 2011 and is also situated in the Altai-Sayan Ecoregion, consists of two protected areas, which are already part of two existing UNESCO BRs (Uvs Nuur Basin BR (1997) and Ubsunorskaya Kotlovina BR (1997)). Furthermore, this transboundary protected area is part of the transboundary Uvs Nuur Basin World Heritage Site (2003).

Towards a potential quadrilateral Great Altay TBR

The successful designation and establishment of the Great Altay TBR is considered a first step towards a comprehensive transboundary conservation and management of the ecosystems of the Altai region. It may leverage the vision and former plans of the establishment of a quadrilateral TBR among the Republic of Kazakhstan, the Russian Federation, Mongolia and the People's Republic of China that were developed in 2004 (Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Eco Consulting Group, 2004) and reconfirmed in 2014 (Environmental Commission of the Russian Geographical Society; Federal Agency for Nature Conservation of Germany, 2014). The numerous surrounding protected areas provide opportunities to foster cooperation and spatial connectivity (Figure 32). At the moment a quadrilateral site is suggested in the framework of the World Heritage Convention. An application for an extension nomination is intended to be submitted to UNESCO in February 2016, which could encompass the following conservation sites in the Altai mountain region (Butorin, 2013):

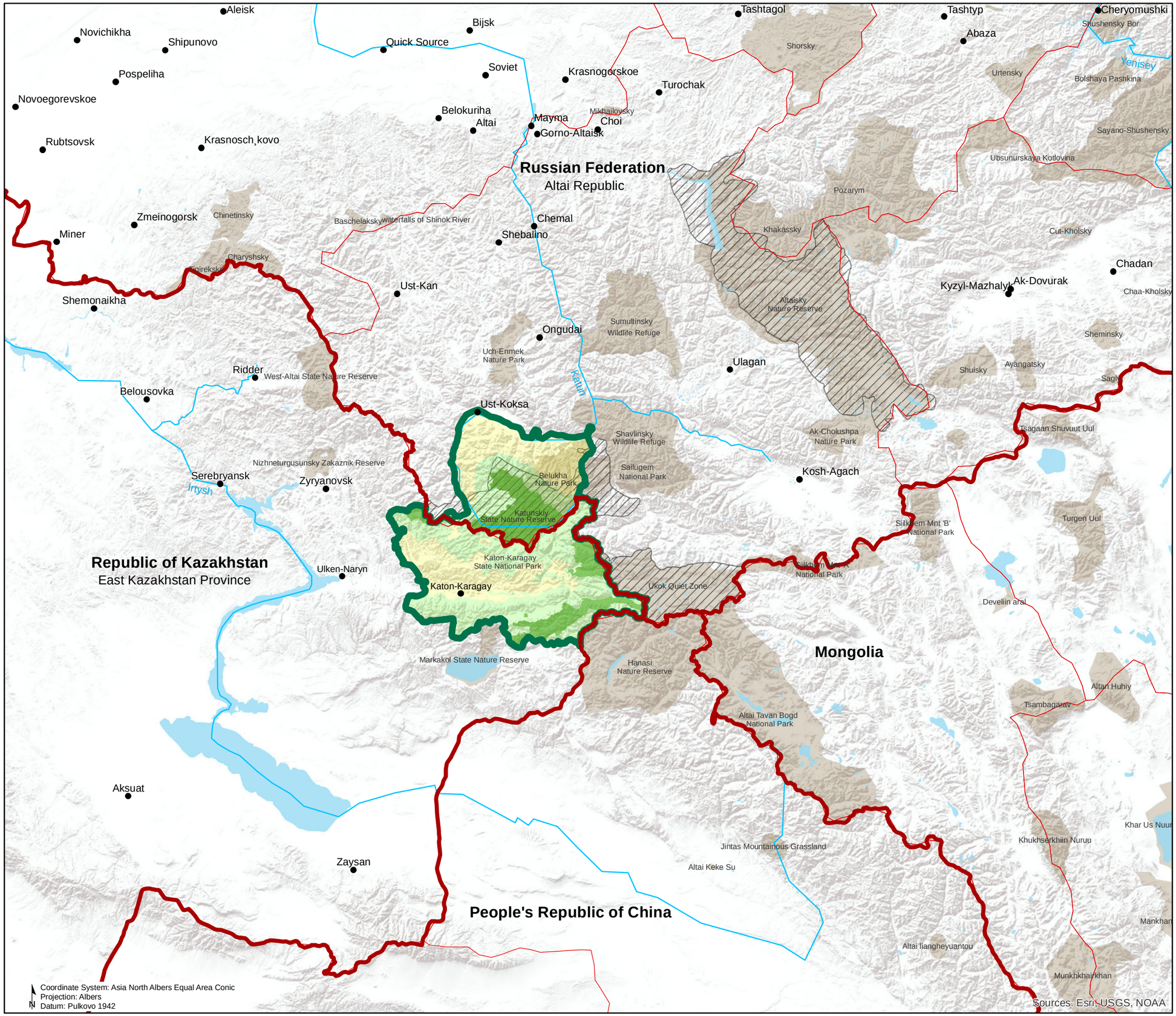
- Kazakhstan: Katon-Karagay State National Park, Markakol and Zapadno-Altayskiy State Nature Zapovedniks, historical-cultural museum "Berel"
- Mongolia: Altai Tavan Bogd National Park, Siilkhemiin Nuruu National Park, Munkh Khairakhan, Myangan Ugalzat, Tsambgarav National Park, Achit Nur, Devlii Aral Nature Reserve, Chivertei Gol National Park, Khukhserkhiin Mountain Strictly Protected Area and Ongog National Park
- China: Hanasi Nature Reserve, Two Rivers' Headwaters Nature Reserve of Altai
- Russian Federation: Sailugem National Park

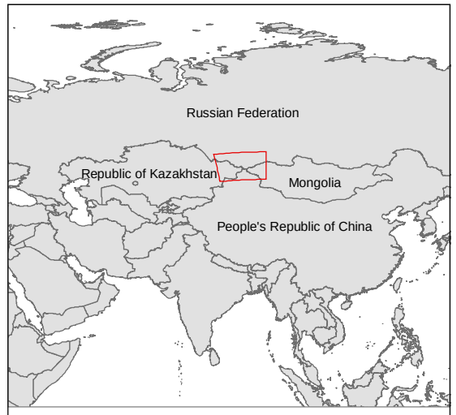
The elaboration of extension nominations for the World Heritage Site and the TBR in the Altai Mountains should be realized in an integrated, cooperative way to allow for consistency in conservation planning and sustainable regional development. It is considered that the core areas of the quadrilateral transboundary biosphere reserve should be ecosystems and biodiversity objects, which are already included in the Golden Mountains of Altai World Heritage Site or are in the process of preparation of the extension applications (Environmental Commission of the Russian Geographical Society; Federal Agency for Nature Conservation of Germany, 2014).

Figure 32 shows the potential geographical scope of a quadrilateral Altai TBR and a quadrilateral World Heritage Site.

Figure 32: Potential geographical scope of a quadrilateral Great Altay TBR and a quadrilateral World Heritage Site

Potential geographical scope of a quadrilateral Transboundary Biosphere Reserve in the Altai





- Settlements
- Country border
- Regional boundaries
- Great Altay Transboundary Biosphere Reserve
- Major rivers
- Core zone
- Buffer zone
- Transition zone
- Lakes
- Golden Mountains of Altai WHS
- Protected areas

Source:
Data from OpenStreetMap, ODbL1.0, www.openstreetmap.org; WWF 2011; Natural Earth Data, www.naturalearthdata.com; ESRI; Administrations of Katunskiy BR + Katon-Karagay BR;
Map created by Monika Hoffmann and Julia Sauermann (CEEM/HNEE)
06/2015

DISCLAIMER: All boundaries shown (state, regional, protected area administrative boundaries) and the designations used do not imply official endorsement or validity. The map authors take no responsibility for the accuracy or correctness of the shown contents.

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Annexes

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List of workshops and meetings held during the planning process

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5.3 Results MARISCO model of the Great Altay Transboundary Biosphere Reserve

Annex 6

MARISCO-methodology: Feasibility and impact categories for strategy rating

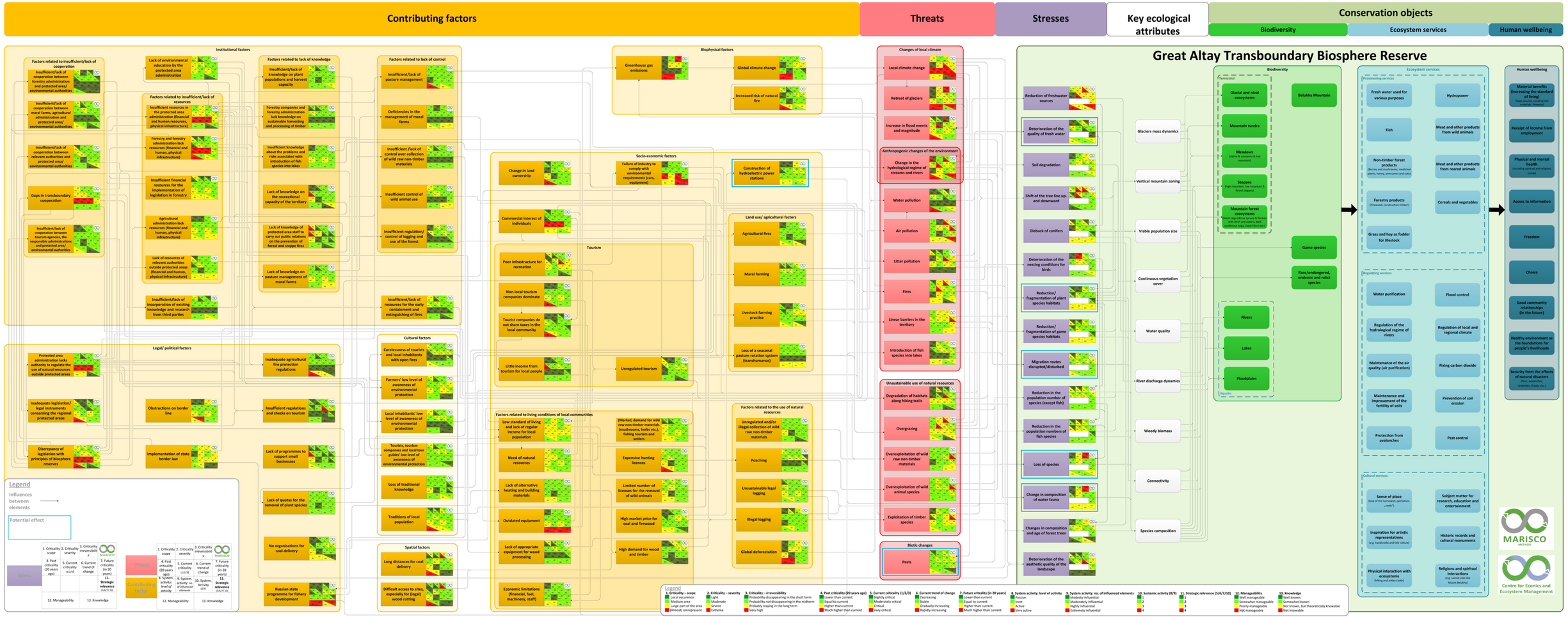
Annex 1 - List of workshops and meetings held during the planning process

	Meeting/Workshop	Place (Country)	Date
1	Kick-off meeting	Gorno-Altaisk (RF))	29.11.2012
2	Initial "MARISCO-Workshop" - Situation analysis	Manzherok Complex (RF)	27.-28.11.2012
3	Study tour incl. joint planning session	BR Schaalsee, BR Röhn, BR Schorfheide-Chorin, Eberswalde University (Germany)	21.-27.04.2013
4	1st Joint Commission Meeting	Manzherok Complex (RF)	27.-28.11.2013
5	2nd "MARISCO-Workshop" - Strategy development	Ust-Kamenogorsk (RoK)	25.-27.02.2014
6	Stakeholder-meeting (local level)	Katon-Karagay (RoK)	24.10.2014
7	Stakeholder-meeting (district level)	Ulken-Naryn (RoK)	27.10.2014
8	Stakeholder-meeting (regional level)	Ust-Kamenogorsk (RoK)	30.10.2014
9	Stakeholder-meeting (local level)	Tyungur village (RF)	04.11.2014
10	Stakeholder-meeting (district level)	Ust-Koksa (RF)	05.11.2014
11	Stakeholder-meeting (regional level)	Gorno-Altaisk (RF)	07.11.2014
12	2nd Joint Committee Meeting	Ust-Kamenogorsk (RoK)	21.11.2014

The various workshops and meetings were targeted to different groups of stakeholders. In general, all gatherings were well attended by respective representatives of the regional, district and local level, including active participation of public as well as civil sector partners. The following listing provides an overview about stakeholder groups targeted by these meetings and workshops. Full lists of participants are included in respective reports.

- The Kick-off meeting was targeted to authorities of the Republic of Altai and the East Kazakhstan province and the Ust-Koksa and Katon-Karagy districts administrations. Presentation of planned nomination process was additionally provided to national authorities and to the public in general (press conference);
- The MARISCO-Workshops were targeted to the core teams of Katunskiy BR and Katon-Karagay SNP who are formally in charge of the management within the core zone and parts of the buffer zone and who were the main actors of the nomination planning process. Scientific-technical exchange was provided by an international expert delegation from the German Federal Agency for the Environment, the Eberswalde University, consultants for tourism, regional development and landscape planning and a representative of the Russian section of WWF.
- During the study tour and joint planning session in Germany the core planning team was coming together with peers of the World Network of Biosphere Reserves to exchange knowledge and understanding of BR/TBR planning and work.
- The 1st and 2nd Joint Commission Meeting was targeted to national and regional level authorities of both countries as well as to the national UNESCO MAB committees, and the managing authorities of Katon-Karagy SNP and Katunsky SNR.
- Various stakeholder meetings of local level were addressed to local residents who live in the transition zone of the TBR and whose livelihood are closely related to development of tourism and agriculture (farers, guides, villagers) as well as to the Nature Park 'Belukha'.
- District level stakeholder meetings were held to involve authorities of district level, who affect land use and land use planning within buffer and transition zones. Local communities were represented by members of district and republican parliaments.
- Two stakeholder meetings were conducted on regional level and targeted to authorities of regional level as well as partners in the field of research activities.

Annex 2 - Conceptual MARISCO model of the Great Altay Transboundary Biosphere Reserve



Annex 3 – MARISCO methodology for the assessment of stresses, threats and contributing factors[1]

Stresses, threats and their contributing factors) are assessed in terms of several criteria to allow a more considered and rational prioritisation of system elements for structuring effective conservation strategies. Three principal criteria were used to assess the stresses, threats and contributing factors:

- strategic relevance (R_S)
- manageability (M) and
- knowledge (K)

1. Strategic relevance

The strategic relevance sums up the outcome of the ratings of *current criticality*, *future criticality*, *current trend of criticality change*, *future criticality* and – except for stresses – *systemic activity*:

Strategic relevance: $\mathbf{R_S = C_C + C_T + C_F + S_A}$

Key: R_S = strategic relevance
C_C = current criticality
C_T = current trend of criticality change
C_F = future criticality
S_A = systemic activity (not relevant for the calculation of the strategic relevance of stresses)

In this context the criticality of is perceived as the importance of the stress, threat or contributing factor for the state of vulnerability of a biodiversity object. Stresses, threats or contributing factors with high criticality ratings would ideally receive a higher attention in the framework of the strategy development process.
The different (sub)descriptors of the strategic relevance are defined as follows:

[1] (Ibisch, P.L. & Hobson, P.R. (eds.), 2014)

1.1 Current criticality

The current criticality is evaluated with the help of the following descriptors:

- *Scope:* Considers the extent of spatial distribution. The rating categories are given in Table 1
- *Severity:* Estimates the degree of the impact. The rating categories are given in Table 2.
- *Irreversibility/ permanence:* Assesses the probability of reversibility. The rating categories are given in Table 3.

Table 1: Rating categories for *current criticality: scope*

Local occurrence = 1	Medium area = 2	Large part of the area = 3	(Almost) omnipresent = 4
Stress/threat: The stress/threat is likely to be very limited in its spatial distribution, affecting the biodiversity object across a small proportion of its occurrence in the area of analysis (1–10 %). **Contributing factor:** The factor is likely to be very limited in its spatial distribution, affecting other elements across a small proportion of the area of analysis (1–10 %).	**Stress/threat:** The stress/threat is likely to be fairly restricted in its spatial distribution, affecting the biodiversity object across a certain part of its occurrence in the area of analysis (11-30 %). **Contributing factor:** The factor is likely to be fairly restricted in its spatial distribution, affecting other elements across a certain part of its occurrence in the area of analysis (11–30 %).	**Stress/threat:** The stress/threat is likely to be well spread, affecting the biodiversity object across a significant part of its occurrence in the area of analysis (31–70 %). **Contributing factor:** The factor is likely to be well spread, affecting other elements across a significant part of the area of analysis (31–70 %).	**Stress/threat:** The stress/threat is likely to be pervasive in its spatial distribution, affecting the biodiversity object across all or most of its occurrence in the area of analysis (71–100 %). **Contributing factor:** The factor is likely to be pervasive in its spatial distribution, affecting other elements across all or most of the area of analysis (71–100 %).

Table 2: Rating categories for *current criticality: severity*

Light = 1	Moderate = 2	Severe = 3	Extreme = 4
Stress: Within the scope, the stress does not imply a reduction of the overall functionality of the biodiversity object. **Threat:** Within the scope, the threat is not likely to degrade or harm the biodiversity object.	**Stress:** Within the scope, the stress eventually may imply a certain reduction of the overall functionality of the biodiversity object within the next 10 years. **Threat:** Within the scope, the threat eventually may imply certain degradation and harm to the biodiversity object within the next 10 years.	**Stress:** Within the scope, the stress is likely to create a reduction of the overall functionality of the biodiversity object within the next 10 years. **Threat:** Within the scope, the threat is likely to degrade and harm the biodiversity object within the next 10 years.	**Stress:** Within the identified scope, the stress most likely means a serious reduction of the overall functionality of the biodiversity object or even its loss within the next 10 years. **Threat:** Within the identified scope, the threat is most likely to degrade and harm the biodiversity object and even cause its loss within the next 10 years. **Contributing factor:** The factor will most likely generate a significant

Contributing factor: The factor is not likely to generate a significant impact in the influenced elements.	**Contributing factor:** The factor may eventually generate a certain impact in the influenced elements.	**Contributing factor:** The factor is likely to generate a clear impact in the influenced elements.	impact in the influenced elements and become a driving force that ultimately harms one or various biodiversity objects (at least within the identified scope).

Table 3: Rating categories for *current criticality: irreversibility*

Probably disappearing in the short term = 1	Probably not disappearing in the midterm = 2	Probably staying in the long term and hard to reverse = 3	Probably rather permanent and irreversible = 4
It is likely that the stress/threat/ factor will disappear spontaneously (without management) in the short term (1 to 5 years), possibly implying nothing more than easily reversible consequences for conservation objects.	It is likely that the stress/threat/ factor will not disappear (without management) in the midterm (6 to 20 years), but this does not imply long-term and irreversible consequences for conservation objects.	It is likely that the stress/threat/ factor will stay present (without management) in the long term (21 to 100 years), this also implies long-term consequences for conservation objects that are hard to reverse.	It is very likely that the stress/threat/factor will stay present in the long-term (probably for more than even a century), which also implies longterm consequences for conservation objects that cannot be reversed in decades.

In order to calculate the **overall current criticality** it is necessary to combine the three sub-criteria *scope*, *severity* and *irreversibility*. Firstly, the combination of scope and severity is calculated as *magnitude* (Table 4). Afterwards, the combination of magnitude and irreversibility/ permanence is calculated leading to the overall current criticality (Table 5).

Table 4: Matrix for the calculation of the *magnitude* (combination of *scope* and *severity*)

MAGNITUDE scope → ↓ severity	Local occurrence = 1	Medium area =2	Large part of the area = 3	(Almost) omnipresent = 4
Light = 1	1	2	2	3
Moderate = 2	2	2	3	3
Severe = 3	2	3	3	4
Extreme = 4	3	3	4	4

Table 5: Matrix for the calculation of the overall *current criticality* (combination of *magnitude* and *irreversibility*)

Magnitude → OVERALL CRITICALITY ↓ Irreversibility	Low = 1	Medium =2	High = 3	Very high = 4
Probably disappearing in the short term = 1	1	2	2	3
Probably not disappearing in the midterm = 2	2	2	3	3
Probably staying in the long term and hard to reverse = 3	2	3	3	4
Probably fairly permanent and irreversible = 4	3	3	4	4

1.2 Current trend of criticality change

Judges the change of the criticality. The rating categories are given below:

Table 6: Rating categories for *current trend of criticality change*

Decreasing = 1	Stable = 2	Gradually increasing = 3	Rapidly increasing = 4
Currently, the criticality of the stress/threat/factor is tendentially decreasing.	Currently, the criticality of the stress/ threat/factor seems fairly stable. No change is recognisable.	Currently, the criticality of the stress/threat/factor is tendentially increasing, but it is doing so gradually and apparently quite predictably.	Currently, the criticality of the stress/threat/factor is tendentially increasing in a fast and accelerating way (exponentially).

1.3 Future criticality

Estimates the degree of criticality in about 20 years. The rating categories are given below:

Table 7: Rating categories for *future criticality*

Lower than current = 1	Equal to current = 2	Higher than current = 3	Much higher than current = 4
The future criticality (in 20 years) is expected to be lower than the current one.	The future criticality (in 20 years) is expected to be equal to the current one.	The future criticality (in 20 years) is expected to be higher than the current one.	The future criticality (in 20 years) is expected to be much higher than the current one.

1.4 Systemic activity

Estimates the level/degree of influence of a stress, threat or contributing factor. It is described by *level of activity* and *number of elements that are influenced*. The rating categories are explained in the following tables:

Table 8: Rating categories for *systemic activity: level of activity*

Passive = 1	Inert = 2	Active = 3	Very active = 4
The element within the conceptual model is influenced by more elements than it is influencing. (difference [influencing - influenced] = < 0).	The element within the conceptual model is influenced by as many elements as it is influencing. (difference [influencing - influenced] = 0).	The element within the conceptual model is influenced by less elements than it is influencing. (difference [influencing - influenced] = 1–3).	The element within the conceptual model is influencing other elements much more than it is influenced. (difference [influencing - influenced] = >3).

Table 9: Rating categories for *systemic activity: number of influenced elements*

Modestly influential = 1	Moderately influential = 2	Highly influential = 3	Extremely influential = 4
The element is influencing 1 element.	The element is influencing 2–3 elements.	The element is influencing 4–5 elements.	The element is influencing >5 elements.

Table 10: Matrix to calculate overall *systemic activity*

Level of activity → Overall systemic activity ↓ Number of influenced elements	Passive = 1	Inert =2	Active = 3	Very active = 4
Modestly influential = 1	1	2	2	3
Moderately influential = 2	2	2	3	3
Highly influential = 3	2	3	3	4
Extremely influential = 4	3	3	4	4

In addition, without being integrated into the calculation of the strategic relevance, an assessment of the **past criticality** was conducted. The past criticality is determined by comparing the current situation with the (assumed) situation 20 years ago. Rating categories are given below:

Table 11: Rating categories for *past criticality*

Lower than current = 1	Equal to current = 2	Higher than current = 3	Much higher than current = 4
The past criticality (20 years ago) of the stress/threat/factor is lower than the current one.	The past criticality (20 years ago) of the stress/threat/factor more or less equals the current one.	The past criticality (20 years ago) of the stress/threat/factor is higher than the current one.	The past criticality (20 years ago) of the stress/threat/factor is much higher than the current one.

2. Manageability

Table 12: Rating categories for *manageability*

Very manageable = 1	Somewhat manageable = 2	Poorly manageable = 3	Not manageable = 4
The element can be easily and directly influenced by strategies and project activities; usually these refer to mainly local elements.	The element is likely to be directly influenced by strategies and project activities to a certain extent, specially if more resources are made available than at present.	The element is not very likely to be directly manageable. It can be influenced instead in a meta-systemic and indirect way.	The element is not manageable at all; it is extremely unlikely that local management would effect any change, either directly or indirectly.

3. Knowledge

Table 13: Rating categories for *knowledge*

Well known = 1	Somewhat known = 2	Not known, but theoretically knowable = 3	Not knowable = 4
The level of knowledge about the factor/threat/stress is very high; the planning team has a precise idea of the element's characteristics, relevance and dynamics.	The level of knowledge about the factor/threat/stress is fair; the planning team has a fairly good idea of the element's characteristics, relevance and dynamics. Some knowledge gaps might have been identified.	The level of knowledge about the factor/threat/stress is poor; the planning team does not have a good idea of the element's characteristics, relevance and dynamics. Some better knowledge might be available, but this is not currently possessed by the team.	It is impossible to obtain a level of good knowledge about the factor/ threat/stress; the planning team can only formulate assumptions about the element's characteristics, relevance and dynamics. Further research would not provide better knowledge. This non-knowability is related to the fact that the element is complexly influenced by other uncertain elements, or that it represents future risks.

Annex 4 – Contributing factors – assessment results

Table 1: Criticality (C) and systemic activity (S_A) of all the contributing factors

Contributing factor	Category	Kazakhstani part of the TBR					Russian part of the TBR				
		Criticality (C)				Overall systemic activity (S_A)	Criticality (C)				Overall systemic activity (S_A)
		20 years ago	Current	Current trend	In 20 years		20 years ago	Current	Current trend	In 20 years	
1. Discrepancy of legislation with principles of biosphere reserves	Legal/political factors	2	3	2	3	4	2	3	2	3	4
2. Insufficient resources in protected area administration (financial, human resources, physical infrastructure)	Institutional factors	3	3	3	2	4	3	3	2	3	4
3. Poor infrastructure for recreation	Socio-economic factors	1	3	2	3	3	3	2	4	3	3
4. Forestry administration lack resources (financial and human, physical infrastructure)	Institutional factors	2	2	2	2	4	1	3	2	3	4
5. Low standard of living and lack of regular income for local population	Socio-economic factors	3	3	2	3	3	3	3	2	3	3
6. Implementation of state border law	Legal/political factors	1	3	2	3	3	1	3	2	3	3
7. Gaps in transboundary cooperation	Institutional factors	3	3	2	2	4	3	3	2	2	4
8. Farmers' low level of awareness of environmental protection	Cultural factors	2	3	2	3	3	2	2	3	3	3
9. Global climate change	Biophysical factors	1	2	3	3	2	1	2	3	3	2
10. Global deforestation	Socio-economic factors	1	3	3	2	2	1	3	3	2	2
11. Failure of industry to comply with environmental requirements (cars, equipment)	Socio-economic factors	2	2	2	2	4	2	2	2	2	4
12. Commercial interest of individuals	Socio-economic	2	2	2	2	4	1	2	2	2	4

	factors										
13. Protected area administration lacks authority to regulate the use of natural resources outside protected areas	Legal/ political factors	2	2	2	2	4	2	2	2	2	4
14. Livestock farming practice	Socio-economic factors	1	2	3	3	2	2	2	3	3	2
15. Need of natural resources	Socio-economic factors	3	3	2	2	3	3	3	2	2	3
16. Traditions of local population	Cultural factors	2	2	2	2	3	2	3	2	2	3
17. Long distances for coal delivery	Spatial factors	2	3	2	3	2	2	3	2	2	2
18. High market price for coal and firewood	Socio-economic factors	1	2	3	3	2	2	2	3	2	2
19. Lack of environmental education by the protected area administration	Institutional factors	3	3	2	2	3	3	2	2	2	3
20. Outdated equipment	Socio-economic factors	2	2	2	2	3	2	2	2	2	3
21. Increased risk of natural fire	Biophysical factors	1	2	3	3	2	1	2	2	2	2
22. Obstructions on border line	Legal/ political factors	2	2	2	2	3	2	2	2	2	3
23. Greenhouse gas emissions	Biophysical factors	1	3	3	2	1	1	3	3	2	1
24. Construction of hydroelectric power stations	Socio-economic factors	2	2	2	2	2	1	2	3	3	2
25. Agricultural administration lack resources (financial and human, physical infrastructure)	Institutional factors	2	2	2	2	3	2	2	2	2	3
26. Insufficient financial resources for the implementation of legislation in forestry	Institutional factors	2	2	2	2	3	2	2	2	2	3
27. No organizations for coal delivery	Legal/ political factors	1	2	3	3	2	2	2	2	2	2
28. Change in land ownership	Socio-economic factors	1	2	3	3	2	1	2	2	2	2
29. (Market) demand for wild raw non-timber materials (mushrooms, herbs etc.), fishing tourism and antlers	Socio-economic factors	3	2	2	2	3	3	2	2	2	3
30. Non-local tourism companies dominate	Socio-economic factors	2	2	2	2	3	2	2	2	2	3
31. Unsustainable legal logging	Socio-economic factors	3	2	2	2	3	2	2	2	2	3

32. Limited number of licenses for the removal of wild animals	Socio-economic factors	2	3	2	2	2	2	3	2	2	2
33. Lack of knowledge on pasture management of maral farms	Institutional factors	2	2	2	2	3	2	2	2	2	3
34. Unregulated tourism	Socio-economic factors	3	2	2	2	2	1	2	3	3	2
35. Tourists, tourism companies and local tour guides' low level of awareness of environmental protection	Cultural factors	2	3	3	2	2	2	2	2	2	2
36. Insufficient knowledge about the problems and risks associated with introduction of fish species into lakes	Institutional factors	2	2	2	2	3	2	2	2	2	3
37. High demand for wood and timber	Socio-economic factors	2	2	3	3	2	2	2	2	2	2
38. Russian state program for fishery development	Legal/ political factors	2	1	2	2	2	1	2	3	3	2
39. Expensive hunting licenses	Socio-economic factors	2	2	2	2	2	2	2	2	2	2
40. Lack of resources of relevant authorities outside protected areas (financial and human, physical infrastructure)	Institutional factors	2	2	2	2	2	1	3	2	2	2
41. Carelessness of tourists and local inhabitants with open fires	Cultural factors	2	2	2	2	1	1	3	3	3	1
42. Difficult access to sites, especially for (legal) wood cutting	Spatial factors	1	2	2	2	2	2	3	2	2	2
43. Insufficient/lack of cooperation between relevant authorities and protected area/environmental authorities	Institutional factors	3	2	2	2	2	2	3	2	2	2
44. Maral farming	Socio-economic factors	3	3	2	2	2	2	2	2	2	2
45. Insufficient regulations and checks on tourism	Legal/ political factors	1	2	2	2	1	2	2	4	3	1
46. Inadequate legislation/legal instruments concerning the regional protected areas	Legal/ political factors	2	1	2	2	3	2	2	1	2	3
47. Insufficient/lack of pasture management	Institutional factors	2	2	2	2	2	2	2	2	2	2
48. Illegal logging	Socio-economic factors	2	2	2	2	2	2	2	2	2	2
49. Insufficient/lack of cooperation between tourism agencies, the responsible administrations and protected area/environmental authorities	Institutional factors	2	2	2	2	2	2	2	2	2	2
50. Agricultural fires	Socio-economic factors	2	2	2	2	2	2	2	2	2	2

51. Economic limitations	Socio-economic factors	2	2	2	2	2	2	2	2	2	2
52. Lack of alternative heating and building materials	Socio-economic factors	2	2	2	2	2	2	2	2	2	2
53. Insufficient/lack of knowledge on plant populations and harvest capacity	Institutional factors	2	2	2	2	2	2	2	2	2	2
54. Poaching	Socio-economic factors	2	2	2	1	1	2	3	3	3	1
55. Unregulated and/or illegal collection of wild raw non-timber materials	Socio-economic factors	2	2	2	2	2	2	2	2	2	2
56. Lack of knowledge on the recreational capacity of the territory	Institutional factors	2	2	2	2	2	4	2	2	2	2
57. Lack of quotas for the removal of plant species	Legal/ political factors	2	2	2	2	2	2	2	2	2	2
58. Lack of appropriate equipment for wood processing	Socio-economic factors	2	3	2	3	1	2	2	2	2	1
59. Lack of knowledge of protected area staff to carry out public relations on the prevention of forest and steppe fires	Institutional factors	2	3	2	2	2	4	3	1	1	2
60. Local inhabitants' low level of awareness of environmental protection	Cultural factors	2	3	3	2	1	2	2	2	2	1
61. Tourist companies do not share taxes in the local community	Socio-economic factors	2	1	2	2	2	3	2	2	2	2
62. Insufficient/lack of cooperation between maral farms, agricultural administration and protected area/environmental authorities	Institutional factors	2	3	2	2	1	2	2	2	2	1
63. Loss of traditional knowledge	Cultural factors	2	2	2	2	2	2	2	2	1	2
64. Insufficient control of wild animal use	Institutional factors	2	2	2	2	1	2	3	2	2	1
65. Little income from tourism for local people	Socio-economic factors	2	2	2	2	1	4	2	3	2	1
66. Insufficient regulation/control of logging and use of the forest	Institutional factors	3	2	3	2	1	1	2	2	2	1
67. Insufficient/lack of resources for the early containment and extinguishing of fires	Institutional factors	2	3	2	2	1	3	2	2	2	1
68. Inadequate agricultural fire protection regulations	Legal/ political factors	2	2	2	2	1	2	2	2	2	1

69. Loss of a seasonal pasture rotation system (transhumance)	Socio-economic factors	2	2	2	2	1	2	2	2	2	1
70. Deficiencies in the management of maral farms	Institutional factors	2	2	2	2	1	2	2	2	2	1
71. Lack of programs to support small businesses	Legal/ political factors	2	2	2	2	2	4	2	1	1	2
72. Insufficient/lack of incorporation of existing knowledge and research from third parties	Institutional factors	2	2	2	2	1	2	2	2	2	1
73. Forestry administration lack knowledge on sustainable harvesting and processing of timber	Institutional factors	3	2	2	2	1	2	2	2	2	1
74. Insufficient /lack of control over collection of wild raw non-timber materials	Institutional factors	2	2	2	2	1	2	2	2	2	1
75. Insufficient/lack of cooperation between forestry administration and protected area/environmental authorities	Institutional factors	2	2	2	1	1	1	2	2	2	1

Key: Criticality ratings: **1** = lower than current/low/decreasing/ lower than current, **2** = equal to current/medium/stable/ equal to current, **3** = higher than current/high/gradually increasing/ higher than current, **4** = much higher than current/very high/rapidly increasing/ much higher than current; Systemic activity rating: **1** = low, **2** = medium, **3** = high, **4** = very high

Table 2: Strategic relevance (R_S), manageability (M) and level of knowledge (K) of all the contributing factors

Contributing factor	Category	Kazakhstani part of the TBR				Russian part of the TBR				Combined value for the whole TBR			
		R_S value	R_S final range	M	K	R_S value	R_S final range	M	K	R_S value	R_S final range	M	K
1. Discrepancy of legislation with principles of biosphere reserves	Legal/political factors	12	3	2	2	12	3	4	1	**12**	**3**	**3**	**2**
2. Insufficient resources in protected area administration (financial, human resources, physical infrastructure)	Institutional factors	12	3	2	2	12	3	2	1	**12**	**3**	**2**	**2**
3. Poor infrastructure for recreation	Socio-economic factors	11	3	2	2	12	3	2	1	**12**	**3**	**2**	**2**
4. Forestry administration lack resources (financial and human, physical infrastructure)	Institutional factors	10	2	2	2	12	3	4	3	**11**	**3**	**3**	**3**
5. Low standard of living and lack of regular income for local population	Socio-economic factors	11	3	3	2	11	3	2	2	**11**	**3**	**3**	**2**
6. Implementation of state border law	Legal/political factors	11	3	3	1	11	3	3	1	**11**	**3**	**3**	**1**
7. Gaps in transboundary cooperation	Institutional	11	3	2	2	11	3	2	2	**11**	**3**	**2**	**2**

	factors												
8. Farmers' low level of awareness of environmental protection	Cultural factors	11	3	2	1	11	3	2	1	**11**	**3**	**2**	**1**
9. Global climate change	Biophysical factors	10	2	4	2	10	2	4	2	**10**	**2**	**4**	**2**
10. Global deforestation	Socio-economic factors	10	2	4	2	10	2	4	2	**10**	**2**	**4**	**2**
11. Failure of industry to comply with environmental requirements (cars, equipment)	Socio-economic factors	10	2	3	4	10	2	3	4	**10**	**2**	**3**	**4**
12. Commercial interest of individuals	Socio-economic factors	10	2	3	3	10	2	3	2	**10**	**2**	**3**	**3**
13. Protected area administration lacks authority to regulate the use of natural resources outside protected areas	Legal/ political factors	10	2	3	2	10	2	3	1	**10**	**2**	**3**	**2**
14. Livestock farming practice	Socio-economic factors	10	2	2	1	10	2	3	3	**10**	**2**	**3**	**2**
15. Need of natural resources	Socio-economic factors	10	2	2	2	10	2	3	2	**10**	**2**	**3**	**2**
16. Traditions of local population	Cultural factors	9	2	3	2	10	2	4	3	**10**	**2**	**4**	**3**
17. Long distances for coal delivery	Spatial factors	10	2	3	1	9	2	4	1	**10**	**2**	**4**	**1**
18. High market price for coal and firewood	Socio-economic factors	10	2	3	1	9	2	3	2	**10**	**2**	**3**	**2**
19. Lack of environmental education by the protected area administration	Institutional factors	10	2	2	2	9	2	2	1	**10**	**2**	**2**	**2**
20. Outdated equipment	Socio-economic factors	9	2	4	4	9	2	4	4	**9**	**2**	**4**	**4**
21. Increased risk of natural fires	Biophysical factors	10	2	3	3	8	2	4	2	**9**	**2**	**4**	**3**
22. Obstructions on border line	Legal/ political factors	9	2	4	2	9	2	3	2	**9**	**2**	**4**	**2**
23. Greenhouse gas emissions	Biophysical	9	2	4	2	9	2	4	2	**9**	**2**	**4**	**2**

	factors												
24. Construction of hydroelectric power stations	Socio-economic factors	8	2	3	3	10	2	3	2	**9**	**2**	**3**	**3**
25. Agricultural administration lack resources (financial and human, physical infrastructure)	Institutional factors	9	2	2	3	9	2	3	3	**9**	**2**	**3**	**3**
26. Insufficient financial resources for the implementation of legislation in forestry	Institutional factors	9	2	3	2	9	2	3	3	**9**	**2**	**3**	**3**
27. No organizations for coal delivery	Legal/ political factors	10	2	3	1	8	2	3	3	**9**	**2**	**3**	**2**
28. Change in land ownership	Socio-economic factors	10	2	2	2	8	2	4	2	**9**	**2**	**3**	**2**
29. (Market) demand for wild raw non-timber materials (mushrooms, herbs etc.), fishing tourism and antlers	Socio-economic factors	9	2	3	2	9	2	3	2	**9**	**2**	**3**	**2**
30. Non-local tourism companies dominate	Socio-economic factors	9	2	2	2	9	2	4	2	**9**	**2**	**3**	**2**
31. Unsustainable legal logging	Socio-economic factors	9	2	3	2	9	2	2	2	**9**	**2**	**3**	**2**
32. Limited number of licenses for the removal of wild animals	Socio-economic factors	9	2	3	2	9	2	3	2	**9**	**2**	**3**	**2**
33. Lack of knowledge on pasture management of maral farms	Institutional factors	9	2	2	3	9	2	2	3	**9**	**2**	**2**	**3**
34. Unregulated tourism	Socio-economic factors	8	2	2	2	10	2	2	1	**9**	**2**	**2**	**2**
35. Tourists, tourism companies and local tour guides' low level of awareness of environmental protection	Cultural factors	10	2	2	1	8	2	2	2	**9**	**2**	**2**	**2**
36. Insufficient knowledge about the problems and risks associated with introduction of fish species into lakes	Institutional factors	9	2	2	2	9	2	2	2	**9**	**2**	**2**	**2**
37. High demand for wood and timber	Socio-economic factors	10	2	1	1	8	2	2	1	**9**	**2**	**2**	**1**

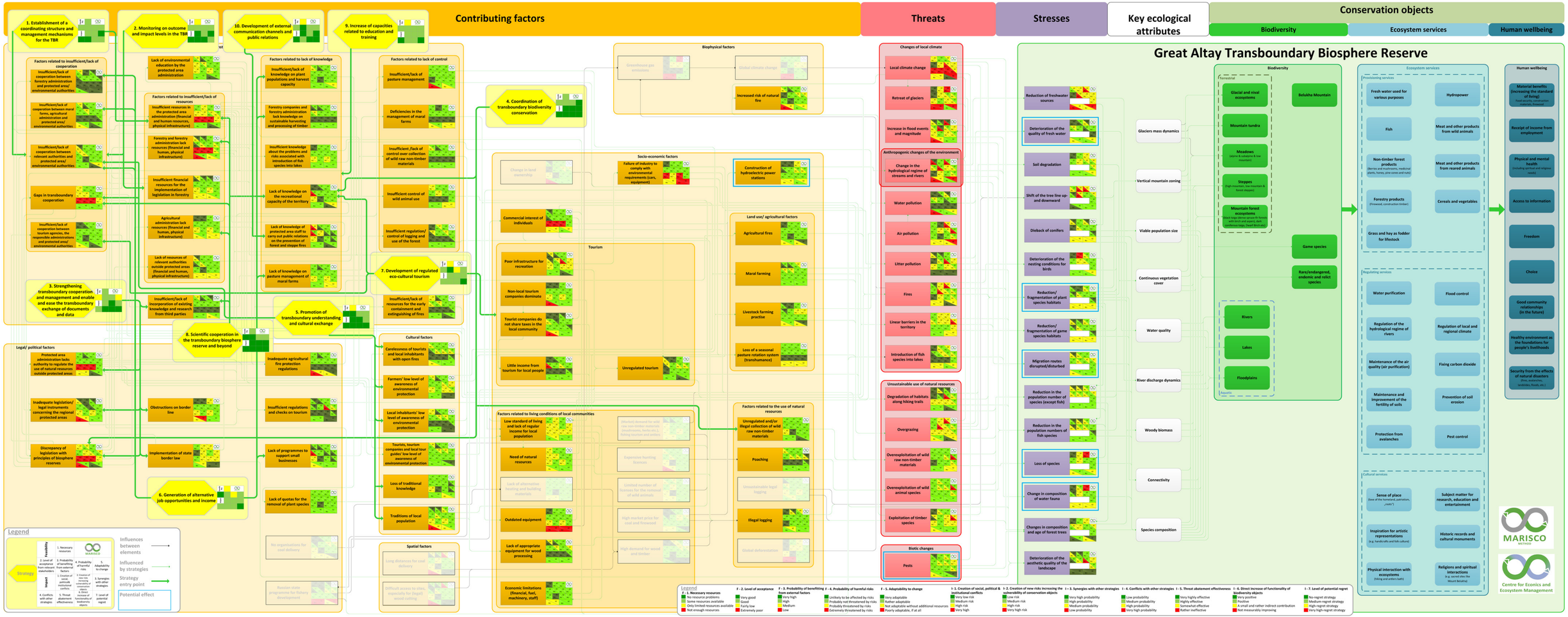
38. Russian state program for fishery development	Legal/ political factors	7	1	4	4	10	2	4	3	**9**	**2**	**4**	**4**
39. Expensive hunting licenses	Socio-economic factors	8	2	3	2	9	2	4	2	**9**	**2**	**4**	**2**
40. Lack of resources of relevant authorities outside protected areas (financial and human, physical infrastructure)	Institutional factors	8	2	3	3	9	2	3	3	**9**	**2**	**3**	**3**
41. Carelessness of tourists and local inhabitants with open fires	Cultural factors	7	1	2	2	10	2	3	2	**9**	**2**	**3**	**2**
42. Difficult access to sites, especially for (legal) wood cutting	Spatial factors	8	2	2	1	9	2	4	1	**9**	**2**	**3**	**1**
43. Insufficient/lack of cooperation between relevant authorities and protected area/environmental authorities	Institutional factors	8	2	2	3	9	2	2	1	**9**	**2**	**2**	**2**
44. Maral farming	Socio-economic factors	9	2	2	2	8	2	2	2	**9**	**2**	**2**	**2**
45. Insufficient regulations and checks on tourism	Legal/ political factors	7	1	2	1	10	2	2	1	**9**	**2**	**2**	**1**
46. Inadequate legislation/legal instruments concerning the regional protected areas	Legal/ political factors	8	2	3	2	8	2	4	2	**8**	**2**	**4**	**2**
47. Insufficient/lack of pasture management	Institutional factors	8	2	2	2	8	2	4	3	**8**	**2**	**3**	**3**
48. Illegal logging	Socio-economic factors	8	2	3	2	8	2	2	2	**8**	**2**	**3**	**2**
49. Insufficient/lack of cooperation between tourism agencies, the responsible administrations and protected area/environmental authorities	Institutional factors	8	2	2	2	8	2	3	1	**8**	**2**	**3**	**2**
50. Agricultural fires	Socio-economic factors	8	2	2	1	8	2	3	3	**8**	**2**	**3**	**2**
51. Economic limitations (financial, fuel, machinery, staff)	Socio-economic factors	8	2	3	2	8	2	3	2	**8**	**2**	**3**	**2**
52. Lack of alternative heating and building materials	Socio-economic factors	8	2	3	2	8	2	3	2	**8**	**2**	**3**	**2**
53. Insufficient/lack of knowledge on plant populations and	Institutional	8	2	2	3	8	2	2	2	**8**	**2**	**2**	**3**

harvest capacity	factors													
54. Poaching	Socio-economic factors	6	1	2	2	10	2	2	2	**8**	**2**	**2**	**2**
55. Unregulated and/or illegal collection of wild raw non-timber materials	Socio-economic factors	8	2	2	2	8	2	2	1	**8**	**2**	**2**	**2**
56. Lack of knowledge on the recreational capacity of the territory	Institutional factors	8	2	2	3	8	2	2	1	**8**	**2**	**2**	**2**
57. Lack of quotas for the removal of plant species	Legal/ political factors	8	2	2	2	8	2	2	2	**8**	**2**	**2**	**2**
58. Lack of appropriate equipment for wood processing	Socio-economic factors	9	2	2	2	7	1	2	2	**8**	**2**	**2**	**2**
59. Lack of knowledge of protected area staff to carry out public relations on the prevention of forest and steppe fires	Institutional factors	9	2	2	2	7	1	2	1	**8**	**2**	**2**	**2**
60. Local inhabitants' low level of awareness of environmental protection	Cultural factors	9	2	2	1	7	1	2	1	**8**	**2**	**2**	**1**
61. Tourist companies do not share taxes in the local community	Socio-economic factors	7	1	3	2	8	2	4	2	**8**	**2**	**4**	**2**
62. Insufficient/lack of cooperation between maral farms, agricultural administration and protected area/environmental authorities	Institutional factors	8	2	2	2	7	1	3	1	**8**	**2**	**3**	**2**
63. Loss of traditional knowledge	Cultural factors	8	2	2	2	7	1	2	3	**8**	**2**	**2**	**3**
64. Insufficient control of wild animal use	Institutional factors	7	1	2	3	8	2	2	3	**8**	**2**	**2**	**3**
65. Little income from tourism for local people	Socio-economic factors	7	1	2	2	8	2	2	2	**8**	**2**	**2**	**2**
66. Insufficient regulation/control of logging and use of the forest	Institutional factors	8	2	2	2	7	1	2	2	**8**	**2**	**2**	**2**
67. Insufficient/lack of resources for the early containment and extinguishing of fires	Institutional factors	8	2	2	2	7	1	2	1	**8**	**2**	**2**	**2**

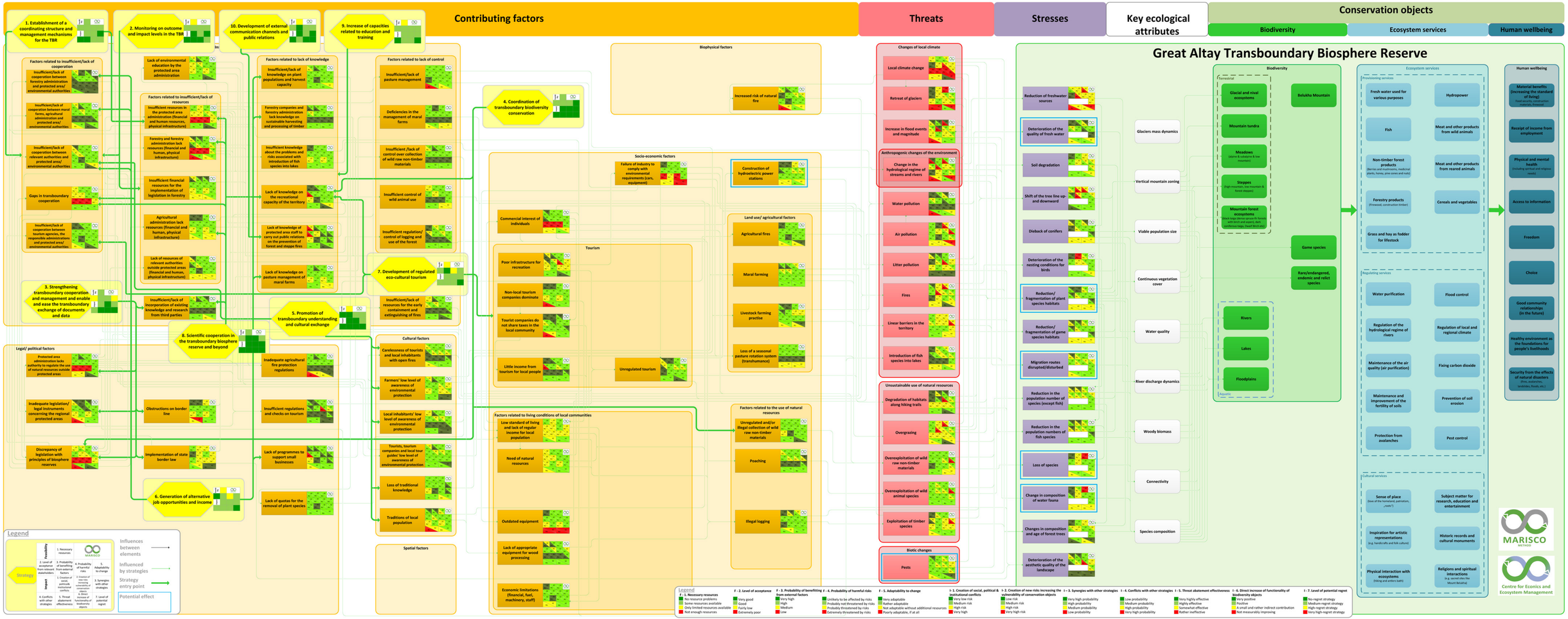
68. Inadequate agricultural fire protection regulations	Legal/ political factors	7	1	3	1	7	1	4	3	**7**	**1**	**4**	**2**
69. Loss of a seasonal pasture rotation system (transhumance)	Socio-economic factors	7	1	3	3	7	1	3	3	**7**	**1**	**3**	**3**
70. Deficiencies in the management of maral farms	Institutional factors	7	1	2	3	7	1	3	3	**7**	**1**	**3**	**3**
71. Lack of programs to support small businesses	Legal/ political factors	8	2	2	2	6	1	3	2	**7**	**1**	**3**	**2**
72. Insufficient/lack of incorporation of existing knowledge and research from third parties	Institutional factors	7	1	2	2	7	1	2	3	**7**	**1**	**2**	**3**
73. Forestry companies and forestry administration lack knowledge on sustainable harvesting and processing of timber	Institutional factors	7	1	2	2	7	1	2	2	**7**	**1**	**2**	**2**
74. Insufficient /lack of control over collection of wild raw non-timber materials	Institutional factors	7	1	2	2	7	1	2	2	**7**	**1**	**2**	**2**
75. Insufficient/lack of cooperation between forestry administration and protected area/environmental authorities	Institutional factors	6	1	1	1	7	1	2	1	**7**	**1**	**2**	**1**

Key: $\mathbf{R_S}$ = strategic relevance, **M** = manageability, **K** = level of knowledge, **1** = low/very manageable/well known, **2** = medium/somewhat manageable/somewhat known, **3** = high/poorly manageable/ not known, but theoretically knowable, **4** = very high/not manageable/not knowable; R_S-classes: **1:** value <= 7, **2:** 8=<value<=10, **3:** 11=<value<=13, **4:** value >=14

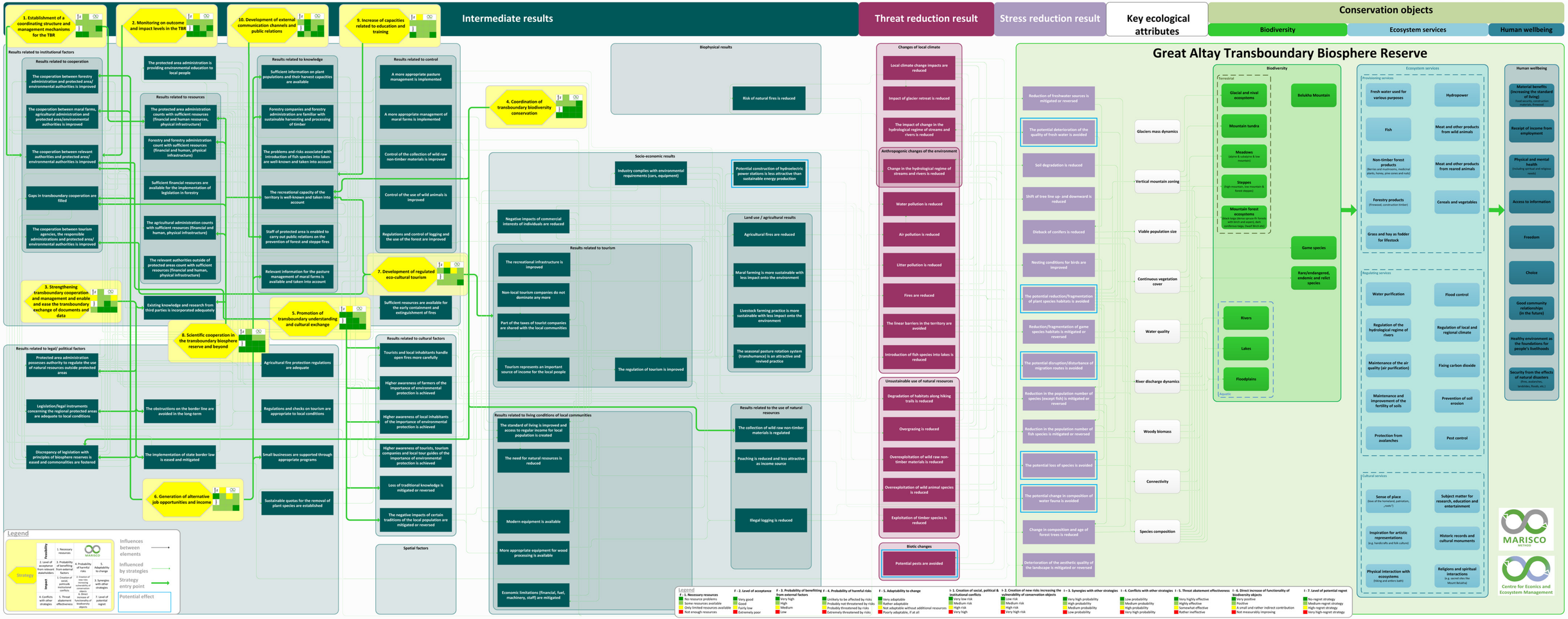
Annex 5.1 - Conceptual MARISCO model of the Great Altay Transboundary Biosphere Reserve with strategies - step 1



Annex 5.2 - Conceptual MARISCO model of the Great Altay Transboundary Biosphere Reserve - step 2



Annex 5.3 - Results MARISCO model of the Great Altay Transboundary Biosphere Reserve



Annex 6 – MARISCO methodology for the assessment of feasibility and impact criteria[1]

Table 1: Feasibility criteria

		Excellent	Good	Problematic	Poor
Feasibility	**Necessary resources**	**No resource problems = 4** There are sufficient financial, personal, time and knowledge resources within the managing institution to implement the strategy.	**Some resources available = 3** There are some resources to at least partially implement the strategy, and additional resources are likely to be obtained	**Only limited resources available** **= 2** Only a few limited resources are available to implement the strategy, and only very small-scale and fairly isolated activities can be carried out. It will be difficult to obtain additional resources.	**Not enough resources = 1** There are not enough resources within the managing institution to implement the strategy and it is unlikely that additional resources can be obtained.
	Level of acceptance from relevant stakeholders	**Very good acceptance = 4** The strategy is accepted by (almost) all of the relevant stakeholders.	**Good acceptance = 3** The strategy is accepted by a major part of the relevant stakeholders.	**Fairly low acceptance = 2** The strategy is supported by a minor part of the relevant stakeholders, but there is no rejection.	**Extremely poor acceptance = 1** The strategy is supported by only a few of the relevant stakeholders and is rejected by most of them.
	Probability of benefiting from external factors (especially opportunities)	**Very high = 4** It is highly likely that the strategy can make use of existing or arising opportunities such as additional resources or external support.	**High = 3** It is quite probable that the strategy can make use of existing or arising opportunities such as additional resources or external support.	**Medium = 2** It is not very probable that the strategy can make use of existing or arising opportunities such as additional resources or external support.	**Low = 1** It is highly unlikely that the strategy can make use of existing or arising opportunities such as additional resources or external support.
	Probability of harmful risks	**Unlikely to be affected by risks = 4** There is (almost) no probability of risks that (could) complicate	**Probably not threatened by risks = 3** There is a low probability of	**Probably threatened by risks = 2** There is a high probability of	**Extremely threatened by risks = 1** There is a high probability of

[1] (Ibisch, P.L. & Hobson, P.R. (eds.), 2014)

		the implementation of the strategy.	risks that (could) somewhat complicate the implementation of the strategy.	risks that (could) complicate or even hamper the implementation of the strategy.	risks that (could) significantly hamper the implementation of the strategy or even make them completely ineffective.
	Adaptability to change	**Very adaptable = 4** The adaptation of the strategy to changing circumstances or unexpected events can be easily achieved without any additional resources.	**Rather adaptable = 3** The adaptation of the strategy to changing circumstances or unexpected events is likely to be achieved with some additional resources.	**Not adaptable without significant** **additional resources = 2** The adaptation of the strategy to changing circumstances or unexpected events could possibly be achieved, but significant additional resources will be required.	**Poorly adaptable, if at all = 1** The strategy is (possibly) not adaptable to changing circumstances or unexpected events.

Table 2: Impact criteria

		Excellent	Good	Problematic	Poor
Impact	Creation of social, political and institutional conflicts	**Very low risk of conflict generation = 4** c) There is no or almost no probability that the strategy will give rise to any conflicts between different stakeholder groups.	**Medium risk of conflict generation = 3** d) It is possible that a certain amount of conflict will be generated between different stakeholder groups and that this will have the potential to influence the conservation project/site.	**High risk of conflict generation = 2** It is fairly likely that relevant conflicts between different stakeholder groups will be generated and that these will have the potential to influence the conservation project/site.	**Very high risk of conflict generation = 1** It is (almost) certain that relevant conflicts between different stakeholder groups will be generated, and that these will influence the conservation project/site.
	Creation of new risks increasing the vulnerability of conservation objects	**Low risk of increasing the vulnerability of conservation objects = 4** There is no risk that the implementation of the strategy will contribute directly or indirectly to the conservation objects' vulnerability in the management area.	**Medium risk of increasing the vulnerability of conservation objects = 3** It is not very likely that the implementation of the strategy will contribute directly or indirectly to the conservation objects' vulnerability in the management area.	**High risk of increasing the vulnerability of conservation objects = 2** There is a high risk that the implementation of the strategy will contribute directly or indirectly to the conservation objects' vulnerability in the management area.	**Very high risk of increasing the vulnerability of conservation objects = 1** There is a very high risk that the implementation of the strategy will contribute directly or indirectly to the conservation objects' vulnerability in the management area.
	Synergies with other strategies	**Very high probability of synergies with other strategies = 4** The strategy is very likely to develop important synergies with several other strategies.	**High probability of synergies with other strategies = 3** The strategy is likely to develop important synergies with some other strategies.	**Medium probability of synergies with some strategies = 2** The strategy will eventually develop important synergies with a few other strategies.	**Low probability of synergies with other strategies, if at all = 1** The strategy is fairly isolated and is not likely to develop any synergies with other strategies.
	Conflicts with other strategies	**Low probability of conflicts with other strategies, if at all = 4** The strategy conflicts with (almost) no other strategy that is being implemented in the	**Medium probability of conflicts with other strategies = 3** The strategy somewhat – but not problematically – conflicts with other strategies that are	**High probability of conflicts with other strategies = 2** The strategy conflicts with a number of the strategies that are being implemented in the	**Very high probability of conflicts with many strategies = 1** The strategy severely conflicts with a substantial

		management area.	being implemented in the management area.	management area.	number of strategies that are being implemented in the management area.
	Threat abatement effectiveness	**Very highly effective in treating threats = 4** The strategy is very effective: it will result in the significant and sustainable reduction, or even eradication, of several threats.	**Highly effective in treating threats = 3** The strategy is quite effective: it will result in the large-scale reduction of at least one threat.	**Somewhat effective in treating threats = 2** e) The strategy is not very effective: it will only result in a minor reduction of a threat, and this may only be temporary.	**Rather ineffective in treating threats = 1** The strategy is (almost) not effective: it will not even indirectly lead to the reduction of threats.
	Direct increase of funtionality of biodiversity objects	**Very positive for biodiversity functionality = 4** The strategy will safeguard or completely restore the long-term functionality of one or more biodiversity objects.	**Positive for biodiversity functionality = 3** The strategy will contribute to the restoration or maintenance of one or more biodiversity objects' functionality.	**A small and rather indirect contribution to biodiversity functionality = 2** The strategy will make a minor contribution to the conservation or restoration of one or more biodiversity objects.	**Not measurably improving biodiversity functionality = 1** The strategy is unlikely to contribute to the conservation or restoration of any of the biodiversity objects.
	Level of potential regret	**No-regret strategy = 4** The strategy will create clear collateral benefits, even if the originally intended impact is not achieved.	**Medium-regret strategy = 3** The strategy is likely to create some positive collateral effects, even if the originally intended impact is not achieved.	**High-regret strategy = 2** The potential level of regret is high. If the originally intended impact is not achieved, the strategy will not create (significant) positive collateral effects. The strategy will also be difficult to reverse and might end up wasting resources.	**Very high-regret strategy = 1** The potential level of regret is very high. If the originally intended impact is not achieved, the strategy will not create positive collateral effects. The strategy will be impossible to reverse in time and would clearly end up wasting resources.

The exposure to risks like climate change and the inherent vulnerability of the fragile region requires an ecosystem-based conservation approach, which was applied using the MARISCO method during a 3-year participatory planning process that was initiated back in 2012. In the final outcome of the project the present management plan for the Great Altay Transboundary Biosphere Reserve was developed together with the application document for the official designation as a UNESCO Transboundary Biosphere Reserve. Developed as a long-term adaptive management plan, the final document meets the established requirements for biosphere reserves, which are the Seville Strategy, the Seville+5 Strategy and the Madrid Action Plan. Furthermore, the management plan serves as an overarching transboundary management strategy for two existing and adjacent biosphere reserves in the Republic of Kazakhstan and the Russian Federation.

a cooperation of:

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