Altai-Sayan Ecoregion Conservation Strategy

FINAL DRAFT VERSION, approved by the Altai-Sayan Steering Committee on 29 June 2012, considering the amendments and comments made during the teleconference of 29 June 2012, as described in the meetings notes of that meeting

COLOFON

Altai-Sayan Ecoregion Conservation Strategy
Full Version

Cover photo: Desert steppe Tuva region (Hartmut Jungius/ WWF-Canon)

Table of Contents

Contribution to WWF Global Conservation Programme

WWF is one of the world's largest conservation organizations, but, even with the help of its numerous partners, it has only finite resources and must focus its efforts. Since its establishment in 1961, WWF has used a variety of methods and strategies to prioritize its activities. In an effort to focus efforts and resources, WWF has developed a Global Programme Framework to act as an outline strategy for its future work. The Global Programme Framework serves the dual purpose of informing external audiences on what WWF does, and of providing internal guidance on the development of priority conservation programmes.

Global Programme 2020 goals	Planned contribution of ASER Strategy goals and objectives
Biodiversity goal - priority places **> Altai-Sayan Montane Forests:** "Biodiversity is protected and well managed in the world's most outstanding natural places"	**Goal 1**: By 2020, the area of ecosystems in the ASER that remain unconverted does not decrease compared to 2010, ensuring ecosystems' biological capacity to harbor biodiversity of global significance.
2020 biodiversity goal - priority species **>** Flagship species - A**sian big cats: Snow leopard** **> Footprint-impacted species: Argali wild sheep and Saiga antelope:** "Populations of the most ecologically, economically and culturally important species are restored and thriving in the wild"	**Goal 3:** By 2020, the population size of Altai Argali in key areas is increased by at least 8% in the Mongolian part and at least 20% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Altai Argali in the Mongolian part of the ASER is increased by at least 15% compared to 2010. **Goal 4:** By 2020, the population size of Mongolian Saiga is increased by at least 25% compared to 2010 in key areas; and the area of occupied habitat by Mongolian Saiga is increased with at least 4% compared to 2010.
	Goal 5: By 2020, the population size of Snow Leopard in key areas remains stable in the Mongolian part and is increased by at least 25% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Snow Leopard remains stable in the Mongolian part and is increased by at least 31% in the Russian part of the ASER compared to 2010.
2020 footprint goal: "By 2020, humanity's global footprint falls below its 2000 level and continues its downward trend, specifically in the areas of energy/carbon footprint, commodities (crops, meat, fish and wood) footprint and *water footprint*"	**Goal 2:** By 2020, the ratio 'km of free flowing key rivers/ total km of key rivers´ is maintained at least 0,89 for Khovd river and 0.65 for Zavkhan river in Mongolian part and 0,85 in Russian part of the ASER; and the annual average flow volume for at critical locations on the key rivers in the ASER (Zavkhan, Khovd, Buyant, Katun, Biya, Tom, Abakan, Ulug-Khem and Enisey) does not change compared to 2010.

Note

The WWF Global Programme Framework states that the establishment of protected areas are important as indicator for measuring success for the biodiversity goal. This is in line with the two objectives of the Econet Strategy of the ASER Strategy:

- **Objective 4.1:** By 2020, a network of protected areas ('econet') encompasses 20% of key biomes in the ASER.
- **Objective 4.2:** By 2020, a network of protected areas ('econet') encompasses at least 35% of Altai Argali habitats, at least 35% of Snow Leopard habitats, and at least 20% of Mongolian Saiga habitats.

Abbreviations

ASER	Altai-Sayan Ecoregion
CBNRM	Community based natural resource management
Econet	Ecological Network (protected area network)
EIA	Environmental Impact Assessment
FSC	Forest Stewardship Council
GFTN	The Global Forest & Trade Network
IRBM	Integrated river basin management
LE	Law enforcement
PA	Protected area
REILI	Responsible extractive industries and linear infrastructure
SEA	Strategic Environmental Assessment
SFM	Sustainable forest management
WWF	World Wide Fund for Nature

Executive Summary

The global significance of the Altai-Sayan Ecoregion (ASER) has been recognized through the designation of two UNESCO World Heritage Sites and its listing as a Global 200 Ecoregion. The Global 200 is a science-based global ranking of the Earth's most biologically outstanding terrestrial, freshwater and marine habitats. The ASER, still largely untouched by human activities, is facing changes in the years to come, due to climate change and developments in economic sectors like hydropower generation, mining and tourism. WWF committed itself in 2010 to develop a *joint* Strategy to ensure and further strengthen conservation efforts for the long-term. The ASER Strategy is WWF's overall plan for conservation, and it offers perspective and direction for future actions.

The ASER Strategy is the foundation of a fundraising approach that is based on the idea of rallying donors behind a joint ecoregional vision and the competitive advantages of WWF. Through this Strategy, WWF is taking conservation of the Altai-Sayan to the next level, aiming to unite key donors behind the integrated management of large-scale, largely intact conservation landscapes.

The process for developing the ASER Strategy involved thorough discussions on biological targets, threats, and suitable strategies for ecoregional conservation, building upon the experience of WWF staff in the region. The development process was designed to be internal, aimed at reaching consensus within the WWF Network. The ASER Strategy will serve as the starting point for conversations and consultations with numerous partners, stakeholders and possible funders within and outside the region, to identify strategic priorities for future programmes and projects in the Ecoregion. The WWF vision for the ASER is that "The Altai-Sayan Ecoregion harbors globally significant biodiversity and provides ecosystem services in an inexhaustible manner, as well as benefits to local communities".

The geographic scope of the ASER Strategy covers the whole of the Altai-Sayan Ecoregion, an enormous area of 1.065.000 km^2, approximately the size of Bolivia and situated in the center of Eurasia. The Ecoregion covers parts of four countries, with 62% of its land being situated in Russia, 29% in Mongolia, 5% in Kazakhstan, and 4% in China. The area contains geographically distinct biomes, consisting of glaciers, mountain tundra, alpine grassland, forest, wetland, steppe, desert and semi-desert that share a large majority of their species, dynamics and environmental conditions. ASER gives life to two of the world's ten largest rivers – the Ob' and the Yenisey, with a total watershed of over 5.5 million km^2. The ASER holds important populations of the Altai Argali, the Snow Leopard, and the Mongolian Saiga (WWF flagship species).

A key initial part of the strategic planning process was to specify the biological conservation targets, specific elements that a project has decided to focus on and whose condition the project ultimately seeks to impact. For the ASER Strategy, ten targets were selected to represent and encompass the full suite of biodiversity and to embody the ecological attributes and functions that are most critical to maintaining the functionality of the whole Altai-Sayan Ecoregion in the long term. The following ecosystems and focal species were selected as biodiversity targets: Forest steppe; Freshwater ecosystems; Glaciers; Mountain tundra and alpine meadow; Semi desert and desert; Steppe; Mountain forests; Altai Argali, Mongolian Saiga; and Snow Leopard. For each target WWF assessed its viability, the ability to withstand or recover from most natural or anthropogenic disturbances and thus to persist for many generations or over long time periods. Overall the viability of the biodiversity targets in the Altai-Sayan Ecoregion are rated 'very good', to 'good'. This means that the target is within the acceptable range of natural variation. This does not mean that conservation action is not needed, on the contrary! Conservation of the ASER offers a unique opportunity to protect a large-scale, essentially *intact* landscape and keep it intact for future generations.

Photo 1: Local Herder, Darvi Mountains (Frans Schpers/ WWF-Netherlands)

Given the many dynamics in a region as enormous as the ASER, WWF performed a situation analysis and a priority-setting exercise that ranked which direct human activities or direct threats, are believed will have the greatest impact on each conservation target over the next 10 years. Thirteen direct threats were identified, of which climate change, pasture degradation from overgrazing and poaching were ranked highest. Other threats include arson; dams and levees; extractive industries; illegal logging; linear infrastructure; multi-tracking (unpaved and illegal roads); unregulated tourism development; unregulated hunting; unsustainable use of water resources; and water pollution. The overall threat rating for the ASER is "high". This means that, *in general*, the threats are likely to be widespread in their scope, affecting the targets across 30-70% of its occurrence or population; that within the scope the threats are likely to seriously degrade or reduce the targets within ten years or three generations and; that the effects of the direct threats can technically be reversed and the target restored, but it is not practically affordable or would take a very long time to achieve.

The pressures on the ecosystems and species in the ASER can be traced back to several main factors. One of these factors is the international, domestic and local need for economic growth, employment, raw materials and agricultural products. The need for economic growth and development, also among the people in the ASER, many living in poverty, leads to an increased demand, harvest and use of natural resources and intensified agricultural practices. A high(er) demand does not have to be a problem in itself, but due to other factors, there is insufficient protection and resources are being used unsustainably. These factors are:

- lack and inconsistency of legislation and regulations;
- weak governance, integrity, and monitoring of governmental policies;
- lack of (transboundary) cooperation and communication between stakeholders;
- low awareness and lack of knowledge about conservation and sustainable use of natural resources;
- weak law enforcement;
- ineffective public participation;

- inadequate land use planning incorporating conservation and;
- weak management capacities of water and protected areas bodies.

Some of these factors are beyond the reach of WWF, but many factors can be tackled by WWF and its partners, and eight strategies were developed accordingly.

The Law enforcement strategy promotes law enforcement in- and outside of the protected areas network through sufficient training and capacity of law enforcement agencies, coordination and cooperation of stakeholders, prosecution, funding, transboundary cooperation and legislation to ensure protection and conservation.

The Climate Adaptation strategy is about increasing knowledge and awareness of relevant stakeholders and governments about climate change and its adverse effects and to develop regular climate change monitoring in the ASER and incorporate adaptation measures into relavant transboundary and regional projects.

The Econet strategy aims ensuring full representation of ecosystems and species in the protected area network and at making the network able to address threats and conserve the full range of biodiversity within its boundaries by effective management practices, improved governance, enforcement and prosecution, professionalism of inspectors, effective communication channels, funding and transboundary cooperation.

The Integrated River Basin Management (IRBM) strategy is about ensuring that water-use policy becomes integrated in the local development agenda, improving the Environmental Impact Assessment (EIA) framework for hydropower development, setting up a water-pricing system and safeguarding the financial self-sustainability of basin level water management authorities.

The Community Based Natural Resource Management (CBNRM) strategy aims to allow communities to effectively manage forests, pastures, water, game, fish and other natural resources to prevent degradation of ecosystems. Important issue is the empowerment and motivation of communities by providing them with the legislative and regulatory mandate to manage their own lands, by creating increased capacity through training, by making funds available for community initiatives through microfinancing and by establishing enabling conditions for relevant agencies (funds and capacity) to monitor the results of CBNRM schemes.

The Responsible Extractive Industries and Linear Infrastructure (REILI) strategy aims at decreasing the negative impacts of construction and existing projects and reducing the impact of multi-tracking by strengthening the legal environment and the role of the public in the implementation of EIA and Strategic Environmental Assessment (SEA) processes and by establishing the enabling conditions for landuse planning that incorporates conservation.

The Sustainable Forest Management (SFM) strategy aims to promote sustainable forest management, decrease pioneer logging and arson throughout the ASER, through Forest Stewardship Council (FSC) certification and ensuring the legality of timber and educational fire prevention campaigns.

Finally, WWF will develop an **ASER Vision Map**. This map is based on a geographic assessment of the current and future economic developments in the ASER. Together with ecological knowledge of biodiversity hotspots it will create the Vision Map, which will be used as an internal screening tool to pinpoint conflict areas and focus WWF conservation efforts regarding landuse planning.

From 2006 to 2011 WWF spend, on average, more than 0,9 million dollar per year on conservation activities in the ASER, of which on average 50% came from government aid agencies, foundations and other donors. For the implementation of the ASER Strategy, WWF envisions the need to scale up at least 75% beyond the current staff capacity, and more partners need to be engaged. The ASER Strategy will help aid WWF in finding key partners to join forces for conservation in the ASER.

Photo 2: Sedum evers, endemic medicinal plant (Hartmut Jungius/ WWF-Canon)

Box 1: Short history of WWF conservation activities in the ASER

WWF commenced its conservation activities in the ASER in 1996, initially in Mongolia, then in 1998 in Russia. The first project, funded by WWF Netherlands, aimed at 'Ensuring Long-Term Conservation of Biodiversity of Altai-Sayan Ecoregion', covered Altaiski krai and Republics of Altai, Tuva, Khakassia in Russia and four aimaks in Mongolia. The goal of the project was to conserve the biodiversity in the ASER for the next 50 years and beyond. The activities that were initially initiated by WWF were further supported by the Global Environment Facility (GEF) through cooperation with United Nations Development Programme (UNDP) country offices in Mongolia, Russia and Kazakhstan. To forge a common understanding and vision for sustainable development and conservation in the ASER, WWF facilitated an international conference called the Altai-Sayan Forum in Belokurikha, Russia on 2-9 October 1999. The idea of developing a comprehensive Ecoregional Conservation Action Plan, based on national-level Conservation Action Plans, was suggested. Also, the Altai-Sayan Millennium Initiative, to conserve biological diversity as a global favour to all humankind, was accepted at this event. It was signed by the governor of Republic of Khakassia, heads of four Mongolian aimaks, the director of WWF Russia and by the heads of all regions of the project, making it an important political document. In 2000, an agreement was signed between WWF, UNDP-GEF and the Russian Ministry for Natural Resources (MNR) for the development of a GEF "PDF-B" funding proposal, resulting in WWF being commissioned to draft the Altai-Sayan Ecoregion Conservation Action Plan (ASECAP) for the Russian part of ASER, with work starting in April 2002. WWF Mongolia played a similar crucial role in preparing the UNDP-GEF project in Mongolia. ASECAP provided a framework for donors and institutions to pursue specific actions. In the same year (2002), a Regional Steering Committee was established to support the UNDP/ GEF programme implementation on international level with the purpose to ensure strategic planning and financial coverage for project activities.

1- Introduction

Conservation of the Altai-Sayan Ecoregion (ASER) offers a unique opportunity to preserve a gigantic, practically *pristine* landscape and thus secure it, and the ecological functions it fulfils, for future generations. The Altai-Sayan Ecoregion differs greatly from most other ecoregions in that respect, that many are already severely threatened by a multitude of factors and where predicted area losses sometimes amount to over 50% by 2030 (WWF International, 2007). Hence our work in the Altai-Sayan is of a different nature and challenges us to show that there are alternative but sustainable ways to manage large areas.

The environment of the ASER is threatened by economic developments, which are likely to increase during the next decades. Hydropower generation, destructive mining, degradation of pastures, deforestation, forest degradation, and tourism development are pressing issues, and the negative effects could worsen due to climate change (Kokorin (ed.), et al., 2011). These threats and their underlying causes should be minimized to conserve the region's unique biological features and intactness. WWF commenced its conservation activities in the ASER in 1996, initially in Mongolia, then in 1998 in Russia (Box 1; previous page). The two WWF offices in Mongolia and Russia, together with WWF China and partners in Kazakhstan, are committed to develop a *joint* ASER Strategy to ensure and further strengthen conservation efforts for the long-term. The ASER Strategy is WWF's overall plan for conservation, and it offers perspective and direction for future actions. The strategic planning process for the ASER Strategy commenced at the end of 2010 and was finalized in 2012 after an intensive period of online meetings, workshops[1] and e-mail communication within the ASER Development team (Annex 1).

The process for developing the ASER Strategy involved thorough discussions on biological targets, threats, opportunities and suitable strategies for ecoregional conservation, building upon the experience of WWF staff in the region. The development process was designed to be internal, aimed at reaching consensus within the WWF Network. The ASER strategy will serve as the starting point for conversations and consultations with numerous partners, stakeholders and possible funders within and outside the region, to identify strategic priorities for future programmes and projects in the Ecoregion.

The ASER Strategy was developed using the WWF Standards of Conservation Project and Programme Management (PPMS, Annex 2), which are in turn based on the Open Standards for the Practice of Conservation (The Conservation Measures Partnership, 2007). The Standards are rooted in a long history of project and programme planning and management in WWF, across other conservation organizations, and in other disciplines.

The ASER Development team would like to thank all of those who provided input and support in preparation of the ASER Strategy and hopes that all who were involved will continue to be a supporter of the Altai-Sayan Ecoregion and contribute to the implementation of the Strategy to conserve the unique biodiversity and largely untouched landscapes.

[1] Three multi-day planning workshops were organized, namely in December 2010 in Moscow, Russia; in June 2011 in Ulaanbataar, Mongolia and in October 2011 in Zeist, the Netherlands.

Photo 3: The Ukok Plateau, Republic of Altai (Denis Bogomolov/ WWF-Russia

2- Outlining the Altai-Sayan Ecoregion

2.1 Background

The global significance of the Altai-Sayan Ecoregion has been recognized through the designation of two UNESCO World Heritage Sites, the listing of one site for nomination (UNESCO World Heritage Convention, 2012) and its listing as a Global 200 Ecoregion (Olson & Dinerstein, 2002); Box 2. Furthermore, the ASER holds important populations of the *Near-Threatened* Altai Argali (*Ovis ammon ammon)*, the *Endangered* Snow Leopard (*Panthera uncia)*, and the *Critically-Endangered* Mongolian Saiga (*Saiga tatarica ssp. mongolica)* (IUCN Red List, 2011). These species are often viewed as flagship species[2] and indicators for the overall health of the Ecoregion (WWF, 2011b; WWF Mongolia, 2010a; Felidae Conservation Fund, 2009; WWF Mongolia, 2010b).

The ASER is distinctive with its diverse ethnic and cultural heritages. There are several indigenous peoples groups that hold traditional knowledge on natural resources management. The population of the AESR is sparsely located, with an average population density of 2.7 people/ km^2, varying regionally between 0.5 and 26.2 people/ km^2. In general, the population in the ASER is decreasing, even up to -37.4% in the Zavhan region (Mongolia), see Figure 2, next page. Biodiversity conservation should be achieved with participation of the local people, who live with and rely on the natural resources for their livelihoods. For the past several years, the economy in the ecoregion has fallen behind and stagnated compared to the national average and people's reliance on natural resource exploitation is increasing (more information on the socio-economic background can be found in Annex 3).

Box 2: The Global 200 Ecoregions

Biodiversity is not spread evenly across the earth, but follows patterns determined by climate, geology and the evolutionary history of the planet. One expression of these patterns are 'ecoregions', relatively large units of land or water that contain a distinct assemblage of natural communities sharing a large majority of species, dynamics, and environmental conditions. Ecoregions are suitable units for conservation planning because they correspond to the major driving ecological and evolutionary processes that create and maintain biodiversity. In 1997, WWF embarked on ecoregion conservation and identified the most valuable and vulnerable ecoregions in the world. The list of priority ecoregions, known as 'The Global 200 Ecoregions', provides a science-based ranking for biodiversity conservation at a global scale (WWF, 2011a).

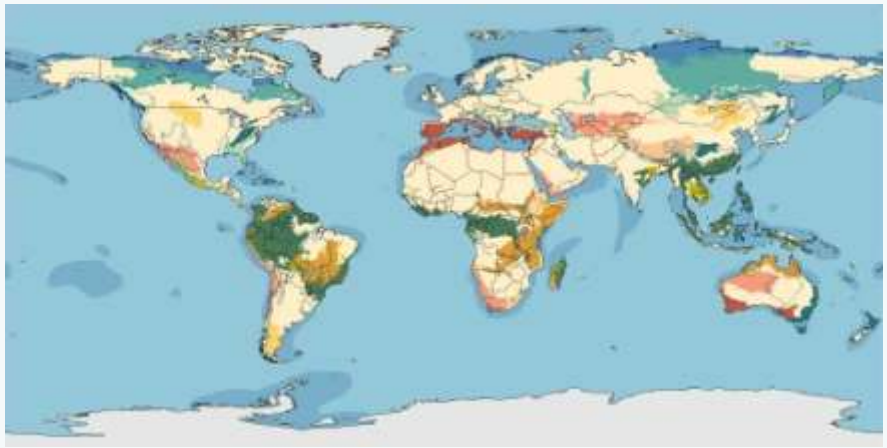


Figure 1: G200: ecoregions map (WWF Global, 2000)

[2] A flagship species is a species selected to act as an ambassador, icon or symbol for a defined habitat, issue, campaign or environmental cause.

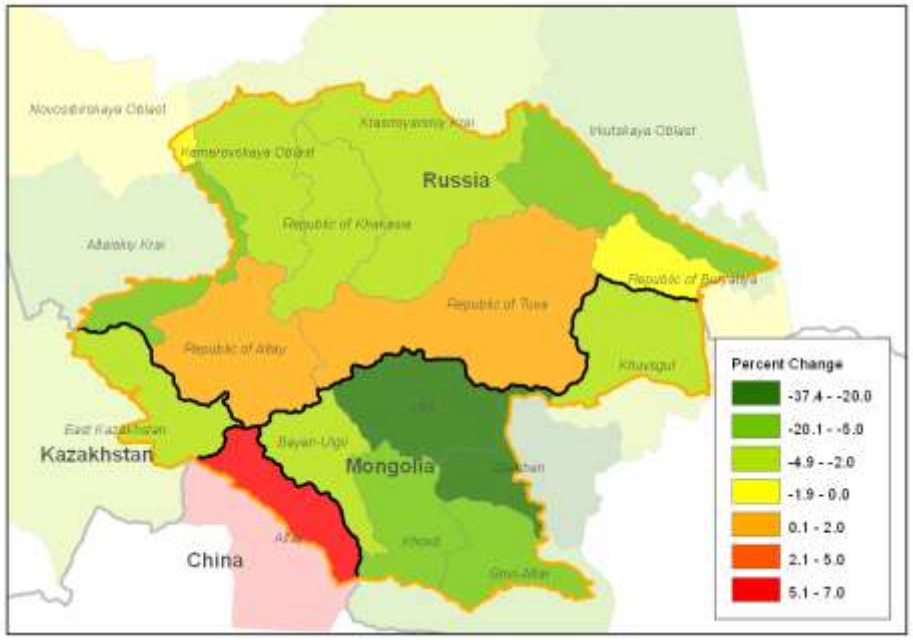


Figure 2: Spatial distribution of population change in % (MottMacDonald, 2012).

2.2 Geographic Scope

The geographic scope of the ASER Strategy covers the whole of the Altai-Sayan Ecoregion, an enormous area of 1.065.000 km^2, approximately the size of Bolivia (Wikipedia, 2011) and which is situated in the center of Eurasia. The ecoregion covers four countries, with 62% of its land being situated in Russia, 29% in Mongolia, 5% in Kazakhstan, and 4% in China. The ASER encompasses the Altai and Sayan Mountains including a number of mountain ranges separated by intermountain depressions. The ASER stretches 2000 km from west to east, starting from the Kazakhstan steppes to Baikal Lake, and 1500 km from north to south, from the transition zone from taiga forests in the north and ending on the border of Gobi desert in the south (Figure 3).

The area contains geographically distinct biomes, consisting of glaciers, mountain tundra, alpine grassland, mountain forest, riparian ecosystems, steppe, desert and semi-desert that share a large majority of their species, dynamics and environmental conditions. The Altai and Sayan Mountains are extremely rugged, with forests stretching high into the mountain valleys and with glaciers in the higher valleys. Forests and forest steppe occupy approximately one half of the area (39%), with boreal species prevalent in the higher elevations and deciduous species found in the foothills and lower elevations. Steppes occupy 24% of the area, which are found primarily in the intermountain depressions and on southern slopes. Mountain tundra and alpine and sub-alpine meadows occupy 17%, deserts and semi-deserts account for 6%, and riparian biomes and lakes are found in only 4% of the area (Figure 4).

ASER gives life to two of the world's ten largest rivers – the Ob' and the Yenisey, with a combined total watershed of over 5,5 million km^2. These two rivers are crucial for the quality and health of freshwater ecosystems for an area as large as Europe.

According to the Millennium Ecosystem Assessment (2005) the ASER is "one of the world centers of plant diversity. Its biological, landscape, historical, cultural and religious diversity is unique". The ASER holds more than 3700 species of vascular plants, forming hundreds of different types of plant communities. Among them are 700 threatened or rare species, more than 300 endemic species and more than 600 sub-endemic species, whose ranges exceed the boundaries of the region to some extent (Siberian Environmental Center, 2008; Millenium Ecosystem Assessment, 2005). Fauna consists of over 650 vertebrate species of which 6% are endemic.

Figure 3: Geographic map of Altai-Sayan Ecoregion (MottMacDonald, 2012)

2.3 Conservation Targets and Goals

A key initial part of the strategic planning process was to specify the biological conservation targets, which are representative of the ecology and threat conditions of the Ecoregion. For the ASER Strategy ten targets were selected to represent and encompass the full suite of biodiversity and that embody the ecological attributes and functions that are most critical to maintaining the functionality of the whole ASER in the long term, see Figure 4 for distribution of the targets. The following ecosystems and focal species were selected as biodiversity targets, listed alphabetically:

Ecosystems:

- Forest steppe;
- Freshwater ecosystems;
- Glacier;
- Mountain forest;
- Mountain tundra and alpine meadow;
- Semi desert and desert;
- Steppe;

Species:

- Altai Argali;
- Mongolian Saiga;
- Snow Leopard;

For each target WWF assessed its viability. Target viability is the ability of a biodiversity target to withstand or recover from most natural or anthropogenic disturbances and thus to persist for many generations or over long time periods. Furthermore, Key Ecological Attributes (KEAs) were determined for each target: aspects of a target's biology or ecology that, if missing or altered, would lead to the loss of that target over time (20-50 years). Any given key ecological attribute will vary naturally over time. The range of variation of a key ecological attributes indicators is "acceptable" when it would allow the target to persist over time. Based on the estimate of the acceptable range of variation, a viability rating scale can be built. This scale involves establishing the following boundaries for an indicator based on calculated thresholds:

- Very Good – Ecologically desirable status; requires little intervention for maintenance.
- Good – Indicator within acceptable range of variation; some intervention required for maintenance.
- Fair – Outside acceptable range of variation; requires human intervention.
- Poor – Restoration increasingly difficult; may result in extirpation of target.

Identification of KEAs, and associated measurable indicators, allows the target viability to be clearly assessed and monitored for success of conservation actions. Please consult Annex 4 for a detailed summary of the Viability Assessment, which presents in table format for each target: the key ecological attributes, relevant indicators, current and desired viability rating.

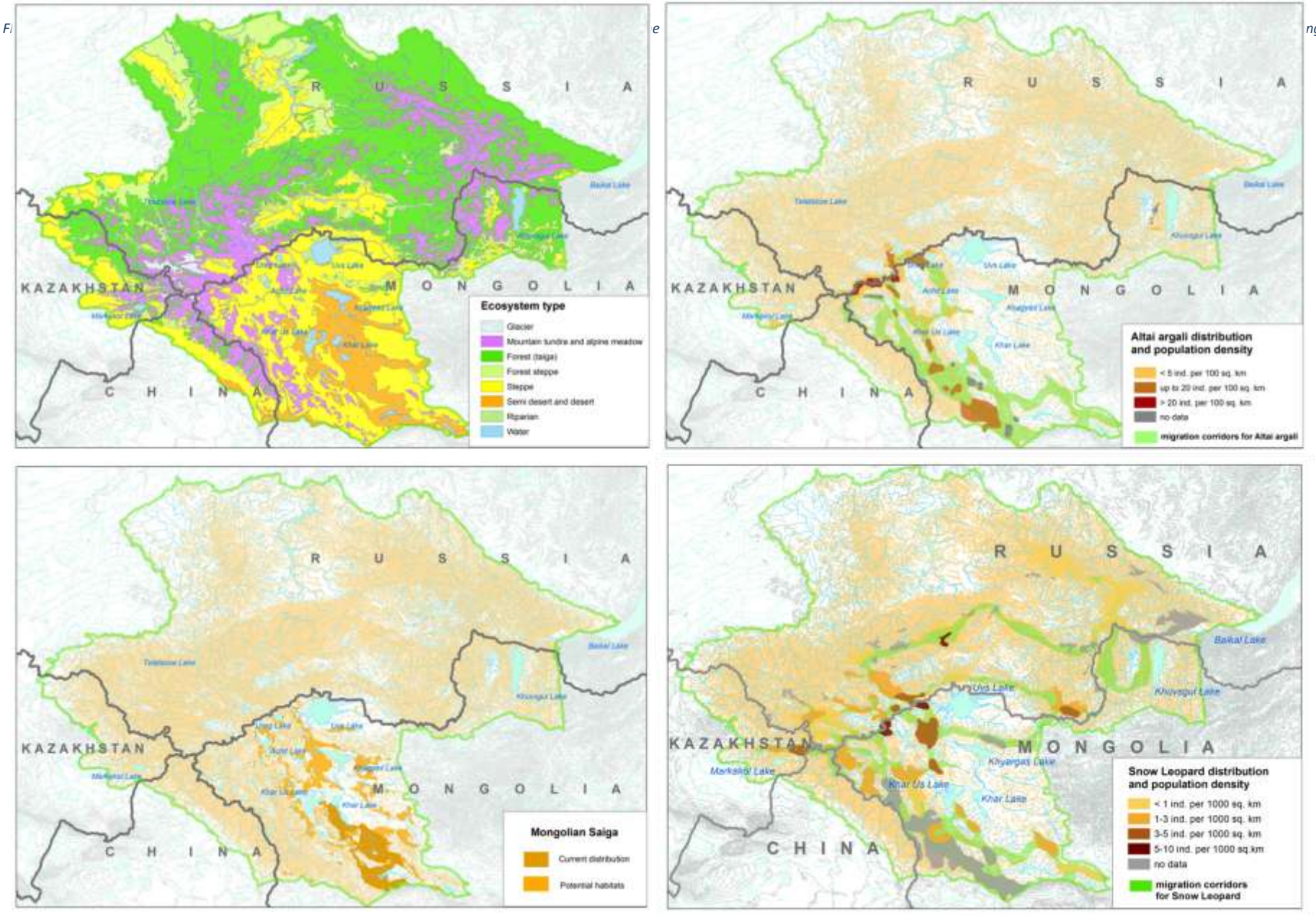


Figure 4: Maps of Altai-Sayan Ecoregion showing the distribution of eight ecosystem types, and three key species (WWF Russia, 2012a)

Overall the viability of the biodiversity targets in the ASER is rated 'very good', to 'good' (Table 1). This means that the indicator measuring the changes of the key ecological attribute is within the acceptable range of natural variation, but that some human intervention may be required for maintenance for the conservation of the biological target. This reflects the healthy state and often pristine quality of habitats across much of ASER. In order to maintain this healthy rating, it is important to protect the ASER from deterioration. In the ASER the socio-economic development is dependent on the utilization of natural resources. Due to poverty of local people and the expected (international) interest for ASER's natural resources, increased pressure for industrial and infrastructure projects will apply to the ASER (Mongolia Ministry of Nature Environment (MNET), 2009; UNDP, Government of Russian Federation, & GEF, 2005).

Table 1: Summary of Viability assessment for current state (2010) per country in the ASER (details Annex 4); Key: RU = Russia, MNG = Mongolia, KZ = Kazachstan, CH = China, VG = Very Good, G = Good, F = Fair, n.a. = not applicable

Target	RU	MNG	KZ	CH
Forest steppe	VG	VG	VG	G
Freshwater ecosystems	G	G	G	G
Glacier	VG	VG	VG	G
Mountain forest	VG	VG	G	VG
Mountain tundra and alpine meadow	VG	VG	VG	G
Semi-desert and Desert	VG	VG	VG	G
Steppe	VG	VG	G	G
Altai Argali	G	G	F	F
Mongolian Saiga	n.a.	F	n.a.	n.a.
Snow Leopard	F	G	F	F

In the following paragraphs each target is described in some detail, including its desired state (viability rating) and the conservation goal[3].

2.3.1 Forest Steppe

The Altai Mountain Forest Steppe is found in intermountain depressions where it forms the transition zone between steppe and mountain forests. It covers about 10% of the ASER. Principal threats include logging for fire wood and problems associated with livestock, e.g., pasture degradation from overgrazing (World Wildlife Fund & Devee, 2001a) and fires. The current state of this biome is rated 'very good', and 'good' in the Chinese part of the ASER.

Goal: By 2020, the area of unconverted[4] forest steppe in the ASER does not decrease compared to 2010.

2.3.2 Freshwater ecosystems

The ASER gives life to two of the world's largest ten rivers, the Ob and the Yenisey (WWF Russia, 2009), as well as many smaller rivers and streams and their associated riparian vegetation. Much of the freshwater is accumulated in ice and snow. In the ASER there are a number of freshwater basins with unique biodiversity, such as the Great Lakes Basin, Khovsgol Lake, Darkhad Depression and Bulgan River Basin, which are important for the survival of some rare and endangered migratory birds like the Swan Goose (*Anser cygnoides)* (Batnasan, 2003). The freshwater ecosystems are highly vulnerable to human activity such as agriculture, animal husbandry and hydropower development. The current state of the freshwater ecosystems is rated 'good'.

[3] A goal is a specific statement detailing a desired impact of a project. It should be ambitious and yet realistic. A good goal is - Linked to Targets; - Impact Oriented; - Measurable; - Time Limited; - Specific.

[4] Unconverted means that the area contains predominantly natural vegetation, even though it may be altered via grazing activities.

Goal: By 2020, the ratio 'km of free flowing key rivers/ total km of key rivers´ is maintained at least 0,89 for Khovd river and 0.65 for Zavkhan river in Mongolian part and 0,85 in Russian part of the ASER; and the annual average flow volume for at critical locations on the key rivers in the ASER (Zavkhan, Khovd, Buyant, Katun, Biya, Tom, Abakan, Ulug-Khem and Enisey) does not change compared to 2010.

2.3.3 Glacier

While glacier only form 1% of the ASER, the Altai contains about 70% of the area of all south-Siberian glaciers, which provide fresh water to the upper tributaries of the Ob river (Surazakov, Aizen, Aizen, & Nikitin, 2007). The water from Ob and Yenisey rivers accounts for 40% of the total river inflow into the Arctic Ocean. There are 2,340 glaciers, covering 0.8% of the ASER. During the last 30 years the rate of glacier area loss increased by factor 1.8. In the Mongolian part of the ASER glacier reductions of 10-30% are found (Kadota & Davaa, 2004). In the Russian part of the ASER glaciers have been in continuous retreat, small glaciers by 20-40% (some vanished) and large glaciers by 8-20% (Kokorin (ed.), et al., 2011). In the Mongolian part of the ASER the area of glacier decreased by 6% between 1945 to 1985, but the retreat of glaciers has intensified in the last decades. Amongst the three glaciers Kharkhiraa, Turgen and Tsambagarav the area decreased by respectively 27.3, 32.5 and 31.9% between 1940 to 2002 [Davaa et al., 2005] in (Davaa, Oyunbaatar, & Sugita, 2007). Despite these changes, the current state of the glaciers is rated 'very good' and 'good' in the Chinese part of the ASER.

2.3.4 Mountain forest

Mountain forests cover about 39% of the ASER. These forests have high biodiversity because they are the transitional zone for vegetation, including plants from two types of habitat: Siberian taiga and Mongolian steppe. The flora consists of about 800 species (World Wildlife Fund & Carpenter, 2001a) and the fauna is characterized by forest ungulates species such as reindeer (*Rangifer tarandus)*, red deer (*Cervus elaphus)* and Siberian musk deer (*Moschus moschiferus)*. The mountain forests are threatened by (illegal) logging activities and forest fires. The current state of this target is rated 'very good' and 'good' in the Kazach part of the ASER.

Goal: By 2020, the area of unconverted mountain forest in the ASER does not decrease compared to 2010.

2.3.5 Mountain tundra and alpine meadow

Mountain tundra and alpine meadow are a relatively large part of the Altai-Sayan landscape comprising 17% of the Ecoregion. Lichens, mosses and vascular plants, well-adapted to the extreme tundra environment, form the principal ground cover. Below 1.800m, open stands of Siberian pine, Siberian fir and dwarf birch form mosaics in the landscape. Several species and subspecies are endemic to this area, e.g. Siberian zokor (*Myosplax myospalax)* and the birch mouse (*Sicista pseudonapaea)*. Mountain tundra and alpine meadow cover 17% of the ASER. Most of this area remains quite untouched, although mining occurs in some areas (World Wildlife Fund & Carpenter, 2001b). The viability assessment of mountain tundra and alpine meadow is 'very good' and 'good' in the Chinese part of the ASER.

Goal: By 2020, the area of unconverted mountain tundra and alpine meadow in the ASER does not decrease compared to 2010.

2.3.6 Semi-desert and desert

The semi-desert and desert occur in the Great Lakes Basin in western Mongolia, comprising 6% of ASER and representing a unique ecosystem. The lower parts are separated by wide, dry valleys scattered with salt pans and small lakes and in the eastern parts dunes occur. Several globally endangered species survive in the region, including the Mongolian Saiga. The vegetation is sparse and mainly characterized by semi-shrubs, shrubs and some grasses. There are 13 endemic plant species in the (semi-)desert area (World Wildlife Fund & Devee, 2001b). Some of the last vast reedbeds of central Asia remain here, and the sharp contrast of the semi-arid desert-steppe bordering the diverse wetlands makes the Great Lakes Basin a distinctive landscape. Overgrazing and overstocking around the open water sources,

deforestation of riparian areas, multiple tracks and hydropower development threaten the (semi-) desert area (World Wildlife Fund & Devee, 2001b). The current state is rated 'very good' and 'good' in the Chinese part of the ASER.

Goal: By 2020, the area of unconverted semi-desert and desert in the ASER does not decrease compared to 2010.

2.3.7 Steppe

Steppe systems, comprising 24% of ASER, are key habitats for ungulates such as Mongolian Saiga, Goitered and Mongolian gazelle (*Gazella subgutturosa* and *Procapra gutturosa* respectively). Altai Argali is also strongly linked to the High Mountain Steppe. Traditional herding practices have co-existed with rich biodiversity for thousands of years, while modern herding has led to an increase of livestock and its concentration around the settlements and water sources. This has caused pasture degradation from overgrazing of grazing lands in some places. Steppe's viability is rated 'very good' in the Russian and Mongolian and 'good' in the Kazakh and Chinese part of the ASER.

Goal: By 2020, the area of unconverted steppe in the ASER does not decrease compared to 2010.

2.3.8 Altai Argali

The Altai Argali is the largest wild sheep in the world and it occurs in the highland pastures of the Altai Mountains of Mongolia and adjacent regions of Russia, China and Kazakhstan (Maroney, 2005). The Argali sheep is threatened due to competition for pastures with domestic livestock and poaching (Maroney, 2005). Total population of Argali within ASER is estimated at 4.000 – 4.500 individuals, from which a substantial part, about 20%, is located along Russian-Mongolian border. The current status of Altai Argali is 'good' in the Russian and Mongolian and 'fair' in the Kazakh and Chinese part of the ASER.

Goal: By 2020, the population size of Altai Argali in key defined areas is increased by at least 8% in the Mongolian part and at least 20% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Altai Argali in the Mongolian part of the ASER is increased by at least 15% compared to 2010. * Key areas are: Sielkhem mountain range, Gulzat and Tsagaan shuvuut mountain, Khokh Serkh mountain range, Munkhkhairkhan range, Myangan Ugalzat mountain range, Sailugem, Chikchacheva Ridges, Momgun-Taiga massif and Tsagan-Shibetu Ridge.

2.3.9 Mongolian Saiga

The Mongolian subspecies of Saiga is endemic to western Mongolia. The species is vulnerable to habitat competition with livestock, poaching, and extreme natural disasters such as cold winters and droughts. All three factors together led to an observed population decline of over 80%, to about 750 animals in 2004 (Mallon, 2008). Severely skewed sex ratios are leading to reproductive collapse; furthermore, more than 95% of the total population of Mongolian Saiga exists in one location (Mallon, 2008). Today, Mongolia Saiga can be found in Uushiin Gobi, Durgun steppe, Khuisiin Gobi, and Shargiin Gobi in the Great Lakes' depression to the south of Khar Us Lake in Western Mongolia. Mongolian Saiga is the flagship species of desert steppe in the Great Lake depression. About 3000 individuals were recorded in 2008 and about 8.000 in 2010 (Large Herbivore Network, 2011). Although the status of the species has improved significantly, high numbers of livestock and unsustainable pasture management continue to be big threats for the Mongolia Saiga. The viability rating for Mongolian Saiga is 'fair'

Goal: By 2020, the population size of Mongolian Saiga is increased by at least 25% compared to 2010 in key areas*; and the area of occupied habitat by Mongolian Saiga is increased with at least 4% compared to 2010. * Key areas are: Sharga, Khuis gobi, Chandmani Khuren tal.

2.3.10 Snow Leopard

The Snow Leopard inhabits the high mountains of Central Asia, often at very high altitudes with extremely low winter temperatures, steep and rocky terrain and far away from sheltering forests. But in the ASER this wild cat can live at the elevation of 500-600 m above sea level in suitable habitats. Across its range and over the last two decades the Snow Leopard population in Central Asia decreased approximately 20%, due to habitat and prey loss, poaching and retaliation killing (Jackson, Mallon, McCarthy, Chundaway, & Habib, 2008). Population size of Snow Leopard in the ASER is estimated between 650-950 individuals. The Snow Leopard hunts mainly wild ungulates, but also livestock such a sheep, goats, and occasionally horses or cattle. Suitable habitat of snow leopard overlaps with other important species like the Siberian ibex (*Capra sibirica)*, Altai Argali, and Altai snowcock (*Tetraogallus altaicus)*, therefore the Snow Leopard can be seen as an umbrella species for the high mountainous areas. Viability rating for Snow Leopard is 'fair' in the Kazakh, Chinese and Russian part and 'good' in the Mongolian part of the ASER.

Goal: By 2020, the population size of Snow Leopard in key areas remains stable in the Mongolian part and is increased by at least 25% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Snow Leopard remains stable in the Mongolian part and is increased by at least 31% in the Russian part of the ASER compared to 2010. * Key areas are: Sielkhem mountain range, Gulzat and Tsagaan shuvuut mountain, Turgen & Kharkhiraa Mountain, Altan Khukhii, Tsambagarav Mountains, Jargalant-Bumbat, Baatarkhairkhan mountain range, Argut River Watershed, Chikhachev Ridge, Mongun-Taiga Massif, Tsagan-Shibetu Ridge, Sayano-shushensky Nature Reserve and its buffer zone, Sengelen Ridge, Tunkinsky Ridge.

Photo 4: Snow Leopard (Naturepl.com/ Lynn M. Stone/ WWF)

Table 2: Prioritization of Threats; Key: R = Russia, C = China, K = Kazachstan, M = Mongolia and L = low threat, M = medium threat, H = high threat, VH = very high threat.

Threats \ Targets	Forest steppe				Fresh water ecosystems				Glacier				Mountain Tundra & Alpine Meadow				Semi-desert & desert				Steppe				Mountain forests (taiga)				Altai Argali				Mongolian Saiga				Snow leopard				Summary Threat Rating			
	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN	RU	CH	KZ	MN
Arson	M	M	M	L																	M	M	M	L	M	M	M	M													M		M	L
Climate Change	L	M	M	M		H	H	H	H	H	H	VH	M	H	H	M		M	L	M	L	M	L	M		M	M	M	L	M	M	M				M	L	M	H	M	H	H	H
Dams and Levees			L		H	M	M	H											L				L																	M	M	L	M
Extractive Industries	L	M	M	L	L	M		M					L	L	L	L		L	L	L	L	L	L	L	L	L	L		L	L	L	M				M	L	L	L	M	M	M	L	M
Illegal Logging	L	M	M	M				M																	L	M	M	M													L	M	M	M
Linear infrastructure	L	M	H										L	L	L			M	M	L	L	M	M	L	L	M	L		M	M		M				H	L	L		M	L	M	M	M
Multi-tracking (unpaved & illegal roads)		M	M										L	L	L			M	L	M	L	M	M	M		M										H					L	M	M	M
Pasture Degradation from Overgrazing	L	M	L	M				H					L	L	L			M	M	H	L	M	H	M		M			M	M		H				H	M	M		H	M	M	M	H
Poaching																													H	H	VH	L				H	H	H	VH	H	H	H	VH	H
Unregulated Hunting																															L	M											L	M
Unregulated Tourism Development	L	M	L	M	M	M	L	L					L	L				M	L		L	M	L		L	M	L		L	M	L	L					L	L	L	L	L	M	L	L
Unsustainable Use of Water Resources					L	M	M	M																																	L	M	M	L
Water Pollution					L	M	H	H																																	L	M	H	M
Summary Target Ratings:	L	M	M	M	M	M	M	H	H	H	H	H	L	M	M	L		M	L	M	L	M	M	M	M	M	M	M	M	M	M	M				H	M	M	M	H	H	H	H	H

3- Situation analysis

The purpose of this chapter is to present those dynamics that are at odds with the long-term ecological viability of the region. On the following pages, WWF explores the negative implications of the current developments in the ASER, the related driving social, economic, political, and institutional processes affecting biodiversity targets, and what opportunities for conservation exist.

3.1 Threats

To gain a better understanding of the many dynamics in a region as enormous as the ASER, WWF executed a study to map the current and future economic developments of the ASER to provide insights in the severity and scope of threats like hydropower generation, mining and infrastructure development. Next, WWF performed a priority-setting exercise that ranked which direct human activities or direct threats[5], have the greatest impact on the biome as a whole. Table 2, on previous page, presents the results of this exercise. It represents an absolute threat ranking, based on expert opinion (WWF staff working in ASER), for each target, projected from 2010 over the next ten years. Each threat was assessed by the team of experts, who determined for each target the extent of the threat on a country level. Three criteria were used to characterize each threat-target pair, and each cell in the Table 2 is based on a combination of:

1. Scope: what % of each target is affected;
2. Severity: where the threat occurs, how much is the target affected; and
3. Irreversibility: how reversible are the impacts themselves.

Details on how the threat ranking was completed can be found in Annex 5.

[5] A direct threat is a human action that immediately degrades one or more biodiversity targets. For example: ´logging´ or ´fishing´.

Thirteen direct threats were identified, in alphabetic order:

1. Arson;
2. Climate change;
3. Dams and levees;
4. Extractive industries;
5. Illegal logging;
6. Linear infrastructure;
7. Multi-tracking (unpaved and illegal roads);
8. Pasture degradation from overgrazing;
9. Poaching;
10. Unregulated hunting;
11. Unregulated tourism development;
12. Unsustainable use of water resources;
13. Water pollution.

Poaching, pasture degradation from overgrazing, water pollution and climate change are ranked highest for the ASER. Table 2 also shows that Snow Leopard, Mongolia Saiga, freshwater ecosystems and glaciers are perceived to be the most threatened targets over the next 10 years. The overall threat rating for the ASER is “high”. This means that, *in general*,

- the threats are likely to be widespread in their scope, affecting the targets across 30-70% of its occurrence or population;
- that within the scope the threats are likely to seriously degrade or reduce the targets by 30-70% within ten years or three generations (of the specific species) and;
- that the effects of the direct threats can technically be reversed and the target restored, but it is not practically affordable or would take 21-100 years to achieve this (The Conservation Measures Partnership, 2007).

Please be aware that the overall threat rating is produced from an algorithm combining all direct threats on all of the targets. Even though individual threats might not be ranked as ‘high’ or ‘very high’, together all threats make the case for conservation action, especially for a region which is still largely intact.

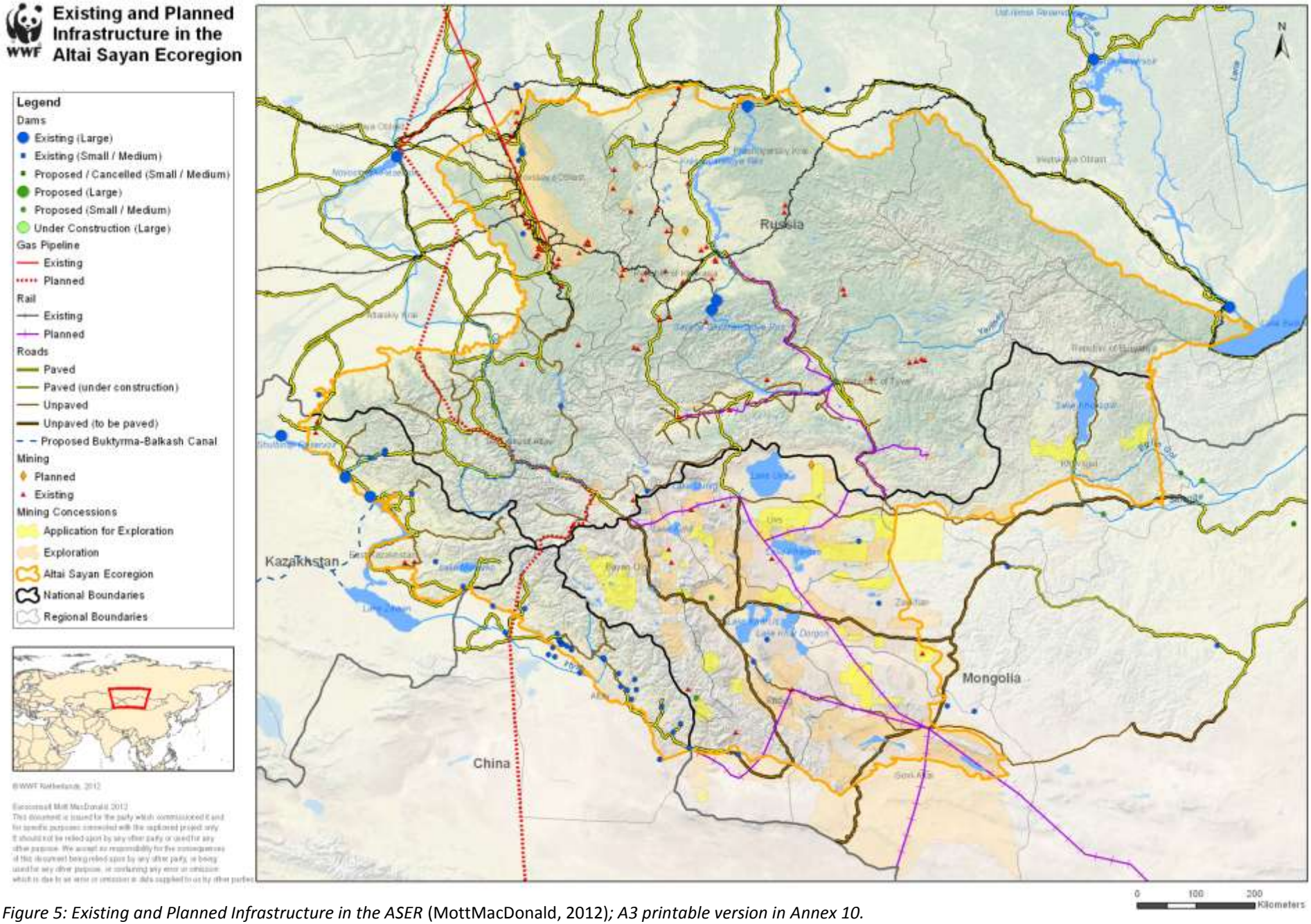


Figure 5: Existing and Planned Infrastructure in the ASER (MottMacDonald, 2012)*; A3 printable version in Annex 10.*

In the following paragraphs each threat is briefly described, based on input from WWF field officers and experts, literature and the results of the study by MottMacDonald (2012), which mapped and describes the current and future economic developments of the ASER; (Figure 5, previous page).

3.1.1 Arson

Illegal fire, or arson, is seen as a moderate threat for the forest and steppe ecosystems in the ASER, and it is expected that the impact will increase in the future (Millenium Ecosystem Assessment, 2005), in part due to climate change. Both forest and steppe are sensitive to fires, especially during periods of high temperature and low precipitation. According to the satellite monitoring system 17.928 fires were recorded in the Russian portion of the ASER covering 8.3 million hectares. Yearly the area is exposed to 1.700 fires, of which 1.100 occur in forest areas and damage 50 to 70 thousand hectares (Shishikin, et al., 2012). It is estimated that over 87% of the fires in the ASER are caused by humans (Jacob & Tobiasen, 2011; Brukhanov, 2009). Arson is a 'medium' threat in the Russian and a 'low' threat in the Mongolian part of the ASER.

3.1.2 Climate Change

Both WWF Russia and WWF Mongolia have completed climate vulnerability change assessments. WWF Russia focused on the impacts on ecosystems, population and economy in the Russian part of the ASER (Kokorin (ed.), et al., 2011). WWF Mongolia looked at the opportunities and challenges of climate change in the freshwater systems of Great Lakes Basin (Batima, Batnasan, & Lehner, 2004) and a governmental assessment was published in 2010 (Dagvadorj, Natsagdorj, Dorjpurev, & Namkha, 2010). Results of these assessment show that warming is taking place. The average rate of warming during 1976 and 2008 in the Russian part of the ASER was 1,85^{0}C, which is judged quite significant (Kokorin (ed.), et al., 2011). Additionally, forecasts predict the increase of the annual maximum temperatures to continue with another 3-4^{0}C during the next 20-30 years, with regional variations (Kokorin (ed.), et al., 2011). In Mongolia an increase of the annual mean air temperature of 2,14^{0}C during 1940-2008 was measured (Dagvadorj, Natsagdorj, Dorjpurev, & Namkha, 2010). Besides temperature increase, the ASER is impacted by increased period of droughts, reduced precipitation, permafrost degradation, earlier dates of river ice break, decreased thickness of ice cover, changes in annual precipitation leading to changes in water run-off and increased probability of dangerous floods, increase of evaporation, and acidification of lakes (Kokorin (ed.), et al., 2011). Climate change affects all biological targets in the ASER, but in different ways and with different severities, from 'low' to 'very high.'

3.1.3 Dams and levees

In general, dams and other water infrastructures affect freshwater ecosystems by severing or changing connections between different parts of the river (WWF Global Freshwater Programme, 2005). They:

- Disconnect rivers from their floodplains and wetlands;
- Reduce speed of water flow;
- Affect migratory patterns and reproductive ability of aquatic species;
- Prevent natural downstream movement of sediments affecting coastal fisheries for example;
- Eliminate seasonal runoff and flood pulses;
- Affect the quality (e.g. temperature) of the water;
- Affect the waste processing capacity of rivers.

Damming is perceived as a ‘medium’ to ‘high’ threat to the freshwater ecosystems in the ASER.

The Siberian rivers have been heavily dammed and regulated during the Soviet era with some of the world’s largest dams and impounded areas on the Yenisei and Ob Rivers. These dams are both inside and beyond the northern boundaries of the ASER (Figure 6; next page). The largest of these hydroelectric dams (and reservoirs) are the Krasnoyarskoye Reservoir (6.000 MW), Sayano-Shushenskaya Dam (2.560 MW), Novosibirsk Reservoir (400 MW), Maynskaya HPP (320 MW), Irkutsk HPP (662.4 MW), Bratsk Reservoir (4.500 MW), Ust-Ilimsk HPP (3.840 MW) and Kureyska

Reservoir (600 MW). Russia is planning to develop further hydropower dams on the Siberian Rivers of a similar scale to the existing dams. Almost all these dams are in Northern Siberia, downstream of the pre-existing dam structures. The exceptions are the Altai dam on the Katun River (Russia), the Chibit Dam on the Chuya River (Russia) and the Bulgan River Dam and Erdeneburen Dam (Khovd) , which are within the ASER area (MottMacDonald, 2012).

Kazakhstan also has several large dams on the edge of the ASER which impound the Irtysh River. They are the Ust-Kamenogorsk HPP (315 MW), Bukhtarma HPP (750 MW) and Shulbinsk HPP (702 MW) (MottMacDonald, 2012).

China has a large number of relatively small dams (for irrigation and hydropower) within and on the edge of the ASER.

In contrast, the Mongolia rivers have very few existing dams which reflects the poor potential for hydropower in Mongolia (where flow rates are highly fluctuating and rivers freeze solid for 5 months a year). These dams are generally small run-of-the-river hydropower schemes which have very small impounded areas and limited electricity generation capacity. Despite this, Mongolia is proposing several sites for hydropower development with two recent dams being built in Gobi-Altai and Khovd provinces (MottMacDonald, 2012). The Mongolian government has policy in place to develop small and medium sized hydropower projects, as hydropower is regarded as a feasible option for energy supply (Dagvadorj, Natsagdorj, Dorjpurev, & Namkhainyam, 2009) and considered as one of the climate change adaptation tools for retaining melting glaciers water at high altitudes. Most of the proposed sites are relatively small (in the order of 50 – 200 MW), although two proposed sites (one downstream of Lake Khuvsgul and another on the Orkhon River) outside the ASER are larger. Both sites received Chinese funding but both, at the timing of writing, had been cancelled by the Mongolian government due to opposition following feasibility studies (MottMacDonald, 2012).

Whether all the proposed dams will be constructed is impossible to tell although one dam in Russia is currently under construction and will be completed before 2020.

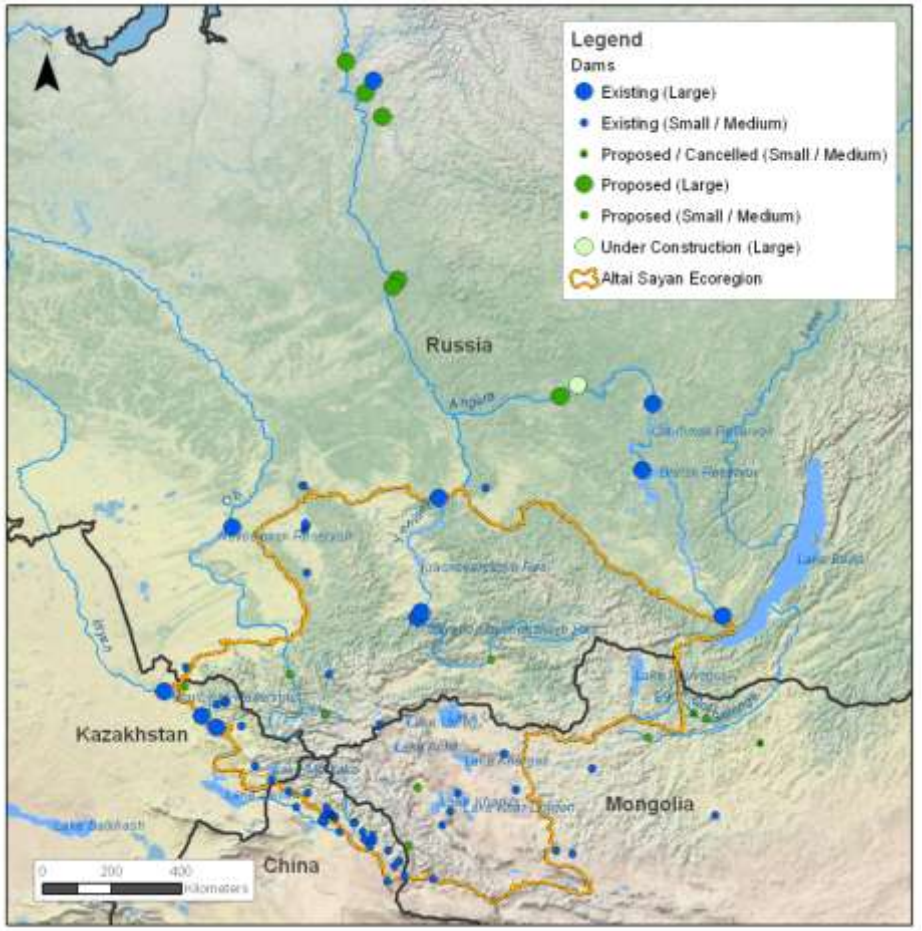


Figure 6: Map showing dams in and downstream the ASER (MottMacDonald, 2012)

In summary, in total 52 existing and proposed dams were identified inside the ASER with another 35 surrounding the ASER. Of the 52 only three can be considered 'large'. These are the Sayano–Shushenskaya Dam, Maynskaya Dam and the Krasnoyarskoye Dam which all impound the Yenisei River. The relatively small Chinese area of the ASER contains 29 of the 52 dams. These are mainly small dams impounding water for irrigation purposes (MottMacDonald, 2012).

3.1.4 Extractive industries

The mining sector is a growing threat in the ASER. Although mining itself may only occupy a small area, the negative effects of mining on ecosystems are numerous: reduced air quality (noise, burning and dust), (unsustainable) use of water resources, pollution of soil and (ground) water, deterioration and destruction of species habitats and the development of mining-related settlements and infrastructure (Jacob & Tobiasen, 2011; UNDP, Government of Russian Federation, & GEF, 2005), leading to loss and fragmentation of habitats.

Figure 5 shows where existing and planned mining is located in the ASER. However, mining proved to be very difficult to map due to the scarcity of publicly available documentation, primarily due to its status as a nationally sensitive activity in all four countries. The study by MottMacDonald (2012) revealed a large number of existing mine sites (85 at the time of publication) although, in the absence of complete national databases, it is unlikely that all mines were captured. It should be expected that in reality there may be many more existing and planned mining sites than depicted in Figure x. Furthermore, many of the small illegal mine sites were and will not be publicized nor are they detectable from remote sensing.

Mining in the ASER is predominantly centered in the Russian region of Kemerovo which contains the largest coal mines in Russia. They are centered on the Kuzbass basin around the city of Kemerovo which has deep mines and the surface pit mines around Kiselyovsk, Zhernovo, Novokuznetsk and Myski. The coal basin lies between Kuznetsk Alatau and Salair mountain ranges, with the coal outcropping at the surface near Kiselyovsk and Prokopyevsk (in the southwest) and Myski and Osinniki (in the southeast). The area also contains coalbed methane that is currently being explored by Gazprom with the intention of extracting it. It is reasonable to presume that the entire basin is under a mining license (whether surface or subsurface) for exploitation. Whether it is currently commercially viable to exploit the coal reserves is another matter. Furthermore, plans for industrial development in the Altai Republic, Republic of Khakassia and Tuva Republic shows a willingness to expand the mining operations. These are predominantly metal ores. Furthermore the Asbestos Mine at Ak-Dovurak in Tuva Republic is described as one of the world's largest open pit Asbestos mines. The Republic of Khakassia's mineral resources include coal, iron, gold, molybdenum, polymetallic ores (lead and zinc), marble, barites, bentonites, limestone, rock phosphorites, asbestos, uranium, gypsum, jadeite and nephrite. It has been reported that there are good prospects for discovering manganese, wolfram, antimony, cobalt, oil, gas and gas condensate.

Kazakhstan has mining activities in the ASER centered around Ridder (formerly Leninogorsk). These are for non-ferrous metal ores, zinc, lead and gold. Active gold mining was identified in the middle reaches of the River Kurchum. This river flows directly into Lake Zaysan from the southern Altai Mountains. The mining here involves the removal of parts of the river bed and alluvial sediments along the channel to access the gold deposits.

Mining will become a major contributor to the Mongolian economy over the next ten years. Growth topped 20% in 2011 due to the inward investment in the mining sector. This investment is predominantly for the Oyu Tolgoi gold and copper mine and the Tavan Tolgoi coal mine both in the Southern Gobi, the Boroo Gold Mines around Darkhan and Ulaanbaatar and other smaller gold and rare earth mines. These mines are all outside the Altai Sayan Ecoregion but it is expected that profits and investment will also result in new roads, transport infrastructure, tourism and property development throughout Mongolia. The economic importance of the sector leads the Mongolian Government to prioritize mining and accommodate the interests of mining companies, without quality environmental and social impact assessments (Enkhbat, 2003). The unregulated illegal mining activities in Mongolia, known colloquially as 'Ninja' mining, are a particular environmental problem. The huge distances and low population density, coupled with the low investment in regulatory mechanisms, makes combating the illegal mining difficult. The illegal mining of gold placer deposits (along rivers) is often associated with the spillage of arsenic, mercury and sodium cyanide (used in the gold refining process), in stream sedimentation, water usage, pastureland damage and erosion. Locating such illegal mining sites is extremely difficult as they do not appear on official maps and can only be verified via ground-truthing (manual verification on the ground). The information on mining exploration license areas for Mongolia should be used with caution as the new Mongolian laws on environmental protection have resulted in the cancellation of many exploration licenses.

Regarding mining in the Chinese part of the ASER, the study by MottMacDonald (2012) was not able to find published records of mines in the ASER nor was it possible to obtain national databases or maps of mining areas of China.

A potential gas field is associated with the Kuzbass Coal Field (Kuznetsk), and this area has been mapped in Figure 5 as a 'mining license' area. Gazprom are also investigating whether it is commercially viable to extract coal bed methane. No records were found about any other specific gas/oil production sites in the ASER. The Transneft oil pipeline seems to follow the route of the transiberian railway and therefore does not go through the ASER. There are oil production fields in Krasnoryarsk and Irkutsk Regions, but these are outside of the ASER (MottMacDonald, 2012).

3.1.5 Illegal logging

Illegal logging is a serious problem in the Russian Federation. Bruckhanov (2009) mentions that "all over Russia timber is stolen by logging companies through invalid inventory and timber quantity and quality assessments, over logging and logging beyond boundaries of felling areas; illegal customs operations". WWF estimations suggest that 10-35% of all timber logged in Russian is illegal, while in certain regions up to 50 % of timber is illegal or suspicious (WWF Russia, 2012b). In Mongolia the forestry sector is dominated by illegal trade and in the capital, Ulaanbataar, 85-90% of consumed wood is illegal (Erdenechuluun, 2006).

The main impacts to biodiversity are fragmentation and degradation of intact forests and negative changes to water quality, stressing forest ecosystems that are key for the survival of reindeer, red deer and musk deer. The overall threat posed by illegal logging ranges from 'low' to 'medium'.

3.1.6 Linear infrastructure

Linear infrastructure poses a 'low' to 'medium' threat to a variety of conservation targets in the ASER. It concerns roads, railways, gas pipelines and power transmissions lines, often related to the extractive industries sector (Jacob & Tobiasen, 2011; Mongolia Ministry of Nature Environment (MNET), 2009). Linear infrastructure can effectively divide, fragment and even isolate wildlife populations, especially in the case of *fenced* railroads, disrupting (seasonal) migration and reducing genetic diversity (Jacob & Tobiasen, 2011) and it creates disturbance through increased noise. Furthermore, linear infrastructure facilitates the transportation of illegal goods, poaching, illegal logging and illegal tourism activities (Jacob & Tobiasen, 2011; UNDP, Government of Russian Federation, & GEF, 2005). Figure 5 gives an overview of linear infrastructure in the ASER.

Northern Siberia is a main source of the world's oil and gas supplies, so the investment in pipelines is to be expected over the coming years. Recently fuel shortages in Mongolia reflect the precarious nature of the fuel supply which is currently transported by train between Irkutsk, Ulaanbaatar and to the Chinese border. There are currently plans for a gas pipeline between Russia and China with three possible routes. One in the far east directly between Russia and China, another following the Trans-Mongolian Railway through Ulaanbaatar and a third between Russia and China through the Altai Region. Gazprom (the Russian oil/gas company) is planning to implement the third option, the Altai Gas Pipeline project. It seems that the Altai gas pipeline is the option preferred by Gazprom due to its relatively short length and that it does not pass through a third country. The pipeline will cut through the ASER (specifically the Akok Plateau) crossing the border at the Kanas Pass in the Altai Mountains (Figure 7, next page). The pipeline will probably pass through the Ukok Quiet Zone protected area of Russia and the Hanasi (Kanas) protected area of China.

The Russian sector of the ASER is already well served with the Trans-siberian railway (which touches the northern boundary of the ASER) and the branch lines which serve Abakan, Abaza and the industrial cities in the Kemerovo valley (which are within the ASER). There are proposals to extend the route, but the study could not find any public information regarding plans to extend the rail infrastructure into the Tuva Republic which currently has no rail links to the Russian part of the ASER (MottMacDonald, 2012).

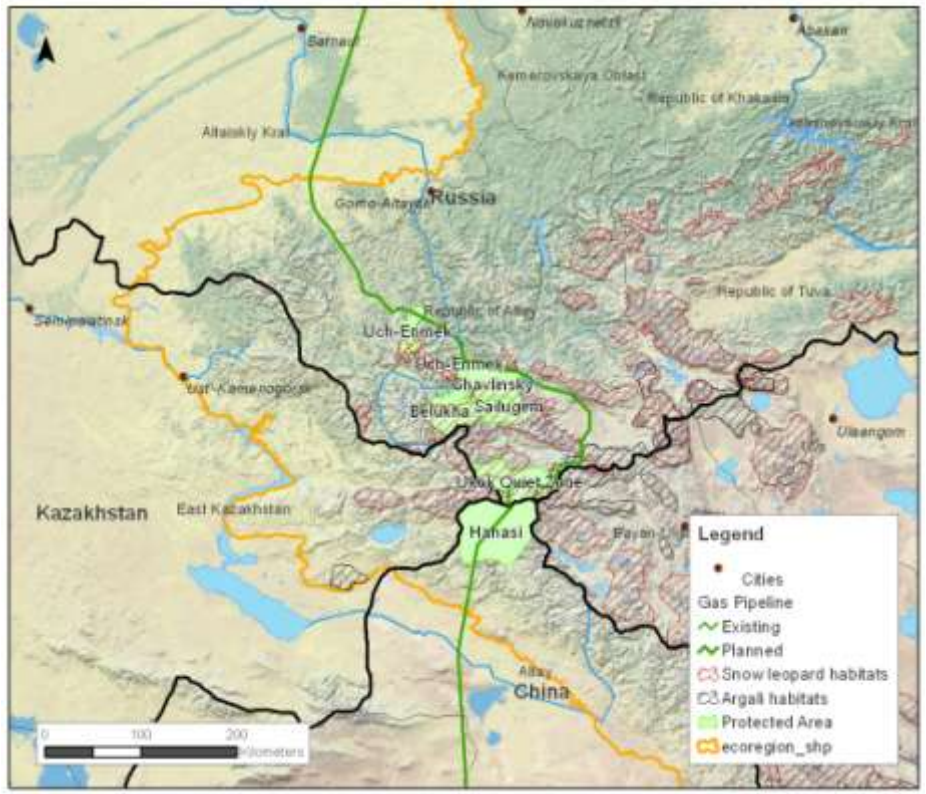


Figure 7: Proposed gas pipeline (MottMacDonald, 2012)

The Mongolian government has well publicized plans to construct railways connecting the new mines in the Gobi to the Chinese border and the rail head to Choibalsan in the far east of the country. These plans are given in the ratified State Policy on Railway Transportation. The planning for this infrastructure is termed Phase 1 and Phase 2. A less well publicized plan is Phase 3 which will link the Chinese border and the mines to the western provinces. These routes will cut through the Mongolian part of the ASER. The timing of Phase 3 is not known and it is not clear whether feasibility studies have been completed and thus whether such expense can be justified (bearing in mind that there are no railheads on the Russian side of the border). It can be expected that any such infrastructure will not be constructed before 2020 (if ever) as the rail link between the mines and the Chinese and Russian Borders is clearly the priority.

Regarding road infrastructure, a brief review of the region from remote sensing and existing maps shows that China, Russia and Kazakhstan are relatively well covered by paved highways, whereas Mongolia has a very poor road infrastructure with the western and eastern provinces having almost no paved roads.

There is a well publicized government plan to link all the provinces of Mongolia with paved roads by 2020. This project will start with the main east-west arterial road known as the 'Millennium Road'. This new arterial network is expected to dramatically cut transport times and costs, thus opening up the far western and eastern provinces for tourism and commerce. Construction of this road in the center of the country has begun already and is due to accelerate with the increased inward investment resulting from the country's mining boom. A difficulty for the assessment of planned infrastructure is the differing scheduling for this road development. The MottMacDonald study (2012) discovered at least three different plans for the Millennium road scheme with different timings and in some cases different routes, which are all presented on the map. It should be noted that the exact routes planned cannot be strictly verified as no engineering designs are available (and probably not yet developed).

No information on planned new routes was found for Kazakhstan, China or Russia which may reflect the prior establishment of paved routes throughout their regions.

Information provided by WWF Kazakhstan described a proposed water transfer scheme which will take water from the northern reservoir of Bukhtarma (Lake Zaysan) on the south-western boundary of the Altai Sayan Ecoregion and transfer it via pumped water pipes and gravitational flow canals to Lake Balkash to the south-west. This will increase water availability in Lake Balkash but may reduce water

availability downstream of Bukhtarma. This may have a detrimental effect on the Irtysh and Ob River downstream of Bukhtarma. From the information provided, it is not clear whether the water transfer scheme has a firm schedule for construction or whether funding has been obtained (MottMacDonald, 2012).

3.1.7 Multi-tracking

Despite low human population density in the Mongolia part of the ASER, the rate of land loss caused by multiple tracks of unpaved and illegal roads increased since 1995, with the growth of herding families and concentration of economic activities closer to settlements. It is estimated that about 300.000 ha of pastureland has been lost between 1991 and 2001 due to 'multi-tracking', the multiplication of tracks caused by vehicles traveling off-road, many carving new tracks, affecting about 0.5% of the total area of productive land in Mongolia (ADB, 2005). Multi-tracking is a 'medium' threat in the Mongolian part and a 'low' threat in the Russian part of the ASER.

3.1.8 Pasture degradation from grazing

Pasture degradation from overgrazing is ranked 'high' for the Mongolian ASER and 'medium' for the other countries. In Mongolia the number of livestock has increased since the 1980's (Suttie, 2000), whereas in Russia the number of livestock has been decreasing (Blagoveshchenskii, Popovtsev, Shevtsova, Romanenkov, & Komarov, 2006). The increase in goats is especially impacting areas in the Mongolian part of the ASER, as they are more aggressive grazers than other livestock. Populations of Altai Argali and Mongolia Saiga have co-existed with nomadic herders and their livestock for centuries, but nowadays the influence of animal husbandry in shaping the landscape is especially intense in the steppe ecosystems. In summary, livestock grazing development in the ASER has several environmental consequences:

- habitat degradation for Altai Argali, Mongolian Saiga and Snow Leopard;
- habitat decrease due to competition for grazing lands for Altai Argali and Mongolia Saiga and prey species of Snow Leopard;
- water pollution and;
- soil erosion and change in sedimentation patterns.

3.1.9 Poaching

Illegal hunting is a constant drain on populations of wild species, many of which have suffered massive declines and reductions in range over the last twenty years (Wingard & Zahler, 2006). Poaching is a significant threat to Snow Leopard (Jackson, Mallon, McCarthy, Chundaway, & Habib, 2008), Mongolian Saiga (Mallon, 2008) and Altai Argali (Harris & Reading, 2008). Yearly, about 10-15 Snow Leopards and 30-50 Mongolian Saiga are poached in Mongolia along with approximately 3-5 Snow Leopards and 7-15 Altai Argali in Russia.

3.1.10 Unregulated hunting

Legal but unregulated trophy hunting poses a risk to Altai Argali, because the quota for hunting the species are set too high leading to overharvesting, threatening population dynamics. Unregulated hunting practices also form an indirect threat for Snow Leopard, as the number of prey species, including Altai Argali, ibex and other mammals, decreases.

3.1.11 Unregulated Tourism Development

While the threat projection is still 'low', in both countries the tourism sector, mainly based on wildlife and wilderness, has been developing for the last 20 years (BirdLife Asia, 2009; Jacob & Tobiasen, 2011).This growth is putting an increasing pressure on certain protected areas and the ASER targets and is leading to 'aesthetic pollution', as a result from more and dense infrastructure, increased frequency of forest fires, accumulation of garbage and waste and uncontrolled development of accommodations (UNDP, Government of Russian Federation, & GEF, 2005).

3.1.12 Unsustainable use of water resources

Ecosystems, their associated biodiversity and local communities are affected by the unsustainable use of ground and surface water. Exacerbated by climate change (increased air temperatures), extraction or diversion for industrial, urban and agricultural use, many rivers, marshlands, and lakes are drying up, resulting in degradation and loss of habitat for fish and bird species (Jacob & Tobiasen, 2011). A recent analysis in Mongolia shows that 852 rivers, 1181 lakes, and 2277 springs have gone dry, some permanently, due to poor resource management and global warming (Mongolia Ministry of Nature Environment (MNET), 2009).

3.1.13 Water pollution

Rivers and other water bodies are polluted by solid waste, and waste water from urban settlements, industrial and agricultural sources, killing the aquatic flora and fauna (Jacob & Tobiasen, 2011). Overconcentration of livestock and their dead carcasses along small rivers and around open water sources is the main source of increased nitrate ($NH4^{+)}$ levels in rivers, causing eutrophication. In Mongolia, where the threat is rated 'high', less than 50% of the total wastewater is being treated due to lack of maintenance of waste water treatment facilities. In Kazakhstan water pollution is also rated 'high' and the water quality is assessed 'extremely dirty' from January to March for the Breksa and Glubotchnka rivers, Figure 8 (Institute of Geography of the Republic of Kazakhstan). Water pollution is ranked 'low' in Russia.

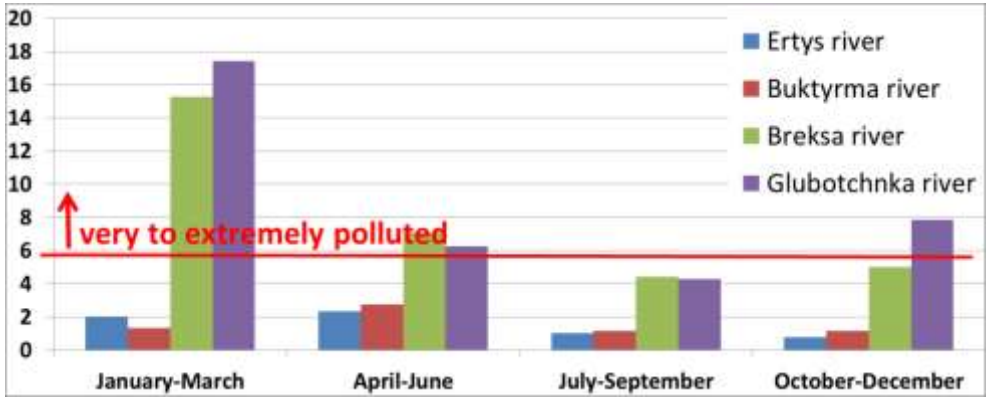


Figure 8: Water quality in four rivers in Kazakhstan in the ASER; Key: 0,3 - 1,0 = clean, 1,0 - 2,5 = slightly polluted, 2,5 - 4,0 = polluted, 4,0 - 6,0 = dirty, 6,0 - 10,0 = very dirty, > 10,0 = extremely dirty

3.2 Context analysis

The context analysis creates a common understanding of the situation in the ASER – including the biological environment and the social, economic, political, and institutional systems present opportunities that affect threats and ultimately the biodiversity targets WWF wants to conserve. These factors and the relationships among them are summarized in a simplified conceptual model diagram[6] - in Figure 9 and in a more detailed version in Annex 6.

[6] A conceptual model diagram is a visual method of representing a set of causal relationships between factors that are believed to impact one or more biodiversity targets. The model links the biodiversity targets (green ovals) to the direct threats impacting them (pink boxes), and the factors (indirect threats and opportunities; orange boxes) influencing the direct threats.

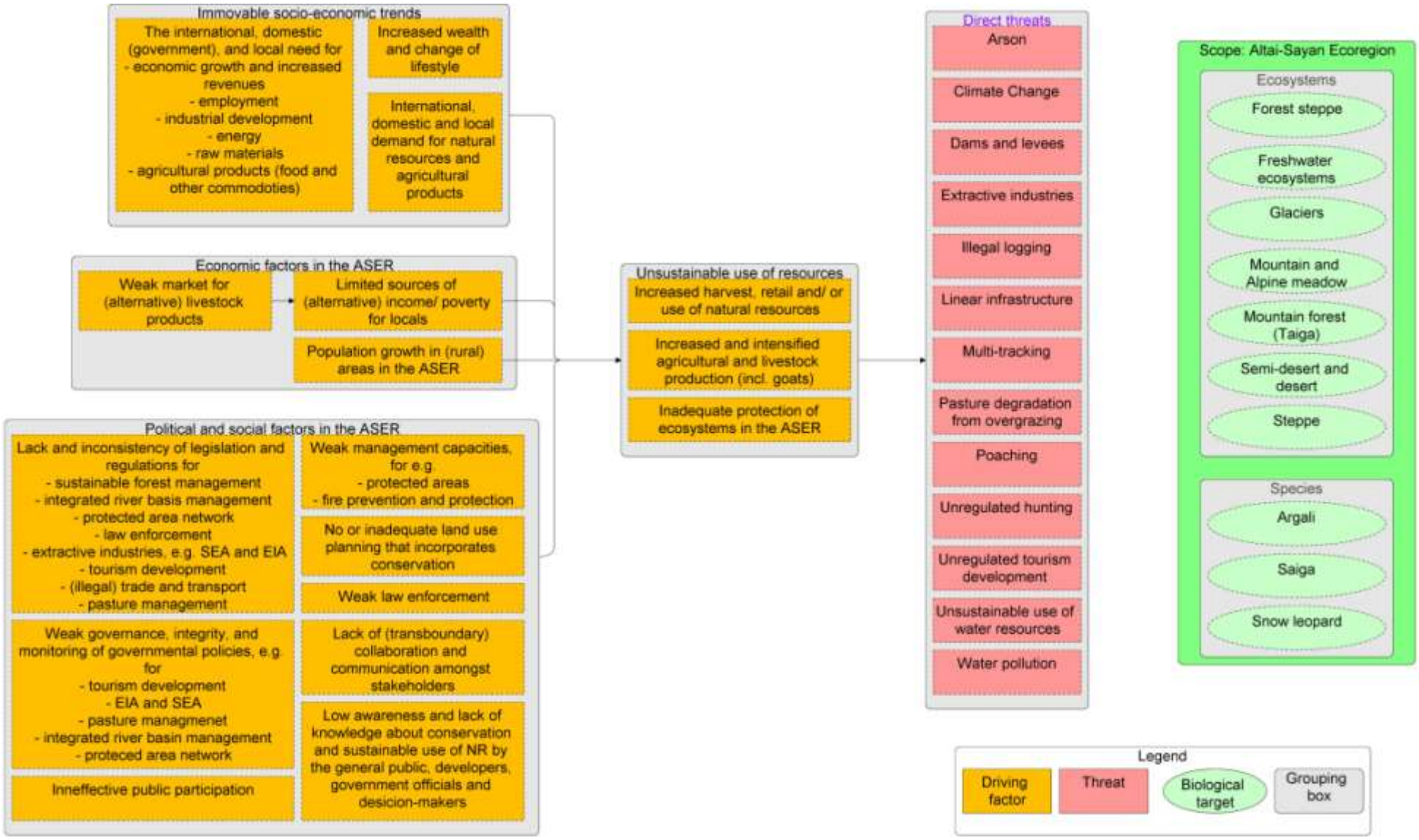


Figure 9: Conceptual Model (simplified)

The simplified conceptual model reveals that the pressures on the ecosystems and species in the Altai-Sayan Ecoregion can be traced back to several main factors (seen on the far left of the model in Figure 9). Local communities have co-existed with their natural surroundings for thousands of years, but in recent decades global development changed people's values and economic situation, opening the national economy to the global markets and leading to communities switching from subsistence use of the local resources to their commercial exploitation (in other words: the international, domestic and local need for economic growth, employment, raw materials and agricultural products. Together with high unemployment (Millenium Ecosystem Assessment, 2005; UNDP, Government of Rusisian Federation, & GEF, 2005), this causes the unsustainable use of natural resources, especially as alternative livelihood options are not readily available. People have increased the number of livestock, especially goats, leading to pasture degradation from grazing of vast areas of pasture land and deterioration of vegetation cover (Mongolia Ministry of Nature Environment (MNET), 2009; Murray, Hunnam, Damjin, Munkhtushin, & Olson, 2009), placing pressure on wildlife who must then compete for grazing areas. High demand for animal parts on the Chinese medical market (UNDP, Government of Rusisian Federation, & GEF, 2005) creates high prices on the black market that in turn boost poaching and trade activities of Snow Leopard, Altai argali and Mongolian saiga, even against the risk of high penalties. The need for economic growth and development, which leads to increased demand, harvest and use of natural resources and intensified agricultural practices do not have to be a problem on their own, but due to several other factors, there is insufficient protection of the ecosystems and species of the ASER and resources are being used unsustainably and are threatened. These factors are:

- lack and inconsistency of legislation and regulations;
- weak governance, integrity, and monitoring of governmental policies;
- lack of (transboundary) cooperation and communication between stakeholders;
- low awareness and lack of knowledge about conservation and sustainable use of natural resources;
- weak law enforcement;
- ineffective public participation;
- inadequate land use planning incorporating conservation and;
- weak management capacities of water and protected areas bodies.

Some of these factors are beyond the reach of WWF, like the international, domestic and local need for economic growth and employment. Other factors can be tackled by WWF and its partners. In other cases, addressing the driving factors makes more sense than working on the symptoms. In the next chapter eight strategies and tools are described.

4- Conservation Strategy

This chapter describes the specific interventions or strategies that will be undertaken to achieve conservation in the ASER. Through a series of well-developed actions, goals and sufficient financial and human input, WWF will be able to realize it´s vision for the ASER. Intermediate objectives have been devised so that indications of success or failure will be apparent before too much time has passed. These strategies are mutually supporting, and thus do not stand alone. Please find an overview of the vision, goals, and intermediate objectives in the Logframe (Annex 8).

4.1 Vision

The ASER Strategy vision is:

"The Altai-Sayan Ecoregion harbours globally significant biodiversity and provides ecosystem services in an inexhaustible manner, as well as benefits to local communities"

4.2 Goal

The ASER Strategy overarching goal is:

"Species diversity (richness and abundance) is supported and natural ecosystem dynamics and resilience are ensured"

Additionally, the ASER Strategy defines five conservation goals:

Goal 1: "By 2020, the area of ecosystems* in the ASER that remain unconverted* does not decrease compared to 2010, ensuring ecosystems' biological capacity to harbor biodiversity of global significance." *Ecosystems are: forest steppe; mountain tundra and alpine meadow; semi-desert and desert; steppe; and mountain forest. *Unconverted means that the area contains predominantly natural vegetation, even though it may be altered via grazing activities.

Goal 2: "By 2020, the ratio 'km of free flowing key rivers/ total km of key rivers´ is maintained at least 0,89 for Khovd river and 0.65 for Zavkhan river in Mongolian part and 0,85 in Russian part of the ASER; and the annual average flow volume for at critical locations on the key rivers in the ASER (Zavkhan, Khovd, Buyant, Katun, Biya, Tom, Abakan, Ulug-Khem and Enisey) does not change compared to 2010."

Goal 3: "By 2020, the population size of Altai Argali in key areas is increased by at least 8% in the Mongolian part and at least 20% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Altai Argali in the Mongolian part of the ASER is increased by at least 15% compared to 2010." *Key areas are: Sielkhem mountain range, Gulzat and Tsagaan shuvuut mountain, Khokh Serkh mountain range, Munkhkhairkhan range, Myangan Ugalzat mountain range, Sailugem, Chikchacheva Ridges, Momgun-Taiga massif and Tsagan-Shibetu Ridge.

Goal 4: "By 2020, the population size of Mongolian Saiga is increased by at least 25% compared to 2010 in key areas*; and the area of occupied habitat by Mongolian Saiga is increased with at least 4% compared to 2010." * Key areas are: Sharga, Khuis gobi, Chandmani Khuren tal.

Goal 5: "By 2020, the population size of Snow Leopard in key areas remains stable in the Mongolian part and is increased by at least 25% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Snow Leopard remains stable in the Mongolian part and is increased by at least 31% in the Russian part of the ASER compared to 2010." * Key areas are: Sielkhem mountain range, Gulzat and Tsagaan shuvuut mountain, Turgen & Kharkhiraa Mountain, Altan Khukhii, Tsambagarav Mountains, Jargalant-Bumbat, Baatarkhairkhan mountain range, Argut River Watershed, Chikhachev Ridge, Mongun-Taiga Massif, Tsagan-Shibetu Ridge,

Sayano-shushensky Nature Reserve and its buffer zone, Sengelen Ridge, Tunkinsky Ridge.

4.3 Strategies

WWF has a constructive role to play in the future of the Altai-Sayan, and it needs a well-planned approach to tackle the most critical threats. This chapter provides a description of the seven selected strategies and a supplementary planning tool.

1. ASER Vision Map (supplementary (landuse) planning tool);
2. Law enforcement (LE) strategy;
3. Climate adaptation strategy;
4. Econet strategy;
5. Integrated River Basin Management (IRBM) strategy;
6. Community Based Natural Resource Management (CBNRM) strategy;
7. Responsible extractive industries and linear infrastructure (REILI) strategy;
8. Sustainable Forest Management (SFM) strategy.

Each section provides a brief description of the strategy followed by brief summary of what threats and factors each strategy addresses. Then it focuses on the main components of the strategy (referred to as s*ub-strategies)*, their associated theories of change (how does the strategy work in practice?), objectives[7] and the potential lines of action. Each strategy's rationale and logic is visualized and clarified by a results chain[8], presented in Annex 7.

4.3.1 ASER Vision Map

Description

Landuse planning that incorporates conservation is currently weak in the ASER. This indirectly influences the environmental impacts of several sectors, including extractive industries, linear infrastructure development, hydropower development and pasture management. While each of these specific sectors is dealt with in strategies described below, the development of an ASER Vision Map that shows where the priority areas are for conservation and economic developments will help WWF to define areas of conflict. The vision map can be used as an ecoregional and national planning and lobbying tool and for strategic prioritization.

Theories of change

The ASER Vision map will help WWF focus on geographic areas where economic development is conflicting with conservation. The map will help WWF to prioritize its energy, to decide which stakeholders to engage with, and it will help improve discussions with governments. In the end, also through other strategies, it will help to ensure that extractive and development activities are sited appropriately.

Intermediate Objectives

1.1 By 2013, WWF possesses an ASER Vision Map, which highlights the areas of conflict and interest for WWF interventions and strategies, based on hotspots of high conservation value and of economic development (infrastructure, extractive industries, and hydropower development).

1.2 By 2020, WWF has developed additional threat mitigation strategies for the ASER, based on the ASER Vision Map, using public participation.

[7] An objective is a formal statement detailing a desired outcome of a project such as reducing a critical threat. Realization of a project's objectives should lead to the fulfillment of the project's goals and ultimately its vision.

[8] A results chain is a graphical depiction of a project's core assumption, the logical sequence linking project activities to one or more targets. In scientific terms, it is equal to a 'hypothesis'.

4.3.2 Law enforcement strategy

Description

Weak law enforcement (LE) is one of the driving factors for unsustainable resource management and inadequate implementation of conservation measures in the ASER. This is in turn caused by

a. lack and inconsistency of legislation and regulations;
b. low awareness of laws amongst communities and local government officials;
c. insufficient human and technical capacity of law enforcement agencies;
d. insufficient funding to implement law enforcement and;
e. lack of cooperation and coordination between agencies on (transboundary) issues like trade and monitoring and evaluation.

Due to these issues it's difficult to combat threats like poaching, illegal wildlife trade, lack or inadequate implementation of SEA's and EIA's, illegal logging and water pollution.

Theories of change

The LE strategy addresses the above issues with six sub-strategies.

The *LE policy sub-strategy* is focused on improving legislation to increase the mandate of park authorities and to ensure more severe punishments for illegal wildlife trade, storage and transportation.

To create more capacity in law enforcement, two sub-strategies have been defined. One is to increase *public participation* by offering training, equipment and government reward incentives to volunteer rangers, community inspectors and the WWF supported anti-poaching units. In addition, the *LE capacity building sub-strategy* will focus on increasing the skills and knowledge of government inspectors by offering special training such as detection and prevention of environmental crimes into the curriculum, and to improve the ability of law enforcement agencies to generate (governmental) funds for effective control.

The *LE financial sub*-strategy is a short term strategy, and focuses on improving the funding by offering temporal grants to several nature protection agencies and anti-poaching brigades to undertake law enforcement.

Finally, the *LE transboundary customs* and *LE inter-agency sub-strategy* concentrate on increasing cooperation, coordination and coherence amongst agencies and between inspectors, both on international and transboundary issues like customs, but also national issues like collaboration of different agencies for effective control. WWF will work closely with law enforcement agencies (State Specialized Inspection Agency, police and border patrol units) to create operational structures at local and national levels to close the illegal wildlife trade network and to suppress the trade in CITES-listed species derivatives and illegal timber products.

WWF's hypothesis is that the sum of the six sub-strategies, namely policy, public participation, capacity building, financial, inter-agency and transboundary will lead to the situation where law enforcement agencies have enough human capacity, skills, funds and legislation to reduce or eliminate the effects of some of the threats. These are unregulated tourism development, unsustainable use of water resources, inadequate legislation for EIA and SEA for dams, infrastructure development, extractive industries, illegal logging, poaching, unregulated hunting, arson and pasture degradation from overgrazing.

The LE strategy feeds into many of the other strategies, wherever law enforcement is an issue. More information and objectives can be found in the related paragraphs.

Intermediate Objectives

2.1 By 2015, Russia has effective legislation that includes criminal prosecution that covers all elements in the illegal wildlife trade supply chain.
2.2 By 2016, meetings of customs officers and information exchange on wildlife trade takes place at least once per three years, leading to more effective cooperation.

2.3 By 2020, on average each year at least 100 inspectors* are trained in a dedicated training course in effective anti-poaching and wildlife trade prevention. *inspectors = police, governments officials, customs.
2.4 By 2020, poaching is decreased by 50%* compared to 2010 for Snow Leopard, Altai Argali and Mongolian Saiga, including transboundary territories. *Measured by three year running average.

4.3.3 Climate adaptation strategy

Description

Climate change is a global issue, which is created mostly outside of the ASER. Mitigation of anthropogenic greenhouse gas emissions is extremely important to limit the change, but the world is already committed to a certain amount of warming and the need for adaptation to the changes is inevitable (Morrison & Lombana, 2011). The ASER is confronted with climate change and will experience change in precipitation, temperature and vegetation shifts (Kokorin (ed.), et al., 2011; Natsagdorj, Batima, Tumursukh, Ulziisaikhan, & Mijiddorj, 2011). WWF recognizes the dynamic nature of the system and needs to plan accordingly, resulting in a climate adaptation strategy. Climate adaptation measures are "adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (Parry, Canziani, Palutikof, van der Linden, & Hanson, 2007).

Theories of change

WWF Russia and WWF Mongolia both recently completed a vulnerability assessment in terms of climate change for their part the ASER (Kokorin (ed.), et al., 2011; Batima, Batnasan, & Lehner, 2004). These reports provide much needed insights, but also make clear that more data is needed and that monitoring of climatic events is crucial. Therefore, additional assessments, and future comprehensive climate change monitoring (data) are needed to identify specific and appropriate climate adaptation measures for the ASER. When detailed climate adaptation strategies are developed, adaptation measures will likely include an education component, a capacity-building component for governmental staff on climate change and climate change modeling, and possibly targeted climatic or ecological modeling. The main thrust of climate adaptation strategies would not be to develop stand-alone adaptation projects, but to integrate climate adaptation into the day-to-day and year-to-year planning and management of environmental and development agencies and incorporate it in other ASER strategies, for example the sustainable forest management strategy on fire prevention - according to Shishikin, et al. (2012) carbon emissions from fires in forest areas in the ASER amount to 27.4 MtC since 2000.

Intermediate Objectives

3.1 By 2020, climate adaptation measures are developed and in place, based on vulnerability assessments and climate change monitoring data.
3.2 All strategies and relevant institutions consider climate change in the normal course of their work.

4.3.4 Econet strategy

Description

Creating an 'econet', an ecologically based network of protected areas and the 'ecological corridors' that connect them has represented one of the key strategies of the WWF offices in the ASER over the last decade. Protected areas have great value, as "they maintain key habitats, provide refugia, allow for species migration and movement, and ensure the maintenance of natural processes across the landscape" (CBD, 2010). Well managed protected areas are "a vital tool for reducing biodiversity loss" and can yield significant benefits far beyond their boundaries. Protected areas offer a strategic investment for governments, as it is estimated that investments in creating and managing protected area (PA) networks will yield returns in societal benefits in the order of 25:1 to 100:1 (CBD, 2010). To facilitate the development of complete ecologically representative protected area networks, the CBD recommended the execution of a gap analysis (Box 3). Russia carried out a gap analysis in 2009 (Krever, Stishov, & Onufrenya, 2009) and Mongolia did so in 2010 (Chimed-Ochir, et al., 2010).

Box 3: Gap analysis

More than 170 countries, including China, Kazakhstan, Mongolia and Russia, signed and ratified the Convention on Biological Diversity (CBD), recognizing that loss of biodiversity is a global threat (CBD, 2012). In 2004, the CBD established the "Program of Work on Protected Areas". This program encourages countries to complete ecologically representative networks of protected areas that will provide basic protection for all national biodiversity. To facilitate this, the CBD suggests that governments carry out a gap analysis to find out if and where a nation's current protected area system falls short of protecting all biodiversity (Dudley & Parish, 2006). "A gap analysis is an assessment of the extent to which a protected area system meets protection goals set by a nation or region to represent its biological diversity" (CBD, 2010).

Currently the PA network comprises about 174.105 km^2 or 16% of the entire ASER and covers most of the biodiversity hotspots and territories with outstanding biodiversity richness. However, weaknesses were identified in the protected area network and management (WWF Russia, 2003). Other organizations confirmed this by stating that the PA network "efficacy is challenged by budgetary constraints, weak management and enforcement capacities, and PA-centered approaches to species and habitat conservation" (UNDP, Government of Rusisian Federation, & GEF, 2005). For the Mongolian side of the ASER, similar observations have been made, e.g. malfunctioning of PA management due to lack of human and financial resources; staff of PA system not having relevant professional training and lack of incentives to improve performance; and modern management principles not being applied (Chimed-Ochir, et al., 2010). Tackling these issues receives the full attention of WWF through the Econet strategy, but other initiatives, like the MAVA Foundation funded Program "Protected areas for the Living Planet" also address them.

Theories of change

The Econet strategy focuses on maintaining and creating a network of protected areas with full representation of key populations, ecosystems and ecological corridors, ensuring effective management and improving governance, enforcement and prosecution. Five underlying sub-strategies are defined to reach this objective.

The *New PAs sub-strategy* will lead to the establishment of new (including transboundary) PAs and ecological corridors. To ensure that areas with high biological biodiversity are selected and take into account climate change, the existing gap analyses and the ASER Vision Map will help determine which areas should be selected. It is also important that decision makers are willing to establish new PAs.

The *Policy sub-strategy* focuses on increasing the knowledge of decision makers on the benefits of an 'Econet', the need for policy and regulations, and effective management, in order to facilitate decision making. Proper integration of local and regional protected areas and areas where sustainable management of natural resources (pastures, game, forest, etc.) takes place, into national and local level land use planning will be of a vital importance for a long-term sustainability of them and hence the connectivity of the protected area network. The Econet strategy assumes that with increased knowledge, decision makers will demonstrate their willingness for action by establishing new protected areas, financing effective enforcement and management of Econet and by improving current PA policies and legislation.

Besides involvement from decision makers, it is important for the functioning of Econet that the public is also actively participating. The *Public participation sub-strategy*, together with the CBNRM strategy, focuses on actions to make local communities in and around protected areas aware of their ecological and legal rights. The assumption is that with increased awareness and encouragement, the communities will also feel increased ownership and will actively participate in conservation activities in the PAs, like planning, management and enforcement and will practice sustainable management principles for their natural resources.

The *Capacity sub-strategy* addresses PA management by strengthening the capacity of existing Educational Training Centers for PA staff and regional administrations and by establishing a network of PA experts to improve communication and learning amongst PA staff. This sub-strategy assumes that by improving the capacity of the Training Centers, the number of people that have participated increases, improving the capacity for effective management and fundraising. It is also important to build

understanding and capacity for assessing potential impacts of climate change to the ecosystems and integrating climate adaptation and mitigation measures using the best available assessment.

The fifth sub-strategy, the *Transboundary sub-strategy* focuses on increasing the cooperation of PA staff in transboundary areas between all four countries.

Implementing these five sub-strategies, together with the Law enforcement strategy, will hopefully lead to a PA system with a full representation of key populations, ecosystems and ecological corridors and with effective management to maintain ecosystem integrity of the ASER.

Intermediate Objectives

4.1 By 2020, a network of protected areas ('Econet') encompasses 20% of key biomes in the ASER (Key biomes include glacier, mountain tundra and alpine meadow, mountain forest, forest steppe, steppe, semi-desert and desert, riparian forest and freshwater systems (lakes and rivers)).

4.2 By 2020, a network of protected areas ('Econet') encompasses at least 35% of Altai Argali habitats, at least 35% of Snow Leopard habitats, and at least 20% of Mongolian Saiga habitats.

4.3 By 2020, three transboundary nature reserves covering at least 25.000 km^2 and with legal status have been established in the ASER.

4.4 By 2020, management effectiveness of the PA network is rated >66% according to the Management Effectiveness Tracking Tool (METT).

4.3.5 IRBM Strategy

Description

In 2004, the Government of Mongolia revised the "Law on Water", incorporating for the first time the concept of participatory planning and management of water resources at water basin levels. In 2009, the government divided the Mongolian territory into 29 water basins, and started actively promoting integrated River Basin Management (IRBM) in all of these basins. IRBM allows for an integrated approach that encompasses the sustainable management of key natural resources such as forest and freshwater, as well as large-scale ecological processes, for conservation. WWF was amongst the first organizations that started implementing IRBM in the Altay-Sayan and Amur-Heilong Ecoregions (World Bank, 2006). The recent established hydropower stations in Chono kharaikh and Zavkhan rivers and other small scale HPPs, causing the destruction of natural flow regimes, underline the need for (improved) large scale watershed planning and implementing IRBM in practice (Chimed-Ochir, et al., 2010).

IRBM is also important for the Kazakh and Chinese part of the ASER. In Kazakhstan the proposed water transfer scheme, the existing and planned hydropower stations and the water pollution require conservation action. In the China there are 29 small dams, mainly small and for impounding water for irrigation purposes.

Theories of change

Under this overarching strategy, three interlinked sub-strategies support the delivery of the four key objectives. Under the *Governance sub-strategy,* WWF will, building on lessons learned from previous interventions, collaborate with other stakeholders to revise the legal framework for IRBM. The sub-strategy assumes that improved legislation and national policies will ensure that water-use policy becomes integrated in the local development agenda. As part of the efforts to mitigate the water infrastructure impacts WWF-Mongolia, in parallel with WWF Russia, will ensure that revision of the EIA legal framework takes into account the specifics of water infrastructure development, e.g. hydropower development. This will lead, in tandem with the REILI and Law enforcement strategy, to improved implementation of the EAI and SEA assessments and the permanent protection of key river stretches and free flowing rivers.

The *Capacity sub-strategy* concentrates on increasing the capacity of the river basin councils and stakeholders in Mongolia, with a special focus on ensuring the financial self-sustainability of basin level water management authorities.

By setting up a water-pricing system, together with increased knowledge and awareness through the *Education sub-strategy*, there will be an economic and environmental incentive to sustainably use the water resources in the ASER. Considering Mongolia's vulnerability to climate change, WWF will ensure that IRBM takes fully into account the need for adaptive management of river systems and the conservation of freshwater ecosystems.

Intermediate Objectives

5.1 By 2016, the laws regulating water management and conservation are amended to ensure an adequate institutional and financing scheme for the River Basin Management Authority.
5.2 By 2016, government officials are fully aware of climate change issues and IRBM's role in the adaptation and mitigation of potential climate change impacts and conservation of freshwater ecosystem's integrity.
5.3 Water pricing system is in place in the Mongolian side of the ASER, reflecting local developments and realities.
5.4 By 2020, nine identified river stretches have been afforded permanent protection against additional dams (River strechtes are Zavkhan; Khovd; Buyant; Katun; Biya; Tom; Abakan; Ulug-Khem; Enisey).
5.5 By 2016, climate change impacts are taken fully into consideration in the IRBM Plan of the Khar Lake-Khovd Basin using water modeling tools adapted to the region.

4.3.6 CBNRM Strategy

Description

Local communities have co-existed with their natural surroundings for thousands of years, but in recent decades global development changed people's values and economic situation, opening the national economy to the global markets and leading to communities switching from subsistence use of the local resources to their commercial exploitation. Extensive areas of important ecosystems will always exist outside of the PA network. Therefore, the sustainable use of natural resources needs to be promoted to ensure biodiversity conservation and the integrity of these productive ecosystems. Sustainability and nationwide replicability of this approach will be fully dependent on a legal environment that allows the transfer of management rights to local communities, including the responsibility for managing resources generated through Community Based Natural Resource Management (CBNRM). For example, in Mongolia, the revised Law on Environmental Protection (amended in 2005), provides a legal basis for possession and use of natural resources. To date, over 200 community based organizations (CBOs) were established and about 20-30% of them have started their operations. Russia has experienced similar developments, for example local herders assisting with the conservation of the Snow Leopard (Snow Leopard Conservancy, 2011).

Some CBOs are also involved in tourist schemes. In 2010, approximately 456.000 foreign tourists visited Mongolia and about 90% of them visited Protected Areas. More than 1 million tourists visited the Russian part of the ASER in 2011. The CBOs cooperate with local tour operators and Protected Area administration with regard to tourism development and engagement. As natural resources are the main living source for local communities, the sustainable use is a priority for them.

According to WWF surveys, the majority of local families wish to develop sustainable legal income and run "green" small family businesses. The main obstacles for economic growth in rural settlements are the lack of investments, the lack of professionalism and skills of people that live in these areas and the lack of developed markets for community products and services. Also, due to extreme poverty in remote areas, local communities do not qualify for bank loans or other traditional means of financing. In order to start and develop small businesses, local families would need to have some prior knowledge of economics, financing, and marketing. Community-based businessmen also need to know how to run their businesses in a biodiversity-friendly manner and learn lessons from their experience. All these issues are addressed by the CBNRM Strategy.

Theories of change

WWF's approach to CBNRM in the ASER includes five sub-strategies, aiming at increased sustainable practices of natural resource exploitation by local communities. The *Policy sub-strategy* is about communicating the benefits of CBNRM to decision makers, so that an improved legal framework and sufficient funding (mechanisms) for CBNRM schemes are in place, giving local communities the rights and funds to manage their resources for the long-term. This sub-strategy is especially relevant, as the last evaluation of the ASER Program advised WWF to engage with local government and seek their support so as to ensure the appropriate legitimacy for WWF interventions (Mott MacDonald, 2008).

The *Entrepreneurship sub-strategy* -to improve the skills of community members and help them to organize themselves in production units- and the *Financial sub-strategy* -setting up a micro-financing fund-, will both support local business development, giving them sufficient alternative income, and thus dissuading them from unsustainable practices.

The *Education sub-strategy* aims at increasing the knowledge of natural resource agencies, like touristic tour operators, so that they will develop and implement CBNRM schemes. And it aims at increasing the knowledge of local communities in sustainable use of different nature resources.

The *Human-wildlife conflicts sub-strategy* aims at decreasing the level of retaliation killing of Snow Leopard by increasing the tolerance of herders for the species through a, e.g. a compensation fund and reduced access to livestock.

Together with the Law enforcement and Econet strategy, the CBNRM Strategy will ensure that communities have legislative and regulatory mandate to manage natural resources, have sufficient training and capacity and have sufficient alternative and sustainable livelihood income and funds or access to finance. Furthermore, relevant agencies have sufficient training and capacity to control, manage and monitor CBNRM schemes.

Intermediate Objectives

6.1 By 2015, the legal framework for CBNRM and pasture management is in place, enabling community based organizations to make diverse use of natural resources.

6.2 By 2016, community funds of CBOs in project intervention areas have increased on average by 30 % for sustainable CBNRM and alternative income development.

6.3 By 2020, the involvement rate (calculation method tbd) of local communities in key conservation areas, that are managing their own NR (including forestry practices) or have developed alternative income schemes/ green businesses which consider the needs of key conservation species, has increased by at least 15% compared to 2010.

4.3.7 Sustainable forest management (SFM) Strategy

Description

Illegal logging is a serious problem in the ASER. In Mongolia the forestry sector is dominated by illegal trade and in the capital, Ulaanbataar, 85-90% of consumed wood is illegal (Erdenechuluun, 2006). WWF estimations suggest that 10-35% of all timber logged in Russian is illegal, while in certain regions up to 50 % of timber is illegal or suspicious (WWF Russia, 2012b). Illegal logging is caused by a combination of factors: decrease of state control and monitoring ability, high unemployment, sharp increase of the dollar's value enhancing the profitability of export and an increase of intermediates (mostly from China) that purchase timbers without regard for sustainability (Brukhanov, 2009). The Russian forest sector focuses on the export of timber products and therefore compliance with requirements of international markets is important (WWF Russia, 2012b). Russia shows a stable annual growth of the forest-covered area. However, these 'new' forests are low-quality young stands, which are not used by the forest industry. There is already a lack of high quality wood in accessible Russian forests, forcing the forest industry to continue extensive forest exploitation including logging of intact and old-growth forests (GFTN Russia, 2011), also called 'pioneer logging'.

At the same time there is the problem of forest degradation due to absence of proper reforestation and sylviculture. WWF proposes to shift this practice and use sustainable forest management practices for areas of secondary forests to avoid further exploitation of valuable -from biodiversity conservation point of view- forests, especially priority ecoregions like the ASER (WWF Russia, 2012b). Besides the threat of pioneer logging, the Russian forest sector faces a number of other serious challenges. The most serious are weak forest management, weak forest governance, weak legislation and high rates of illegal logging and trade (WWF Russia, 2012b; Brukhanov, 2009).

Forest fires are also a concern in the ASER. According to the satellite monitoring system, data from 2000 and onwards, 17.928 fires were recorded in the Russian portion of the ASER covering 8.3 million hectares. Yearly the area is exposed to 1.700 fires, of which 1.100 occur in forest areas and damage 50 to 70 thousand hectares, each fire having an average burned area of 45 hectares. In general, the fire return intervals of extreme fire seasons in the ASER have been 2-3 years for the past 10 years. The number of non-forest fires has remained stably high over the past five years. At the same time, a trend can be observed showing an increase in the number of fires whilst the cyclicity in fire occurrence remains unchanged (Shishikin, et al., 2012). The major reason for forest fires are people neglecting fire safety rules. According to the data of the Ministry for Emergency Situations, 87 % of fires are caused by humans (Brukhanov, 2009).

Theories of change

The SFM Strategy aims to increase the area of certified forests and to improve the harvesting practices of timber and non-timber products with involvement of major stakeholders: state agencies, non-governmental organizations (NGOs), communities and logging companies. FSC certification in Russia began in 2000. Now Russia has nearly 31 million ha of FSC-certified forests, or near 25% of all commercial forests in the country. Russia is the world's second leader in FSC forest management certification, following Canada, which contains about 18% of all FSC-certified forests in the world (GFTN Russia, 2011). Four sub-strategies have been defined to improve forest management in the ASER.

The *Markets sub-strategy* is about creating incentives and showing market opportunities to forest companies, especially those with FSC-certification, by improving research and thus knowledge on the current international and domestic market's opportunities for (sustainable) timber and non-timber products in the ASER. The Global Forest & Trade Network (GFTN) Russia plays an important role. GFTN Russia, the Association of Environmentally Responsible Forest Producers, is an ideal network for supporting Russian forest companies to achieve sustainable forest management, forest certification and to disseminate outputs of this work to other Russian producers. It is also a platform to promote FSC-certified forest products in the country and create the domestic market of such products (GFTN Russia, 2011).

The *Promoting SFM sub-strategy* is about getting different actors in the forest sectors committed to FSC certification, forest law enforcement, governance processes and ensuring legality. WWF introduces SFM approaches in the ASER and makes sure that relevant actors are aware of, understand the requirements and the potential benefits of SFM, including FSC-certified and legal timber. This will create political support and engagement from logging companies to commit themselves to SFM practices. Analysis of biological hotspots (Econet Strategy) will help determine areas where SFM and full protection is urgent.

The *Capacity-building sub-strategy* focuses on improving forest management by training governmental forest inspectors and PA staff managers in SFM and forest fire management practices. Together with the CBNRM Strategy this will lead to more support, including financial support, for SFM and eventually to the incorporation of SFM approaches and adequate fire prevention measures into national and regional policies and CBNRM schemes.

CBNRM is an important component of the SFM Strategy, because WWF believes that reducing and eliminating illegal logging in the ASER can be achieved by allowing local communities to manage and benefit from surrounding forest resource areas. The current legal and regulatory environment for sustainable use of forest resources is relatively adequate; however their enforcement is poor in practice. In Mongolia, since the 'Possession of Forest Resource Areas by Community Based Organizations and Economic Entities' was approved in 2009, more than 32% of the total forested areas are possessed by local communities. In some cases local communities abuse

the permit they have received for fuelwood and use it collecting timber for building houses and fencing instead. This is actually a risk for the CBNRM strategy and will hopefully be addressed by the parallel LE Strategy.

The *Environmental education sub-strategy* focuses on educational campaigns for the public on fire prevention and SFM. This will in time increase awareness of the consequences of fires and will activate communities to participate in monitoring of fires and illegal logging.

Intermediate Objectives

7.1. By 2020, at least 5-10 medium to large sized logging companies implement the SFM principles in the ASER.
7.2. By 2010, areas of "pioneer logging" of Russian forests in the ASER have decreased up to 30%.
7.3. By 2020, wood legality is ensured on 50% forest areas under lease in the ASER.
7.4. By 2020, FSC certification quality in Russia ensured.
7.5. By 2020, have strengthened community participation with monitoring and management of forest fires in the Russian Part of the Altai-Sayan Ecoregion.

4.3.8 Responsible extractive industries and linear infrastructure (REILI) Strategy

Description

The Environmental Impact Assessment (EIA) and landuse planning that incorporates conservation are important for reducing and further mitigating negative impacts from mining activities, related infrastructure development and multi-tracking. In Russia, the Environmental Protection Act (1991) imposed the rule that no project could go ahead without the positive conclusion of State Ecological Expertise (SEE). However, since 2007 certain legislation lead to the situation that many extractive industry projects are not the matter for SEE anymore. Therefore, ugent work is needed to return SEE as mandatory for economic activities and projects that could cause high potential negative environmental impacts. Current legislation is not sufficient, and enforcement is weak, especially regarding the lack of mandatory public involvement and monitoring (WWF Russia, 2003). The Mongolian Law on Environmental Impact Assessment was adopted in 1998. The law defines Environmental Impact Assessments as "the proper identification of any possible adverse effects from industrial and service activities by citizens, economic entities and organizations as well as the determination of measures to prevent, minimize and mitigate such adverse impacts". The weakness of the Law on EIA is that it does not require impact assessments for all projects, especially ones of small size, not even in ecological sensitive areas where the cumulative impact of many small projects can be considerable (Enkhbat, 2003).

Theories of change

Considering the mining and related infrastructure developments in the ASER, the primary focus of the REILI strategy will be on creating a sound legal framework for responsible mining and mining-associated infrastructure development that avoids and minimizes the current and potential threats from mining and mining associated infrastructures to the globally important areas and species at national level. The REILI Strategy is divided into two parts. Part one is about the SEA and EAI (processes) and consists of three sub-strategies.

The *Financial sub-strategy* is about establishing a fund which mobilizes expertise and supports capacity building for independent review of SEA and EIA (processes) and for stimulating local communities to participate in SEA and EIA and monitor impacts.

The *Public participation sub-strategy* is also focused on encouraging local communities to participate so that the role of public watch dog is strengthened.

The *Policy sub-strategy* focuses on a strengthened legal environment for the implementation of SEA and EIA processes. Together with *Financial* and *Public participation sub-strategies* this should lead to an improved quality of SEA and EIA analyses.

These three subs-strategies, with the Law enforcement strategy, will finally lead to the situation where mitigation and modification measures are implemented in existing projects.

The second part of the REILI Strategy is strongly intertwined with the Econet strategy and ASER Vision Map. It assumes that these two strategies will provide WWF with updated knowledge on future PA's and corridors, and possible conflicts based on its internal screening. This knowledge allows WWF to improve its engagement and negotiation with project developers, governments and local communities. By informing these actors and proposing alternatives, more efficient land use planning and management that incorporates conservation will be in place. Better land use planning and improved SEA and EIA will decrease the negative impacts of mining, its related infrastructure development and multi-tracking on key habitats and ecosystems.

Intermediate Objectives

8.1. By 2014, WWF has identified appropriate (additional) conservation actions by using its internal conservation and development Vision map as a screening tool, to identify conflict areas between conservation and EI and LI developments.

8.2. By 2015, there is an improved legal framework (with public participation mechanisms in place for experts and general public) to develop and implement SEA and EIA of construction and extractive industries projects.

8.3. By 2016, local people's knowledge of responsible mining, EIA, and SEA is increased, ensuring strong public monitoring of the biodiversity impacts of economic sector development.

8.4. By 2020, all EI and LI projects in the habitats of key species (Argali, Saiga, Snow Leopard) are developed and implemented in accordance with improved SEA and EIA.

5- Monitoring and Evaluation

A conservation initiative designed to focus on results will, at best, have an impact equal to the sum of its parts. However, a conservation initiative geared towards results *and learning*, will have an impact that is greater than the sum of its parts (Salafsky & Margoluis, 1999). The ASER Strategy has taken this observation to heart and has embraced the adaptive management process, focusing on both *monitoring* (assess progress) and *learning* (analyze, adapt and sharing lessons) to improve WWF's conservation actions in the ASER.

5.1 Monitoring

Key monitoring components

For short to medium-term monitoring, WWF needs information to assess whether it is achieving results in the theories of change in the most efficient and effective way possible. In other words: is the ASER Strategy doing the things right? To do this, WWF will look to the set of inermediate objectives and associated indicators to monitor progress, and allow the organization to adapt actions based on the findings. This type of monitoring will enable the organization to check its own assumptions and hypotheses; test how long it actually takes to achieve the results the Strategy proposes, and correct course as needed.

For medium to long-term monitoring, WWF will assess whether it's on track with its conservation goals are being achieved, in other words: is the ASER Strategy doing the right thing and are the strategies being executed correctly?

WWF will also monitor other key performance indicators. These are:

- Management performance: measuring management effectiveness of ASER Strategy activities;
- Fundraising performance: measuring fundraising efforts and related results.

Methodology and Process

The monitoring process and methodology are divided into data collection, data management and programme adaptation. The logical framework, Annex 8, describes the goals, objectives, related indicators, and how monitoring data will be collected. Data management falls under the responsibility of the ASER Steering Committee. This includes the analysis of monitoring data and short-term adaptation and learning within the responsible WWF country offices. The ASER Steering Committee is also responsible for the long-term programme monitoring and adaptation, which will be based on an external evaluation of the ASER Strategy. The external evaluation will be carried out every 3 years beginning in 2015 and it will:

- review the overall performance of the ASER Strategy with respect to stated targets and objectives;
- identify specific accomplishments;
- identify failures and shortcomings in the execution of the Strategy;
- assess the validity of the conservation mechanism and the programme strategy and;
- formulate recommendations.

5.2 Evaluation

Reporting on monitoring and evaluation will be carried out in correspondence with the WWF network reporting cycle, namely to develop two Technical Progress Reports per year per country, which will be sent to the ASER Steering Committee. The Technical Progress Report is an internal document. These reports form the basis for the dissemination of (monitoring) information and sharing of lessons learnt with external audiences. The ASER Steering Committee is responsible for external communication with relevant stakeholders, including donors, within and outside the WWF Network, by using for example the Altai-Sayan newsletter.

Photo 5: Altai-Sayan Ecoregion (Gernant Magnin/ WWF-Netherlands)

6- Operational Plan: Human Capacity and Financial Requirements

6.1 Human and other capacity requirements

Knowing that the key requirement to the success of any organization or project is its staff, it is important to consider the human and other capacity requirements for the implementation of the ASER Strategy.

Staff requirements

Until now, WWF Mongolia has had about 8,5 full time equivalent staff (fte)per year available for the implementation of activities in the Mongolian part of the ASER; and WWF Russia had about 5,5 fte per year available for the implementation of activities in the Russian and Kazakh part of the ASER.

Staff in the Khovd office (WWF Mongolia) has been very stable over the past decades. Currently there are four core staff members: field office director, conservation officer, rural development officer and a driver. In addition, WWF Monglia financially supports two staff members for the mobile anti-poaching unit and the chairperson and two secretaries of the Khar lake – Khovd river basin council. These individuals will be gradually transferred to the public budget as a part of WWF-Mongolia's exit strategy. The Khovd office also coordinates activities of project staff in two neighbouring provinces, namely in Uvs (2 staff) and Gobi-Altai (5 staff).

The Altai-Sayan Ecoregional office of WWF-Russia is located in Krasnoyarsk and has five core staff members: Head of ecoregional office, Senior project coordinator (based in Altai Republic), Project coordinator (based in Altaisky kray), Communication Officer, Office administrator and part-time forest officer (based in Krasnoyarsk). The main project activities are going on in Altai and Tuva Republics and southern portion of Krasnoyarsky kray. Irregular project activities take place in three other regions: Altaisky kay, Kemerovskaya oblast and Khakassia Republic.

In order to effectively implement the strategies that have been outlined in this document, more staff will be needed. The future success of the ASER Strategy will depend on a diversely skilled and experienced group of professionals that allows the relevant field offices to support donor engagement processes and provide the technical backbone of the conservation projects in different areas. A human resource strategy will be developed when funding is secured for (parts of) the ASER Strategy, ensuring that the enough personnel are available with the right expertise. WWF Mongolia will focus on building its in-house capacity in the areas of climate change adaptation and ecosystem services approaches. The Russian Altai-Sayan office needs additional professional staff in the areas of development and fundraising, legislation, mining issues officer and for species. Furthermore, additional field offices need to be established in Altai and Tuva Republics.

Governance structure

All four ASER countries have a solid WWF presence. Legally, implementation of ASER is the responsibility of each WWF National Organization (NO) or Programme Office (PO). However, to better coordinate the WWF ASER work, the WWF ASER Steering Committee (SC) was set up in 2005. It represents an agreement between funding and executing WWF parties, and staff members from WWF International, WWF Netherlands and both WWF Russia and WWF Mongolia always take part in the SC, with *ad hoc* attendance by representatives from China and Kazakhstan. The WWF ASER SC is meant to facilitate the project and programme process and is therefore the main decision maker.

The WWF ASER SC physically meets once a year somewhere in the Altai-Sayan, and virtual meetings are organized regularly. As part of the renewed ASER strategy, WWF wishes to revitalize the Steering Committee, by 1) inviting permanent representation of all four countries, and 2) employing an Ecoregion Facilitator. The Ecoregion Facilitator facilitates the implementation of the ASER Strategy by helping the different countries and WWF offices with fundraising, networking and assisting the SC and the different staff on country level to implement the ASER Strategy. Each country has its own point of contact or entity which is responsible for the execution of the ASER Strategy and coordinates the relevant field offices and staff. The relevant

field staff and offices are responsible for the actual work. The diagram below shows the four basic levels that WWF sees as necessary to guarantee its own functioning.

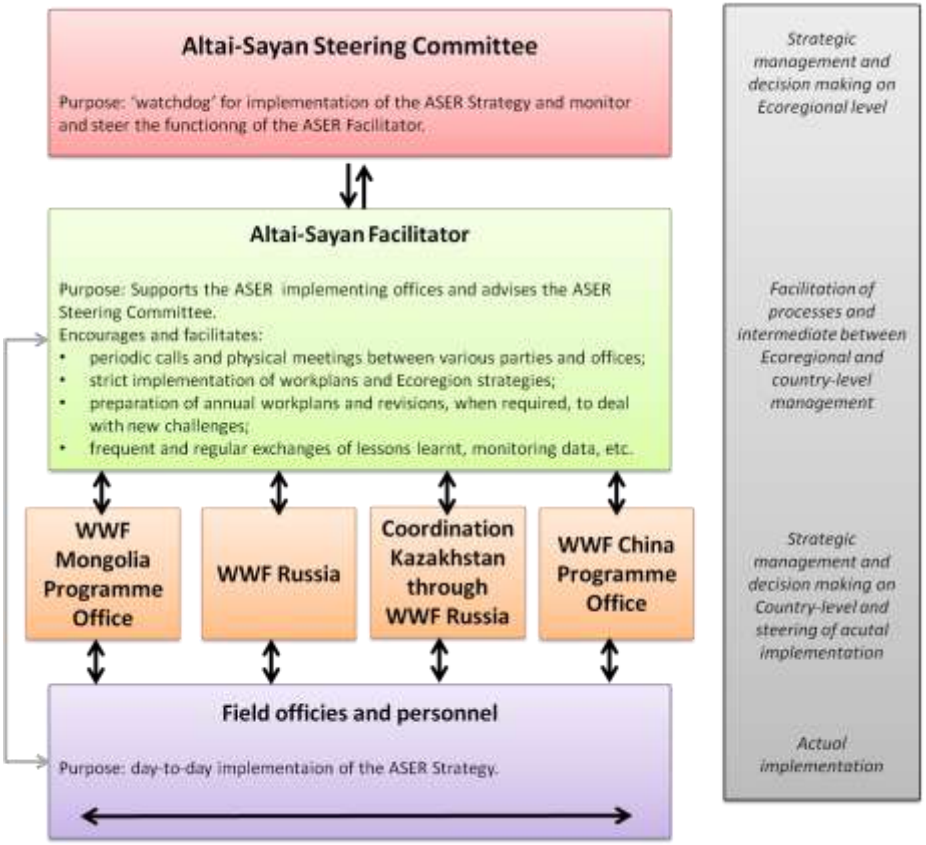


Figure 10: Organizational structure for implementation and management of the ASER Strategy

Stakeholders and partners

To address current and future conservation issues, WWF will work with many partners and stakeholders. Often these partners will be government partners, central, regional or local; or they will be NGO's or representatives of local people. More often than not, the partnerships that will be established will be vibrant mixtures of many relevant stakeholders.

For each issue or area where WWF will seek to implement the ASER Strategy, it will sit down with all stakeholders and agree on a description of the issue, the "drivers" behind the issue, and possible solutions; and then agree on an implementation plan, budgets, and other actions. There will be not one single blue-print or model of how the governance of these projects will be organized. For complicated, transboundary issues or areas, it will be likely that ministerial or provincial authorities will lead the process, whilst more localized projects such as pilots with various regimes of grazing could be managed by a local WWF office or a local NGO. In all cases, WWF will carefully consider how to support the establishment of a governance model, and how best to facilitate successful implementation.

The ASER consist of four countries and there is not one single ecoregional authority. In each country there are a small number of governmental institutes with which WWF has closely collaborated in the past and which are considered crucial for successful implementation of the ASER strategy.

In Mongolia environmental protection is covered by the strategic planning division and the environment and tourism department of the the Provincial (Aimag) Governor's Office. The environment and tourism department also coordinates the hydro meteorological centre and the forestry unit at the provincial level. In addition, in the Mongolian part of the ASER, there are eight protected area administrations that manage 26 protected areas. These institutions are funded by the state and are mandated to carry out coordination, implementation of state and regional policies in environmental conservation. There are also five multi and bi-lateral organizations that implement projects in support of the government programme for rural

development and sustainable use of natural resources (pasture and water). These include:

- Coping with the Desertification project funded by SDC;
- "Green gold" pasture ecosystem management project;
- "Sustainable livelihoods programme phase 2" funded by WB ;
- The Rural Agribusiness Support Program (RASP) designed and managed by Mercy Corps with financing from the USDA;
- Ecosystem Based Adaptation Approach to Maintaining Water Security in Critical Water Catchments in Mongolia project funded by Adaptation fund and managed by UNDP.

There are not many conservation NGO's working in the Mongolian part of the ASER. WCS works in Saiga monitoring and conservation research. World Vision Mongolia has just incorporated an environmental component and is planning work in ASER and Irves enterprise is working in the Snow Leopard habitats and supports alternative income for local communities and decrease the Snow Leopard and herder conflict.

WWF Mongolia is closely collaborating with Mercy Corp and Green gold in pasture management and rural marketing. In the area of water management WWF is also closely working with the Coping with the Desertification project. Furthermore, WWF Mongolia has signed a corporate MOU for collaboration with the Protected Area department of the Mongolia Ministry of Nature Environment and Water Agency.

In the Russian and Kazakh part of Altai-Sayan Ecoregion, WWF Russia cooperates with different governmental and non-governmental organizations. Among government structures WWF works with Regional and District governments, including Game Management Departments, Forest Departments, Regional departments of Nature Protection Agency of Russia (Rosprirodnadzor), Tourism and Enterprise Departments, Directorates of Regional Protected Areas, Regional Universities and different research centres. Regional and Federal Protected Areas are one of the most important partners of WWF in Altai-Sayan Ecoregion. The Association of Nature Reserves and National Parks of the Altai-Sayan Ecoregion unites the great majority of Protected Areas in the Russian part of the Ecoregion and collaborates with WWF in many conservation activities.

Approximately 20 NGO conservation and indigenous groups in the Ecoregion have WWF support to implement activities on species conservation, environmental education, sustainable development of local communities, anti-poaching, renewable energy development and Protected Areas management. WWF cooperates with other foundations for the implementation of joined conservation and sustainable development projects, for example, Citi Foundation, OxFam and MAVA Foundation. Other initiatives include:

- Partnership between WWF and US Fish and Wildlife Service, State University of New York, Snow Leopard Conservancy and Altai Project on Snow Leopard and Altai argali monitoring and conservation in Altai Mountains;
- Since 2006 UNDP/ GEF Project "Biodiversity conservation in the Russian portion of Altai-Sayan Ecoregion" with total budget of 3.5 million US dollars plays considerable role in the area and support enormous number of diverse conservation activities in Altai-Sayan;
- "Strana Zapovednaya" Foundation regularly supports conservation, research and environmental education activities;
- Global Green Fund is active in the Ecoregion since 2002 and support non-governmental conservation organizations in the Russian part of Altai-Sayan Ecoregion.

6.2 Financial requirements and fundraising strategy

WWF spend about US$5.6 million dollar from 2006 to 2011 on conservation activities in the ASER. Per year this comes down to an average of about US$946.000 dollar (Figure 11). Based on the income and expenditures of previous years, and the planned (new) conservation strategies described in this document, WWF expects it needs to triple that amount, meaning that US$14,4 million dollar is needed for the

implementation of the ASER Strategy from 2011 – 2020, on average US$1.6 million per year.

In the past ten years WWF-activities in the ASER have been funded by various donors. On average, 55% of the funding came from WWF, ranging between 19% and 98% in different years. On average, 8% of income came from Government Aid Agencies, including UNDP, GEF, SIDA, World Bank, GTZ and SDC. On average, 37% of income came from foundations and other private and corporate donors, of which the MAVA Foundation, CITI foundation and Oxfam were quite substantial.

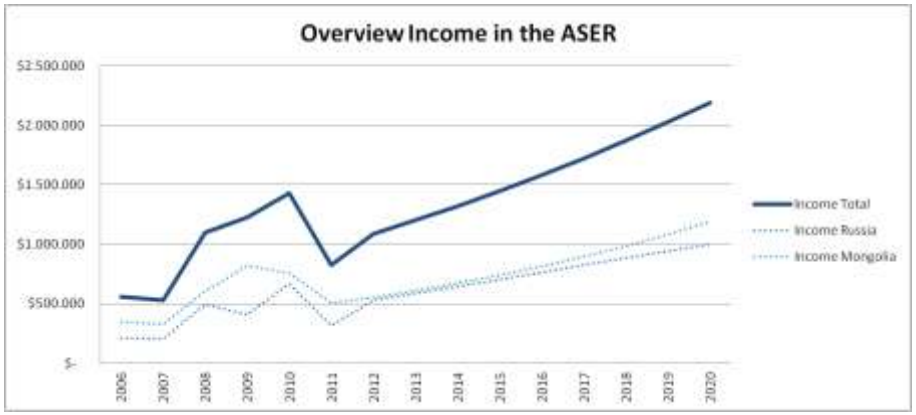


Figure 11: Overview Income in the ASER

For the implementation of the ASER Strategy WWF envisions the need to scale up beyond the current carrying capacity, aiming to triple income over the next ten years. Therefore, a fundraising strategy is needed. The ASER Strategy is part of the fundraising strategy and it is founded on the idea of rallying donors behind a joint ecoregional vision and the competitive advantages of WWF. Through this Strategy, WWF is taking conservation of the Altai-Sayan to the next level, aiming to unite key donors behind the strategic direction of integrated management of large-scale conservation landscapes. This will deliver on donors' core conservation mission, in particular fulfilling their CBD commitments.

6.3 Risk Assessment and mitigation strategy

WWF has installed sound management control systems on an operational level and developed a governance structure of the ecoregional level, which should allow WWF to pro-actively address risks. Peer review of new projects and programmes at design stage allows avoiding possible pitfalls, and close review of financial planning and human resources allows the field offices to take pro-active actions to any challenges arising.

During the preparation of the new ASER Strategy several potential risks were identified and mitigation actions proposed. These are summarized in Table 3.

Table 3: Risk assessment and mitigation strategy

Potential risks	Mitigation
Conservation	
The capacity and coordination amongst ministries and government agencies is still very limited.	Ensure that programmes and projects have sufficient focus and timeframe that focus both on increasing the target institutions capacity and/ or needed time for partners' absorption capacity.
(Mongolia) 2012 election brings new members of parliament who are pro-mining or financially tied with mining and are unresponsive to environmental issues.	Building up alliances with influential multi and bi-laterals and pro-conservation prominent individuals for advocacy.
(Mongolia) The pasture law has been on hold since 1997 due to lack of political will of parliament members. The current situation is causing the "tragedy of commons" over largest natural resources in the country.	Building up alliances with influential multi and bi-laterals and members of parliament active for adopting the law on Pasture.
Economic sectors and economic development are main drivers for degradation.	Increase internal knowledge threats and develop appropriate strategies.

Harsh and snowy winters could considerably decrease the number of argali and saiga.	Identify and develop strategy for better protection of possible refuge areas for argali and saiga with lowest snow cover and mildest winter temperatures Prevent obstruction of general migration routes for these species by linear infrastructure.
Increase in prices for wildlife products in illegal market can considerably negatively influence populations of saiga and snow leopard.	To develop effective anti-poaching activities concentrated in the most important species habitats. Provide local communities with appropriate alternative income and incentives to protect endangered species.
Low interest of federal and regional governments in conservation in favour of intensive nature resource consumption.	Actively involve local communities and public sectors in campaigns against unsustainable nature resource consumptions.
Partnerships	
WWF enters a Strategic partnership with a corporation that turns out to have questionable reputation and/ or has a hidden agenda of green washing.	WWF conducts sound due diligence of potential partners in corporate sector.
Fundraising	
Unable to mobilize income and fundraising targets for various reasons.	Field/ country offices continue to diversify income sources to minimise risk exposure to any one source. Define clear spending priorities across strategies and operations to clarify where spending cuts can be made if needed. Identify investments that could be delayed with least conservation impact.
Sudden withdrawal of funds / other major financial surprise e.g. exchange rate loss	Ensure minimum reserves targets are met through regular cost control/ monitoring and implementing prompt cost savings action if needed.
Finance and Administration	
Delays in recruiting key positions/ Unable to maintain staff due to market competition.	Implement improved workforce planning to effectively forecast and prepare for necessary capacity levels. Maintain service level agreement with WWF International/ Network to help support short term capacity gaps. Regular benchmarking of salary and other factors with appropriate actions. Strengthen succession planning/ training within existing team to flexibly cover key positions from within in urgent situations.
General risks to staff health, safety and security	Develop, update and enforce policy and procedures. Identify and address any inadequate equipment / support levels. Provide training to staff on health, safety and security.

6.4 Project lifespan and exit strategy

This strategy document spells out the intermediate objectives and theories of change for achieving WWF's vision for the Altai-Sayan Ecoregion. The conservation objectives are set at a time horizon of about 10 years or less, and for the most part these intermediate objectives will not be sufficient to meet all conservation goals in the long term. Yet, it is not too early to consider an exit strategy that ensures the long-term sustainability of conservation in ASER. The exit strategy will be developed in the course of the next 3 years, including stakeholder participation.

<PARAGRAPH ABOUT 'USE' OF STRATEGY TO BE ADDED>

7- Annexes

Annex 1 – ASER Strategy Development Team

The strategic planning process for the ASER Strategy commenced at the end of 2010 and it was finalized at the beginning of 2012 after an intensive period of online meetings, workshops and e-mail communication within the ASER Development team. Three multi-day planning workshops were organized, namely in December 2010 in Moscow, Russia; in June 2011 in Ulaanbataar, Mongolia and in October 2011 in Zeist, the Netherlands. A core planning team (CPT) worked closely together with an advisory group under the guidance of the WWF ASER Programme Steering Committee.

ASER Strategy Core Planning Team

The small size of the CPT facilitated easy communications and cooperation. The CPT consisted of four staff members from different WWF offices with two country coordinators responsible for the communications within their own country teams:

Name	Function	Office	Role
Albertien Perdok	Advisor Ecological Networks & Species Conservation	WWF Netherlands	Overall coordination
Batkhuyag Baldangombo	Programme development and performance manager	WWF Mongolia	Country coordinator
John Morrison	Conservation Planning & Design	WWF US	Open Standards expert
Mikhail Paltsyn	Project Coordinator Altai-Sayan Programme	WWF Russia	Country expert
Onon Yondon	Species Programme Manager	WWF Mongolia	Country expert
Svetlana Kozlova	ASER Conservation Planning Expert	External expert hired by WWF Russia	Country coordinator

Advisory group

The advisory group consisted of the following members, in alphabetic order:

- Alexander Belokurov, Protected Area Programme Officer, WWF International;
- Alexander Bondarev, Head of Altai-Sayan Ecoregional office, WWF Russia;
- Alexander Brukhanov, Forest programme coordinator ASER, WWF Russia**;**
- Alexander Voropaev, GFTN-Russia Coordinator;
- Alexey Knizhnikov - Oil & Gas Environmental Policy Officer, WWF Russia;
- Buyanaa Chimeddorj, Species officer of WWF Mongolia;
- Chimed-ochir Bazarsad, Rep, WWF Mongolia;
- Dan Cao, Manager PO Liaison and Support, WWF International;
- Gary Miller, Director Europe/Middle East, WWF International;
- Gernant Magnin, Programme leader Ecological Networks and Species Conservation, WWF Nethelrands;
- Lkhagvasuren Badamjav, Conservation Director, WWF Mongolia;
- Munkh-Erdene Khulan, Communication programme manager, WWF Mongolia;
- Olga Pereladova, Head of WWF Central Asia Programme, WWF Russia;
- Oyunmunkh, Species officer of WWF Mongolia;
- Tim Reed, independent consultant, former director Conservation audit programme at The Nature Conservancy;
- Youde Chang, Programme Officer Species Conservation, WWF China;
- Victoria Elias, Programme Director, WWF Russia.

Annex 2 – WWF Standards of Conservation Project and Programme Management

The WWF Standards are rooted in a long history of project and programme planning and management in WWF, across other conservation organizations, and in other disciplines. These Standards were founded on the best practices for designing and implementing conservation projects and programmes. They are meant to help conservation projects describe their long-term vision and key assumptions, develop effective activities, measure their success, and then adapt, share, and learn over time. The Standards describe a series of five steps (Figure 12):

1. **Define** who will be involved on the project team in the early stages, your project's geographic or thematic scope, your vision of what you hope to achieve, and the context in which you intend to work including threats and opportunities and who the key stakeholders are.
2. **Design** your action plan (including goals, objectives and activities,) monitoring and operational plan.
3. **Implement** your workplans while ensuring sufficient funding, capacity and partners.
4. **Analyze** your data, results and assumptions, and operational and financial performance & **Adapt** your workplans as necessary based on your findings.
5. **Share** lessons, formal communication products, feedback and evaluations, and a learning culture with key external and internal audiences.

Figure 12: WWF's Conservation Project/ Programme Cycle

The ASER Strategy describes steps one and two.

Annex 3 – Socio-Economic Background

Socio-economic background is given for the two largest countries in the ASER.

Russia

Source: Conservation Action Plan for the Russian Altai Sayan Ecoregion (WWF Russia, 2003), with minor updates made in 2012.

People in the Ecoregion depend on the environment and biodiversity resources for their livelihoods. Biodiversity conservation should not be achieved without participation of the local people, who live with and rely on the natural resources in the region. The Altai Sayan Ecoregion is not only unique with its diverse biological resources, but also with its diverse ethnic and cultural heritages. There are several indigenous peoples groups that inhabit in the Ecoregion and hold important traditional knowledge on natural resources management. For the past several years, the economy in the ecoregion has fallen behind and stagnated compared to the national average and people's reliance on natural resource exploitation is increasing.

People

The population of the Altai Sayan Ecoregion is characterized with many different indigenous people groups who are sparsely located within the vast landscape. In 2010, the population of the Russian part of the Ecoregion was 4.900.000, comprised of diverse ethnic groups, including the indigenous peoples, of which 70% lives in cities. The average population density is 3.7 individuals/ km^2. The Tuva Republic and Altai Republic are least densely populated, at 2.0 individuals per km^2 respectively, whereas the Kemerovo region is at the other end of the spectrum with a population density of 26.2 people per km^2. The population is widely dispersed among villages and small settlements throughout the region. The largest urban centers are Krasnoyarsk, Kemerovo, Abakan, Novokuznetsk and Belovo. As in other parts of the Russian Federation, the demographic trends demonstrate a reduction in birth rates and an increase in death rates. With the exception of the Altai and Tuva Republic, the population is slowly decreasing throughout the region. The highest decrease was recorded in Kemerovo and Altai Regions, which reached to 0.7 percent annually. The population decrease in these regions is 6 to 30% larger than other parts of the Russian Federation.

The diverse ethnic groups, nearly 20 of them, comprise the unique culture of the Russian Altai Sayan Ecoregion. The population of indigenous people comprises about 8% of the population in the Ecoregion. Particularly in the Tuva Republic the indigenous people represents the majority of the population. Indigenous peoples are distributed throughout the Ecoregion and in some settlements they constitute 100% of the population. The Khakasian, Tuva, and Altai have relatively large population in the region. The Tuvans comprise the largest indigenous group in the Ecoregion, with 208,600 population in 2000. In contrast, there are only 50,000 (25%) Altai in the Republic of Altai, and 63,000 (11%) Khakasian in the Republic of Khakasia. The Telengite, Tubalar, Kumandine, Chelkan, and the Altai ethnic cluster of Shortsy, Teleut, Todzha Tuva, and others are smaller in number but contribute to the rich cultural diversity in the ecoregion. Approximately 46,000 people belong to this group, accounting less than 1 percent of the total population in their region.

In general, the depressed social and economic conditions of the indigenous people are significantly behind to the average population in the Ecoregion. On average, unemployment rate among indigenous people is 1.5 to 2 times higher than the regional average and in some settlements it even reaches to 95%. Under the dire economic conditions in the region, and in absence of alternative sources of livelihood, many are now relying on exploitation of natural resources. Deterioration of their culture, particularly due to increased drug and alcohol consumption has also been a serious problem among the indigenous people.

Gender issues in the ecoregion are not well studied until today. The role of women and men for natural resource management is an important aspect to promote and ensure biodiversity conservation.

Culture Heritage

In addition to the natural beauty and landscapes of the Altai-Sayan region, the region's landscapes include historical sites with a variety of archeological monuments. The Altai-Sayan region is often viewed as one of the cradles of civilization. In spite of the fact that there are many links between past cultures of the Altai Sayan region and modern civilization, the antique and middle age history of Southern Siberia and Central Asia is little known to the general public.

The Altai-Sayan Ecoregion is extremely rich in stone and caves paintings; antique burial mounds, menhirs, steles and other historic monuments. One of the oldest sites, the Malaya Siya site in Khakassia, dates back to 35,000 BC. It is hard to imagine the Khakassian step without its thousands of burial mounds and man-erected stones. Although some precious sites were submerged by artificial lakes or were otherwise destroyed over the centuries, historical heritage is relatively well preserved in the region. In those parts of the Altai-Sayan Ecoregion which were at the center of rich cultures in the past, historical monuments are integrated into the natural landscape in a way to form a harmonic, inseparable unity. The presence of such cultural sites and their need for protection cannot be neglected through the ecoregion conservation initiatives.

Cultural diversity continues to characterize the Altai-Sayan Ecoregion also in modern times. A variety of languages of the Slavic, Turkic, Altai, and Mongolian families are spoken today in the Altai-Sayan eco-region. Different nationalities including Russians, Mongolians, Chinese, Kazakhs, Uighurs, Uzbeks, Altais, Tyvans, Buriatians, Shors, Khakass, Teleut, and others live in the region. Some of them have still preserved traditional ways of using natural resources. In dry areas of Tuva, for example, herdsmen are returning to nomadic life patterns and undertake four seasonal migrations like their ancestors did. This practice could prevent pasture degradation of pastures, thus ensuring sustainable use of land. Protection of the Altai-Sayan's biodiversity depends to some degree on the ability of indigenous people to preserve traditional land use patterns. Such patterns do not only ensure sustainable use of land, but also ensure that certain natural sites to which sacred value is attached remain respected and undisturbed.

Economy

Mining, agriculture, forestry, and hunting support the main economy of the people in the Russian part of the Altai Sayan Ecoregion. Mining industry supports the major part of the economy in many parts of the region. Coal, gold, iron, ore, copper are found in large areas of the region. The main economic activity of the local people is agriculture, in the form of livestock and farming. Livestock production is a very important element of the rural economy and sheep, goats, cattle, yaks and horses are major livestock that the people rely on. Particularly in Tuva, Altai and other areas, nomadic livestock farming was practiced in the past, however, most of them are now settled and stopped practicing the traditional seasonal nomadic herding.

The region ranks the highest in Russia in terms of per capita grain, meat and milk production. The Altai produces the richest variety of wheat, which has high gluten content. Furbearer breeding and bee keeping are also common, and vegetable growing and horticulture are also widespread. Most of the population is engaged in subsistence agriculture and only limited amount of products is traded as commercial goods. Only 6.9% of total agriculture products were traded in 2001. Republic of Khakasia and Krasnoyarsk regions are the major agriculture centers in the Ecoregion, which produce more than half of the total volume of agriculture products of the Ecoregion. .

Like many other parts of the Russian Federation, the Altai-Sayan Ecoregion has not been spared the effects of the recent economic downturn in the country and the associated social hardships experienced during the past decade. In fact, the living standard of people in the Altai-Sayan Ecoregion are substantially worse off than the average Russians, in terms of availability of social infrastructure, life expectancy, income, employment and other indicators.

Assessments made by group of experts indicate that 30-70% of the entire population of the Ecoregion has fallen below the average national economy due to its heavy reliance on subsistence economy. Official unemployment figures range from 1.4% in Altaiskyi Krai to 11.6% in the Tuva Republic. As noted before, among certain indigenous peoples' villages, unemployment rates reach to 95%. The average monthly income is only 1,210.7 rubles (approx. US$ 40) per person in the Ecoregion. Low-income level has limited and decreased the purchasing power of the population.

Moreover, the income gap between the rural and urban population is very high in the Ecoregion. For example, rural population in the Altai Republic have two times less income (sometimes even lower) than the people living in the rest of the Altai region.

The depressed socio-economic conditions in turn have translated into greater pressure being applied upon the region's natural resources. This is particularly accentuated in the case of populations in the rural area, who had to turn to exploitation of natural resources to meet their subsistence needs and economic requirements.

Mongolia

Source: Altai-Sayan Ecoregion Conservation Action Plan for Mongolia (Enkhbat, 2003).

Population and Demography

In the Mongolian Altai-Sayan eco-region over 356.000 people reside in 2001, about 15 percent of the population of Mongolia. Distributed over an area of 427,320 sq. km the average population density is 1.2 persons per sq. km, which is by 0.3 persons lower than the average population density in Mongolia. It is also lower than the average population density in the neighboring countries that is sharing the eco-region (Russia, Kazakhstan and China). The population is not distributed evenly throughout the aimags, the most western aimag Bayan-Ulgii shows the highest density with 2 persons per sq. km, whereas Gobi- Altai has only 0,5 persons per sq. km. The other aimags have numbers close to the eco-region average. About 50 percent of the population in the eco-region lives in the urban centers, soum and aimag centers, and the rest follows the traditional nomadic lifestyle in the rural areas. The average annual population growth in the eco-region is below the nationwide rate of 1.4 percent, except for Khovsgol (1.43). After an annual population increase in the eco-region between 1.8 – 2.44 percent in the 1980s the growth rates decreased considerably due to various socio-economic reasons the recent transition.

Approximately 16 different ethnic groups inhabit the Altai Sayan eco-region. However, they all share the same traditional nomadic lifestyle. The main ethnic group is the Khalkh followed by Kazakh and Durvud. The official language in Mongolia is Mongolian with different dialects of Mongolian. Another minority group exists in the Khovsgol sub-region, with an equally nomadic lifestyle, but their livestock is comprised of reindeer. The reindeer herders who are locally called “Tsaatan” people constitute approximately 180 people at two main camps in the northern mountains of the Khovsgol Aimag. The Tsaatan people’s original territory stretches into Russia where still the majority of the group exists.

Over the last ten years the Altai-Sayan region has experienced an increased rate migration to Ulaanbaatar and other major urban areas in the central part of the country. The main reasons for these migrations were:

- lack of work opportunities in the region
- remoteness from the market with poor road and communication network
- increased living costs for products that are coming from other centers
- increased rate of livestock thefts close to the Russian border
- desire of the people to provide with their children access to better education.

There were some visa-versa movements, especially in the early 1990’s. People who were moving into the eco-region wanted to:

- live in proximity of relatives
- search for better grazing areas for their livestock
- live in the rural areas because of unemployment and the consequent need to try to make a living from the natural resources - mainly as herder.

Residing close to the national border and being as ethnic groups whose traditional territory extends beyond the national borders, the population of Altai-Sayan eco-region is not only influenced by the increased internal migration to Ulaanbaatar and the urban centers, but also by the international migration, especially between Bayan-Ulgii and Kazakhstan. Over the last several years many Kazakh people returned to live in Mongolia, who left the country in the early transition period in

1990's. The main reason returning back to their homeland was associated with a limited employment opportunity in Kazakhstan.

Employment

Over the last five years employment rate has increased in all aimags within the eco-region. Employment rates of economically active population in 2001 varied between 87-96%. These high percentages have to be taken cautiously, because employment rate is based on the number of people able to work but not on actual employment, additionally all members of herder families are considered as employed although the women and teenagers don't earn any money. This unpaid workforce in family business accounts for 30-50 percent of the total workforce in the eco-region. 75 percent of the workforce is working for the livestock sector, which is about 1.6 times higher than the national average. 15 percent of the employed people work in health, education, civil administration, defense and social welfare system which is 1.4 percent less than the national average.

The political change in the early 90's with the consequent shift from a centrally planned economy to a free market economy forced many urban residents to resume herding as a mean of supporting their life. Since 1990 the number of herder households has been increasing up to 100 percent with the strongest increase in the first five years after the change. Currently, about 56 percent of the herders are between 16 and 35 years old and only 31 percent are between 35 and 60 years. With the herders not having any other professional education the above numbers strongly indicate that rural Mongolia will have to rely on livestock herding as the base of their economy for a long time.

Living standards

Currently 35 percent of the population in Mongolia is considered to live below the poverty line. Within the eco-region this number is even higher with an average of approximately 40 percent and even 45 percent in the Khovsgol Aimag. During the last three years of consecutive severe winter "dzud" and drought, many families have lost a big part of their livestock and forced to live now in poverty. Besides, alternative job opportunities other than livestock herding are very limited in the region.

Living standard vary throughout the region. The populations of the northern and southern Altai enjoy the highest living standard in the region. In the southern Altai sub-region (Gobi Altai Aimag), the trade is well organized by local cooperatives that sell cashmere and other livestock products (this high degree of organization is the outcome of the Gobi Initiative project and the competitive Initiative working with herders) on local auctions.

Social System

Education has been one of the Mongolia's strengths. Literacy had reached 98 percent for men and 95 percent for women during 1970's and 1980's largely due to a vast network of schools that included boarding facilities for children of herding families. But during the early transition years there were serious reversals as a result of the withdrawal of Soviet aid and the pressure on the education budget. The number of primary and secondary schools in 2001 within the western region as follows: Bayan-Ulgii –35, Uvs – 27, Khovd – 25, Khovsgol – 33, Zavkhan – 38 and Gobi-Altai – 28. There are a number of universities in the region that mostly situated in Khovd aimag center. During the last 2-3 years the government was able to provide necessary funding for reopening the dormitories in soum centers for children from herding families to attend the school. It has made a significant increase in school attendance by nomadic herdsmen family's children.

Mongolia has an extensive medical and public health infrastructure. In the last several years, the Government has promoted efforts to downsize, decentralize, and in some cases privatize elements of health care. In rural areas, physical access to services is often a constraint due to lack of transport and communication networks. In 1994, in order to reduce the pressure on health budget the Government has introduced a system of health insurance. Currently, about 90 percent of the populations are enrolled. The numbers of physicians and pharmacists in the aimags of the Altai-Sayan eco-region are in Bayan-Ulgii- 140, in Uvs – 136, in Khovd – 135, in

Khovsgol – 171, in Zavkhan – 124, and in Gobi- Altai – 115. However, the number of persons per physician in the western aimags is much less than the country's average. The average in the country at 2001 was 365 persons per a physician. These numbers were in Bayan-Ulgii –684, in Uvs – 635, in Khovd – 654, in Khovsgol – 704, in Zavkhan – 702 and in Gobi-Altai – 555. With this high number of persons per physician, there is also unequal access to medical services in the region. Generally, poor families and migrants have less access to medical services. In addition, environmental health concerns increasing affect all Mongolians as pollution levels escalate and access to safe water and sanitation decline with increased urbanization and deteriorating infrastructure throughout the country.

Current Economic Situation and Development Trend

The economic situation in the Altai-Sayan is extremely poor, all soums in the region face deficit in the local budget. A main economic sector in the Altai-Sayan is livestock breeding which constitutes over 70 percent of GDP of the region. Fees collected from the natural resources use make a significant portion in the local budget such as trophy hunting fee. Overall, between 60-75 percent of the local budget in each soum has been relied on subsidies from the central government budget allocation.

Agriculture, specifically nomadic livestock breeding is a key area of Mongolia's economy. Nomadic livestock breeding still remains the basis not only for the socio-economic development of rural areas but also for livelihood of the rural population. In 1992, herding collectives were dismantled and most state owned livestock was privatized. Herders became responsible for management decisions over their own herds. At the beginning of transition to market economy, in 1990, there were 25 856.9 thousands heads, in 1999 -33 568.9 thousands and in 2001- 26 075.3 thousands heads of livestock.

The number of livestock in the Mongolian Altai-Sayan eco-region increased up to 12 million heads until 1999 and followed by rapid decrease as in the whole country due to recent consecutive dzud (severe winter) in 2000 and 2001. From aimags within the region, Khovsgol and Gobi-Altai aimags were the third and the fourth in the country by the number of their livestock in 2001: 1,77 million and 1,71 million heads respectively.

In terms of prevailing livestock, the number of goats has been increasing significantly in the past 10 years not only all over the country, but also within the eco-region: compared to 1990, the number of goats increased by 1.9 times in 1999, reaching 4,3 million heads. This was due to relatively high price of cashmere. Increasing number of goats has a negative effect on pastures. Furthermore, it leads to loss of pastures.

While the number of goats has been increasing, the number of camels has been dwindling. In 2001, there were 285.2 thousand camels in the country, including 82.4 thousand in the eco-region. Number of cattle has been increasing in the region, however slowly. In regard of horses and sheep, their numbers have been declining gradually –this also shows that herders are not concerned with selection and breeding of high productivity animals, but rather, refer the type of livestock that brings most profit in the shortest time.

Agriculture, mainly livestock sector of the region makes about 75 percent of GDP. Within the eco-region crop growing is developed in the Great Lakes basin, central parts of Uvs and Khovd aimags, northern and north-western parts of Gobi-Altai aimag, and central part of Zavkhan aimag. Although, the Altai high mountains sub-region features wide expanses of fertile land, very little of this land is even. Therefore crop-growing is uncommon in the above-mentioned area. There are plenty of steppe areas in Gobi-Altai aimag suitable for crop growing, however, due to lack of water, crop growing developed only in the areas around water sources. In Khovsgol aimag, the western part is suitable for crop growing in regard of soils and water sources. However, the climate in this area restricts crop growing only to growing fodder crops and some vegetables.

According to researchers, 57.9 thousand hectares in Uvs, 15-30 thousand hectares in Khovd, 5-15 thousand hectares in Gobi-Altai, and 5-15 thousand hectares in Bayan-Ulgii aimag are suitable for crop growing. Currently, an area of 3-4 times less than the above is used for crop growing in the eco-region. Flourmills operate in almost all soums within the eco-region. Growing crops and vegetables along with livestock

breeding is common among the local population who usually irrigate their fields and vegetable gardens by hand.

Industry is underdeveloped in the Mongolian Altai-Sayan eco-region. Before 1990, a number of heavy industry plants used to operate in all aimags: 6 000 kilowatt capacity thermal power plant in Bayan-Ulgii, ferro-concrete and concrete making plants, a brick factory with a capacity of 5 million bricks per year, wool processing plant capable to wash and clean 2000 tons of wool per year, food factories and confectionaries, in Uvs aimag – a large flour mill in Ulaangom capable to produce 4.5 thousand tons of flour per year equipped with storage for 3200 tons of wheat, Tsagaan khairkhan wood factory that supplied wood and wooden products to Khovd and Bayan-Ulgii, spirit factory, fruit and berry gardens, in Khovd – brick factory capable to produce 10 million bricks per year, ferro-concrete making plant, auto service capable to provide service to 200 vehicles and repair 100 engines and many smaller enterprises and industries in soums. The majority of these plants stopped their operation due to lack of funds, obsolete machinery and technology, and other difficulties associated with transition to market economy.

Since 1990, most of the enterprises and industries in the eco-region have been privatized. Currently 82 economic entities operate in Bayan-Ulgii, 76 –in Khovd, 57 – in Uvs, 90 –in Gobi-Altai, 78 -in Zavkhan and 81 -in Khovsgol aimags.

Infrastructure is poor in Altai-Sayan eco-region, especially road system. Dirt roads prevail in the eco-region except for a few paved roads: in Bayan-Ulgii aimag –within Ulgii town, the aimag center, and several kilometers to Tsagaan nuur soum, in Uvs aimag –within Ulaangom town, the aimag center, and several kilometers to Khandgait border point to Russia, in Khovd aimag –within Khovd town, and within Murun, the center of Khovsgol aimag. In Gobi-Altai and Zavkhan, there are paved roads in the aimag centers; however there are no paved roads in the areas falling to the eco-region.

The Government of Mongolia has initiated the Millennium Road project as a part of the regional development plan under which new roads will be constructed and existing roads renewed and reconstructed as needed. The Millennium Road that will run through the middle part of the country aims at improving communication with Mongolia's neighboring two countries through bringing together smaller roads that branch off horizontally from the main road the vertical direction that connects Mongolia with Russia and China. Within the eco-region, the Millennium Road will be passing through the following areas: the Great Lakes Depression, passing through it, northern part of the Khar-Us Lake National Park, i.e. through territories of Erdenekhairkhan, Zavkhanmandal and Durvuljin soums of Zavkhan aimag, Durgun, Myangad and Buyant soums of Khovd aimag, the Khovd town, Khovd and Erdeneburen soums, through Tolbo, Buyant, Bugat, Ulgii and Nogoon-nuur soums of Bayan-Ulgii aimag until Tsagaan-nuur border point.

Within the eco-region Bayan-Ulgii, Khovd and Uvs aimags have relatively better energy infrastructure compared to Zavkhan, Gobi-Altai and Khovsgol because of the Western Region Energy System supply. However, due to shortage of funding even the energy system for the first three aimags facing a serious problem to be energy cut by energy supplier in Russia. In general, the energy situation in the eco-region is as follows: few central locations are supplied with energy from the main system, and the remaining ones use high-cost energy generated by diesel power generators. Possibilities for utilizing renewable energy sources, using diesel power generators that use less fuel and thermal plants are high priority for the eco-region. Households in rural areas and in soum centers use conventional stoves to heat their homes.

Annex 4 - Viability Assessment

Target viability is the ability of a biodiversity target to withstand or recover from most natural or anthropogenic disturbances and thus to persist for many generations or over long time periods. Furthermore, Key Ecological Attributes (KEAs) were determined for each target: aspects of a target's biology or ecology that, if missing or altered, would lead to the loss of that target over time (20-50 years). Any given key ecological attribute will vary naturally over time. The range of variation of a KEA's indicators is "acceptable" when it would allow the target to persist over time. Based on the estimate of the acceptable range of variation, a viability rating scale can be build. This scale involves establishing the following boundaries for an indicator based on your thresholds:

- Very Good – Ecologically desirable status; requires little intervention for maintenance.
- Good – Indicator within acceptable range of variation; some intervention required for maintenance.
- Fair – Outside acceptable range of variation; requires human intervention.
- Poor – Restoration increasingly difficult; may result in extirpation of target.

Table 1: Summary of Viability assessment for current state (2010) per country in the ASER

Target	RUSIA	MONGOLIA	KAZAKHSTAN	CHINA
Forest steppe	Very Good	Very Good	Very Good	Good
Freshwater ecosystems	Good	Good	Good	Good
Glacier	Very Good	Very Good	Very Good	Good
Mountain forest	Very Good	Very Good	Good	Very good
Mountain tundra and alpine meadow	Very Good	Very Good	Very Good	Good
Semi-desert and Desert	Very Good	Very Good	Very Good	Good
Steppe	Very Good	Very Good	Good	Good
Altai Argali	Good	Good	Fair	Fair
Mongolian Saiga	n.a.	Fair	n.a.	n.a.
Snow Leopard	Fair	Good	Fair	Fair

Key:

overall			
RU	*MNG*	*KZ*	*CH*

Indicator rating			
Poor	**Fair**	**Good**	**Very Good**

Table 4: Viability Assessment

Target	Category	KEA	Indicator	Current state (2010)				Desired state (2020)			
Steppe ecosystem	Size	Area of steppe	Km^2 of steppe (unconverted)	250.372 [a,b]				250.372			
				71.940 [b]	140.670 [b]	20.756 [b]	17.006 [b]	71.940	140.676	20.756	17.006
Forest-Steppe ecosystem	Size	Area of forest-steppe	Km^2 of forest steppe (unconverted)	105.512 [a,b]				105.512			
				82.800 [b]	16.083 [b]	4.308 [b]	2.321 [b]	82.800	16.098	4.308	2.321
Mountain forest ecosystem	Size	Area of mountain forest	Km^2 of mountain forest (unconverted)	412.963 [a,b]				412.964			
				362.441 [b]	28.998 [b]	16.174 [b]	5.350 [b]	362.441	28.956	16.174	5.350
Desert and Semi-desert ecosystems	Size	Area of desert and semi-desert	Km^2 of desert and semi-desert (unconverted)	59.108 [a,b]				59.108			
				0 [b]	56.544 [b]	0 [b]	2.564 [b]	0	56.556	0	2.564
Mountain tundra and alpine meadow	Size	Area of mountain tundra and alpine meadow	Km^2 of mountain tundra and alpine meadow (unconverted)	180.966 [a,b]				180.966			
				112.930 [b]	44.534 [b]	8.696 [b]	14.806 [b]	112.930	44.467	8.696	14.806
Glacier	Size	Area of glaciers	Km^2 of glaciers	8.017 [a,b]				8.017			
				4.953 [b]	1.792 [b]	551 [b]	721 [b]	4.953	1.846	551	721
Freshwater	Landscape	Connectivity	Km of undammed	0,85				0,85			

Target	Category	KEA	Indicator	Current state (2010)				Desired state (2020)			
ecosystems	context		key rivers/total kilometers of key rivers	0,85 [c]	0.65 (Zavkhan) & 0,89 (Khovd) [d]	n.a	tbc	0,85	0.65 (Zavkhan) & 0,89 (Khovd)	n.a	tbc
	Condition	Hydrologic regime	Annual average volume of key flow events in key rivers (m3/s)	n.a.				n.a.			
				Katun - 626 Biya- 477 Tom - 1100 Abakan- 381 Ulug-Khem - 589 Enisey – 3350 [e]	Zavkhan at Guulin gauge - 8.85 (min 4.04- max 56.1); Khovd at Myangad gauge 75 (min 57.9- max 318); Buyant at Khovd gauge - 5.67 (min 4.59 - max 19) [f]	Buktarma - 214.0; Kurshum - 60.8; Ul'ba - 100.0; Uba - 177.0; Ertis - 628 (Ust'-Kamenogorsk) [o]	tbc	Katun - 626 Biya- 477 Tom - 1100 Abakan- 381 Ulug-Khem - 589 Enisey – 3350	Zavkhan at Guulin gauge - 8.85 (min 4.04- max 56.1); Khovd at Myangad gauge 75 (min 57.9- max 318); Buyant at Khovd gauge - 5.67 (min 4.59 - max 19)	Buktarma - 214.0; Kurshum - 60.8; Ul'ba - 100.0; Uba - 177.0; Ertis - 628 (Ust'-Kamenogorsk)	tbc
Snow Leopard	Size	Population size	Population number in key areas (Annex x)	660-950 *g				660-950			
				32-40 in 5 key populations [h]	150 in 8 key areas [i]	About 10 in 3 key areas [p]	About 10-20 in 2600-3500m Altai mountain areas [r]	40-50 in 5 key populations	150 in 8 key areas	About 15-20 in 3 connected key areas	About 30 in 2600-3500m Altai mountain areas
	Size & landscape context	Area of occupancy	Ha of occupied habitat	7.300.000				8.400.000			
				1.900.000 [j]	5.400.000 [i]	802.555 [p]	1.500.000 [r]	3.000.000	5.400.0000	802.555	1.500.000
Argali (subspecies Altai)	Size	Population	Population number in key areas (Annex x)	4.000-4.500 [k]				6.130-6.730			
				400-500 in total [k]	2.770 in 6 key areas [l]	10-15 in total [q]	700-800 [s]	500-600	3.000-3.500 in 6 key areas	50-70 in total	tbc

Target	Category	KEA	Indicator	Current state (2010)				Desired state (2020)			
	Size & landscape context	Area of occupancy	Ha of occupied habitat	2.500.000				2.800.000			
				500.000 [m]	2.000.000 [m]	643.477 [q]	n.a.	500.000	2.300.000	643.477	n.a.
Mongolian Saiga	Size	Population	Population number in key areas (Annex x)	8.000				10.000-12.000			
				n.a.	8.000 [n]	n.a	n.a.	n.a.	10.000-12.000	n.a	n.a.
	Size & landscape context	Area of occupancy	Ha of occupied habitat	1.300.000				1.360.000			
				n.a.	1.300.000 [n]	n.a	n.a.	n.a.	1.360.000	n.a	n.a.

References for Table x: Viability Assessment

a. Includes Kazachstan and China
b. GIS calculations using layer of ecosystem types for Altai-Sayan Ecoregion, scale 1:1.000.000 (Samoilova, 2001)
c. GIS calculations using layer of key rivers in Russian part of Altai-Sayan Ecoregion (Katun, Biya, Tom, Abakan, Ulug-Khem, Enisey): length of undammed rivers (3307 km) / total length of the rivers (3889 km)
d. GIS calculations using layer of Khovd river in Mongolian part of Altai-Sayan Ecoregion : length of undammed rivers (750.1km) / total length of the rivers (833.6 km to Teel river mouth)
e. Annual average volume of key rivers in Russian part of Altai-Sayan Ecoregion (Katun, Biya, Tom, Abakan, Ulug-Khem, Enisey; Wikipedia vocabulary http://ru.wikipedia.org)
f. Annual average of minimum and maximum flow of key rivers in Mongolian part of ASER based on last 70 years (WWF Mongolia freshwater department, 2011)
g. Total number of Snow Leopard in Altai-Sayan Ecoregion (without China) is 660-930 individuals: 100-150 in Russia (field reports of 2004-2011), 500-700 in Mongolia (Schaller et al. 1994; McCarthy, 2000a), 12-15 in Eastern Kazakhstan (Baidavletov, 1999)
h. Minimal number of the leopards in 5 regularly monitored key populations in 2008-2011 is 32-40 individuals. For Russia such populations are Argut (middle part of Argut River) with 5-8 individuals, Tsagaan-Shuvuut (8 -10 individuals), Sayano-Shushensky NR and its buffer zone (7-8 individuals), Chikhachev Ridge (4-5 individuals) and Sengelen (8-9 individuals); WWF Field reports)
i. Minimal number of the leopards in 8 regularly monitored key populations is 150 individuals. For Mongolia such populations are Altan-huhiy (25 individuals), Jargalant-Bumbat (28 individuals), Munhhairhan (18 individuals), Baataskhairkhan (9 individuals), Siilhem B (9 individuals), Tsagaan shuvuut (17 individuals), Tsambagarav (no data), Turgen (45 individuals) total amount of snowleopard in Mongolia is 500-700 spread over 5.435.174 ha (WWF Field reports)
j. Approximate Area of Snow Leopard occupancy in Russia (GIS analysis based on results of field surveys in 2004-2011, WWF field reports)
k. According to last surveys (2009) total number of Altai Argali in Altai-Sayan Ecoregion (without China) is 5800-5900 individuals: 5400 in Mongolia (Harris, Wingard and Lhagvasuren, 2009), 400-500 in Russia (Argali counts in October-November 2007-2009 by S. Spitsyn and A. Kuksin), 15-30 in Kazakhstan (Survey Reports of Eco-Altai NGO 2002 and 2004)

l. Minimal number of the Argali in 6 regularly monitored key populations is 2770 individuals. For Mongolia such populations are Gulzat (500 individuals), Myangan ugalzat (1000 individuals), Siilhem A (550 individuals), Siilhem B (200 individuals), Tsagaan shuvuut (20 individuals), Khokh serkh (500 individuals); total amount of Argali in Mongolia is 5400 spread over 2.116.059 ha (WWF Field reports)

m. Area occupied by Argali in Russia (Paltsyn, Lkhagvasuren, Spitsyn, Onon, Kuksin, Munkhtogtokh, 2011)

n. WWF Field reports

o. Annual average volume of key rivers in Kazakhstan's part of Altai-Sayan Ecoregion (Buktarma; Kurshum; Ul'ba; Uba; Kara Ertis (Ust' Kamenogorsk), Water Resources Committee of the Ministry of Agriculture of the Republic of Kazakhstan, 2011)

p. For territory of Katon-Karagaisky National Park (643477 ha), Markakolsky Game Reserve (103000 ha), West Altaysky Game Reserve (56078 ha) (O. Loginov, Director of the "Snow Leopard Fund" Kazakhstan: http://www.snowleopardnetwork.org/actionplans/Kazakhstan_strategy_English_Dec11.pdf; Snow Leopard Conservation Strategy in Kazakhstan (Ust' Kamenogorsk, 2011)

q. Institute of zoology – Baidavletov – data of official governmental census 2011 – Snow Leopard (7-8), Argali (subspecies Altai) (10-15)

r. Personal communication WWF-China Species department

s. S. Spitsyn, A. Kuksin. Report on results of field survey in the Russian portion of Altai argali distribution in October-November 2007. Archives of UNDP/GEF Project in the Russian portion of Altai-Sayan Ecoregion + G. Tsogtjargal Survey Report «Argali sheep survey in Uvs and Bayan-Ulgii aimag boundary area», December 2007 + R. Harris, G. Wingard, B. Lhagvasuren. 2009 National Assessment of Mountain Ungulates in Mongolia. Report to Mongolian Institute of Biology Mongolian Academy of Science, Mongolian Ministry of Nature, Environment and Tourism, World Wide Fund for Nature – Mongolia. + Zinchenko, Bufalov, October 2004, Survey Report on Altai Argali in Eastern Kazakhstan

Annex 5 – Threat ranking

The threat ranking table (Table 2; Chapter 3.1) provides an overview of the main threats to the ecoregion, and it shows to what extent each biological target is affected. Each target was assessed by a team of experts, who determined for each target the extent of the threat on country level. Three criteria were used and each cell in the table is thus based on a combination of

1. Scope: what % of each target is affected;
2. Severity: where the threat occurs, how much is the target affected; and
3. Irreversibility: how reversible are the impacts themselves.

The criteria are described in more detail below.

Scope

The proportion of the target that can reasonably be expected to be affected by the threat within ten years, given the continuation of current circumstances and trends. For ecosystems and ecological communities, measured as the proportion of the target's occurrence. For species, measured as the proportion of the target's population.

4 = Very High: The threat is likely to be pervasive in its scope, affecting the target across all or most (71-100%) of its occurrence/population.

3 = High: The threat is likely to be widespread in its scope, affecting the target across much (31–70%) of its occurrence/population.

2 = Medium: The threat is likely to be restricted in its scope, affecting the target across some (11–30%) of its occurrence/population.

1 = Low: The threat is likely to be very narrow in its scope, affecting the target across a small proportion (1-10%) of its occurrence/population.

Severity

Within the scope, the level of damage to the target from the threat that can reasonably be expected given the continuation of current circumstances and trends. For ecosystems and ecological communities, typically measured as the degree of destruction or degradation of the target within the scope. For species, usually measured as the degree of reduction of the target population within the scope.

4 = Very High: Within the scope, the threat is likely to destroy or eliminate the target, or reduce its population by 71-100% within ten years or three generations.

3 = High: Within the scope, the threat is likely to seriously degrade/reduce the target or reduce its population by 31-70% within ten years or three generations.

2 = Medium: Within the scope, the threat is likely to moderately degrade/reduce the target or reduce its population by 11-30% within ten years or three generations.

1 = Low: Within the scope, the threat is likely to only slightly degrade/reduce the target or reduce its population by 1-10% within ten years or three generations.

Irreversibility (Permanence)

The degree to which the effects of a threat can be reversed and the target affected by the threat restored. It is assessed for the impact of the threat on the target, not the threat itself.

4 = Very High: The effects of the threat cannot be reversed, it is very unlikely the target can be restored, and/or it would take more than 100 years to achieve this (e.g., wetlands converted to a shopping centre).

3 = High: The effects of the threat can technically be reversed and the target restored, but it is not practically affordable and/or it would take 21–100 years to achieve this (e.g., wetland converted to agriculture).

2 = Medium: The effects of the threat can be reversed and the target restored with a reasonable commitment of resources and/or within 6–20 years (e.g., ditching and draining of wetland)

1 = Low: The effects of the threat are easily reversible and the target can be easily restored at a relatively low cost and/or within 0–5 years (e.g., off-road vehicles trespassing in wetland).

Consulted experts

The threat ranking was performed by several experts from the Altai-Sayen ecoregion, namely:

- Alexander Bondarev, Head of Altai-Sayan Ecoregional office, WWF Russia;
- Batkhuyag Baldangombo, Programme Development manager, WWF Mongolia;
- Mikhail Paltsyn, Project Coordinator Altai-Sayan Programme, WWF Russia;
- Onon Yondon, Species Programme Manager, WWF Mongolia.

Annex 6 – Conceptual model

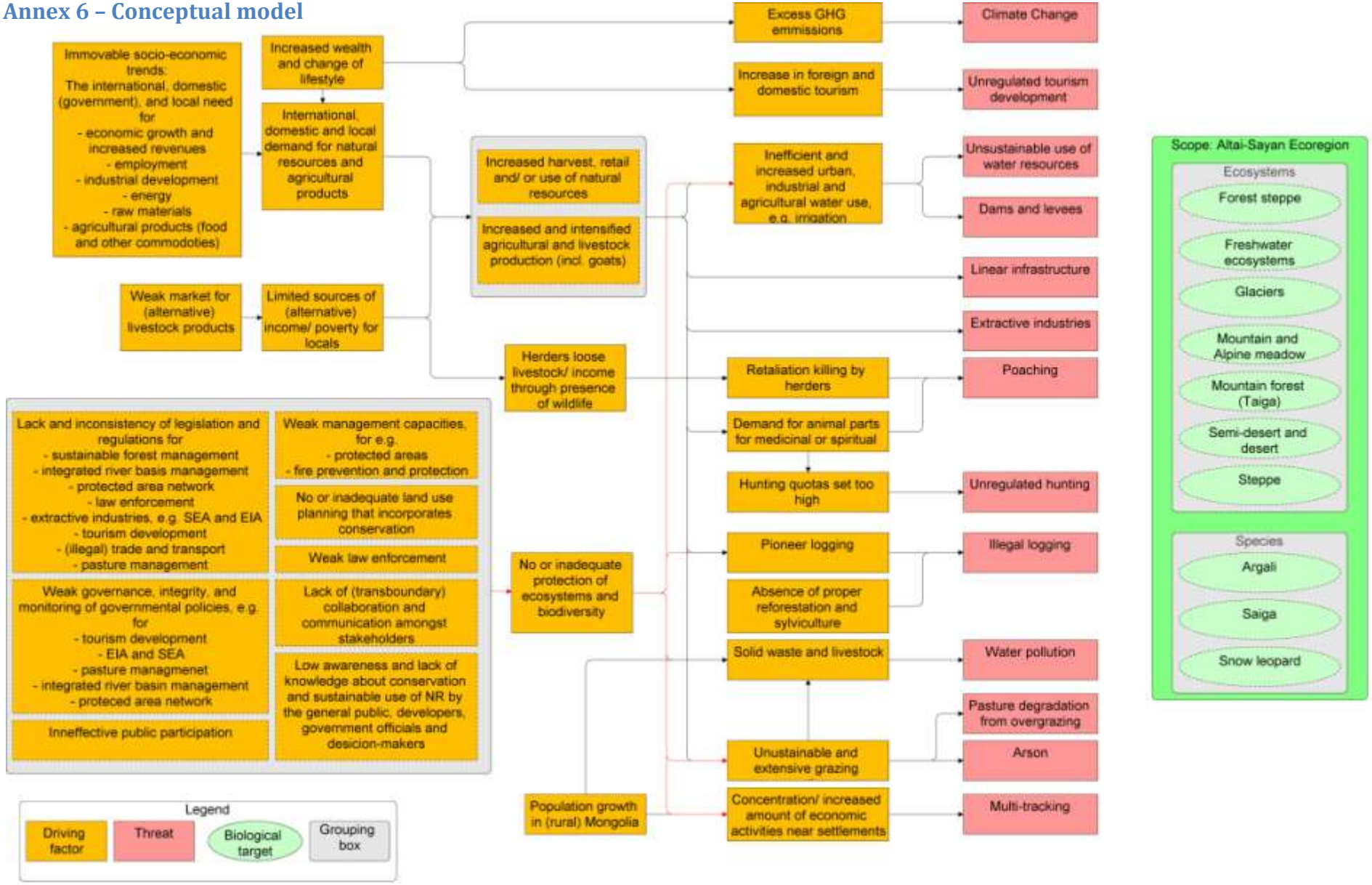


Figure 13: Conceptual model showing the situation analysis of the ASER

Annex 7 – Results chains

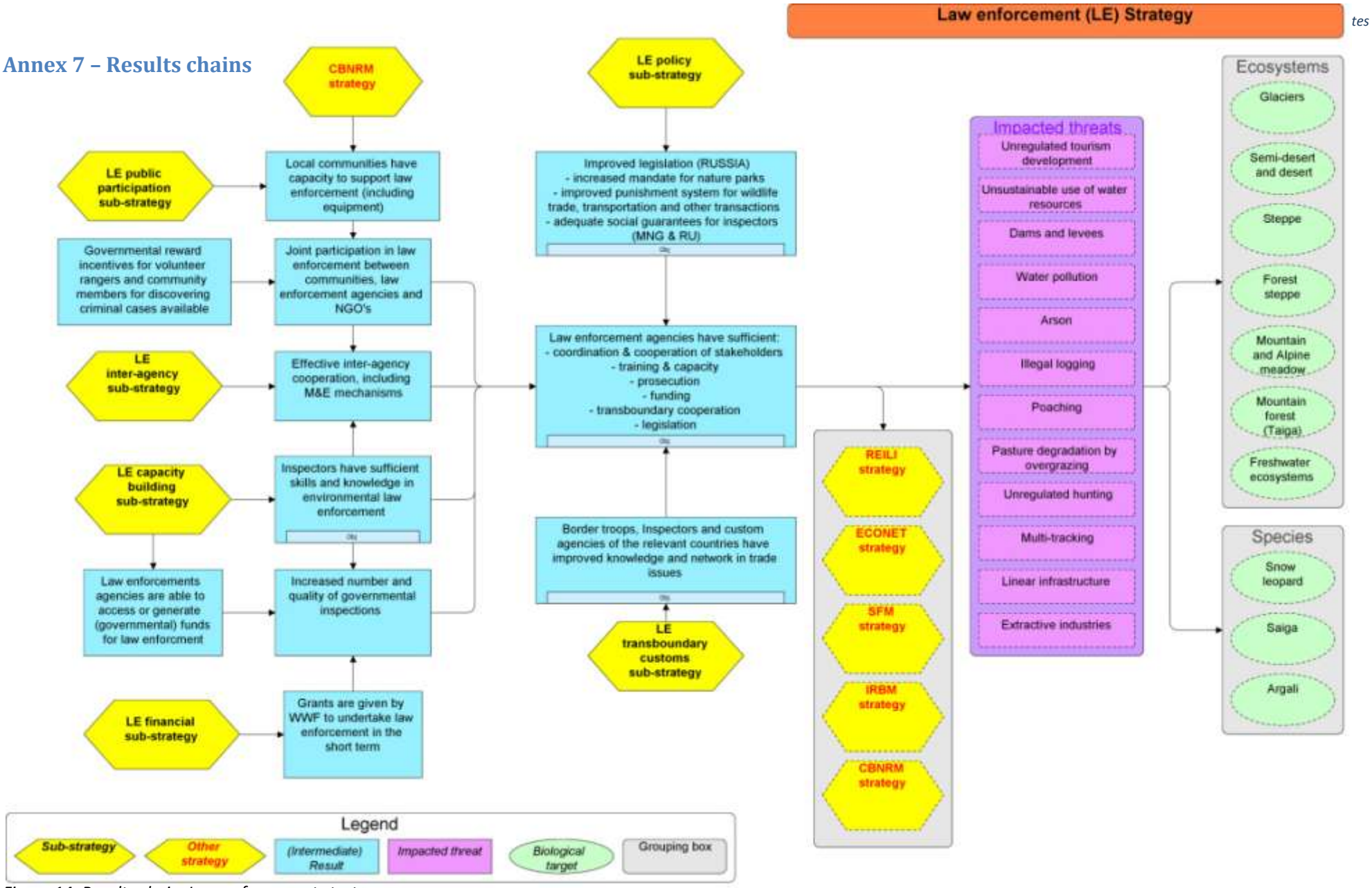


Figure 14: Results chain Law enforcement strategy

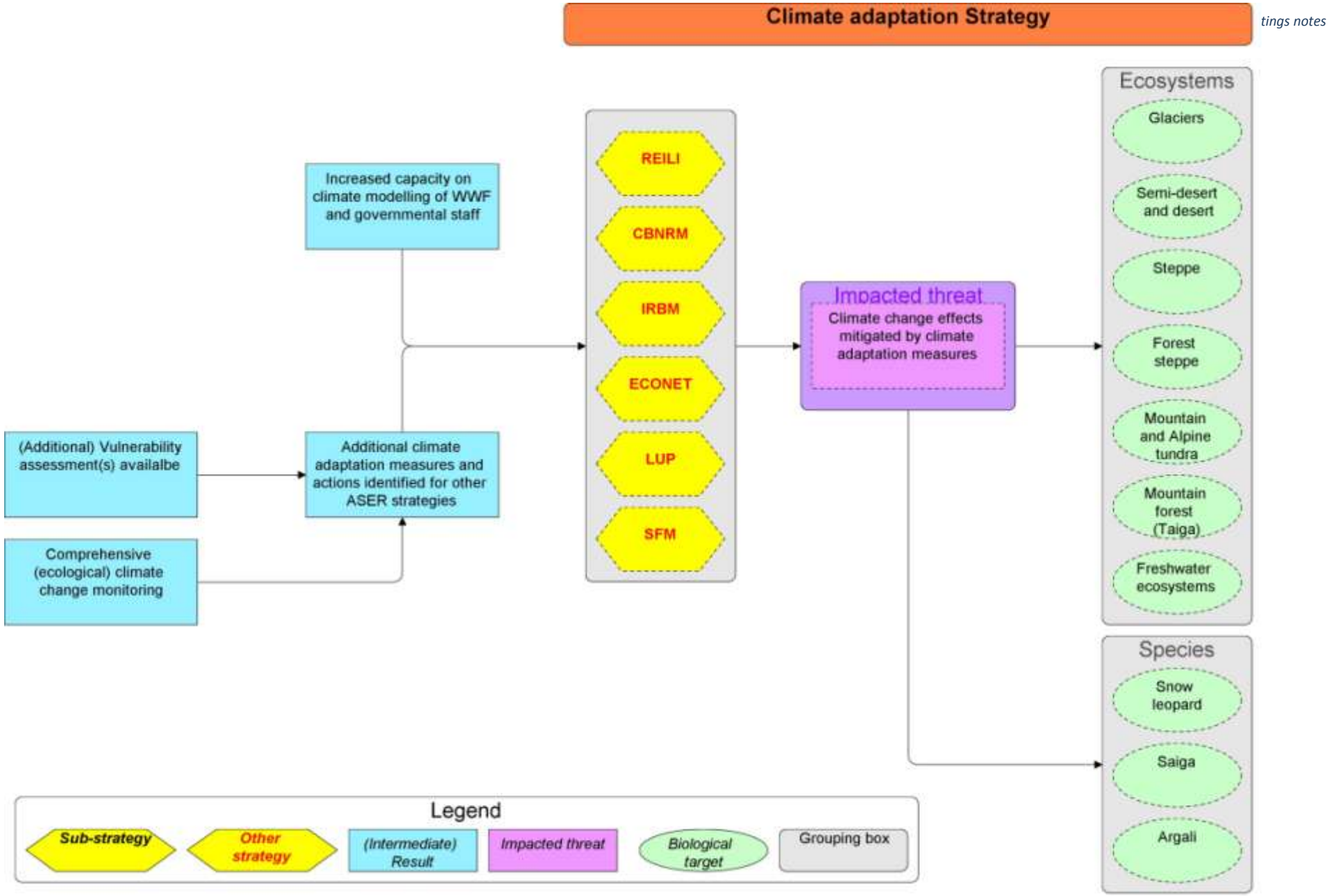


Figure 15: Results chain Climate adaptation strategy

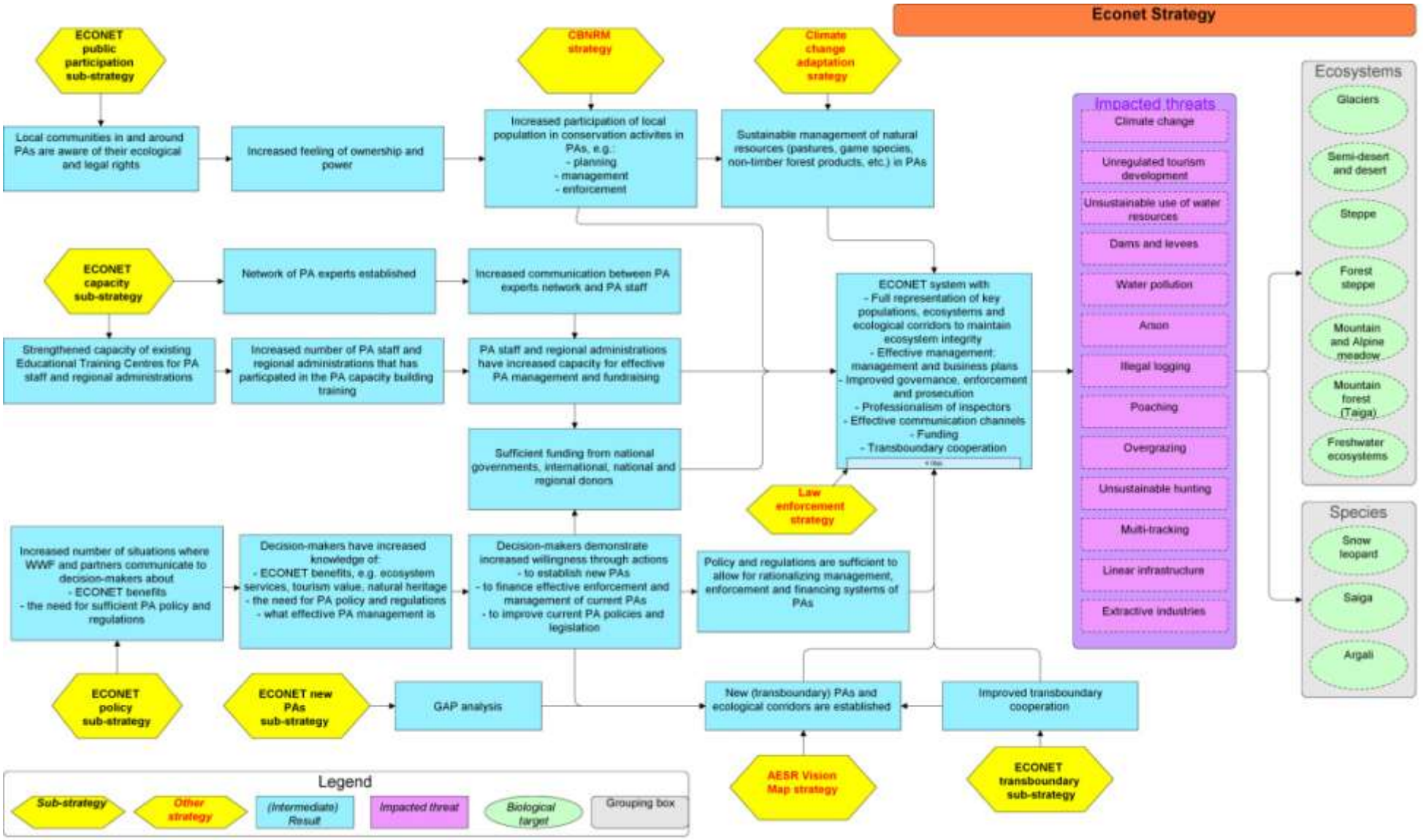


Figure 16: Results chain Econet strategy

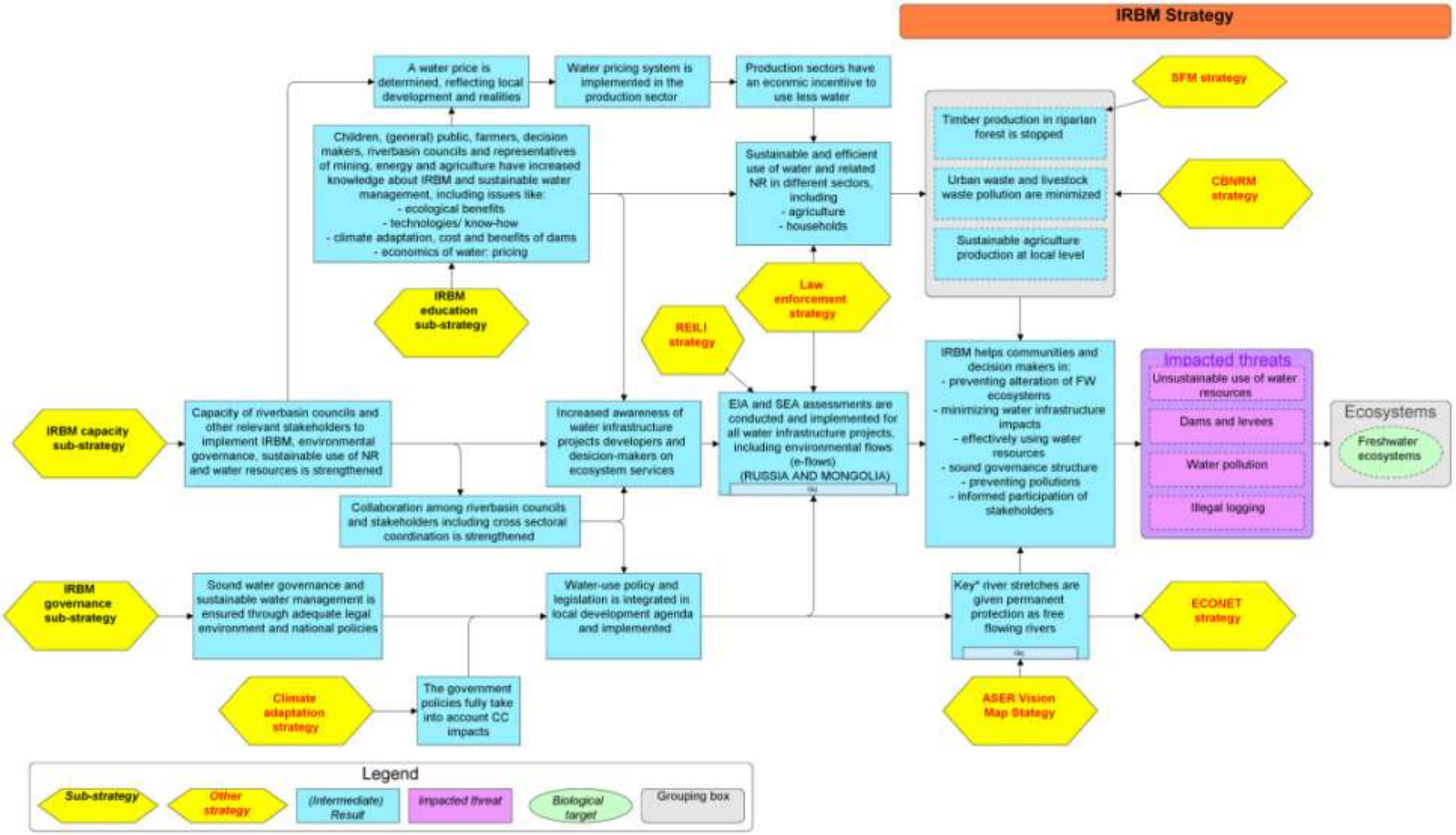


Figure 17: Results chain IRBM strategy

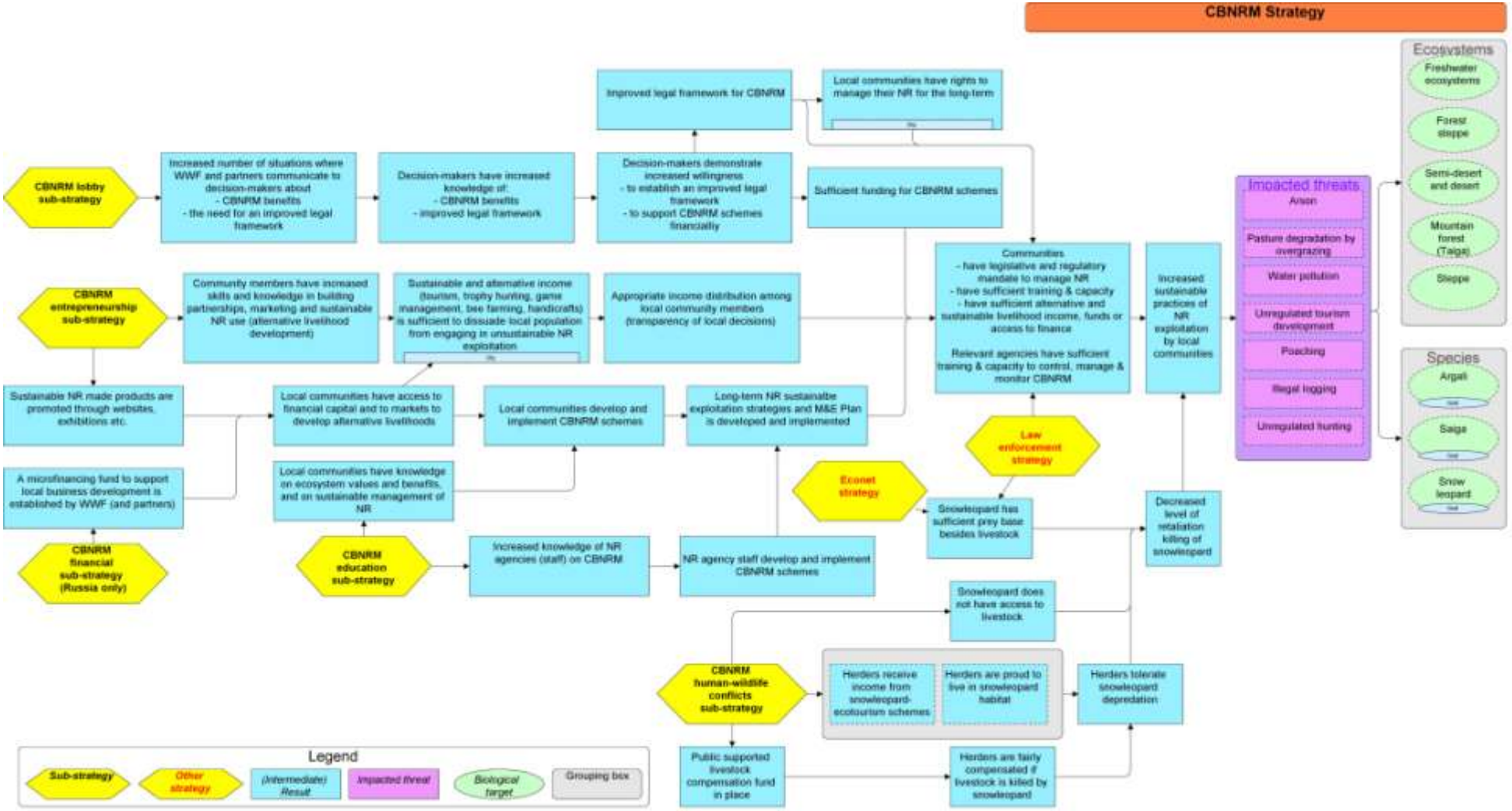


Figure 18: Results chain CBNRM strategy

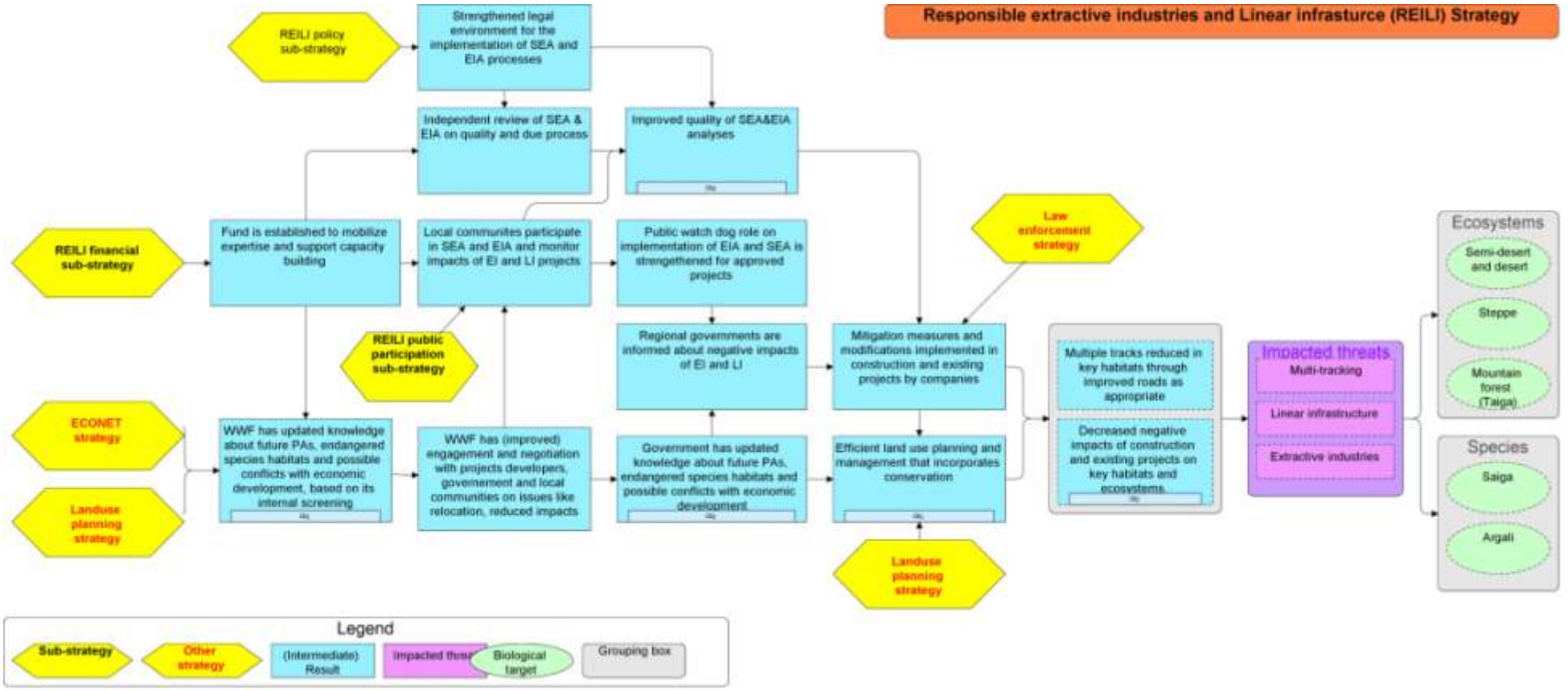


Figure 19: Results chain REILI strategy

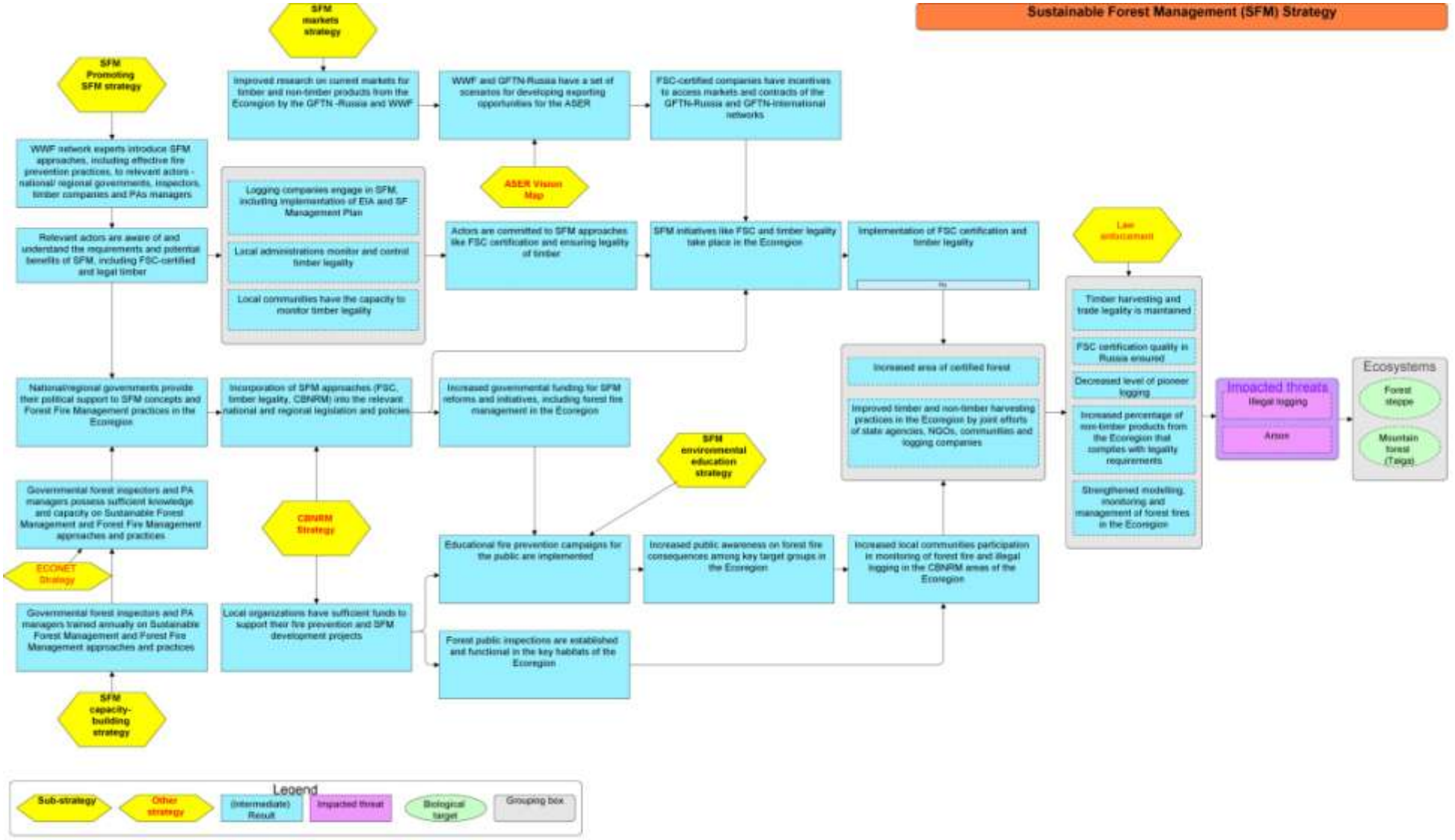


Figure 20: Results chain SFM strategy

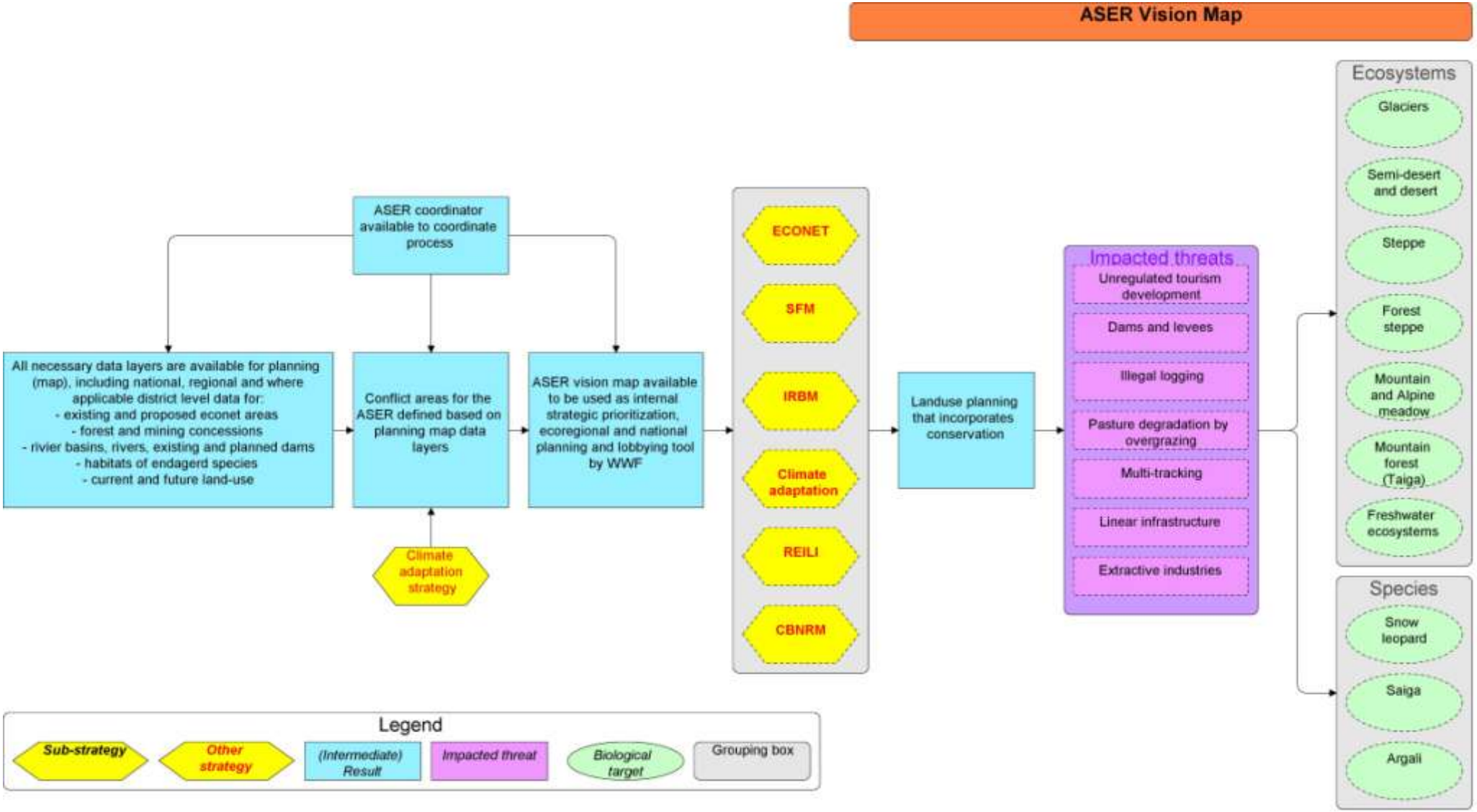


Figure 21: ASER Vision Map

Annex 8 - Logframe ASER Strategy

Logframe and Monitoring plan - ASER Strategy					
Vision statement: Altai-Sayan Ecoregion harbors globally significant biodiversity and provides ecosystem services in an inexhaustible manner, as well as benefits to local communities					
Overarching goal: Species diversity (richness and abundance) is supported and natural ecosystem dynamics and resilience are ensured					
Conservation strategy	**Indicator**	**Baseline Value (2010)**	**Expected Value (2020)**	**Methods or Source of Verification**	**Assumptions and Risks**
Conservation goals:					
Goal 1: By 2020, the area of ecosystems* in the ASER that remain unconverted* does not decrease compared to 2010, ensuring ecosystems' biological capacity to harbor biodiversity of global significance." *Ecosystems are: forest steppe; mountain tundra and alpine meadow; semi-desert and desert; steppe; and mountain forest. *Unconverted means that the area contains predominantly natural vegetation, even though it may be altered via grazing activities.	Area of unconverted a. forest steppe b. mountain tundra and alpine meadow c. semi-desert and desert d. steppe e. mountain forest	a. 10.551.236 km^2 b. 18.096.548 km^2 c. 5.910.783 km^2 d. 25.037.205 km^2 e. 41.296.387 km^2	a. 10.551.236 km^2 b. 18.096.548 km^2 c. 5.910.783 km^2 d. 25.037.205 km^2 e. 41.296.387 km^2	GIS analysis for the whole Altai-Sayan Ecoregion; every 5 years, by GIS departments of WWF offices in the area.	GIS method might improve and baseline data would become irrelevant. (Natural) vegetation cover will probably change due to climate change.
Goal 2: By 2020, the ratio 'km of free flowing key rivers/ total km of key rivers´ is maintained at least 0,89 for Khovd river and 0.65 for Zavkhan river in Mongolian part and 0,85 in Russian part of the ASER; and the annual average flow volume for at critical locations on the key rivers in the ASER (Zavkhan, Khovd, Buyant, Katun, Biya, Tom, Abakan, Ulug-Khem and Enisey) does not change compared to 2010.	a. km of free flowing key rivers/ total km of key rivers b. annual average volume of key rivers	a. 0.85 for Russia and 0.89 for Khovd river and 0.65 for Zavkhan river for Mongolia b. Katun - 626 Biya- 477 Tom - 1100 Abakan- 381 Ulug-Khem - 589 Enisey – 3350 Zavkhan at Guulin gauge - 8.85 (min 4.04- max 56.1); Khovd at Myangad gauge 75 (min 57.9-max 318); Buyant at	a. 0.85 for Russia and 0.89 for Khovd river and 0.65 for Zavkhan river for Mongolia b. Katun - 626 Biya- 477 Tom - 1100 Abakan- 381 Ulug-Khem - 589 Enisey – 3350 Zavkhan at Guulin gauge - 8.85 (min 4.04- max 56.1); Khovd at Myangad gauge 75 (min 57.9-max 318); Buyant at	Calculations by freshwater experts for key rivers in the ASER, every 5 years.	Information and monitoring regarding e-flows is needed, to calculate freshwater viability in more detail.

Conservation strategy	Indicator	Baseline Value (2010)	Expected Value (2020)	Methods or Source of Verification	Assumptions and Risks
		Khovd gauge - 5.67 (min 4.59 -max 19)	Khovd gauge - 5.67 (min 4.59 -max 19)		
Goal 3: By 2020, the population size of Altai Argali in key areas* is increased by at least 8% in the Mongolian part and at least 20% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Altai Argali in the Mongolian part of the ASER is increased by at least 15% compared to 2010. * Key areas are: Sielkhem mountain range, Gulzat and Tsagaan shuvuut mountain, Khokh Serkh mountain range, Munkhkhairkhan range, Myangan Ugalzat mountain range, Sailugem, Chikchacheva Ridges, Momgun-Taiga massif and Tsagan-Shibetu Ridge.	a. population number in key areas b. occupied habitat	a. 400-500 for Russia and 2.770 in Mongolia b. 500.000 ha for Russia and 2.000.000 ha for Mongolia	a. 500-600 for Russia and 3.000-3.500 in Mongolia b. 500.000 ha for Russia and 2.300.000 ha for Mongolia	Survey and field reports by relevant organizations; at least every 3 years.	Survey methods should be executed the same to make comparison possible.
Goal 4: By 2020, the population size of Mongolian Saiga is increased by at least 25% compared to 2010 in key areas*; and the area of occupied habitat by Mongolian Saiga is increased with at least 4% compared to 2010. * Key areas are: Sharga, Khuis gobi, Chandmani Khuren tal.	a. population number in key areas b. occupied habitat	a. 8.000 b. 1.300.000 km^2	a. 10.000-12.000 b. 1.360.000 km^2	Survey and field reports by relevant organizations; at least every 3 years.	Survey methods should be executed the same to make comparison possible.
Goal 5: By 2020, the population size of Snow Leopard in key areas* remains stable in the Mongolian part and is increased by at least 25% in the Russian part of the ASER compared to 2010; and the area of occupied habitat by Snow Leopard remains stable in the Mongolian part and is increased by at least 31% in the Russian part of the ASER compared to 2010. * Key areas are: Sielkhem mountain range, Gulzat and Tsagaan shuvuut mountain, Turgen & Kharkhiraa Mountain, Altan	a. population number in key areas b. occupied habitat	a. 32-40 for Russia and 150 for Mongolia b. 1.900.000 ha for Russia and 5.400.000 ha for Mongolia	a. 64-70 for Russia and 150 for Mongolia b. 3.000.000 ha for Russia and 5.400.000 ha for Mongolia	Survey and field reports by relevant organizations; at least every 3 years.	Survey methods should be executed the same to make comparison possible.

Conservation strategy	Indicator	Baseline Value (2010)	Expected Value (2020)	Methods or Source of Verification	Assumptions and Risks
Khukhii, Tsambagarav Mountains, Jargalant-Bumbat, Baatarkhairkhan mountain range, Argut River Watershed, Chikhachev Ridge, Mongun-Taiga Massif, Tsagan-Shibetu Ridge, Sayano-shushensky Nature Reserve and its buffer zone, Sengelen Ridge, Tunkinsky Ridge.					
Conservation objectives:					
Strategy 1/ Supplementary tool: ASER Vision map					
Objective 1.1: By 2013, WWF possesses an ASER Vision Map, which highlights the areas of conflict and interest for WWF interventions and strategies, based on hotspots of high conservation value and of economic development (infrastructure, extractive industries, and hydropower development).	Availability of a. Map showing current and future economic development and b. ASER Vision Map	a. Map showing current and future economic developments available	b. ASER Vision map available, highlighting areas of conflict and interest for WWF interventions and strategies	GIS data and expert input	Economic development is an ongoing threat, ASER Vision map should be renewed after 5 years.
Objective 1.2: By 2020, WWF has developed additional threat mitigation strategies for the ASER, based on the ASER Vision Map, using public participation.	Threat mitigation objectives and measures		Updated ASER Strategy in place incorporating additional threat mitigation strategies based on ASER Vision Map		
Strategy 2: Law enforcement					
Objective 2.1. By 2015, Russia has effective legislation that includes criminal prosecution that covers all elements in the illegal wildlife trade supply chain.	a. Text of legal documents b. Red Data List c. Regulations on wildlife trade control d. System of wildlife trade control	Baseline needs to be determined before 1 January 2013.	a. Changes in Hunting and Animal Laws adopted and in force b. Changes in legal status of Red data list adopted c. Regulations on wildlife trade control within the Custom Union are ensured and adopted by Russia d. System of wildlife trade control is established and effective	Field reports	WWF and their partners have sufficient influence on key agencies to lobby their conservation priorities.
Objective 2.2: By 2016, meetings of customs	Number of meetings		Meeting takes places at	Field reports	Meetings alone might

Conservation strategy	Indicator	Baseline Value (2010)	Expected Value (2020)	Methods or Source of Verification	Assumptions and Risks
officers and information exchange on wildlife trade takes place at least once per three years, leading to more effective cooperation.			least once per three years		not lead to more effective cooperation and additional measures will be needed.
Objective 2.3: By 2020, on average each year at least 100 inspectors* are trained in a dedicated training course in effective anti-poaching and wildlife trade prevention. *inspectors = police, governments officials, customs.	Number of trained inspectors	Baseline needs to be determined before 1 January 2013.	Min. 100 inspectors per year	Field reports	
Objective 2.4: By 2020, poaching is decreased by 50%* compared to 2010 for Snow Leopard, Altai Argali and Mongolian Saiga, including transboundary territories. *Measured by three year running average.	Number of poaching instances discovered by government agencies in project areas	Baseline needs to be determined before 1 January 2013.	50% decrease compared to 2010	Official reports	
Strategy 3: Climate adaptation					
Objective 3.1: By 2020, climate adaptation measures are developed and in place, based on vulnerability assessments and climate change monitoring data.	a. Climate adaptation measures in place b. Availability of climate change monitoring data	a. No climate adaptation measures developed or in place b. No relevant and detailed climate monitoring in place	a. Appropriate climate adaptation measures in place, reviewed by climate experts b. Relevant and detailed climate monitoring in place	Field reports	Increasing the amount of monitoring data will require additional funding and good-will.
Objective 3.2: All strategies and relevant institutions consider climate change in the normal course of their work.	Indicator needs to be determined before 1 January 2013.	Baseline needs to be determined before 1 January 2013.	Value needs to be determined before 1 January 2013.	Field report	Details for monitoring this objective need to be determined.
Strategy 4: Econet strategy					
Objective 4.1: By 2020, a network of protected areas ('econet') encompasses 20% of key biomes* in the ASER. *Key biomes include glacier, mountain tundra and alpine meadow, mountain forest, forest steppe, steppe, semi-desert and desert, riparian forest and freshwater systems (lakes and rivers).	a. Percentage of PA network covering ASER and total area (km^2) b. Biomes area in ASER covered (in %) by PA network	a. 13,0%; 168.000 km^2 b. Glacier 59,4 Mountain Tundra & Alpine Meadow 22,6 Mountain forest 11,8 Forest Steppe 7,0 Steppe 4,9 Semi desert & desert 13,8	a. 20%; 197.158 km^2 b. Glacier 61,7 Mountain Tundra & Alpine Meadow 31,7 Mountain forest 17,0 Forest Steppe 9,9 Steppe 9,5 Semi desert & desert 18,3	GIS analysis for the whole Altai-Sayan Ecoregion; every 5 years, by GIS departments of WWF offices in the area.	National and regional governments continue to prove their political support and financing for maintaining Protected Areas (PAs). WWF Russia and key WWF donors will continue to financially

Conservation strategy	Indicator	Baseline Value (2010)	Expected Value (2020)	Methods or Source of Verification	Assumptions and Risks
		Riparian 14,9 Lakes and Rivers 57,9	Riparian 21,4 Lakes and Rivers 62,0		support the development of the Econet system.
Objective 4.2: By 2020, a network of protected areas ('econet') encompasses at least 35% of Altai Argali habitats, at least 35% of Snow Leopard habitats, and at least 20% of Mongolian Saiga habitats.	Percentage of species habitat covered by protected areas	Altai Argali 20,6% Snow Leopard 23,2% Mongolian Saiga Baseline needs to be determined before 1 January 2013.	Altai Argali 38,5 Snow Leopard 36,0 Mongolia Saiga Value needs to be determined before 1 January 2013.	Survey and field reports by relevant organizations; at least every 3 years.	National and regional governments continue to support the idea of Pas development by proving political support and financing for maintaining Protected Areas (PAs).
Objective 4.3: By 2020, three transboundary nature reserves covering at least 25.000 km^2 and with legal status have been established in the ASER.	a. Number of transboundary parks b. Area covered	a. 2 b. Baseline needs to be determined before 1 January 2013.	a. 3 b. 25.000 km^2	GIS analysis for the whole Altai-Sayan Ecoregion; every 5 years, by GIS departments of WWF offices in the area.	Russian and Mongolian governments continue to commit to the development of transboundary PAs.
Objective 4.4: By 2020, management effectiveness of the PA network is rated >66% according to the Management Effectiveness Tracking Tool (METT).	METT rate	Baseline needs to be determined before 1 January 2013.	>66%	Management Effectiveness Tracking Tool (METT)	
Strategy 5: IRBM strategy					
Objective 5.1: By 2016, the laws regulating water management and conservation are amended to ensure an adequate institutional and financing scheme for the River Basin Management Authority.	Text of legal documents	No amendments to laws regulating water management and conservation	Appropriate amendments to laws regulating water management and conservation	Text of legal documents	
Objective 5.2: By 2016, government officials are fully aware of climate change issues and IRBM's role in the adaptation and mitigation of potential climate change impacts and conservation of freshwater ecosystem's integrity.	a. Number of occasions per year where issue of climate change was discussed. b. Percentage of gov't officials present at these occasions.	a. Baseline needs to be determined before 1 January 2013. b. Baseline needs to be determined before 1 January 2013.	a. Value needs to be determined before 1 January 2013. b. Value needs to be determined before 1 January 2013.	Field report	Presence of gov't officials at climate change events does not necessarily lead to full awareness of climate change and role of IRBM.
Objective 5.3: Water pricing system is in place in the Mongolian side of the ASER,	Presence of water pricing systems	No water pricing system in place	Water pricing system in place	Field report	

Conservation strategy	Indicator	Baseline Value (2010)	Expected Value (2020)	Methods or Source of Verification	Assumptions and Risks
reflecting local developments and realities.					
Objective 5.4: By 2020, nine identified river stretches* have been afforded permanent protection against additional dams. *river strechtes are Zavkhan; Khovd; Buyant; Katun; Biya; Tom; Abakan; Ulug-Khem; Enisey	Text of legal documents	0 of 9 identified river stretches have permanent protection against dams	9 out 9 identified river stretches have permanent protection against dams		River stretches need to be pinpointed and carefully defined before 1 January 2013 using ASER Vision map tool.
Objective 5.5: By 2016, climate change impacts are taken fully into consideration in the IRBM Plan of the Khar Lake-Khovd Basin using water modeling tools adapted to the region	a. Presence of IRBM plan of Khar Lake-Khovd Basin b. Presence of modeling tools adapted to the region	a. No IRBM plan for Khar Lake-Khovd Basin b. No modeling tool	a. IRBM lan for Khar Lake-Khovd Basin b. Modeling tool available	Field report	
Strategy 6: CBNRM strategy					
Objective 6.1: By 2015, the legal framework for CBNRM and pasture management is in place, enabling community based organizations to make diverse use of natural resources.	Legal framework	Legal framework not in place	Legal framework in place	Field report	
Objective 6.2: By 2016, community funds of CBOs in project intervention areas have increased on average by 30 % for sustainable CBNRM and alternative income development.	Budgets of CBO's	Baseline needs to be determined before 1 January 2013.	Increase of 30%	Field report	
Objective 6.3: By 2020, the involvement rate (calculation method tbc) of local communities in key conservation areas, that are managing their own NR (including forestry practices) or have developed alternative income schemes/ green businesses which consider the needs of key conservation species ,has increased by at least 15% compared to 2010.	Involvement rate (calculation method tbc)	Baseline needs to be determined before 1 January 2013.	Value needs to be determined before 1 January 2013.	Field report	Calculation method for the involvement rate needs to be determined before 1 January 2013.
Strategy 7: SFM strategy					
Objective 7.1: By 2020, at least 5-10 medium to large sized logging companies implement the SFM principles in the ASER.	Number of logging companies that implement SFM	0	At least 5-10 medium to large sized companies	Field report	
Objective 7.2: By 2020, areas of "pioneer	Percentage of pioneer	Baseline needs to be	Decrease of 30%	Field report	

Conservation strategy	Indicator	Baseline Value (2010)	Expected Value (2020)	Methods or Source of Verification	Assumptions and Risks
logging" of Russian forests in the ASER have decreased up to 30%.	logging areas in the ASER.	determined before 1 January 2013.			
Objective 7.3: By 2020, wood legality is ensured on 50% forest areas under lease in the ASER.	Percentage of wood where wood legality is ensured for leased forest areas in the ASER	Baseline needs to be determined before 1 January 2013.	50%	Field report	
Objective 7.4: By 2020, FSC certification quality in Russia ensured.	Indicator needs to be determined before 1 January 2013.	Baseline needs to be determined before 1 January 2013.	Value needs to be determined before 1 January 2013.	Field report	Details for monitoring this objective need to be determined.
Objective 7.5: By 2020, have strengthened community participation with monitoring and management of forest fires in the Russian Part of the ASER.	Indicator needs to be determined before 1 January 2013.	Baseline needs to be determined before 1 January 2013.	Value needs to be determined before 1 January 2013.	Field report	Details for monitoring this objective need to be determined.
Strategy 8: REILI strategy					
Objective 8.1: By 2014, WWF has identified appropriate (additional) conservation actions by using its internal conservation and development Vision map as a screening tool, to identify conflict areas between conservation and EI and LI developments.	Number of additional actions and measures	0	Value needs to be determined before 1 January 2013.	Field report	
Objective 8.2: By 2015, there is an improved legal framework (with public participation mechanisms in place for experts and general public) to develop and implement SEA and EIA of construction and extractive industries projects.	a. Text of legal documents; amendments to EIA/ SEA laws b. Percentage of SEA and EIA processes with public participation	a. Baseline needs to be determined before 1 January 2013. b. 0	a. Value needs to be determined before 1 January 2013. b. Value needs to be determined before 1 January 2013.	Field report	
Objective 8.3: By 2016, local people's knowledge of responsible mining, EIA, and SEA is increased, ensuring strong public monitoring of the biodiversity impacts of economic sector development.	Number of instances where public responds/ objects to EIA and SEA	Baseline needs to be determined before 1 January 2013.	Value needs to be determined before 1 January 2013.	Field report	
Objective 8.4: By 2020, all EI and LI projects in the habitats of key species (argali, saiga, Snow Leopard) are developed and implemented in accordance with improved SEA and EIA.	Percentage of projects developed and implemented in accordance with improved SEA and EIA	0	Value needs to be determined before 1 January 2013.	Field report	

Annex 9 - Key areas for species conservation

Table 5, Figure 21: Priority areas for species conservation in Mongolian part of the ASER.

Ref.	Priority areas for Snow leopard, Argali sheep and Mongolian saiga conservation include trans-boundary areas
1	Sielkhem mountain range (Snow leopard & Argali)
2	Gulzat and Tsagaan shuvuut mountain (Snow leopard & Argali)
3	Khokh Serkh mountain range (Argali)
4	Munkhkhairkhan range (Argali)
5	Myangan Ugalzat mountain range (Argali)
6	Turgen & Kharkhiraa Mountain (Snow leopard)
7	Altan Khukhii, Tsambagarav Mountains (Snow leopard)
8	Jargalant-Bumbat, Baatarkhairkhan mountain range (Snow leopard)
9	Sharga, Khuis gobi, Chandmani Khuren tal (Mongolian Saiga)

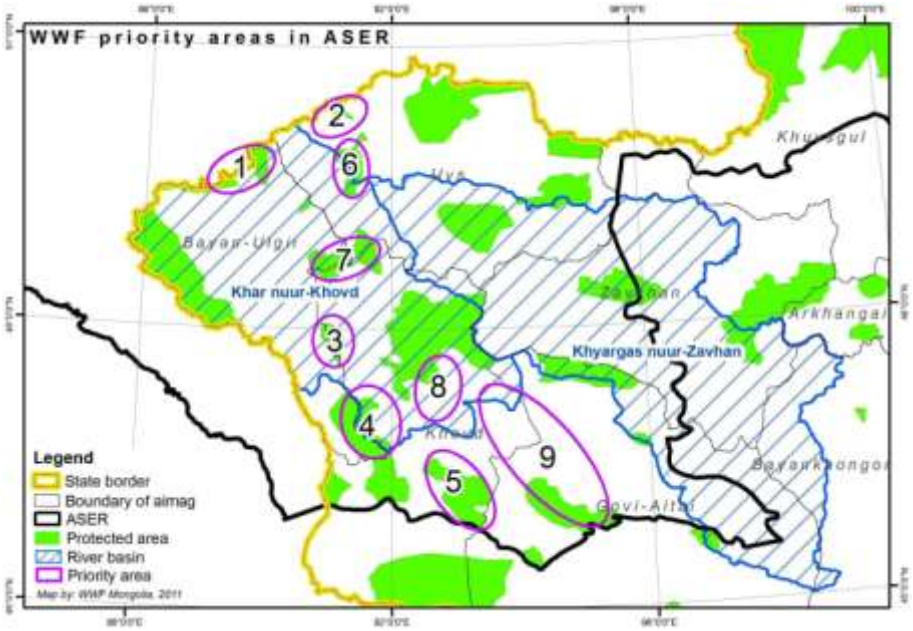
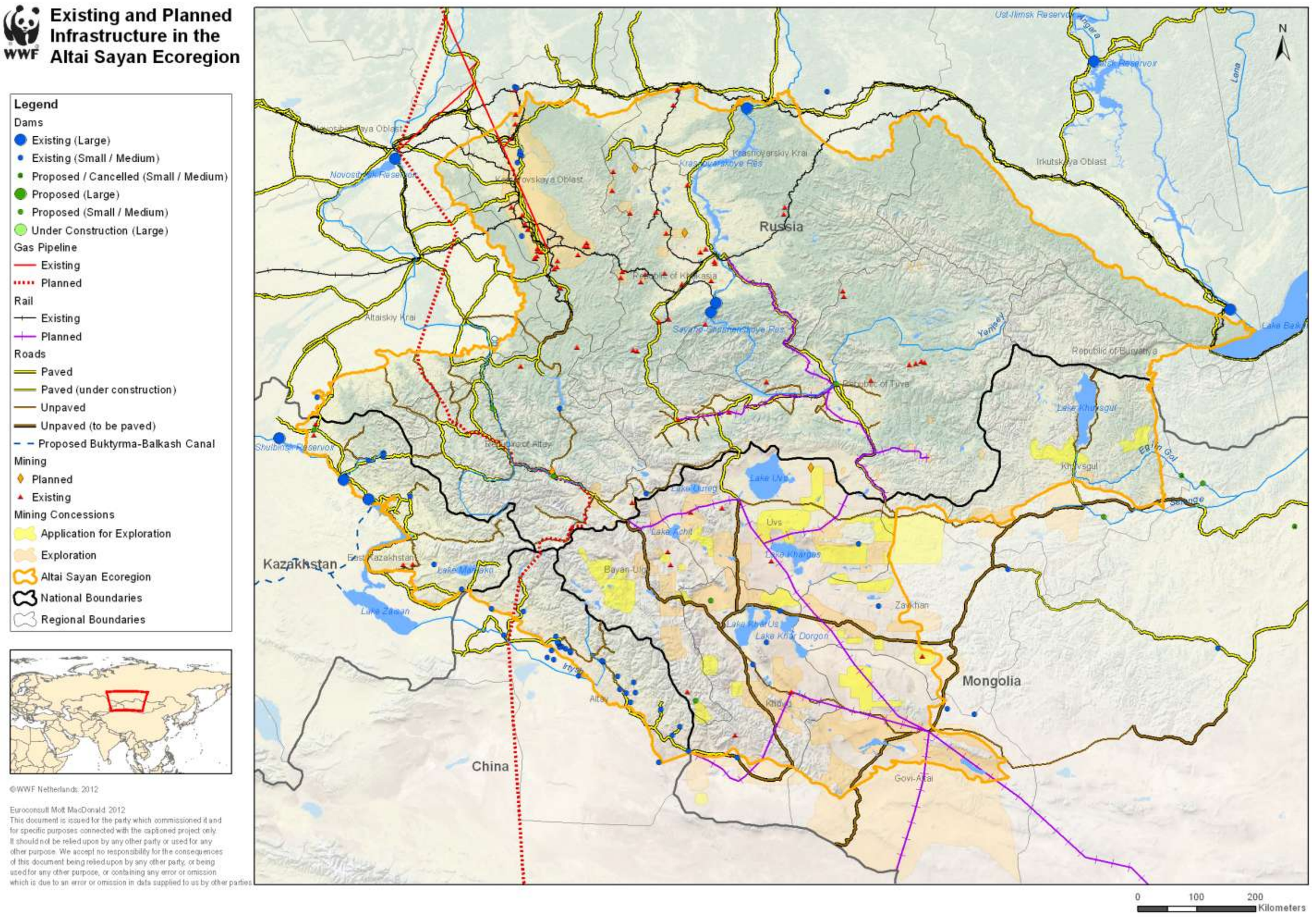


Table 6. Priority areas for species conservation in Russian part of the ASER.

Ref.	Priority areas for Snow leopard and Altai Argali conservation include trans-boundary areas
1	Sailugem (Argali)
2	Chikchacheva Ridges (Snow leopard & Argali)
3	Momgun-Taiga massif (Argali)
4	Tsagan-Shibetu Ridge (Snow leopard & Argali)
5	Argut River Watershed (Snow leopard)
6	Mongun-Taiga Massif (Snow leopard)
7	Sayano-shushensky Nature Reserve and its buffer zone (Snow leopard)
8	Sengelen Ridge (Snow leopard)
9	Tunkinsky Ridge (Snow leopard)

Annex 10 – A3 map Existing and Planned Infrastructure in the ASER (MottMacDonald, 2012)



Works Cited

ADB. (2005). *Country Environmental Analysis Mongolia.* Philippines: Asian Development Bank.

Batima, P., Batnasan, N., & Lehner, B. (2004). *Freshwater systems of the Great Lakes Basin, Mongolia. Opportunities and challenges in the face of climate change.* Ulaanbataar: WWF Mongolia Programme Office.

Batnasan, N. (2003). Freshwater issues in Mongolia. *National Seminar on IRBM in Mongolia*, (pp. 53-61). Ulaanbataar.

BirdLife Asia. (2009). *Safeguarding Important Areas of Natural Habitat alongside Economic Development.* Washington D.C.: World Bank: Mongolia Discussion Papers. East Asia and Pacific Region Sustainable Development Department.

Blagoveshchenskii, G., Popovtsev, V., Shevtsova, Romanenkov, & Komarov. (2006). *Country Pasture/Forage Resource Profiles Russian Federation*. Retrieved November 2011, from FAO Grassland and Pasture Crops: http://www.fao.org/ag/AGP/AGPC/doc/Counprof/Russia/russia.htm

Brukhanov, A. (2009). *Environmental Assessment of Siberia Forests: Alarming Results.* WWF Russia.

CBD. (2012). *List of Parties*. Retrieved 2012, from Convention on Biological Diversity: http://www.cbd.int/convention/parties/list/#tab=0

CBD. (2010). *Protected areas - an overview*. Retrieved 2012, from Convention of Biological Diversity: http://www.cbd.int/protected/overview/

Chimed-Ochir, B., Hertzman, T., Batsaikhan, N., Batbold, D., Sanjmyatav, D., Onon, Y., et al. (2010). *Filling the gaps to protect the biodiversity of Mongolia.* WWF Mongolia Programme Office.

Dagvadorj, D., Natsagdorj, L., Dorjpurev, J., & Namkha, B. (2010). *Mongolia: Assessment Report on Climate Change 2009.* Ulaanbataar: Ministery of Nature, Environment and Tourism, Mongolia.

Dagvadorj, D., Natsagdorj, L., Dorjpurev, J., & Namkhainyam, B. (2009). *Mongolia Assessment Report on Climate Change 2009.* Ministery of Environment, Nature&Tourism, Mongolia.

Davaa, G., Oyunbaatar, D., & Sugita, M. (2007, 01 22). Surface water of Mongolio. *http://raise.suiri.tsukuba.ac.jp/new/press/youshi_sugita8.pdf* , pp. 55-68.

Dudley, N., & Parish, J. (2006). *Closing the Gap. Creating Ecologically Representative Protected Area Systems: A Guide to Conducting the Gap Assessments of Protected Area Systems for the Convention on Biological Diversity. Technical Series no. 24.* Montreal: Convention on Biological Diversity.

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

Erdenechuluun, T. (2006). *Wood Supply in Mongolia: The Legal and Illegal Economies.* Washington, D.C.: World Bank: Mongolia Discussion Papers, East Asia and Pacific Environment and Social Development Department.

Felidae Conservation Fund. (2009). *Ecological Study on Snow Leopards in Mongolia*. Retrieved November 2011, from http://www.felidaefund.org/research/mongolia_project.html

GFTN Russia. (2011). *Draft: Global Forest & Trade Network - Russia, Business Plan for FY2012-2014.* Moscow: GFTN Russia.

Harris, R. B., & Reading, R. (2008). *Ovis ammon*. Retrieved November 2011, from IUCN Red List: http://www.iucnredlist.org/apps/redlist/details/15733/0

Institute of Geography of the Republic of Kazakhstan. (Unknown). Map on Ecological Status.

IUCN Red List. (2011). *The IUCN Red List of Threatened Species*. Retrieved November 2011, from http://www.iucnredlist.org/

Jackson, R., Mallon, D., McCarthy, T., Chundaway, R. A., & Habib, B. (2008). *Panthera uncia*. Retrieved November 2011, from IUCN Red List: http://www.iucnredlist.org/apps/redlist/details/22732/0

Jacob, A., & Tobiasen, A. (2011). *Mongolia's biodiversity: status, threats, and recommendations for conservation.* USAID/ EGAT/ Biodiversity Team.

Kadota, T., & Davaa, G. (2004). Recent glacier variations in Mongolia. *Proceedings of the 3rd International Workshop on Terrestrial Change in Mongolia*, (pp. 20-22). Tsukuba, Japan.

Kokorin (ed.), A., Blyakharchuk, T., Gerasimchuk, I., Gruza, G., Kamennova, I., Parfenova, Y., et al. (2011). *Assessment Report: Climate change and its impact on ecosystems, populaiton and economy of the Russian portion of the Altai-Sayan Ecoregion.* Moscow: WWF Russia.

Krever, V., Stishov, M., & Onufrenya, I. (2009). *National protected areas or the Russian Federation: Gap analysis and perspective framework.* Moscow: WWF Russia.

Large Herbivore Network. (2011). *Saiga Antelope - Saiga tatarica*. Retrieved 2012, from Large Herbivore Network: http://www.lhnet.org/saiga-antelope/

Mallon, D. P. (2008). *Saiga tatarica*. Retrieved November 2011, from IUCN Red List: http://www.iucnredlist.org/apps/redlist/details/19832/0

Maroney, R. L. (2005). Conservation of argali Ovis ammon in western Mongolia. *Biological Conservation* , 231-241.

Millenium Ecosystem Assessment. (2005). *Subglobal Assessment report Altai-Sayan Ecoregion*. Retrieved November 2011, from http://www.millenniumassessment.org/en/SGA.AltaiSayan.html

Mongolia Ministry of Nature Environment (MNET). (2009). *Mongolia´s fourth national report.* Ulaanbataar: MNET with GEF, UNDP, CBD and Mongolian Nature and Environment Consortium.

Morrison, J., & Lombana, A. (2011). *Climate Adaptation: Mainstreaming in existing Conservation Plans (full version).* WWF.

Mott MacDonald. (2008). *Evaluation of the Altai-Sayan Ecoregion Conservation Programme of WWF Russia and WWF Mongolia.* Moot MacDonald.

MottMacDonald. (2012). *Report on the development of a map for the Altai-Sayan Ecoregion.* Arnhem: MottMacDonald.

Murray, M., Hunnam, P., Damjin, B.-O., Munkhtushin, G., & Olson, K. (2009). *Mid-term evaluation for UNDP Mongolia: Community-based Conservation of Biological Diveristy in the Mountain Landscapes of Mongolia's Altai-Sayan Eco-Region.* UNDP Mongolia.

Natsagdorj, L., Batima, P., Tumursukh, D., Ulziisaikhan, B., & Mijiddorj, R. (2011). *Assessments of climate change and anthropogenic impacts into hydrological systems of Onon, Kherlen and Khalkh river basins, Mongolia.* Ulaanbataar: WWF Mongolia.

Olson, D. M., & Dinerstein, E. (2002). The Global 200: Priority Ecoregions for Global Conservation. *Annals of the Missouri Botanical Garden* , 89: 199-224.

Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P. J., & Hanson, C. E. (2007). *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

Salafsky, N., & Margoluis, R. (1999). *Great than the sum of their parts: Designing conservation and development programs to maximize results and learning.* Washington DC, USA: Biodiversity Support Program.

Shishikin, A., Ivanov, V., Ponomarev, E., Valendik, E., Ivanova, G., Kukavskaya, E., et al. (2012). *Fire Danger Mitigation: A strategy for Protected Areas of the Altai-Sayan Ecoregion.* Krasnoyarsk: UNDP.

Siberian Environmental Center. (2008). *Plant Conservation*. Retrieved November 2011, from http://www.sibecocenter.ru/en/plants.htm

Snow Leopard Conservancy. (2011). *Community-based Conservation of Snow Leopards in Russia*. Retrieved 2012, from Snow Leopard Conservancy Conservation Program: http://www.snowleopardconservancy.org/text/conservation/conservationRussia.htm

Surazakov, A. B., Aizen, V. B., Aizen, E. M., & Nikitin, S. A. (2007). Glacier changes in the Siberian Altai mountains, Ob river basin, (1952-2006) estimated with high resolution imagery. *Environmental Research Letters* , 2: 045017.

Suttie, J. M. (2000). *Country Pasture/ Forage Resource Profiles Mongolia*. Retrieved November 2011, from FAO Grassland and Pasture Crops: http://www.fao.org/ag/AGP/AGPC/doc/Counprof/mongol1.htm#Evolution of stock

The Conservation Measures Partnership. (2007). *Open Standards for the Practice of Conservation, version 2.0.* http://www.conservationmeasures.org/wp-content/uploads/2010/04/CMP_Open_Standards_Version_2.0.pdf.

UNDP, Government of Rusisian Federation, & GEF. (2005). *Biodiversity Conservation in the Russian Portion of the Altai-Sayan Ecoregion - Phase 1 Full size project document.* GEF, Global Environmental Facility.

UNESCO World Heritage Convention. (2012). *World Heritage List*. Retrieved May 2012, from http://whc.unesco.org/en/list

Wikipedia. (2011). *List of countries and outlying territories by total area*. Retrieved November 2011, from http://en.wikipedia.org/wiki/List_of_countries_and_outlying_territories_by_total_area

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

World Bank. (2006). *Mongolia: A review of environmental and social impacts in the mining sector.* Washington: The International Bank for Reconstruction and Development / The World Bank.

World Wildlife Fund, & Carpenter, C. (2001b). *Altai alpine meadow and tundra (PA1001)*. Retrieved November 2011, from http://www.worldwildlife.org/wildworld/profiles/terrestrial/pa/pa1001_full.html

World Wildlife Fund, & Carpenter, C. (2001a). *Sayan montane conifer forests (PA0519)*. Retrieved November 2011, from http://www.worldwildlife.org/wildworld/profiles/terrestrial/pa/pa0519_full.html

World Wildlife Fund, & Devee, E. (2001a). *Altai montane forest and forest steppe (PA502)*. Retrieved November 2011, from http://www.worldwildlife.org/wildworld/profiles/terrestrial/pa/pa0502_full.html

World Wildlife Fund, & Devee, E. (2001b). *Great Lakes Basin desert steppe (PA1316)*. Retrieved November 2011, from http://www.worldwildlife.org/wildworld/profiles/terrestrial/pa/pa1316_full.html

WWF. (2011a). *About Global Ecoregions*. Retrieved November 2011, from http://wwf.panda.org/about_our_earth/ecoregions/about/

WWF Global Freshwater Programme. (2005). *Free-flowing rivers: economic luxury or ecological necessity?* Zeist, The Netherlands: WWF Living Planet.

WWF Global. (2000). *G200 Maps (1999-2000)*. Retrieved May 2012, from WWF: http://wwf.panda.org/about_our_earth/ecoregions/maps/

WWF International. (2007). *The Amazon's Vicious Cycles.* Gland: WWF International.

WWF. (2011b). *Know Your Flagship, Keystone, Priority and Indicator Species*. Retrieved November 2011, from http://www.worldwildlife.org/species/flagship-species.html

WWF Mongolia. (2010b). *Factsheet on Argali Wild Sheep*. Retrieved November 2011, from http://mongolia.panda.org/en/about_mongolia/wildlife/wild_sheep/

WWF Mongolia. (2010a). *Factsheet on Mongolian Saiga antelope*. Retrieved November 2011, from http://mongolia.panda.org/en/about_mongolia/wildlife/saiga_antelope/

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

WWF Russia. (2012b). *Draft Conservation Strategy Russia 2013-2017.* Moscow: WWF Russia.

WWF Russia. (2012a). Ecosystem type. *CAP maps Altai-Sayan Ecoregion* . WWF Russia.

WWF Russia. (2009). *Ensuring Long-Term Conservation of the Altai-Sayan Ecoregion*. Retrieved November 2011, from http://m.panda.org/who_we_are/wwf_offices/russia/projects/?uProjectID=RU0074