Managing Connectivity Conservation in North-East Asia:

Case of Dauria International Protected Areas

North-East Asian Subregional Programme for Environmental Cooperation
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Acknowledgements

This report is prepared based on country reports submitted by experts from China, Mongolia and the Russian Federation. The core team includes Wu Lan, Lu Cai and Lei Guangchun (Beijing Forestry University, China), Janchivdorj Luten (Mongolian Academy of Sciences), Irina A. Zabelina (Ecology and Cryology of Russian Academy of Sciences), Oleg Goroshko and Olga K. Kirilyuk (Daurksy State Nature Biosphere Reserve). This joint study project also provides outcomes from the field survey which was conducted at the Daursky State Nature Biosphere Reserve (31 July – 7 August 2017).

The report was originally published in Korean (December 2017) by Korea Environment Institute (KEI), and key authors include Jangmin Chu, Hyunwoo Lee, Jiye Lee and Sungwoon Jeon (KEI).

This English version has been prepared to share the study outcomes with the DIPA-range countries (i.e. China, Mongolia and the Russian Federation) and those who are interested in transboundary cooperation for nature conservation. The team of report preparation includes Sangmin Nam, Qian Cheng, Mi-Jin Lee (ESCAP-ENEA), with great support from Yeeun Lee, Hyeonji Kim and Qiheng (Terri) Hong (interns).

I. Introduction

There are over one hundred protected areas along international borders among North-East Asian countries and one-tenth are categorized as strictly protected nature areas or national nature reserves subject to nature conservation management, including those adjoining its neighboring protected areas across international borders. As for the NEASPEC flagship species, transboundary cooperation is vital because these species have a large natural range across countries, even physically unconnected sites are in fact ecologically connected by these species. Such ecological connectivity has made countries amongst the subregion a unique ecological community where their conservation efforts, especially those made by the range countries, need to be connected.

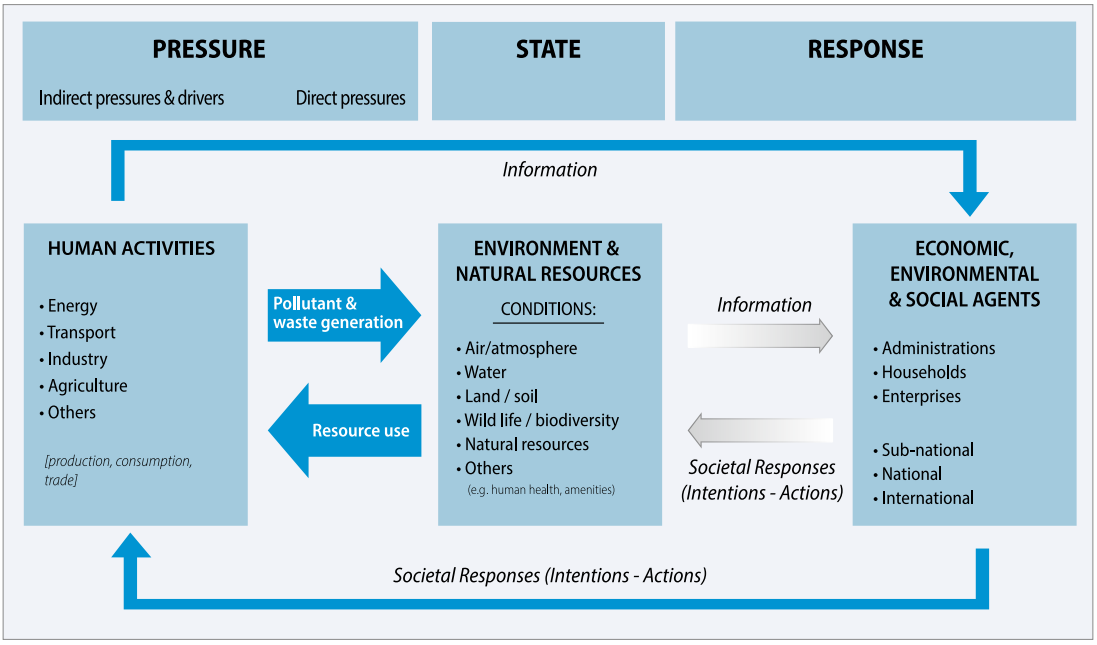
Following the discussion at the 21st Senior Official Meeting (SOM-21) of the North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC) in 2017, this project is jointly carried out by Korea Environment Institute (KEI) and the NEASPEC Secretariat to examine the environmental and institutional aspects of connectivity conservation with the Dauria International Protected Areas (DIPA), encompassing the Tumen River Area as a case study for applying a connectivity conservation approach for transboundary nature conservation. Connectivity conservation is a mechanism promoting the flow of ecological processes necessary for the provision of ecosystem services and ensuring movements of wildlife from one habitat to another.

More specifically, this interdisciplinary study aims to: enhance coordinated actions to conserve key species and their habitats in transboundary areas of North-East Asia; strengthen science-policy interface; strengthen bi/multi-lateral cooperation among all stakeholders and their capacities; and contribute to the implementation of global, (sub-)regional and national goals for sustainable development, especially the environment-related Sustainable Development Goals (SDGs). To achieve such objective, the study analyzes the different stages of cooperation among transboundary habitats in DIPA and explores options for future cooperation. The study also looks at how human connections, such as knowledge generation and sharing and joint planning, can sustain and enhance the conservation efforts among habitats and range countries.

II. Research Methodology

Based on literature reviews on the biodiversity of DIPA and surrounding areas, the study examines the pressure, state and response elements of the DIPA areas, following the Pressure-State-Response (PSR) model proposed and used by the OECD[1]. The PSR model is a cause-effect relationship framework that examines how human activities exert pressure on the environment and affect the quality and quantity of natural resources, and how the society responds through the environment, economic and sectoral policies with behavioral changes. Figure 1 indicates a continuous feedback mechanism created by the interchanges of cause-effect relationships.

Figure 1. Pressure-State-Response Model



Source: OECD (1998)

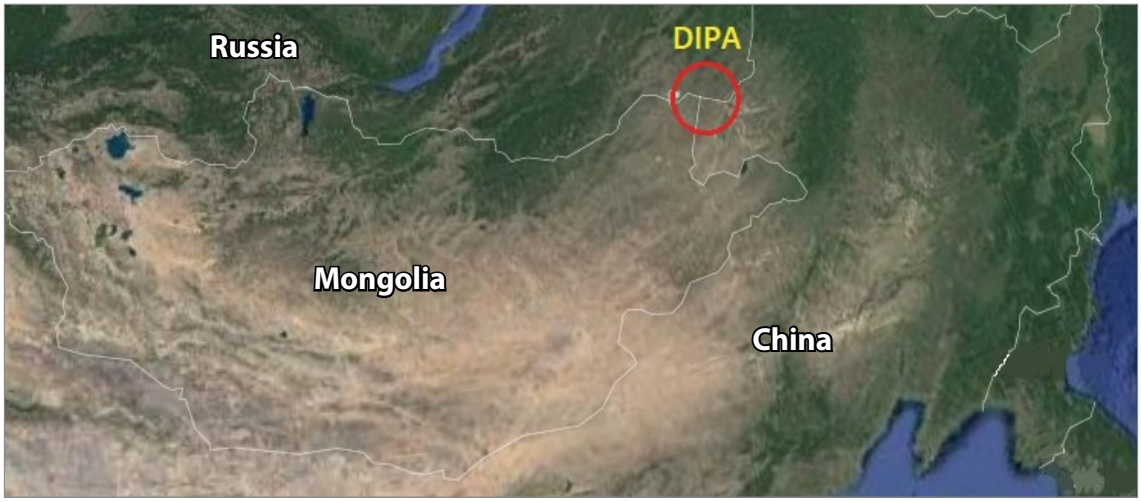
Further to the literature review and PSR model analysis, the study examines the state of biodiversity and institutional architecture of DIPA, complemented by field research carried out from July 31st to August 7th in 2017 for the duration of 8 days and 6 nights at the Daursky State Nature Biosphere Reserve in the Russian territory, as well as field visits to Hulunhu National Natural Biosphere Reserve in China and Mongol Daguur Strictly Protected Area in Mongolia, to inform the analysis and response measures proposed in this research paper.

1 PSR model was invented by the OECD at 1994 and is a classic cause-effect chain framework model.

III. Pressure on Biodiversity in DIPA and Neighbouring Areas

Established in 1994, the Dauria International Protected Area (DIPA) is located in the center of the transboundary Daurian Steppe ecological region between China, Mongolia and the Russian Federation. It consists of three nature conservation areas, namely the Hulunhu National Nature Biosphere Reserve (HNNR; or Dalainor Biosphere Reserve) in China[2], the Mongol Daguur Strictly Protected Area (SPA) in Mongolia and the Daursky State Nature Biosphere Reserve (Daursky NR) in the Russian Federation, covering a total area of 1,096,210 km^2. DIPA contains key habitats of wetland, steppe, rock and forest and serves as an important habitat and breeding ground for several key species. A Joint Commission established jointly by the three range countries provides advice and guidance for carrying out joint activities in DIPA.

Figure 2. Location of DIPA



A pressure analysis on the economic, social and environmental dimensions of each of the involved protected areas covered by DIPA is conducted following the PSR methodology.

3.1 Russian Federation

As the Russian part of the DIPA, the Daursky State Nature Biosphere Reserve is located in the Zabaykalsky Krai (431,892 km^2) which accounts for 2.53% of the total area of the Russian Federation, covering 5,000 km borderline with Mongolia to the south and China to the southeast (Figure 3). There are 31 administrative districts (referred as "Rayon" in Russian), and Chita is a city and

2 Aka. Dalai Lake Nature Reserve in the Inner Mongolia Autonomous Region, China

the administrative center of the Zabaykalsky Krai. DIPA of the Russian side is surrounded by Ononsky, Borzinsky and Zabaykalsky Rayons (Figure 4).

Figure 3. Location of Zabaykalsky Krai

Source: Olga K. Kirilyuk (16 Nov 2017), "Chinese-Mongolian-Russian Dauria International Protected Area: Cooperation in Nature Conservation", re-cited from a presentation made at the 2017 Northeast Asia Peace and Cooperation Forum

Figure 4. The Municipal Districts Included in the DIPA Territory and Neighboring Areas

Source : Google map

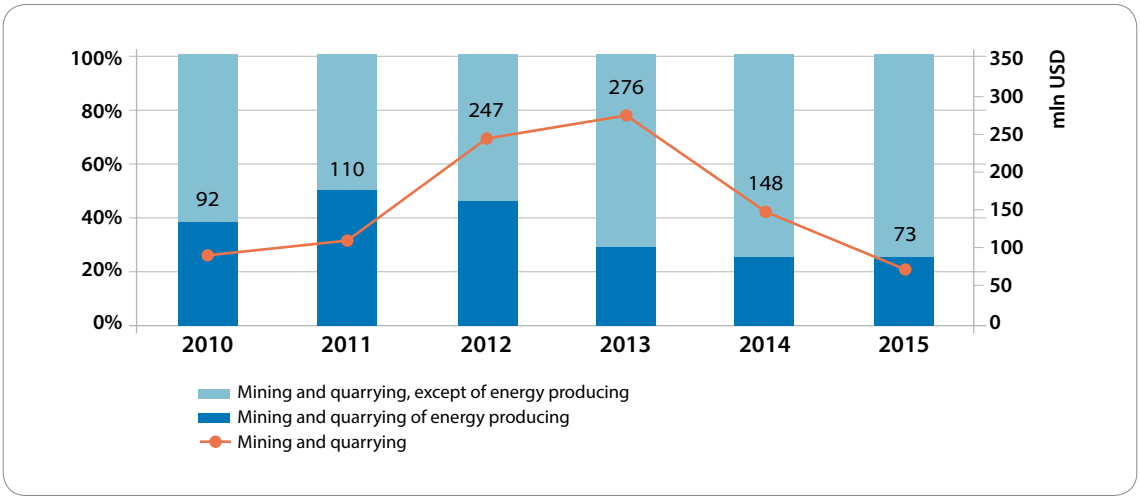
Source: Irina Zabelina (16 Nov 2017), "Pressure on Biodiversity in DIPA and Neighboring Area", re-cited from a presentation made at 2017 Northeast Asia Peace and Cooperation Forum.

3.1-1 Socio-economic factors

The total population of the Zabaykalsky Krai is 1,078,983 as of December 2016. The number has been continuously decreasing, dropping about 7.1% since 2002. One-third of the total number is rural population.

Major industries in the Zabaykalsky Krai are agriculture, forestry and hunting, fishing and aquaculture, wholesale and retail trade, transport and communication. However, mining and quarrying industry was the dominating contributor to local economic growth in the Zabaykalsky Krai over the past 10 years. Capital investment including foreign direct investment in the mining industry of the Zabaykalsky Krai, however, has been declining since 2013 (Figure 5). According to the data published by the Federal Statistic Service of the Russian Federation in 2016, slightly more than half of the mineral resources mined were used for energy production.

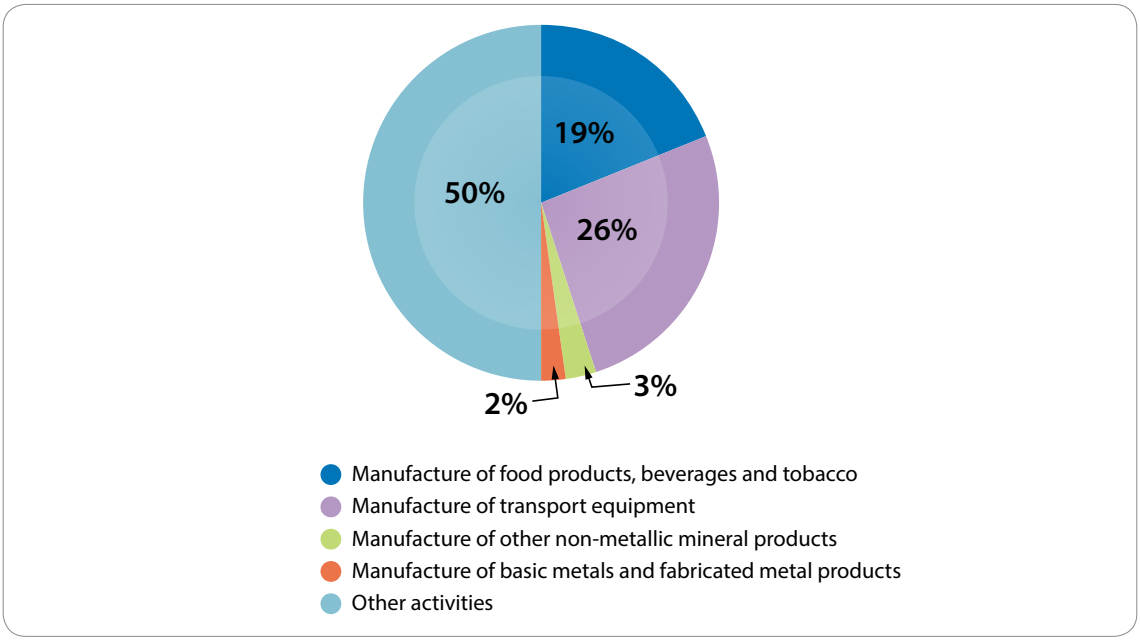
Figure 5. Capital Investment Status for Mining Industry at Zabaykalsky Krai (2010-2015)



Source: Irina Zabelina (2017), "Pressure on Biodiversity in DIPA and Neighboring Area", p.17.

In the structure of manufacturing industry, the largest shares belong to transport equipment (26%), followed by food, drink and tobacco manufacture (19%), non-metallic mineral product manufacture (3%), and basic metals and fabricated metal products (2%) (Figure 6).

Figure 6. Structure of manufacturing industry in the Zabaykalsky Krai (2017)



Source: Russian Federation Federal State Statistics Service (2017)

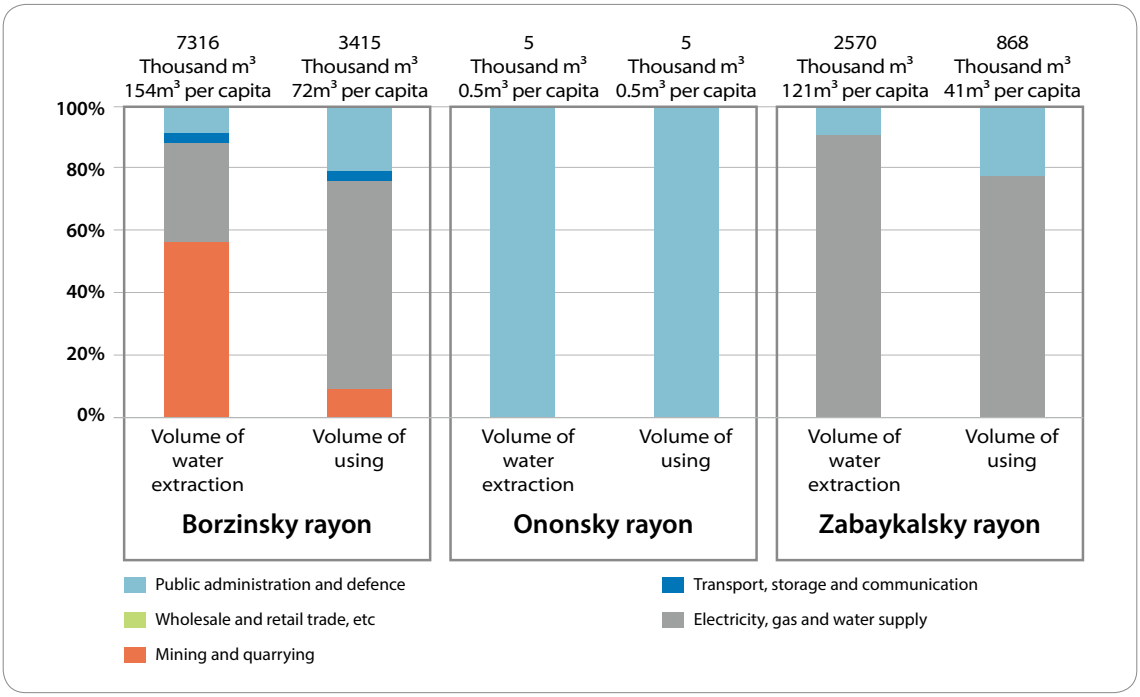
Air pollutants and water waste in the Zabaykalsky Krai were decreased by 17% and 55%, respectively, during 2006-2015, but solid waste rapidly increased by four times during 2012-2015 due to the mining industry.

The soil surface of the Zabaykalsky Krai has been damaged by the mining activities, and it caused water pollution. It is estimated that some 260 km^2 of soil surface (0.057% of the total area of the Zabaykalsky Krai) was damaged due to the mining industry, and the mining industry does not represent a major pressure point for the habitats and organisms of the Daursky NR so far. However, further study is needed to examine the impact of the mining industry on water pollution and water resources.

3.1-2 Environmental factors

The regional climate is a combination of long durations of sunshine and a large amount of solar radiation with a lower temperature and irregular precipitation pattern. According to the Zabaykalsky Krai weather center, the local average temperature has risen 1.9°C compared to the 1951 level. The temperature has risen 2.4°C in winter and decreased 1.3°C in the summer due to climate change. The annual rainfall in Borzinsky, Kansnokamensky, Mogoytuysky, Olovyanninsky, Ononsky, Priargunsky and Zabaykalsky reaches 200~300 mm in the steppe regions and 350~450 mm in mountainous regions. More than half of the annual precipitation falls mainly in July and August, and severe drought is observed in the Spring and June. In addition, a 30-year drought cycle has been observed in the Zabaykalsky Krai, and the current cycle started in 2008. Currently, severe drought acts as a major pressure factor for DIPA biodiversity and habitats.

Figure 7. Comparison of Water Resource Usage and Extraction for Three Districts of DIPA (2016)



Source: Irina Zabelina (2017), "Pressure on Biodiversity in DIPA and Neighboring Area", P.15.

Figure 7 shows the usage and extraction of water resources of Borzinsky, Ononsky and Zabaykalsky Rayons for DIPA regions in 2016. It is important to note that in the Borzinsky region, mining and quarrying exceed the designated usage amount for water resource as it requires a large quantity of water, and water pollution becomes inevitable in the extracting process of the mining and quarrying industry. In the Zabaykalsky Rayon, 78% of water consumption goes to electricity, gas and water supply.

As desertification continues for the southeastern part of the Zabaykalsky Krai, 30% of its agricultural land is in the process of desertification. According to the observation of the Russian Federation, around 150 million ha of land have been found eroded, among which 102 million ha is agricultural land. Desertification in the region results mainly from the reduction in rainfall quantity due to climate change, and the exposure to wind that worsens soil erosion. Soil erosion due to wind can be observed especially in the southern part of the region, Ononsky, Zabaykalsky and Borzinsky districts. About 607.7 thousand ha of the agricultural land is eroded by wind, causing an unsuitable condition for plantation and therefore exacerbating desertification. For instance, desertification in the Zabaykalsky Rayon, where DIPA is located, is due to 46% of soil salinization, 30% of wind, and 21% of soil erosion of the agricultural land by water.

Another environmental pressure factor is overexploitation of forest and biological resources. The Zabaykalsky Krai has abundant and diverse natural resources. Each year, 70,000 hoofed-animals and 50,000 furs are produced in the region by sacrificing as many as 39,000 sables and 13,470 elks. The lumber harvest of 461,7 m^3 in 2015 represents some 14% increase than the previous year contributed by illegal logging, especially along the Sino-Russian border. Sometimes the quantity for illegal logging surpasses legal logging.

Forest fires act as another pressure factor in the Zabaykalsky Krai (Table 1). In 2015, 1,377 forest fires occurred in the area exceeding the record of 1,115 incidents in 2014 and damaged some 898.2 million ha, which is 15 times compared to 2010. According to the Ministry of Natural Resources of the Zabaykalsky Krai, forest fires that occurred at the Daursky State Nature Biosphere Reserve in 2012 caused damage at Uldza river and 500 ha of steppe area. 300 ha of steppe area in the Tsasucheysky Bor, one of the most important conservation regions for the Daursky State Nature Biosphere Reserve, was also completely destroyed. In total, 2% of the Daursky State Nature Biosphere Reserve have been damaged by forest fires.

Table 1. Forest Fire in the Zabaykalsky Krai (2010-2015)

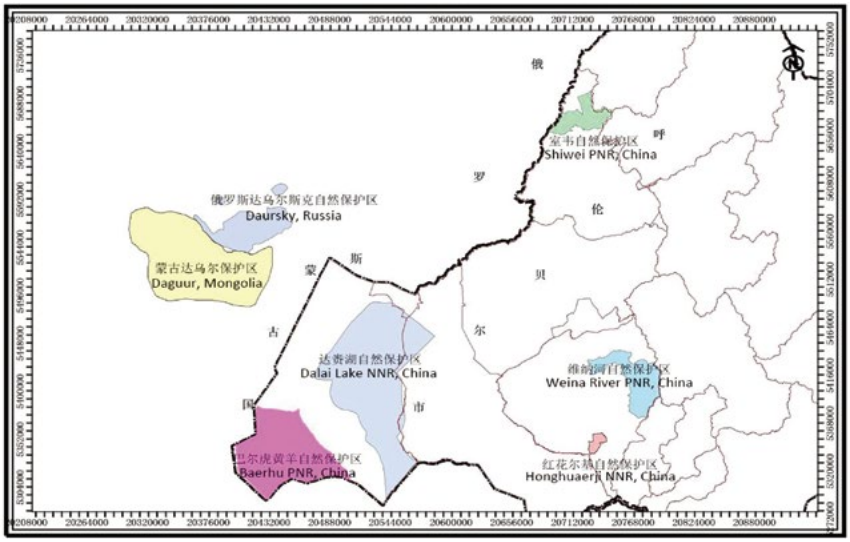
Indicator	2010	2011	2012	2013	2014	2015
No. of forest fires	716	1,642	841	432	1,115	1,377
Forest area damaged by forest fires (thou/ha)	59.7	211.6	445	520	555.4	898.2
Burned and damaged timber by forest fires (thou/m^3)	597.1	1,099.1	1,046	n/a	n/a	n/a
Devastated area by forest fires (ha)	n/a	29,247	36,651	31,883	26,748	62,024

Source: Federal State Statistics Service of the Russian Federation (2017)

3.2 China

The Hulunhu National Nature Biosphere Reserve (HNNR; or Dalainor Biosphere Reserve) is located at the northeast of Inner Mongolia near the border of Manzhouli City and Xinbaerhuyou Banner (Figure 8) in China.

Figure 8. Map of the Hulunhu National Nature Biosphere Reserve and its Surrounding Cities

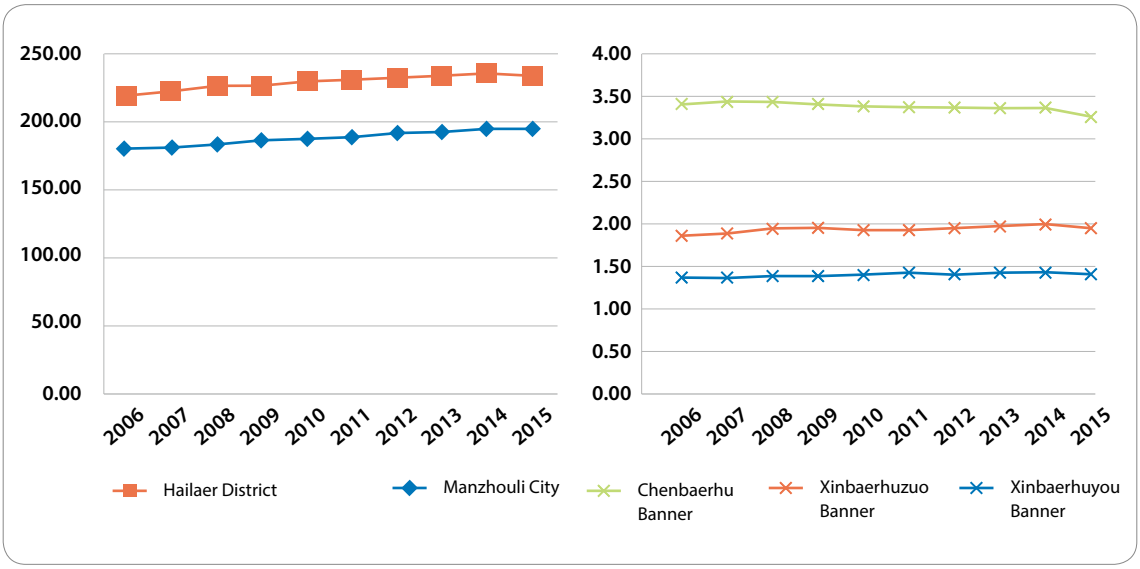


Source: Lu Cai (2017.11.16), "State of Biodiversity in Hulun Lake, China's Part of DIPA", re-cited from a presentation made at the 2017 Northeast Asia Peace Forum

3.2-1 Socio-economic factors

The total area of HNNR is 7,400 km^2, including wetland (3,253 km^2), steppe (4,083 km^2) and sand and barren area (64 km^2). The population in HNNR and surrounding cities reached approximately 591,804 with a density of 8.95 persons per km^2 in 2015. As of 2014, 11,250 people were living inside the nature reserve, and most of them were Mongolian. Figure 9 shows the trend of population growth in five surrounding cities of HNNR from 2006 to 2015. Except Chenbaerhu Banner, most cities showed an increase in population growth due to urbanization until coming to an overall decrease in population growth in 2015. With the implementation of the ecological immigrant project in the nature reserve areas encouraged by the national government, families inside the core and buffer areas of HNNR should move to the town nearby in coming years. Overall, the population factor does not present a major pressure factor for the biodiversity of HNNR, but it needs to be examined further based on most recent data.

Figure 9. Population Growth for the Hulunhu National Nature Biosphere Reserve and Surrounding Cities



Source: Wu Lan (2017.11.16), "Pressure on Biodiversity in DIPA and neighboring areas (China Territory)", re-cited from a presentation made at 2017 Northeast Asia Peace Forum.

The economic structure in the NHHR is very simple; stock-farming and fishing are the main economic sources. Although stock-farming is not allowed inside the national nature reserve, the total number of cattle was estimated to be around 3,054,300 in 2014 outside of the protected area (Table 2). All the 5 surrounding cities had comparatively high numbers of sheep and goats driven by the profits from wool and cashmere, and overgrazing has accelerated desertification in the area.

Table 2. Number of Cattle in the Hulunhu National Nature Biosphere Reserve and Surrounding Cites (2014)

City/District	Horse, Cow, Camel, etc.	Sheep and Goat	Pig	Total
Hailaer District	47,500	62,700	16,900	127,100
Manzhouli City	3,300	32,700	53,300	89,300
Xinbaerhuyou Banner	168,200	855,000	1,100	1,024,300
Xinbaerhuzuo Banner	60,000	1,077,500	700	1,138,200
Chenbaerhu Banner	142,500	528,300	4,600	675,400

Source: Own creation

As the biggest electricity supplying and coal producing area in China, the rapid development of the mineral sector has accelerated economic growth in Inner Mongolia over the past ten years. The coal-based local growth model is forecasted to continue for the next several years. Figure 10 indicates major coal mines marked in red circles. Hulunbuir city, where HNNR is included, is also one of the major mines.

Figure 10. Major Coal Mines in the Inner Mongolia

Source: Korea Institute for International Economic & Policy (2017)

Due to the coal-centered and large-scale development, there has been water pollution and continuous desertification in Argun River since 2000, as the coal industry is extremely water-intensive. Despite the forecasted continuation of the drought that occurred in 2008 in the Dauria region, coal enterprises continue to overuse the available water resource for coal mining and development.

Lastly, Xiaohekou, Shuanmazhuang, the golden beach and the silvery beach in HNNR are famous and important tourist places in Inner Mongolia. Especially, Xiaohekou, which has more than

a 30-year tourism history, attracts nearly 100,000 tourists annually and makes about USD 150,000 per year. Furthermore, a new road constructed in the Hailaer District has caused disruption to natural resources, habitats and living organisms.

3.2-2 Environmental factors

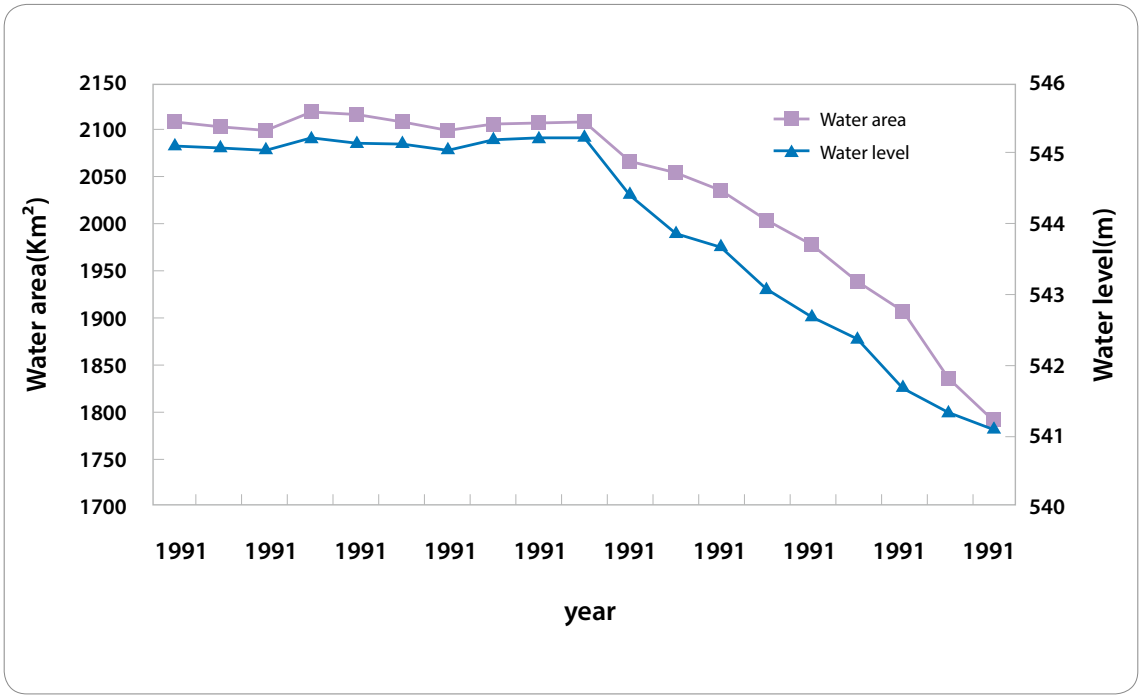
The HNNR belongs to a temperate semiarid continental climate zone, with extreme minimum and maximum temperatures of -42.7°C and 40.1°C, respectively. The mean annual precipitation and evaporation are 247-319 mm and 1,636 mm, respectively. Since 1950, the average temperature has risen by 1.1°C with a reduction in average rainfall of 54 mm for the past 30 years, leading to an acceleration in the degradation of grassland and desertification. Especially, in the region of HNNR, summer rainfall has been significantly reduced, causing a reduction in overall precipitation.

Kherlen River flows in the southwest of the Hulun River and to the south flows Oroqen River (Figure 11). Figure 12 shows the trend of evaporation loss of Hulun Lake according to the change in rainfall quantity. Since 1991 to 2008, the surface area for Hulun Lake has decreased by 316.68 km^2 along with water level lowered by 3.94 m. However, as Figure 12 shows, an abrupt change for Hulun Lake occurred after the year of 2000, with 275.07 km^2 of surface area reduction and 3.2 m of water level decrease. As evaporation rate increased and rainfall decreased, Hulunhu National Nature Biosphere Reserve's grassland has been degraded while desertification has accelerated.

Figure 11. Location of Hulun Lake

Source: Doopedia (2017)

Figure 12. Evaporation Trend of Hulun Lake (1991-2009)



Source: Zhang Na, Wu Liji (2014)

The reduction in rainfall and high arid temperature are acting as the natural causes of desertification in Hulunbuir plateau, where HNNR is located. Furthermore, Hulunbuir plateau consists of middle and fine sand which are prone to sandstorms. To combat desertification, China has come up with several policies like the Water and Soil Conservation Law adopted in 1991 and amended in 2010, and Regulation on Water and Soil Conservation in Inner Mongolia adopted in 2015. The local government put Chenbaerhu Banner, Xinbaerhuzuo Banner and Xinbaerhuyou Banner as 3 of 37 cities/townships to the important precaution list for soil erosion in 2016. Development activities in those areas will be limited to protect the environment.

3.3 Mongolia

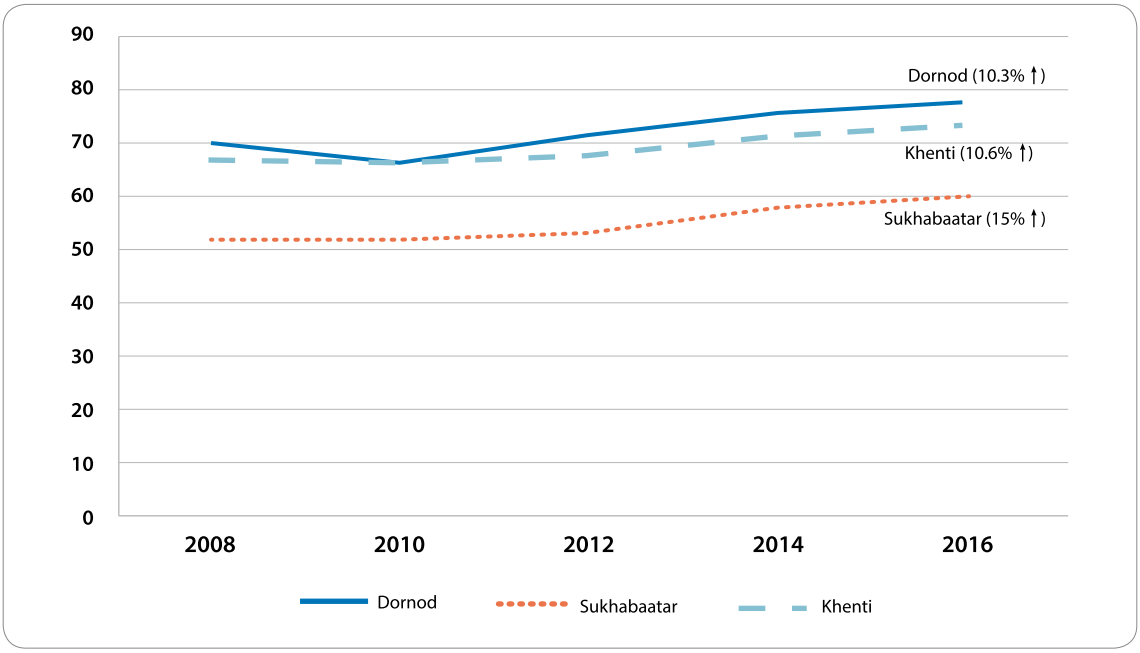
The Mongol Daguur Strictly Protected Area (SPA), as part of DIPA located in the Dornod Aimag in Eastern Mongolia, has a surface area of 1,030.1 km^2 (core area: 560 km^2, conservation area: 385 km^2, Limited area: 315 km^2). Mongolia's eastern steppe is one of the world's largest remaining intact grasslands and harbours the greatest concentration of wild ungulates in Asia.[3]

3 Schaller, 1998b

3.3-1 Socio-economic factors

Eastern Mongolia has a vast territory and is one of the most sparsely populated region. Population in this region was 211,100 as of late 2016, accounting for 6.7% of total population in Mongolia. As a result of continuous population growth in 3 major cities in Eastern Mongolia since 2008, the Dornod Aimag shows a 10.3% population increase in 2008-2016 (Figure 13). However, the highest population density in Khentii Aimag was 0.91 km^2, and Dornod Aimag 0.6 km^2 in 2016, which is still very low.

Figure 13. Population Growth in Three Major Cities in Eastern Mongolia (2008-2016)



Source: National Statistics Office of Mongolia (2017)

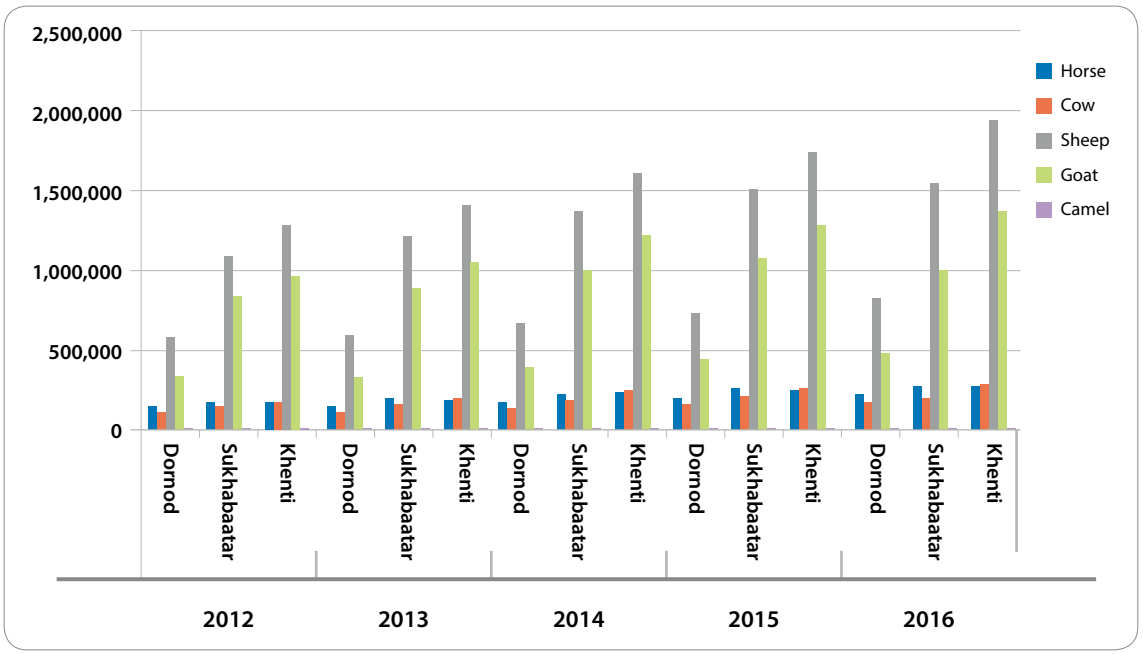
[unit: thousand]

Eastern Mongolia is a major uranium field and there are three uranium mines in Dornod. As of 2017, there are 192 mining companies with special licenses to mine in Eastern Mongolia. Among these mining companies, 89 have exploration licenses and 40 have mining licenses. These companies take up 13.2% (4,967 km^2) of the Ulz River that goes over the border of Mongolia and flows into the Torey rivers. Furthermore, based on the year of 2014, 71% of the total water from the Ulz River is used for mining and exploring[4]. The release of toxic waste from the mining industry is one of the major reasons for a decrease in water resources. As Ulz River has gone through continuous drought and reduction in both the quality and quantity of water resources, a cautionary plan is needed for water resource management. Furthermore, the newly constructed transportation infrastructure near the mine, such as roads and railways, can also cause an acceleration in the migration of biological species.

4 Simonov and Wickel (2014), p.51.

As Mongolia is a country with a long history of the nomadic tribe, most of its economic activities are based on pastureland, ranching, agriculture and water resource[5]. The growing trend for each type of cattle in East Mongolia can be observed in Figure 14. Goat population has increased drastically by 1.52 times compared with 2007, and such sudden growth is due to increased demand by the cashmere market. Mongolia produces around 8,000 tons of cashmere annually, which contributes to 30% of the world's total cashmere production[6]. Goats are less tolerant to the cold, and eat grass and even the roots. Therefore, this overgrazing causes land degradation and adverse impacts on vegetation species. Despite this, as the wool and cashmere industry brings direct economic impacts, the socio-economic structure of Mongolia is shaped to allow extensive cattle raising.

Figure 14. Number of Cattel by Region in Eastern Mongolia (2012-2015)



3.3-2 Environmental factors

Eastern Mongolia is highly elevated and has a continental climate. Climate change has become a main pressure element triggering various changes in the Mongol Daguur SPA in the recent decades. According to the Mongolian weather survey between 1940 and 2008, the annual average temperature of Mongolia rose by 2.14°C. The glaciated areas decreased rapidly by 12.3% in 1940-1990, by 9.8% in 1990-2000 and by 11.7% in 2000-2010, indicating the impact of climate change on Mongolia's atmospheric temperature. Furthermore, rainfall has become more unevenly distributed for SPA and surrounding cities. Despite the rainfall peaks from June to August, the wetland has become drier due to continuous summer droughts in the past several years (Table 4).

5 Tsolmon Undrakhbayar (2016) http://s-space.snu.ac.kr/bitstream/10371/129994/1/000000137242.pdf

6 William Danforth(2017) https://frontcap.com/wp-content/uploads/2017/02/Mongolias-Cashmere-Report-February-2017.pdf

Table 3. Average Temperature (2000-2010) in the Mongol Daguur Strictly Protected Area

Month (2000-2010)	Average (°C)	Month (2000-2010)	Average (°C)
January	-22.8	July	17.5
February	-17.8	August	16.2
March	-8.1	September	9.8
April	3.9	October	2.4
May	10.0	November	-10.1
June	16.3	December	-18.5
Average annual temperature: -0.1°C			

Source: Chuluunkhoroot Dashbalbar (2014), Mongol Daguur Strictly Protected Area Management, Dornod, p.52

Table 4. Average Rainfall (2000-2010) in the Mongol Daguur Strictly Protected Area

Month (2000-2010)	Average (mm)	Month (2000-2010)	Average (mm)
January	4.8	July	50.6
February	4.1	August	43.3
March	4.9	September	19.6
April	5.8	October	9.2
May	17.8	November	5.7
June	29.1	December	6.8
Average precipitation: 15.9 mm			

Source: Chuluunkhoroot Dashbalbar (2014), Mongol Daguur Strictly Protected Area Management, Dornod, p.52

According to the surface water inventory conducted in 2003, there were 5,565 rivers and streams of which 683 were dried up; 9,700 springs of which 1,484 were dried up and 374 mineral waters of which 10 were up in Mongolia. Mongolia's flux of river increased from the end of the 1970s to the beginning of the 1990s and kept a continuous low level from 1996 to 2008. Although precipitation has increased since 2009 due to the wet period, extreme weathers and fragile ecosystem in eastern Mongolia have intensified the droughts and water shortages (Table 5). Another pressure element is the low water quality due to a high mixture of salinity and minerals in the eastern part of Mongolia.

Table 5. Comparison of Surface Water Evaporation in Eastern Mongolia (2011 and 2016)

	River				Spring Water				Lake			
	2011	Evaporation	2016	Evaporation	2011	Evaporation	2016	Evaporation	2011	Evaporation	2016	Evaporation
Dornod	126	19	132	54	374	48	586	174	426	200	524	204
Sukhabaatar	70	5	48	1	309	16	407	57	157	6	97	17
Khenti	866	93	287	25	846	359	743	217	1246	126	207	31
Sum	1062	117	467	80	1529	423	1736	448	1829	332	828	252

Source: National Statistics Office of Mongolia (2017)

Desertification also acts as a pressure element for the biodiversity of Mongolia. As of 2016, 75.33% of the total area of Mongolia is for agriculture and stock-farming, 90% of which are pastureland. In the case of of Eastern Mongolia, global warming, uneven distribution of precipitation, inappropriate human activities and overgrazing caused 72.6% of pasture degradation (Table 6).

Table 6. Pastureland Degradation Rate in Eastern Mongolia

Aimag	Non-degraded	Small /10%/	Medium /20%/	More degraded /30%/
Dornod	—	2125.2	7332.0	1168.9
Sukhabaatar	—	772.6	6181.8	727.9
Khenti	305.5	1181.2	2066.9	2066.9
Sum	305.5	4079	15580.7	4008.5

Source: National Statistics Office of Mongolia (2017)

Furthermore, each year, one or two large-scale forest fires occur in the Russian Federation and spread into Mongolia. Despite the efforts on addressing the forest and steppe fires in Mongolia through inter-agency cooperation over the past decade, no agreement has been made to prevent cross-border fires. While much has been done on the conservation of wetlands both internationally and at national level, there is not much management mechanism on addressing cross-border fires and the related awareness needs to be raised.

3.4 Implication

Climate change is the common environmental pressure point faced by all three countries. In particular, severe droughts have caused abrupt changes in biodiversity in the Dauria region. As the protected areas have not taken the impact of climate change into full consideration, it needs a flexible approach to accommodate the challenges and impacts of climate change such as through expansion, reduction and cancellation of the existing protected areas. Also, an extensive conservation strategy which includes mitigation and adaptation measures to climate change at the international and local level needs to be developed.

IV. State of Biodiversity in DIPA and Neighboring Areas

4.1 Russian Federation

4.1-1 Status of key species

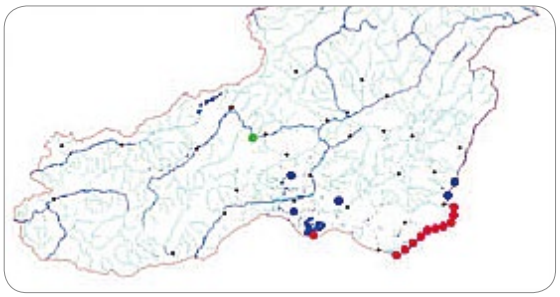
The Daursky Nature Reserve provides the habitat for 593 flora, 1,326 invertebrates and 379 vertebrates species, including 21 bird species (CR: 2 species, EN: 4 species, and VU: 15 species) and 1 mammal species (Tarbagan marmots) listed on the IUCN Red List as of 2017 (Table 7).

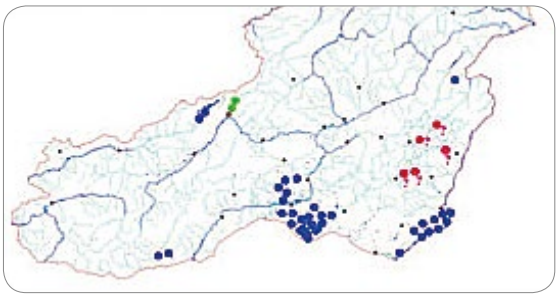
Table 7. Status of Major Species of the Daursky Nature Reserve in Russia

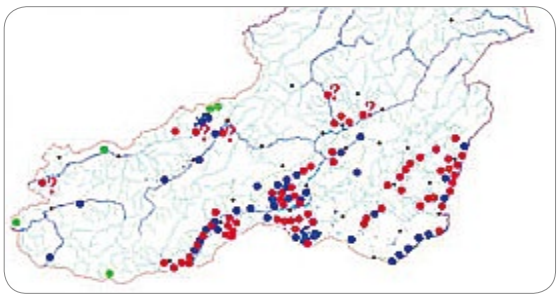
Classification	Total number of species	IUCN Red List	National Red Book List	Regional Red Book List (Zabaykalsky Krai)
Flora	593	0	5	44
Insecta	1,326	0	2	26
Cyclostome	-	-	-	-
Fish	7	0	0	0
Amphibian	3	0	0	1
Reptile	3	0	1	2
Bird	321	21	39	65
Mammal	45	1	4	7
Vertebrate (total)	379	22	44	75
Fauna (total)	1,705	22	46	101

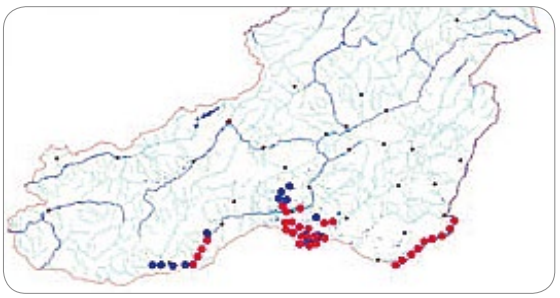
The water birds, fish and reptiles in the Daursky Nature Reserve are mainly found in wetlands such as the Torey Lakes, the Ulz river and the Borgia river. The Torey Lakes are well known habitats and breeding grounds for a variety of representative species of North-East Asia. Figure 15 shows the distribution of key globally threatened protected species in the Daursky Nature Reserve.

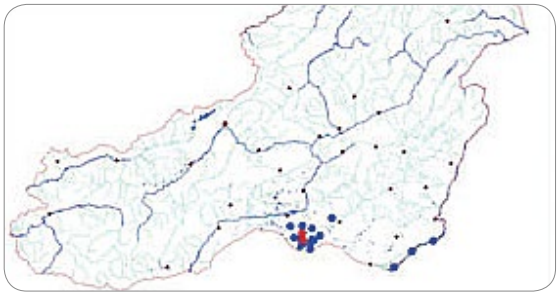
Figure 15. Distribution of Key Globally Threatened Protected Species (2012)

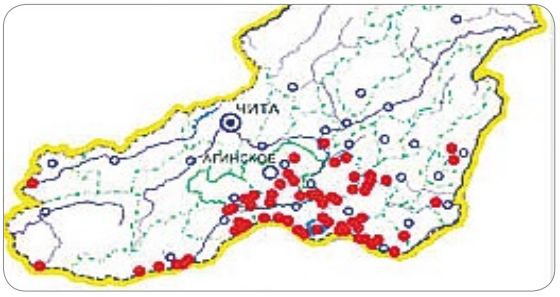

Red-Crowned Crane


Hooded Crane

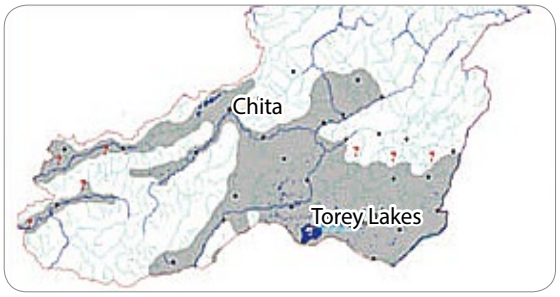

Great Bustard


Swan Goose


Relict Gull

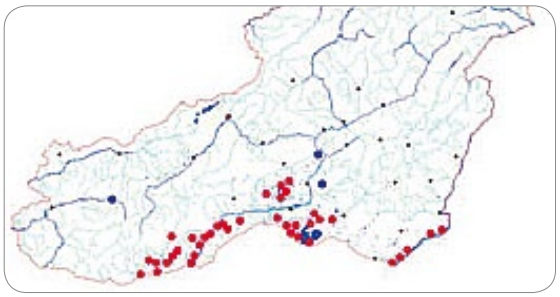


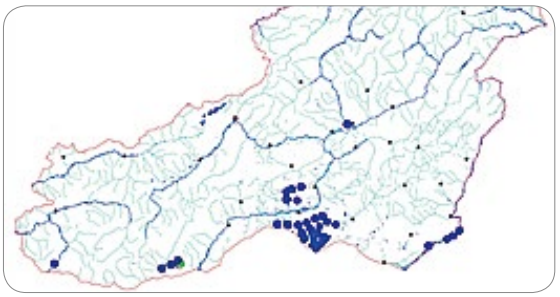
Tarbagan Marmot



Saker Falcon

Steppe Eagle


White-naped Crane

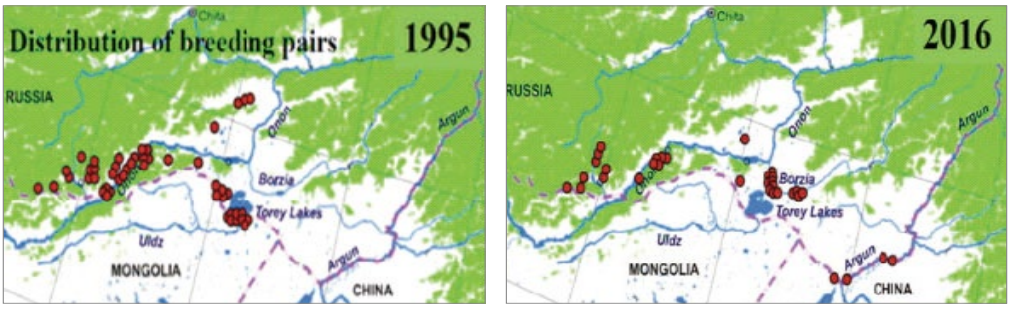

Siberian Crane

Note: 1) Gray: breeding area, 2) Red spot: breeding site, 3) Blue spot: flyway, 4) Green spot: Past record

Source: Red Book of Zabaykalsky Krai (2012)

According to the NEASPEC report of *Conservation and Rehabilitation of Habitats for Key Migratory Birds in North-East Asia* (2016), the population of the White-naped crane has been greatly declining over the last 20 years[7], and its breeding population has been reduced to half. About 100 pairs of the White-naped crane were discovered in 1995 but only 45 pairs remained in 2016 (Figure 16)[8] . In addition, the breeding success rate of the White-naped crane has also reduced by about one-half and only 36% of the 45 pairs were able to breed in 2016. As such, 98% of the White-naped crane breeding habitats are unprotected.

Figure 16. Comparison of the White-naped Crane Breeding in 1995 and 2016



Source: Korean Society of Environmental and Ecology (2016)

The Daursky NR Management Office is responsible for biodiversity conservation and management within the Nature Reserve. For example, the management office has been monitoring birds, flora and water resources at about 250 observation sites covering not only the Daursky area but a part of wetland and steppe in the Mongolian side through DIPA Transboundary Waterbirds and Wetland Monitoring Network.

4.1-2 Status of ecosystem

There are diverse types of habitats in the Russian Daursky Nature Reserve. 69.2% - 86.8% of its overall ecosystem is covered by steppe and pasture, 12% by forest and woodland and some 1% - 18% by river (Table 8).

Table 8. Types of Habitats in the Daursky Nature Reserve

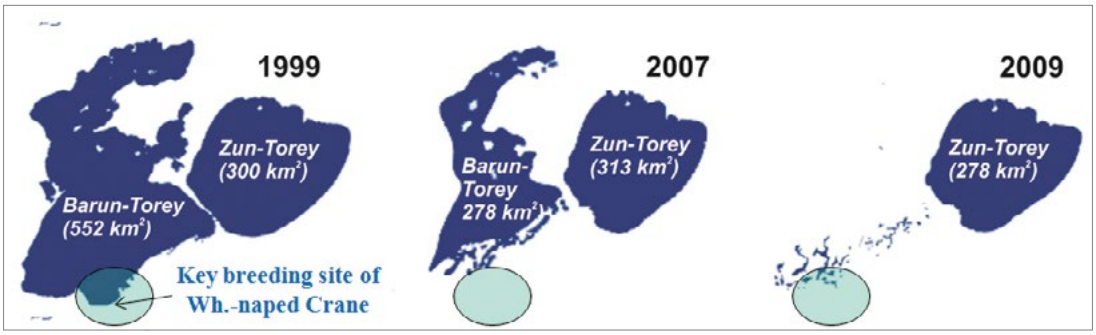
Types of Habitat	Composition (%)
Forest and woodland	12
Bush	0.2
Steppe and pasture	69.2 – 86.6
Wetland	0.1 – 0.5
Rock	0.1
River	1 - 18

7 Medeura Gangsopdeu (2016), p.25

8 Goroshko (2012)

The continuous dry-out of the Barun Torey River and Zun Torey River indicates the largest habitat changes in the Daursky Nature Reserve (Figure 17) followed by the change of the breeding habitat of the White-naped crane. 98% of the White-naped crane's breeding habitats in Russia are not protected, and its breeding outside the protected area can hardly succeed due to many disturbance and threats surrounding it. Therefore, it is necessary to adjust the current protected area to reflect such habitat changes, for example, by designating a new protected area.

Figure 17. Change of the Torey Lakes



Source: Korean Society of Environment and Ecology (2016)

4.2 China

4.2-1 Status of key species

The Hulunhu National Nature Reserve (HNNR) in China provides habitats for a variety of organisms, including 486 higher plants, 330 birds, 30 fish, 2 amphibians, 26 reptiles and 26 mammals. 331 species of Perennial herb are distributed in HNNR and account for 68.1% of the total flora and 199 species of xerophytic plants are distributed widely in the wetlands of the protected area. HNNR recorded 330 species of birds, including 208 water birds. More than 80,000 water birds reside here each year.

Hulun Lake is a habitat for 30 species that makes up most of the annual catches in Inner Mongolia. These fish migrate to shallow swamps to spawn. However, the spawning habitats are under threat from salinization and alkalization caused by climate change.

The representative mammal of HNNR is the Mongolian Gazelle. About 90% of the total population of Mongolian Gazelles habituate in DIPA. However, its population and habitats have declined in the past decades. The most influential anthropogenic factor in such reduction is the overgrazing of livestock. Excessive grazing exceeding pasture capacity has led to the destruction of vegetation in the steppes of China, and rapid land degradation is in progress.

4.2-2 Status of ecosystem

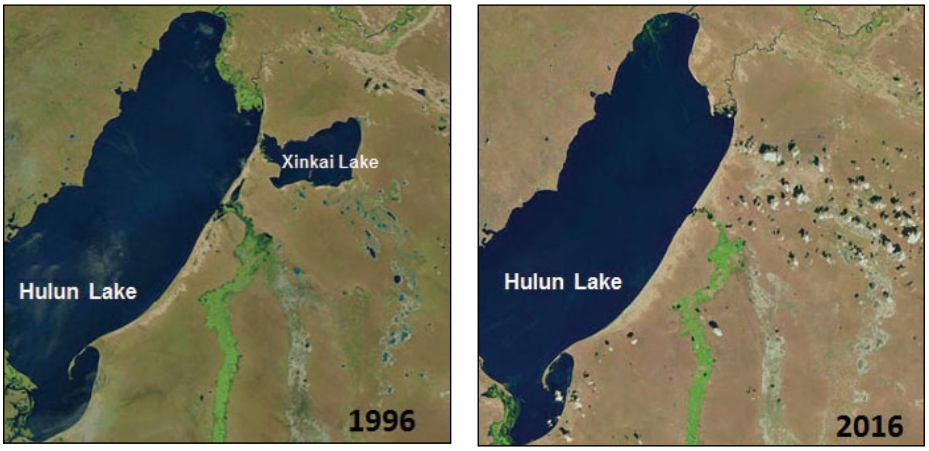
The total area of HNNR is 7,400 km^2, composed of wetland (3,253 km^2), grassland (4,083 km^2), sand and barren land (64 km^2). HNNR includes core area (757.91 km^2; 10%), buffer zone (385.34 km^2; 5%) and transition zone (6,256.75 km^2; 85%) and can be divided into the following 5 zones (Table 9).

Table 9. Classification of the Hulunhu National Nature Reserve

Name	Location	Size	Habitat type
Shuangshanzi	HNNR (Northwest)	58.95 km^2	Reed marshes, islands, mud coasts and small lakes, with no living organisms
Galadabaixin	Hulun Lake (South)	303.33 km^2	<core area> Reeds and reservoirs, stream forms
Wuersun	Wuersun River (center)	213.93 km^2	Typical riverfront wetlands
Wulannuoer	Wuersun River (upper part)	105.35 km^2	<core area> River, main habitat of water birds
Beier Lake	China and Mongolia border	86.47 km^2	<core area> River, main habitat of water birds

Xinkai Lake, spotted to the northeast of Hulun Lake in 1996, was completely evaporated to disappearance in 2016 (Figure 18).

Figure 18. Change of Hulun Lake (1996-2016)



Source: Google map

4.3 Mongolia

4.3-1 Status of key species

Major species observed in the Mongol Daguur Strictly Protected Area (SPA) are listed in Table 10.

Table 10. Major species in the Mongol Daguur Strictly Protected Area

Classification	Major Species
Vegetation (346 species)	Serratula, Medicago, Polygonum, Stipa, Caragana, Astragalus, Hard bluegrass, etc.
Mammal (31 species)	Mongolian gazelle, Roe deer, Wolf, Corsac Fox, Daurian hedgehog, *Myotis mystacinus*, Pika, Hare, etc.
Fish (7 species)	Common carp, Crucian carp, etc.
Amphibian (2 species)	*Pseudepidalea raddei*, Amur Brown Frog
Reptile (4 species)	Black snake, Solenoglyph, *Natrix natrix*, Mongolian racerunner
Bird (226 species)	White-naped crane, Hooded crane, Common crane, Siberian Crane, Bean goose, Relict Gull, Great bustard, Mandarin duck, Northern lapwing, Heron, etc.

Source: re-structured from Medeura Gangsopdeu (2016), p.90

The plant species are mainly in the Ulz River and its surrounding wetland areas where willow (*Salix masanunei Matsuo*) (shrubs) is the main species. In the grassland area, Elymus mollis and Stipa are mainly distributed. The Mongol Daguur Strictly Protected Area also provides habitats for rodents and carnivores. *Microtus Brandtii*, a rodent species, has rapidly increased and undermined ecosystems in the past 20 years [9]. Local governments have carried out several removals of the species in these areas but ended up with little success. It is also important to note that fish mainly reside at Tari Lake, Duruu Lake and Ulz river in protected areas.

The Ulz River in the Mongol Daguur Strictly Protected Area is also an important habitat for globally rare and endangered birds such as Siberian Crane, White-naped Crane and Great Bustard. However, recent threats such as grassland degradation and forest fire due to climate change are stressing out the rich biodiversity in this area.

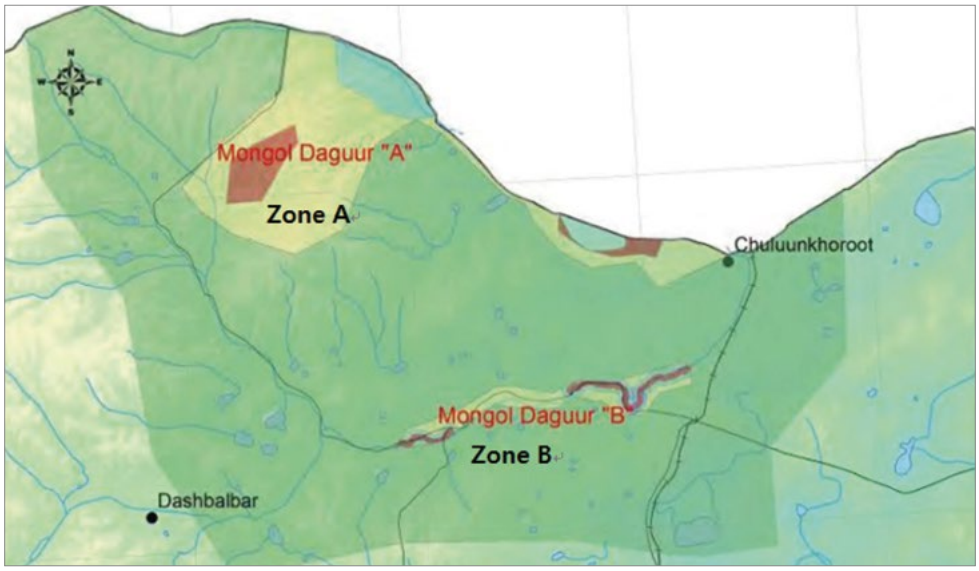
The Mongol Daguur SPA is managed by the Dornod Conservation and Management Office, which is one of the 33 offices established to supervise national-level protected areas designated by the Ministry of Nature, Environment and Tourism. However, limited capacity in human resources (only 2 rangers for the entire Mongol Daguur SPA) and absence of a field office hinder sustainable monitoring and management of the area.

9 Choybalsan (2014)

4.3-2 Status of ecosystem

The ecosystem types the Mongol Daguur Strictly Protected Area include the following: rivers and lakes (2.1%), mountainous dry grassland (33.2%), flat dry grasslands (53.2%), river and wet grasslands (5.6%) and others (5.6% of cropland and residential area)[10]. Mongol Daguur SPA is divided into core area (160 km^2; 15.1%), conservation area (358 km^2; 34.8%) and limited area (516 km^2; 50.1%), and also can be divided into two zones: Zone A for forest and prairie and Zone B for prairie and wetland (Figure 19).

Figure 19. Zonation of the Mongolia Daguur Strictly Protected Area



Note: 1) Red: core area; 2) Light green: conservation area; and 3) dark green: limited area
Source: Munchjargal Myagmar, et al. (2014) p.33

Table 11. Status of land usage of the Mongol Daguur Strictly Protected Area (as of 2015)

Type of Land usage	Zone A (km^2)	Zone B (km^2)
Agriculture and pasture	87,165	14,540
Urbanization area	-	-
Road network	85	4
Forest resource	108	-
Water resource	422	692
Protected area	-	-
Total area	87,780	15,236

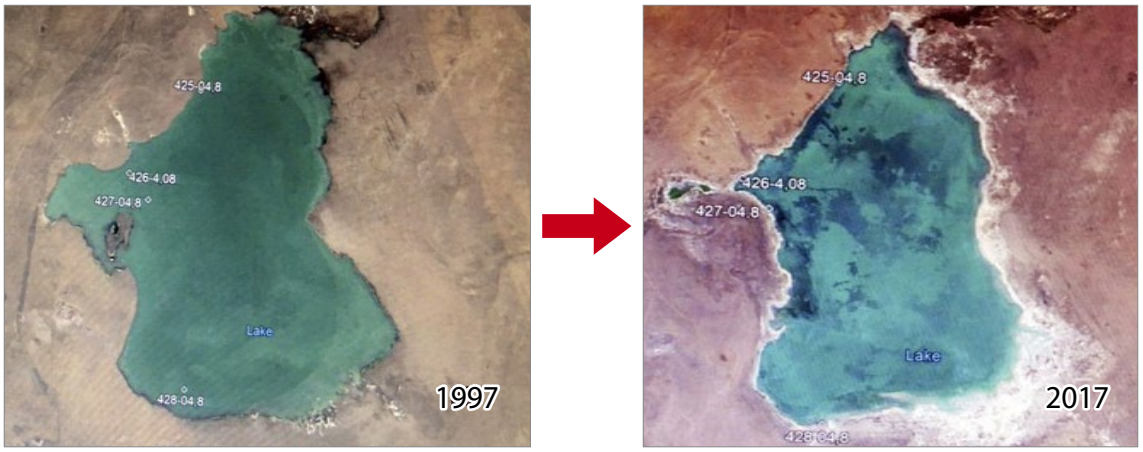
Source: Medeura Gangsopdeu (2016), p.60, re-cited

10 Medeura Gangsopdeu (2016)

The breeding grounds of water birds such as Tari Lake, Ulz river area and Duruu Lake area have been designated as core areas. The conservation area surrounds the core areas and is about 1 km from Lake Tari and 0.5 km around the Ulz river.

Over the past several years, rapid changes in major rivers, lakes and wetlands in the Mongol Daguur SPA have occurred due to climate change. Figure 20 shows the evaporation of Khukh Lake in Zone B for the last 20 years. In addition, rivers such as Guluut, Khunkher, Bus, Chuh and Khorin Tsagaan within the SPA have already disappeared by 40% - 60%. In addition, the Duruu Lake has completely disappeared in 2017 due to extreme dry weather (Figure 21).

Figure 20. Zone B of the Mongol Daguur Strictly Protected Area: Khukh Lake change (1997-2017)



Source: Google Map

Figure 21. Zone B of the Mongol Daguur Strictly Protected Area: Duruu Lake change (1984-2017)

Sources: Google map (satellite images) and Janchivdorj (photo taken August 2017)

4.4 Implication

The number of species and habitats in all three countries corresponding to DIPA shows a declining trend. It is largely due to climate change, but anthropogenic factors including deforestation, excessive grazing, mining of mineral resources and construction of transportation infrastructure also directly destroy and disturb the habitat of endangered species.

While birds experts from Mongolia, Russia and China conduct monitoring to see distribution status of the White-naped crane, there is no joint research on the threats and damages faced by the habitats in DIPA. It is thus recommended to conduct scientific research and monitoring focusing on the threats and damages to the habitats of the White-naped crane and re-adjust the current protected area or its zonation. Furthermore, a more precise, scientific monitoring system is needed to develop a spatial mapping and a distribution map for rare and endangered species.

V. Response of Biodiversity in DIPA and Its Neighboring Areas

5.1 Intergovernmental Cooperation Mechanism

5.1-1 DIPA Joint Commission

Cooperation between the governments of the Russian Federation, Mongolia and China for DIPA's conservation of wildlife and natural ecosystems is mainly organized and realized through the DIPA Joint Commission, which is the highest decision-making body of the DIPA. It addresses issues which need to be decided on an intergovernmental level. At the time of the establishment of the DIPA in 1994, the three countries decided to establish a "DIPA Joint Commission" to coordinate the cooperation for joint management and conservation of the DIPA and to ensure its implementation. The DIPA Joint Commission is held in the order of Russia-Mongolia-China, and is required to be held at least once every three years. The duties of the DIPA Joint Commission are as follows:

- Organize and coordinate the cooperation activities of the three countries in DIPA;
- Propose cooperative activities that promote mutual understanding;
- Plan and implement cooperative programmes in DIPA and assess the progress of implementation; and
- Make decisions about the organizational and procedural processes of DIPA cooperation activities.

The Commission consists of three co-chairs, three deputy co-chairs, representatives and secretariats of each member country. Each country designates a co-chair, and the competent Ministries of protected areas management and the conservation sector in each country designate members to the DIPA Joint Commission. The Secretariat must prepare and hold regular meetings of the DIPA Joint Commission and keep the proceeding notes. Furthermore, the Secretariat must also create and maintain a document archive on DIPA collaborative activities. All decisions of the DIPA Joint Commission must be made by consensus and take effect from the date on which the chairpersons sign the proceedings of the commission.

Since the first DIPA Joint Commission was held in China in 1995, a total of six Joint Commissions were held until 2017 irregularly, despite the agreement to hold the Commission at least once every three years. It is largely due to the presence of annual bilateral meetings on DIPA (Russia-Mongolia and Russia-China), as well as DIPA Working Group, where member countries also make decisions and implement cooperative activities. Also, the host country responsibility to organize a meeting and cover all expenses is another barrier.

5.1-2 DIPA Working Group

While the DIPA Joint Commission is the highest decision-making body for conservation and management of DIPA among the three countries, the DIPA Joint Commission Working Group (DIPA Working Group, hereinafter) is the implementation body for cooperation. Consisting of directors and field managers in the nature reserve of each of the three countries, it was officially established at the Second DIPA Joint Commission in October 1996 in Mongolia. The Working Group has since then actively been held, including bilateral meetings between Russia – Mongolia and China - Mongolia depending on the circumstances and scope of issues concerned.

The DIPA Working Group organizes and administers all activities taking place in DIPA in between the Joint Commission sessions. Daursky NR, Mongolian-Daguur SPA and Hulunhu NNR are the responsible management bodies for the Working Group. The specific roles and responsibilities of the Working Group include:

- Organize and coordinate activities for the implementation of DIPA Joint Commission decisions;
- Organize and coordinate DIPA cooperation activities during the period between sessions of the Joint Commissions;
- Prepare and finalize the DIPA short-term cooperation plan (for 1-2 years); and
- Coordinate and analyze the implementation of the adopted DIPA cooperation plan.

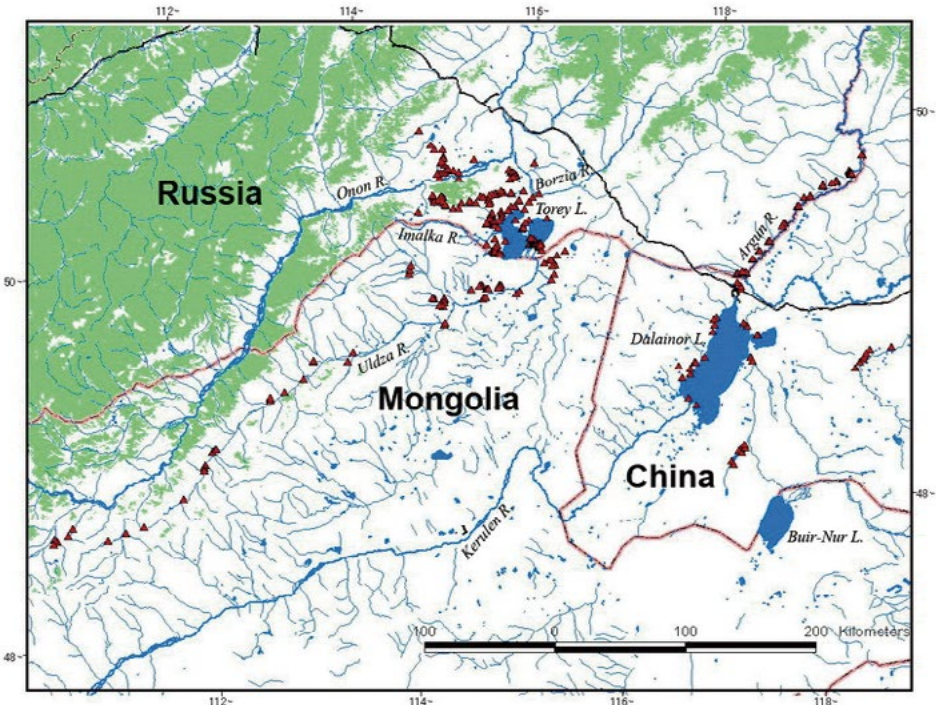
Directors of the regional protected management institution participate in the Working Group meetings and decide the composition of the Working Group. The Working Group meetings are held in the order of China - Mongolia - Russia and must be held at least once a year. Meeting expenses are borne by the host country while the cost of round-trip transportation for delegations is borne by each participating country. From 1995 to 2017, more than 60 meetings of the DIPA Working Group were organized.

The DIPA Working Group is actively developing and implementing a trilateral cooperation programme for DIPA conservation and management. The DIPA Joint Collaboration Programme focuses on joint monitoring and field surveys of biodiversity, mainly on water birds, mammals, and vegetation, data and information sharing, training programmes for practitioners working for national nature reserves, development and implementation of various public awareness programmes, DIPA promotional items, and joint actions towards international cooperation. Likewise, the DIPA Working Group organized the Dauria Transboundary Monitoring Network (DTMN) in 2010 to conduct scientific and systematic monitoring and research, noting the impact of climate change and anthropogenic factors on migratory waterbirds in DIPA.

The DTMN designates and monitors about 250 sites throughout the DIPA. Wetlands, lakes and watersheds around DIPA are the major monitoring points. Each monitoring site is divided into three groups according to the frequency of monitoring required. The goal of the Network (Figure 22) is to analyze the changes in the DIPA ecosystem, establish a long-term conservation plan for

DIPA, and to suggest ways of using natural resources that are reasonable and sustainable for each country[11].

Figure 22. Dauria Transboundary Monitoring Network



Note: red triangles - location of the monitoring stations network in wetlands of Dauria Ecoregion

Source: Oleg Goroshko (2016), p.234

5.1-3 Bilateral Cooperation Mechanism

The bilateral cooperation mechanisms among the three DIPA countries also cover issues that may affect the conservation and management of DIPA. "Environmental Sub-commission under the Commission on Regular Meetings of Russian and Chinese Heads of Government" has held annual meetings since its establishment in 2006. Focus areas of its discussion include a) the conservation of biodiversity, protected areas and ecosystem; b) cooperation in the event of an environmental disaster; and c) water conservation and joint monitoring in the border area. In particular, "Russia-China Working Group on Transboundary Protected Areas and Biodiversity Conservation" under the Environmental Sub-commission discusses bilateral cooperation on nature reserves at the border region, including DIPA related issues. The Working Group meeting also has been held annually since 2007.

Similarly, "China-Mongolia Agreement on Protection and Utilization of Transboundary Waters (1994)", "Mongolia-Russia Agreement on Protection and Use of Transboundary Waters (1995)", and "Russia-China Agreement on Reasonable Utilization and Protection of Transboundary Waters (2008)" are also the means to facilitate bilateral discussions for the border waters in DIPA including

11 Oleg Goroshko (2016), p.234

the Ulz River, the Borja River, the Arjuna River and the Lake Torrey.

Table 12. DIPA-linked Sub-regional Bilateral Cooperation Mechanism

Name	Form	Establishment	Areas of Cooperation
Environmental Sub-commission under the Commission on Regular Meetings of Russian and Chinese Heads of Government	Sub-commission	2006	- Biodiversity - Protected areas - Ecosystem conservation - Pollution prevention and cooperation in case of environmental disaster - Protection and joint monitoring of the water system in the border area
Russia-China Working Group on Transboundary Protected Areas and Biodiversity Conservation under the Environmental Sub-commission	Working Group	2007	- Establish a working group annual plan and conduct bilateral cooperation accordingly - Coverage: (1) International Russian-Chinese Reserve "Lake Khanka"; (2) Bolshekhekhtsirsky State Nature Reserve (Khabarovsk Territory, Russia), Bastak (Jewish Autonomous Region, Russia) and Trekhrechye State Nature Reserve (Heilongjiang Province, China); (3) Reserves of Khingansky (Russia) and Honghe (China); and (4) Argun / Hailar river
China-Mongolia Agreement on Protection and Utilization of Transboundary Waters	Bilateral Agreement	1994	- Protection and fair and reasonable use of water system (lakes, rivers and streams) in the China-Mongolia border area - Joint monitoring, investigation and cooperation on water resources, water quality, water system change, water pollution, and wild animals and plants
Mongolia-Russia Agreement on Protection and Use of Transboundary Waters	Bilateral Agreement	1995	- Information exchange on flood forecast - Joint investigation, evaluation and planning for flood management - Joint monitoring for water quality and pollution prevention - Prevention of domestic development plans that may affect the border water system - Development of Integrated Transboundary Water System Management Plan
Russia-China Agreement on Reasonable Utilization and Protection of Transboundary Waters	Bilateral Agreement	2008	- Border area contamination - Transboundary protected areas - Operation of Joint Environmental Working Group to promote networking among Nature Reserves in Russia and China

5.2 Domestic governance

5.2-1 National stakeholders and partners for DIPA conservation and management

National stakeholders and partners such as NGOs, academia, local governments and international organizations also participate in the conservation and management activities in DIPA (Table 13).

Table 13. Mapping of DIPA Stakeholders and Partners in Russia, China and Mongolia

Country	Classification	Agency
Russia	Central government / Agency	- Ministry of Natural Resources and Ecology (superior body for management and financing) - Federal Supervisory Natural Resources Management Service (Dep. of Zabaykalsky Province) - Baikal Branch of Federal State Budgetary Institution (FSBI) Glavrybvod - Red Data Book Commission - State Nature Biosphere Reserve "Daursky"
	Local government / Agency	- Ministry of Nature Resources of Zabaykalsky Krai - Ministry of Education of Zabaykalsky Krai - Ministry of International Cooperation and Foreign Relations of Zabaykalsky Krai - Ononsky Municipal District; Borzinsky Municipal District; Zabaykalsky Krai Municipal District - Red Data Book Commission of Zabaykalsky Krai - Transbaikal Museum of Local Nature and History
	Academia	- Institute of Nature Resources, Ecology and Cryology, Russian Academy of Sciences - Transbaikal State University
	NGO	- WWF Russia
	Business	- Electric Company - Mobile Telephone Service Provider
Mongolia	Central government / Agency	- Ministry of Environment and Tourism (MET) - Mongol Daguur Strictly Protected Area Administration of MET - Mongol Daguur Strictly Protected Area (Mongol Daguur SPA) - Onon-Ulz River Basin Directorate (Dornod Aimag Bayan Dun Soum Centre) - Kherlen River Basin Directorate (Chinggis City, Khentii Aimag)
	Local government / Agency	- Eastern Mongolian Protected Areas Administration (Dornod Aimag)
	Academia	- Institute of General and Experimental Biology, Mongolian Academy of Sciences - Institute of Geography & Geo-ecology, Mongolian Academy of Sciences
	NGO	- Wildlife Science and Conservation Center of Mongolia (Mongolian Associate NGO of ICF) - NGO Movement on Ulz River protection - WWF Mongolia Programme Office - WCS Mongolia Programme Office - The Nature Conservancy (TNC) Mongolia Programme Office

Country	Classification	Agency
China	Central government / Agency	- Ministry of Environmental and Ecology (former Ministry of Environment Protection) - National Forestry and Grassland Administration (former State Forestry Administration) - Hulunlake (Dalainor) National Nature Reserve Management Bureau
	Local government / Agency	- Provincial Forestry Department of Inner Mongolia Autonomous Region - Hulunbeier Municipal Government - Xinbarhuzuoqi county government; Xinbarhuyouqi county government; Manzhouli city government
	Academia	- Chinese Academy of Science - Chinese Academy of Forestry Sciences - Beijing Forestry University - Tsinghua University
	NGO	- International Crane Foundation (China chapter in Harbin) - Wetland International - WWF China - Association of Friends of Wetlands
International Programmes		- UNDP-GEF Project on Improving the coverage and management efficiency of protected areas in the steppe biome of Russia (2010-2015): Although the project title specifies Russia only, the project covered nature reserves of all three countries in DIPA.

Since all reserve-parts under the DIPA are national-level nature reserves, all financial support and decisions for the conservation and management of the DIPA are made by the respective national central governments as follows:

- Russia: Ministry of Natural Resources and Ecology
- Mongolia: Ministry of Environment and Tourism
- China: Ministry of Environment and Ecology (former Ministry of Environmental Protection) for nature reserves; and National Forestry and Grassland Administration (former State Forestry Administration) for wildlife within nature reserves

Support and cooperation of local governments are also important as well, given their roles in the actual implementation of conservation strategies and plans. For example, various cooperation activities such as capacity building, awareness-raising programme and wildlife research have been conducted at the Municipal District level in Russia.

5.2-2 Domestic legal system for DIPA conservation and management

Since DIPA is designated as a national-level nature reserve by each country, it is managed upon the national law of each participating countries. Table 14 below shows the mapping of domestic legal system for DIPA conservation and management in each country (Table 14).

Table 14. Domestic Legal System for DIPA Conservation and Management in Russia, China and Mongolia

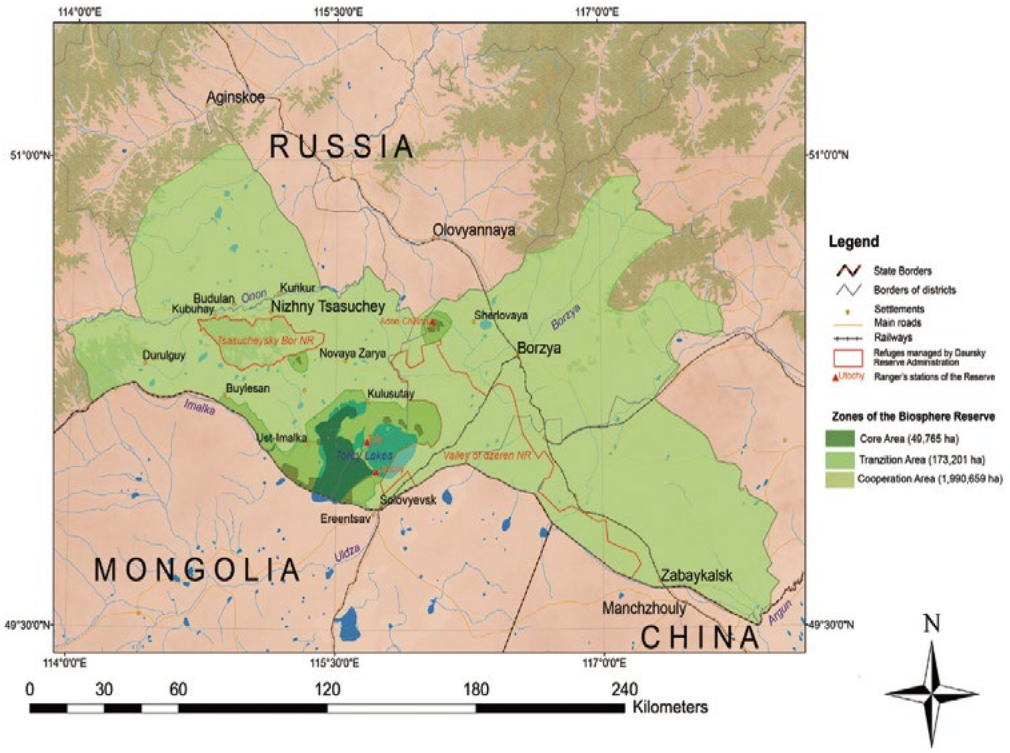
Russia	- Environmental Protection Act - Wildlife Law - Federal Law on Special Protected Natural Areas (1995) - Federal Law on Hunting and Preservation of Hunting Resources (2009) - Federal Law on Fisheries and Conservation of Aquatic Biological Resources (2004) - Land Code (esp. Ch. 17 on Special Protected Natural Areas) - Forest Code (esp. Ch. 17 on land use of SPNAs) - Water Code (esp. Art. 66 on specially protected water body) - Code of administrative violations (esp. Ch. 8 on violations in Protected Areas) - Criminal Code of the Federation (esp. Art. 258-262 on Redbook listed species)
Mongolia	- Law on Environmental Protection (1995/2002) - Law on Protected Area - Law on Environmental Impact Assessments (1998/2012) - Law on land (1994/2005) - Law on Land Fees - Law on Disaster Protection - Law on Water (2012) - Law on Prohibition of Exploration and Extraction of Mineral Resources in the head water and forest zone areas (2009) - Law on Water Pollution Payment (2012) - Law of Mineral Resources - Law on Flora Protection (1996) - Recommendation of National Security Council of Mongolia (2010) - National Biodiversity Action Plan of Mongolia (1996) - National Water program
China	- Wildlife Protection Law - Law of Fishery - Law of Grassland - Law of Water - Land Management Law - Environmental Protection Law - Regulation on Nature Reserve (1994) - Regulation on Protected Areas (promulgated by the State Council) - Regulation on Hulun Lake NNR (adopted by People's Congress of Inner Mongolia, 2016) - Protocols and Specific measures for the habitat protection (by Hulunhu NNR)

5.2-3 Domestic governance of the Daursky State Nature Biosphere Reserve of Russia: Cooperation and achievement between the State Nature Reserve and local governments

The Russian government designated the Dauria as a protected area in 1982. At that time, only the water portion of the Torey Lakes and the Tsasucheysky Pine Forest were included as "Tsasuchaysko-Toreiysky Federal Refuge", which are now the core area of the Daursky Nature Reserve. The area was then designated as a "Special Protected Nature Areas", the highest level for protected areas, in 1987 to protect its unique wetlands, steppes and forest ecosystem. Currently, the Daursky

Nature Reserve is comprised of a core area with 45,765 ha and a buffer zone of 173,201 ha. The buffer zone includes "Tsasucheysky Bor (a forest ecosystem, designated in 1987)" and "Valley of Dzeren Nature (designated in 2011)", and both are now designated as "Federal Nature Refuges". The Daursky Nature Reserve Management Office is responsible for the conservation and management of the core area and two Federal Nature Refuges in the buffer zone.[12]

Figure 23. Zonation of the Daursky NR and Surroundings



Source: Olga Kirilyuk (2017)

Since "Special Protected Nature Area (SPNA)" is most strictly regulated in Russia, the Daursky Nature Reserve as well is regulated by the Federal Law of Special Protected Natural Areas which was established in March 1995. All activities in SPNA are prohibited except activities permitted by the Daursky NR Management Office. Once a specific region is designated as SPNA, all residents should give up all rights and relocate to a different area.

Regulations applied to "Federal Nature Refuge (FNR)" are more relaxed compared to those applied for SPNA, and existing land ownership and land usage in FNR may be removed or retained. For instance, for two FNRs located in the buffer zone of the Daursky Nature Reserve, land ownership and land usage are retained, which in turn cause certain limits for the management office to control land usage.

The Daursky NR Management Office has one director, four deputy directors who are responsible for scientific research, conservation of nature reserves, environmental education and

12 Olga Kirilyuk (ed.) 2009, Biosphere Reserve Daursky. Chita: Express Publishing House, p. 104.

tourism, and administrative staff. The work of the Daursky NR Management Office is divided into six areas including: a) activities to preserve the natural environment in the conservation area, such as fire prevention and containment measures, management of facilities including sign boards and bulletin boards; b) monitoring and restraining violations of laws and regulations on the use of natural environmental resources in conservation areas; c) environmental education such as museum and exhibition activities, public relations and publications, school education and ecotourism; d) research; e) environmental monitoring in the Reserve area; and f) international cooperation with such as the Ramsar Convention and UNESCO. In addition, the Director should submit annual activity reports and environmental monitoring reports to the Ministry of Natural Resources and Ecology.[13]

As no economic and social activities are allowed in the core areas of the Daursky NR, what impacts the Daursky NR's conservation management happens at the buffer zone surrounding the core area. Because the buffer zone is not a legally protected area, cooperation with Zabaykalsky Krai and three local governments (namely, Ononsky Municipal District, Borzinsky Municipal District and Zabaykalsky Municipal District), to which the Daursky NR belongs, is essential to manage and control the buffer zone.

The Daursky NR Management Office is currently working with the Department for the Protection, Control, and Regulation of the Use of Objects of Wildlife of Zabaykalsky Krai. To facilitate cooperation with local governments, the Daursky NR Management Office has entered into voluntary agreements with local governments and village residents. One of the agreements was concluded with the Ministry of Natural Resources of Zabaykalsky Krai in 2009 and another voluntary agreement was for fire extinguishing activities concluded in 2017. Details are summarized in Table 15.

Table 15. Details of Voluntary Agreement with the Daursky NR Management Office, Local Governments and Residents

Name of the agreement	Long-term cooperation for biodiversity conservation and sustainable development of the South-East of Zabaykalsky Krai
Concluded by	A: Daursky NR Management Office B: Ministry of Natural Resources of Zabaykalsky Krai
Year of conclusion	2009
Regional scope	Steppe and forest-steppe areas of Ononsky, Borzinsky, Zabaykalsky, Krasnokamensky, Priargunsky and Aginsky districts
Goals	- Add conservation and restoration of rare and endangered plants and animals to the Red Book of the Russian Federation and Zabaykalsky Krai - Promote long-term sustainability of human activities in the steppe and forest-steppe areas in the Dauria ecoregion - Promote ecological literacy of residents - Promote governance effectiveness of Specially Protected Nature Areas under the Federal and State Governments - Promote communication among the Federal government, nature conservation agencies, scientific research institutions, educational institutions, public agencies, commercial agencies and environmental protection agencies, etc.

13 Olga Kirilyuk(2017), "2017 Northeast Asia Peace and Cooperation Forum"

Main areas of cooperation	Knowledge sharing and awareness-raising activities, monitoring in the Nature Reserve, and creating a working group for a specific theme
Terms of Reference	- State government (B) should provide the necessary information to the Daursky NR management office and enable them to participate in activities that contribute to the implementation of the above-mentioned goals. The Daursky NR Management Office (A) should share appropriate analysis, on-site information and data with the state government, provide advice and consulting, and contribute to the preparation of legal documents. Also, the Daursky NR Management Office (A) should promote joint nature conservation activities with state government and invite government officials to seminars, workshops and programmes organized by the Management Office.

Name of the agreement (tentative)	Agreement on fire extinguishing activities
Concluded by	A: Daursky NR Management Office B: Villages in Nizhniy Tsasuchey
Year of conclusion	2017
Regional scope	Nizhniy Tsasuchey
Goals	Coordinate activities to extinguish forest fires and steppe fires in protected areas
Main areas of cooperation	Identify management responsibilities and provide human resources for forest fires and steppe fires
Terms of Reference	Director of the Daursky NR Management Office (A) manages extinguishing of forest fires and steppe fires in the Nature Reserve; and residents in the Nizhniy Tsasuchey area (B) manage and execute extinguishing of forest fires and steppe fires in each village. The Daursky NR Management Office provides three people who can support the residential area's extinguishment work and the necessary equipment. Nizhniy Tsasuchey also provides three people, but if needed to extinguish the fire in the Nature Reserve area, it provides more volunteers. This Agreement is valid until the end of 2017 and may be extended by signing a new agreement.

The Daursky NR Management Office plays a key role in investigating the status of wildlife in Zabaykalsky Krai, establishing and updating a list of endangered species, and designating new protected areas. The adoption of the "Zabaykalsky Protected Areas Development Concept by 2030", which was proposed by the Daursky NR Management Office, is one of the noteworthy achievements.

5.3 Global governance

Since its establishment in 1994, DIPA has been acknowledged by international communities for its ecological importance and a role model of collaboration and governance. Since the designation as the Ramsar Wetlands including the core area of the Daursky NR in September 1994, all national nature reserves of each DIPA participating country are designated as Ramsar Site, Flyway Site Network of EAAFP, Important Bird and Biodiversity Area of BirdLife International, and Biosphere Reserve of the UNESCO Man and the Biosphere Programme as of 2017. Further to these achievements, the Russian Daursky NR (including core areas, buffer zones and nature reserves) and the Mongol Daguur SPA were jointly admitted as World Natural Heritage by UNESCO under the name of "Landscape of Dauria" in 2017. Table 16 indicates the international recognition of the joint conservation efforts made in DIPA.

Table 16. List of International recognition of DIPA as protected areas

	Ramsar site (Designation)	EAAFP FSN (Designation)	UNESCO BR (Designation)	IBA (Assessment)	UNESCO World Heritage (Designation)
Daursky NR	Yes *(Torey Lakes)* (1994-09-13)	Yes (1997-03-07)	Yes (1997)	Yes (2004)	Yes (2017)
Mongol Daguur SPA	Yes (1997-12-08)	Yes (1997-03-07)	Yes (2007)	Yes (2009)	
Hulunhu National Nature Reserve	Yes (2002-01-11)	Yes (2001-01-31)	Yes (2002)	Yes (2009)	-

Source: Own creation

However, no visible progress for DIPA conservation and management with international organizations such as the Ramsar Convention and UNESCO has been made yet.

5.4 Implication

The over two-decade experience of international cooperation in DIPA is a very valuable one for North-East Asia where there are not many cases of long-term multi-national cooperation mechanisms. DIPA has achieved tangible results on many fronts, ranging from joint research to monitoring and environmental education. Currently, the governance structure of DIPA is centered on the DIPA Joint Commission and the DIPA Working Group. Although the DIPA Joint Commission shows a very loose organizational structure, meeting only every three to five years, there are other bilateral cooperation mechanisms that can complement it. In the recent years the international community has been increasingly emphasizing the importance of an integrated management system based on cooperative mechanisms such as joint reporting, integrated management, joint education and training for overlapping protected areas with two or more international protected area systems. Therefore, on the way forward, DIPA, as a representative Multi-Internationally Designated Areas (MIDA)[14] in North-East Asia, could coordinate conservation policies and mechanisms among Russia, Mongolia and China, and be a good testing ground for the integrated management of various international protected area systems for the conservation and efficient management of DIPA. The following key policy recommendations for more effective governance could be considered (Table 17).

14 Multi-Internationally Designated Areas (MIDA) refer to areas where all or part of two, three, or four of the designations under the Ramsar Convention, World Heritage Convention, UNESCO MAB, and UNESCO World Geological Park are overlapped (Thomas Sharp et al. 2016)

Table 17. Policy Recommendations for DIPA Governance

- Provide long-term and stable financial resources for joint monitoring and research;
- Reduce administrative and language barriers for mutual visits and joint investigations and monitoring;
- Enable a more organic combination of the activities of the DIPA Working Group and the international community and their respective policy-making mechanisms;
- Set up a DIPA Information sharing system (e.g. DIPA Information House or DIPA Clearing House Mechanism); and
- Establish a DIPA International Forum to accommodate more stakeholders and partners who are interested in DIPA's conservation and management activities, such as those from other countries in North-East Asia and NGOs such as WWF, WCS and ICF

VI. Suggestions and Ways Forward

6.1 Suggestions

The case study on the development and governance of the Dauria International Protected Area (DIPA) has provided critical insights to the KEI-NEASPEC Joint Project on Biodiversity Conservation and Cooperation in North-East Asia. In this regard, the research team proposes to establish a North-East Asia Transboundary Protected Areas Network through communication, collaboration and coordination as follows.

- *Establish a cooperation platform through existing cooperation mechanisms and networks*

Reflecting the experiences from this KEI-NEASPEC joint project focusing on DIPA, we propose a joint research on the transboundary areas in the Tumen River Estuary as a follow-up study project. The suggested area has abundant biodiversity and great value of connectivity conservation. Through the existing cooperation mechanisms and networks, this study may also contribute to promote peace in the Korean Peninsula.

- *Establish a joint cooperation and communication mechanism for connectivity conservation through short- and mid-term research*

Although DIPA is governed by DIPA Joint Commission (intergovernmental decision-making body) and DIPA working group (implementing body), better communication, stable financial support, strengthened information sharing and joint researches will be key factors to achieve common goals and objectives to conserve DIPA. Due to language barriers among the practitioners of each DIPA administration, it is critical to facilitate smooth communication and improve administrative procedures, such as by making the immigration procedure easier for scientists to do more frequent exchange visit and research. Budget for international cooperation programmes for DIPA also needs to be secured to conduct joint activities when establishing a budget plan for DIPA management.

- *Establish a North-East Asia Transboundary Protected Areas Network*

It is advised to incubate a regional cooperative mechanism of transboundary protected areas network, similar to "Natura 2000" in Europe, to ensure the long-term conservation of most threatened species and valuable landscapes in North-East Asia. The Network does not mean to exclude human activities but achieve the delicate balance between conservation and ecosystem services for human benefits. For instance, it is recommended to build a joint monitoring system for

water resources in DIPA to secure enough level of water resources to keep ecosystem sustainability.

Nutshell of Natura 2000

"Natura 2000" is a network of core breeding and resting sites for rare and threatened species and key natural habitats for sustainable nature conservation and use at the EU level for the protection of biodiversity. Natura 2000 began with the adoption of the 1979 Bird Directive (79/409/EEC) and the 1992 Habitats Directive (92/43/EEC) adopted by the European Commission[15], and is composed of Special Area of Conservation (SACs) designated by the EU Member States under the "Habitat Directive", supplementing and integrating Special Protection Areas (SPAs) designated under the "Bird Directive", as the legal basis for the designation of the Natura 2000 protected areas. Establishment of the Natura 2000 network was a key European contribution to the Convention on Biological Diversity (CBD) and fulfillment of EU Member States' international obligation to preserve biodiversity.

6.2 Ways forward

- *Development of a comprehensive monitoring system for economic, social and environmental aspects in DIPA*

DIPA monitoring has been conducted by each country within its jurisdiction, and trilateral joint monitoring to cover the entire DIPA rarely happened. Considering existing monitoring activities are mostly focused on a few species and their distribution, DIPA needs a joint, comprehensive monitoring system which covers economic, social and environmental factors. Particularly, as water stress has considerable impact on wildlife and plants, a comprehensive monitoring system on water resource and its capacity should be established to maintain ecosystem functions in DIPA.

- *Establishment of a DIPA Comprehensive Information Center*

There is no communication platform or official website for DIPA, but an independent website operated by the Daursky Nature Reserve. To share and accumulate information at all times among current constituents of DIPA and the national conservation institutions of China, Mongolia and Russia, a "DIPA Comprehensive Information Center" is needed. The Center can then host the existing DIPA related data and generate new information and feedback from the comprehensive monitoring system, starting from a short-term project focusing on the DIPA's water use status and the establishment of a joint water monitoring system for economic activities.

15 http://ec.europa.eu/environment/nature/natura2000/index_en.htm; also European Commission Environment (2017)

- *Launch of an International Information Network for Biodiversity Connectivity Conservation of DIPA*

DIPA is the most important breeding ground for endangered birds wintering in DPRK, ROK, Japan and southeast China. Thus it is necessary to constantly exchange information and expand cooperation to preserve those habitats that are biologically linked with DIPA. Common International Information Network for DIPA Biodiversity Connectivity Conservation will serve as a primary information exchange network among governments and other key stakeholders in each country. The Network should include not only national institutes and intergovernmental mechanisms directly or indirectly related to DIPA, but NGOs, international organizations and experts to consider DIPA and its biologically linked areas as a common natural heritage in North-East Asia. This will also enable the establishment of a network to incorporate broader protected areas in North-East Asia.

- *Establishment of a North-East Asia Transboundary Protected Areas Network*

For conservation and peaceful use of transboundary areas, such as between Russia and China, Russia and Mongolia, China and Mongolia, and Russia, China and Mongolia in DIPA, Russia, China and DPRK in Tumen River estuary, and DPRK and ROK in the demilitarized zone, it is necessary to establish a "North-East Asia Transboundary Protected Areas Network" as a priority agenda for North-East Asian countries to cooperate and implement joint programmes under the common goal of preserving and better managing international protected areas. This will be a good test ground for developing intra-state cooperation and policy coordination.

Endnotes

Cai, L (2017), "State of Biodiversity in DIPA and Neighboring Area", pp.1-25

Gangsapdeu, M. (2016) " Mongolia International Protected Area management mechanism and biological characteristic research: Mongol Daguur strictly protected area", University of Seoul

Goroshko, O. (2017), "State of Biodiversity in DIPA and Neighboring Area", pp.1-19

IUCN (2008), "Guidelines for Applying Protected Area Management Categories", p.32

Janchivdorj L. (2017), "Pressure on Biodiversity in DIPA and Neighboring Area", pp.1-30

Kim, Buyong. (2011), "Outlook and current status of mineral resource development in Inner Mongolia", Provincial Economic Trends in China (Vol. 2, No. 18), Korea Institute for International Economic Policy (KIEP), p.6

Kirilyuk, O. (2017), "Conservation Measures/ Response of Biodiversity in DIPA and Neighboring Area", pp.1-17

Korean Society of Environment and Ecology (ed.) (2016), "The Overall Report of the NEASPEC Nature Conservation and Rehabilitation of Key Habitats for Key Migratory Birds in North-East Asia with Special emphasis on Cranes and Black -faced Spoonbills (2013-2016)" Incheon: UNESCAP-ENEA and NEASPEC

Lee, Jae-young, et al. (2011), "Development situation of mineral resources in Mongolia and investment expanding ways of Korea", Studies in Comprehensive Regional Strategies (11-15), p.65

OECD (1998), "Towards sustainable Development: Environmental Indicators"

OECD (2003), "OECD Environmental Indicator Development, measurement and use", OECD Reference Paper, p.21-22

Schaller, G.B. (1998b), Mongolia's golden horde, a million migrating gazelles. Wildlife Conservation, November/December, p.36–41

Simonov, E. and Wickel, B. (2015), "Kherlen River: the Lifeline of the Eastern Stepp". p.46-100

The Red Book of Zabaykalsky Krai: Animals (2012), Novosibrisk: Novosibirsk Publishing

Wu, L (2017), "Pressure on Biodiversity in Huluhu National Nature Reserve and Neighboring Area", p.1- 14

Zabelina, I (2017), "Pressure on Biodiversity in DIPA and Neighboring Area", p.1-25

Zhang Na and Wu Liji (2014), "Analysis of the Changing Characteristics and Factors Influencing the Dalai Lake Area", p. 44-45

Doopedia, "Kerulen River", https://www.doopedia.co.kr/doopedia/master/master.do?_method=view&MAS_IDX=101013000711919, Searched: Nov 2019

European Commission Environment, "Natura 2000", https://ec.europa.eu/environment/nature/natura2000/index_en.htm, Searched: Nov 2019

UNEP (2015.7.25), "UNEP launches global connectivity conservation project", https://www.unep-wcmc.org/news/unep-launches-global-connectivity-conservation-project, Searched: Nov 2017

The Russian Federation and Mongolia (2013), "Landscapes of Dauria", http://nhpfund.ru/ files/Dauria-nomination.pdf, Searched: Nov 2017

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