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Conservation of Biodiversity in North-East Asia and Border Cooperation

KEI-NEASPEC Joint Project

KEI UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Final Report

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외교부
Ministry of Foreign Affairs

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Contents

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I. Introduction

Among more than 100 protected areas in North-East Asia, 24 are located in transboundary areas across the national borders. As they are free from impacts of anthropogenic activities, these transboundary protected areas have become crucial habitats for diverse species with limited scope of protection and management due to their cross-border locations. Therefore, bi- and multi-lateral efforts for targeted and efficient management of transboundary habitats and biodiversity conservation are urgently needed.

As a follow-up of the 21st Senior Official Meeting (SOM-21), this joint project carried out by Korea Environment Institute (KEI) and North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC) examines conservation of biodiversity and border cooperation in North-East Asia. Among the 24 transboundary protected areas distributed in the North-East Asia region, this project targeted at the Dauria International Protected Area (DIPA).

DIPA was established on March 29th, 1994. Located at the center of Transboundary Daurian Steppe Ecological Region between the Russia, Mongolia and China, DIPA consists of nature conservation areas including Daursky State Nature Biosphere Reserve in the Russia Federation, Mongol-Daguur Strictly Protected Nature Area in Mongolia and the Dalainor Biosphere Reserve in China. With the total area of 1,096,210 km^2, DIPA contains key habitats of wetland, steppe, rock and forest. It acts as an important habitat and breeding ground for several key species. Therefore, it holds a big potential for application of connectivity conservation.[1]

<Figure 1-1> Case Study Location

This report diagnoses the economic, social and environmental pressure for DIPA. Then, based on the pressure analysis, it observes the state of biodiversity in DIPA area. Thirdly, it

[1] Mechanism that promotes the flow of ecological processes necessary for the provision of ecosystem services and

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describes appropriate responses for China, Russia and Mongolia through an analysis of the governance system. Finally, it suggests taking appropriate measures for establishing a Northeast Asia biodiversity network or mechanism, such as a “North-East Asia Transboundary Protected Area Network”.

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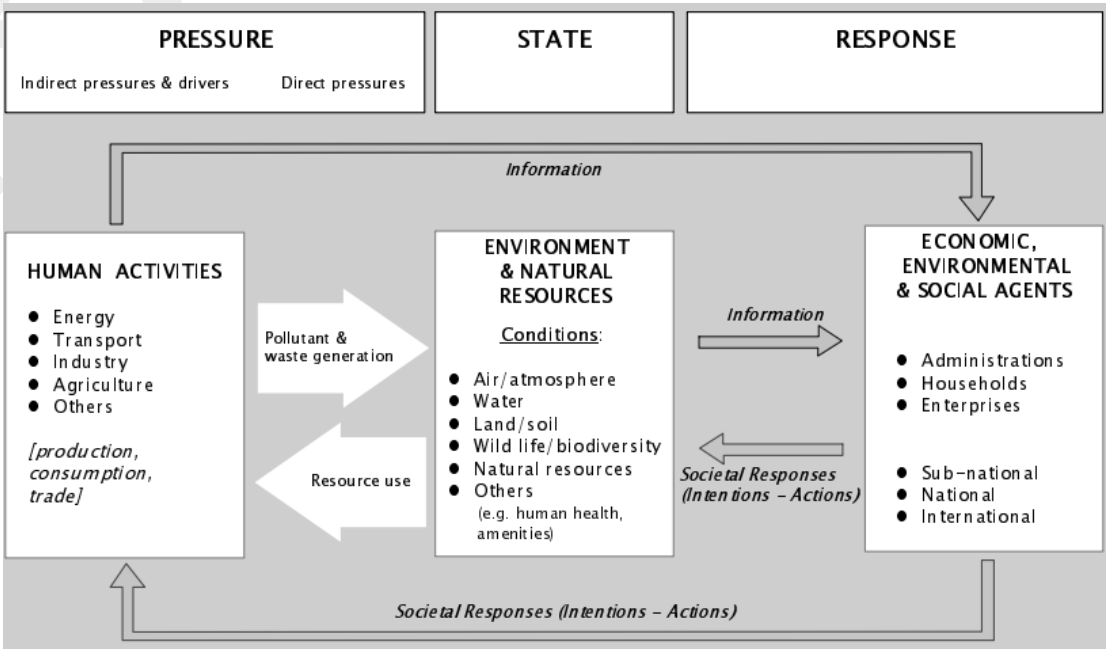
II. Research Methodology

For the research conduction, the literature on the biodiversity of DIPA and surrounding area was analyzed through Pressure, State and Response elements. Pressure-State-Response (PSR) model is a mechanism proposed and used by OECD. [2] It is a cause-effect relationship framework that investigates how human activities exert pressure on the environment and affect the quality and quantity of natural resources then examines how the society responds through the environment, economic and other sectoral policies along with changes in behavior. <Figure 2-1> indicates a continuous feedback mechanism created by interchanges of cause-effect relationships.

Furthermore, field research was conducted by the research team from July 31st to August 7th in 2017 for the duration of 6 nights and 8 days at Daursky State Nature Biosphere Reserve and results of this field research has been proposed and analyzed in this paper.



<Figure 2-1> PSR Model

Source: OECD (1998)

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

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III. Analysis of Pressure Element for DIPA Biodiversity

3.1 Overview of the Russian Federation

Zabaykalsky Krai has a surface area of 431,892km^2 and accounts for 2.53% total area of Russia. Located at the southeast of Siberia with Mongolia on the south and China on the southeast, it faces 5,000 km borderline (Refer to <Figure 3-1>). There are 31 administrative districts (referred to as “Rayon” in Russia). Among all, Chita is the central administrative district. Ononsky, Borzinsky, Zabaykalsky Krai and DIPA are located around Chita (Refer to <Figure 3-2>). Furthermore, Daursky State Nature Biosphere Reserve is in the region of Zabaykalsky Krai.

<Figure 3-1> Location of Zabaykalsky Krai

Source: Kiriliuko (2017.11.16), “Chinese-Mongolian-Russia Dauria International Protected Area: Cooperation in Nature Conservation”, re-cited from a presentation of [2017 Northeast Asia Peace Forum]

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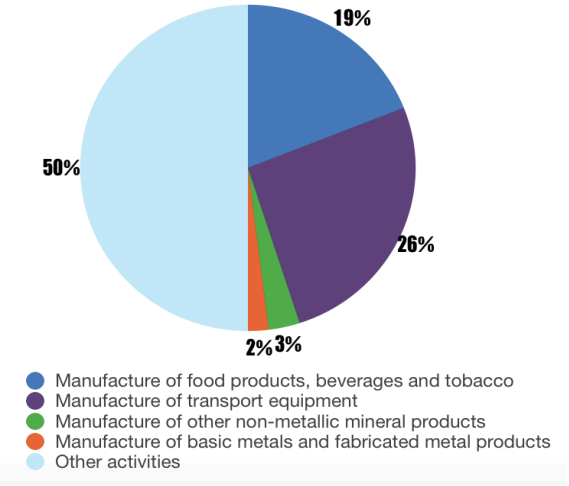
<Figure 3-2> Location of DIPA within Russia and Surrounding Cities

Source: Zabelina (2017.11.16), "Pressure on Biodiversity in DIPA and Neighboring Area", re-cited from a presentation of [2017 Northeast Asia Peace Forum]

3.1-1 Socio-economic factors

Mining and quarrying industry in Zabaykalsky Krai region has an especially prominent proportion in the GDP. Based on the year of 2016, majority of mineral resources mined for energy source were used for transport equipment (26%), food, drink and tobacco manufacture (19%), basic metals and fabricated metal products (2%), nonmetallic mineral product manufacture (3%), etc. (50%) (Refer to <Figure 3-3>).



<Figure 3-3 > Industrial Sector Trend in Zabaykalsky Krai in 2016

Source: Russia Federation Federal State Statistics Service (2017)

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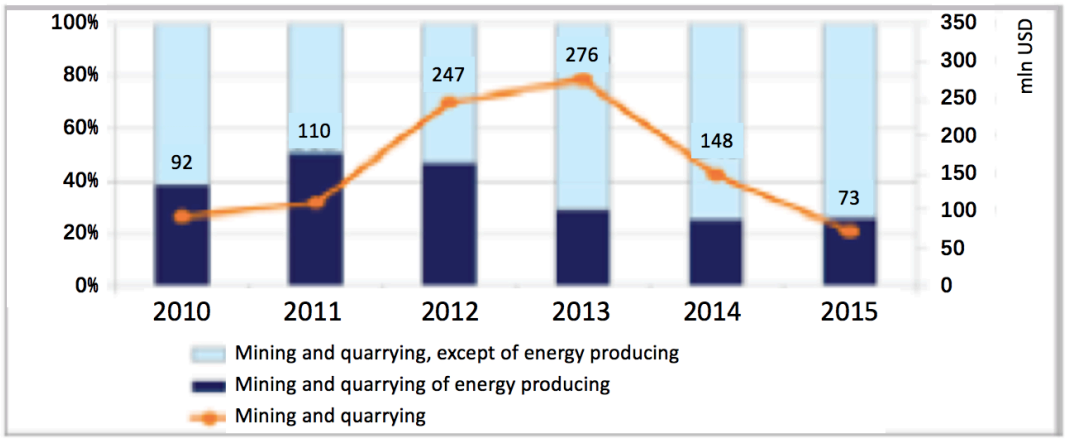
According to Russia Federation Federal Statistic Service of 2016, mining for mineral and electricity has increased by 4.8% along with valuable mineral being 7.6% compared to last year. Ononsky mainly has sea salt, sodium bicarbonate, clay, sand, pebble and other materials used for construction reserved. Zabaykalsky Krai has brown coal, zeolite, and other construction



materials reserved. However, these natural materials are not used for exportation.

<Figure 3-4> Capital Investment Status for Mining Industry at Zabaykalsky Krai (2010-2015)
Source: Zabelina (2017), "Pressure on Biodiversity in DIPA and Neighboring Area", p.17.

In the last three years, capital investment in the mining industry at Zabaykalsky Krai has decreased significantly (Refer to <Figure 3-4>). Approximately, 26,000 ha, 0.057% of the total surface area for Zabaykalsky Krai's soil has been damaged due to the mining industry. On average, around 1,000 ha of soil is damaged due to the mining industry. Therefore, although, mining industry at Zabaykalsy Krai does not act as a major pressure point for habitats and organisms of Daursky State Nature Biosphere Reserve, a further look is needed at the impact the development of mining industry on water pollution.

3.1-2 Environmental factors

According to the Zabaykalsky Krai weather center, the average temperature has risen by 1.9°C compared to 1951. Due to climate change, the temperature for winter has risen by 2.4°C while the temperature for summer has decreased by 1.3°C. Furthermore, rainfall in Zabaykalsky Krai has been unstable, with prairie regions (Borzinsky, Kansnokamensky, Mogoytuysky, Olovyanninsky, Ononsky, Priargunsky, Zabaykalsky Krai) having rainfall of 200~300mm and mountain regions having rainfall of 350~450 mm. A drought cycle of 30 years can be observed especially in the region of Zabaykalsky Krai. Currently, severe drought act as a major pressure factor for DIPA biodiversity and habitats.

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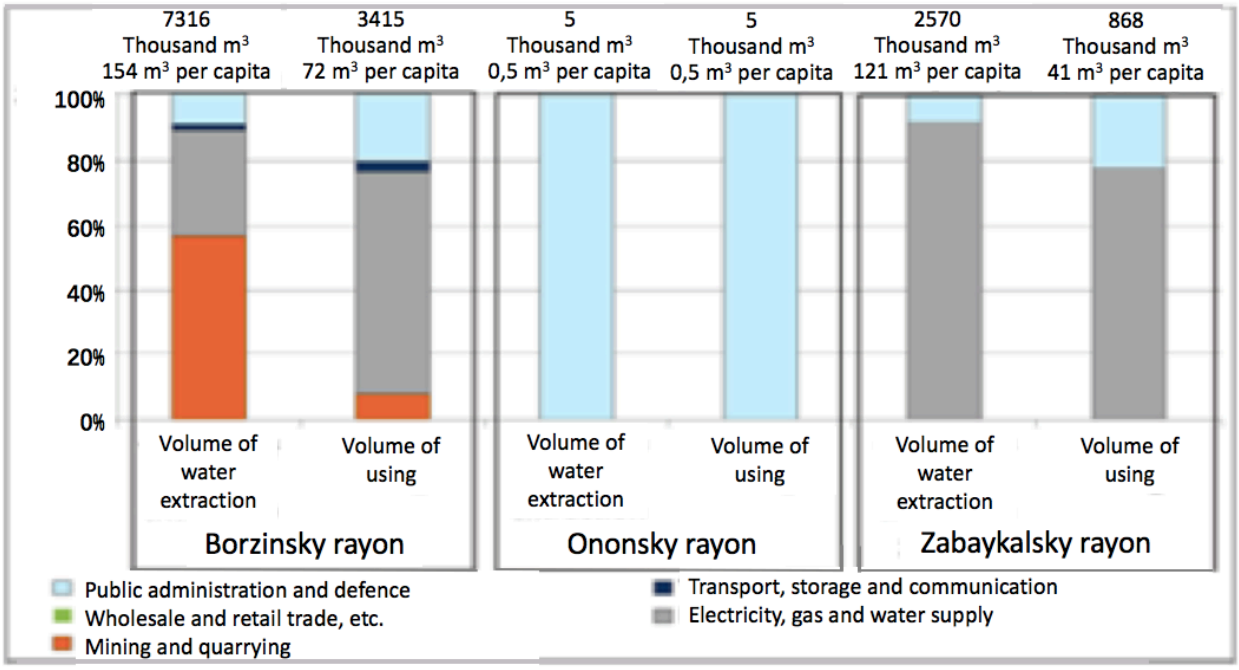

<Figure 3-5> Comparison of Water Resource Usage and Extraction According to the Regions of DIPA

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

<Figure 3-5>shows usage and extraction amount of water for DIPA regions, Borzinsky, Ononsky and Zabaykalsky in 2016. It is important to note that in Borzinsky region, mining and quarrying excesses the designated usage amount for water resource because it requires a large quantity of water. It is, also, inevitable that, in the process of extracting minerals, water pollution occurs. In the region of Zabaykalsky Krai, 78% of water usage is concentrated in electricity, gas and water supply.

Furthermore, desertification continues for the southeastern part of Zabaykalsky Krai. 30% of agricultural land of the region is in the process of desertification. According to the observation of Russia Federation, around 150 million ha of land have been found to have 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 at the southern part of the region, Ononsky, Zabaykalsky Krai, and Borzinsky. About 607.7 thousand ha of agricultural land's soil is eroded due to the wind, causing an unsuitable condition for growing plants, and thereby causing desertification. Zabaykalsky Krai region, an area with Daursky State Nature Biosphere Reserve, has progressed 46% with desertification, 30% with soil salinization, and 21% with agricultural land soil erosion due to water.

The other environmental pressure factors are overexploitation of forest and biotic resources. Zabaykalsky Krai has abundant and diverse natural resource. Each year, 70,000

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animal hoofs and 50,000 furs are produced in the region. In 2015, there has been 461,7m^3 lumber harvest, indicating an 14% increase compared to 2014. Part of this is due to illegal logging in this region. Especially, at the border region of Russia and China, quantity for illegal logging surpasses that of legal logging.

Furthermore, in recent years, forest fires that occurred at Zabaykalsky Krai acted as a pressure factor for biodiversity as well (Refer to <Table 3-1>). In 2015, 1377 forest fires occurred in the area and 1115 in 2014. A surface area of up to 898.2 million ha has been damaged due to forest fire amounts, which is 15 times compared to that area of 2010. According to the Ministry of Natural Resources of the Zabaykalsky Krai, 12 forest fires have occurred, indicating 329,000 ha of the damaged area, in the past 3 years at Ononsky. Forest fires that occurred at Daursky State Nature Biosphere Reserve in 2012 caused damage at Uldza river and 500 ha of steppe area. Furthermore, Tsasucheysky Bor, one of the most important conservation regions for Daursky State Nature Biosphere Reserve, was damaged. Likewise, forest fires have caused damage in 2% of the area at Daursky State Nature Biosphere Reserve.

<Table 3-1> Zabaykalsky Krai Forest Fire (2010-2015)

Index	2010	2011	2012	2013	2014	2015
Number of forest fire	716	1642	841	432	1115	1377
Forest damage due to fire (thous/ha)	59,7	211,6	445,0	520,0*	555,4	898,2
Wood damaged due to fire (thous/m^3)	597,1	1099,1	1046,0	n/a	n/a	n/a
Ruin due to forest fire (ha)	n/a	29247	36651	31883	26748	6024

Source: Russia Federation Federal State Statistics Service (2017)

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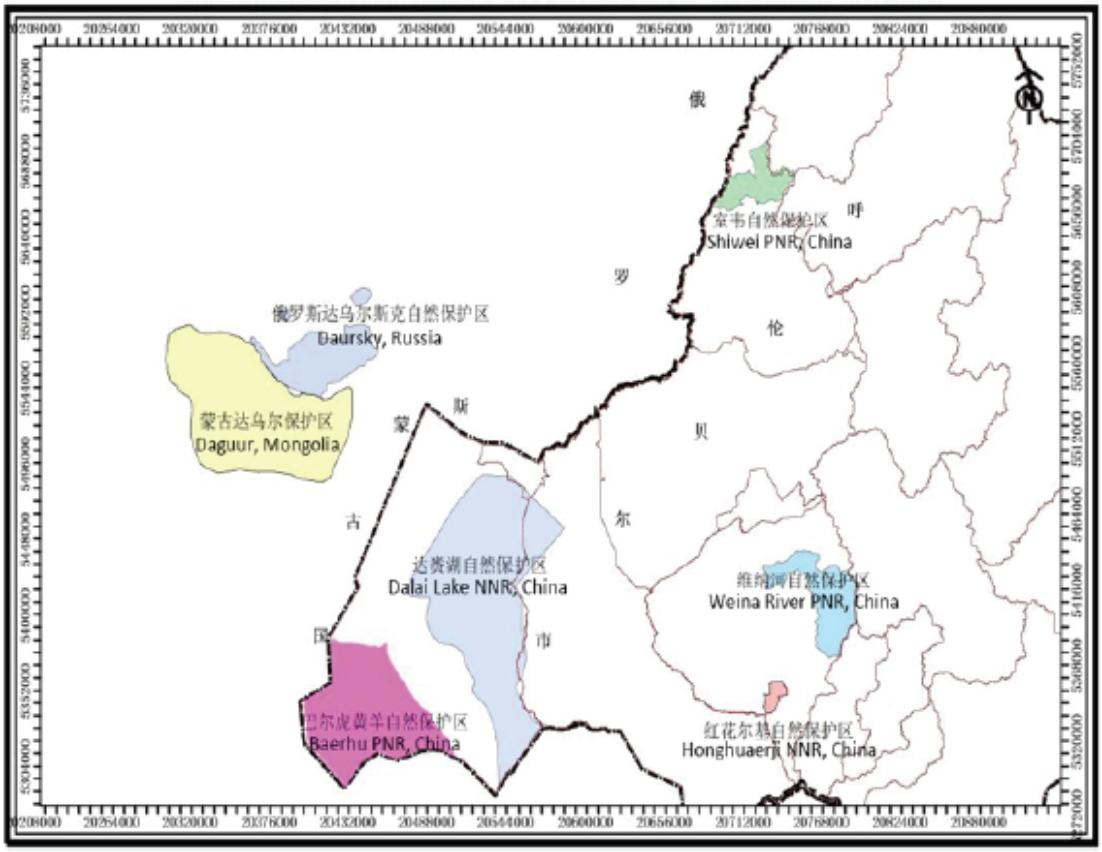
3.2 Overview of China

Dalainor Biosphere Reserve is located at the northeast of Inner Mongolia and is located at the border of Manzhouli City and Xinbaerhuyou Banner (Refer to <Figure 3-6>).



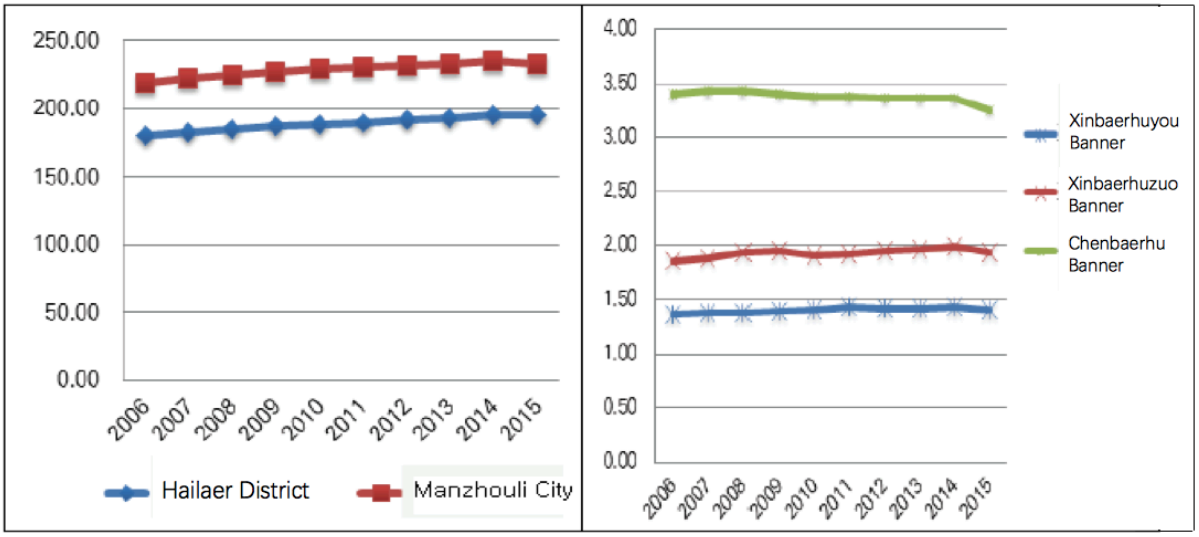
<Figure 3-6> Map of Dalainor Biosphere Reserve and Surrounding Cities

Source: Cai (2017.11.16),” State of Biodiversity in Hulun Lake, China’s Part of DIPA”, re-cited from a presentation of [2017 Northeast Asia Peace Forum]

3.2-1 Socio-economic factors

In 2015, the population of Dalainor Biosphere Reserve and surrounding 5 cities was approximately 591,804 with the density of 8.95/km^2. <Figure 3-7> shows population growth trend for surrounding cities of Dalainor Biosphere Reserve from 2006 to 2015. Except for Chenbaerhu Banner, in the past 10 years, cities showed an increase in population due to urbanization in these areas. However, recently, in 2015, there has been an overall decrease in population growth compared to 2014. Therefore, although the population does not act as a

strong pressure factor for the biodiversity of Dalainor Biosphere Reserve, it needs a necessary attention.



<Figure 3-7>Population Growth for Dalainor Biosphere Reserve and Surrounding Cities

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

Cattle raising is not possible within the Dalainor Biosphere Reserve. However, outside of the protected area, the total number of cattle was estimated to be around 3,054,300 in 2014 (<Table 3-2>). All the 5 cities had comparatively high numbers of sheep and goats, because of high profit that comes from wool and cashmere. Goats' habit of eating up to the roots of plants when they get hungry accelerates desertification. Therefore, goats and cattle accelerate the destruction of vegetation and desertification.

<Table 3-2> Number of Cattle in Dalainor Biosphere Reserve and Surrounding Cites (2014)

City/District	Horse, Cow, Camel and etc.	Sheep, Goat	Pig	Total
Hailaer District	47500	62700	16900	127100
Manzhouli City	3300	32700	53300	89300
Xinberhuyou Banner	168200	855000	1100	1024300
Xinaberhuzuo Banner	60000	1077500	700	1138200
Chenbaerhu Banner	142500	528300	4600	375400

Source: Own creation

Inner Mongolia is China's biggest electricity supplying and coal producing region. In the past 10 years, development of mineral resource has accelerated the economic growth of the region, which

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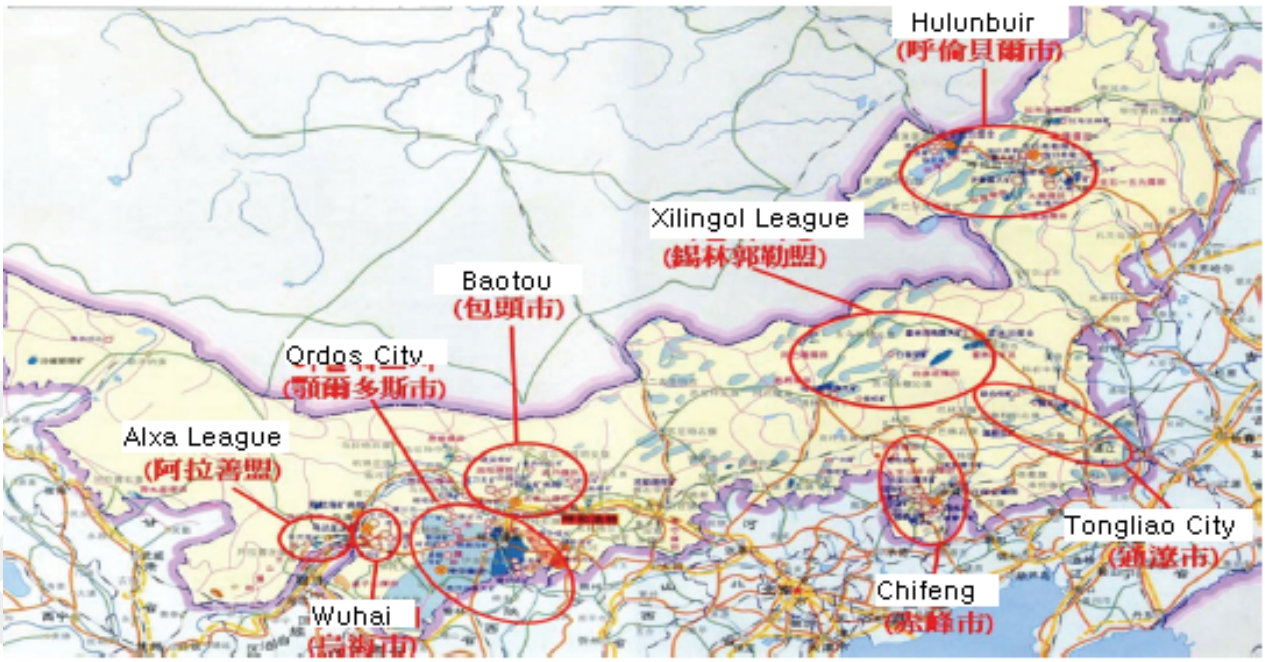
explains the why Inner Mongolia's coal centered economic growth is forecasted to continue on for the next several years. <Figure 3-8> indicates major coal mine with red circles.



<Figure 3-8> Inner Mongolia Coal Distribution Map

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

Due to the coal-centered and large-scale development, there has been water pollution in Argun River along with continuous desertification after the year 2000, as the industry requires heavy usage of water. Despite the forecasted continuation of the drought that occurred in 2008 in the Dauria region, coal enterprises will continue to overuse the available water resource for coal mining and development.

Lastly, as a representative tourist attraction in Inner Mongolia, an average of 10 million tourists come and go to Dalainor Biosphere Reserve per year. The tourism sector creates $150,000 per year. Furthermore, a new road constructed in the Hailar District causes disruption on natural resources, habitats and bio-species.

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3.2-2 Environmental factors

<Figure 3-9> Location of Hulun Lake

Source: Doopedia (2017)

Kherlen River flows in the southwest of the Hulun River and to the south flows Oroqen River (Refer to <Figure 3-9>). Since 1950, the average temperature has risen by 1.1°C with a reduction in average rainfall of 54mm for the past 30 years, leading to an acceleration in the degradation of grassland and desertification. Especially, in the region of Dalainor Biosphere Reserve, summer rainfall has been significantly reduced, causing a reduction of overall rainfall. <Figure 3-10> shows the trend of evaporation loss of Hulun Lake according to the change in rainfall quantity. Since 1991 to 2008, surface area for Hulun Lake has decreased by 275.07km^2 along with water level being lowered by 3.2m. As <Figure 3-10> shows, an abrupt change for Hulun Lake occurred after the year of 2000. As evaporation rate increased and rainfall decreased, Dalainor Biosphere Reserve's grassland has been degraded while desertification has accelerated.

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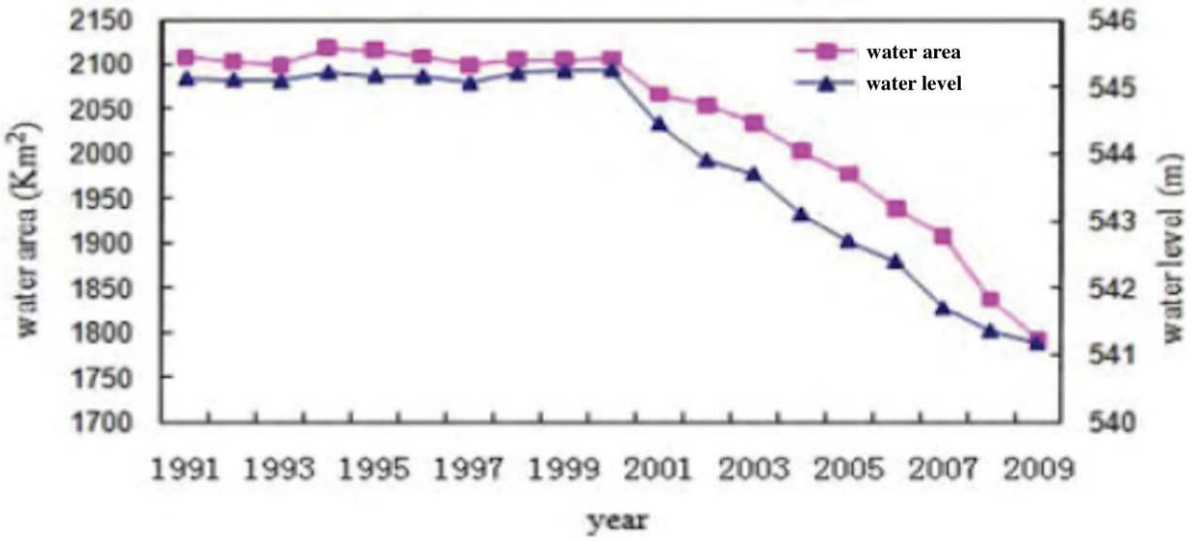

<Figure 3-10> Hulun Lake Evaporation Trend (1991-2009)

Source: Zhang Na, Wu Liji (2014)

The reasons for the desertification in Hulunbuir plateau, where Dalainor Biosphere Reserve is located, are as follow. First, reduction in rainfall and high arid temperature are acting as a natural cause. Second, 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 People's Republic of China Soil and Water Conservation, 1991' and 'Inner Mongolia Soil and Water Conservation Regulation, 2015'. More responses regarding to desertification will be discussed in Chapter 5.

3.3 Overview of Mongolia

Mongol-Daguur Strictly Protected Area (SPA), as part of DIPA for Mongolia located at Dornod Aimag at the west of Mongolia, has a surface area of 1,030.1km^2 (Core Area: 560km^2, Conservation area: 385km^2, Limited area: 315km^2). IUCN has designated Mongol-Daguur Strictly Protected Nature Area as a special region for "protection of biodiversity, geological feature with a strict restriction for human use/visit and influence with dedication for research and monitoring".[3]

[3] IUCN(2008). "Guidelines for Applying Protected Area Mangement Categories", IUCN, p.32

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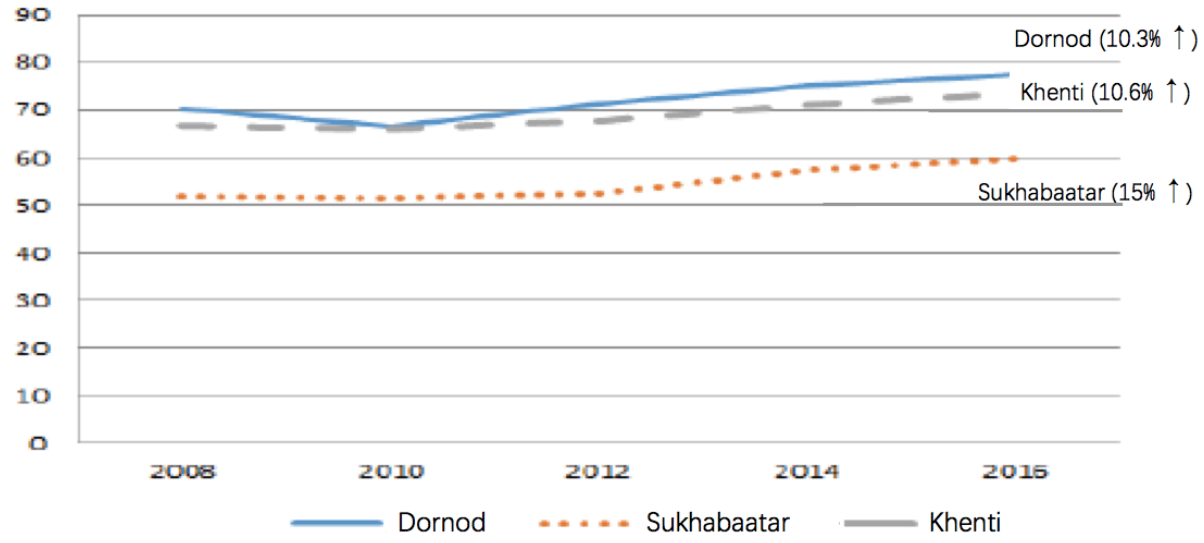
3.3-1 Socio-economic factors

In 2016, the population density for the whole East Mongolia was 0.7/km^2. There has been a continuous population growth in the 3 cities of East Mongolia since 2008. <Figure 3-11> indicates that Dornod, an Amiag with SPA, has shown a 10.3% population increase in 2008-2016. Furthermore, based on the year of 2016, the population density for Dornod is 0.6/km^2. This shows that population density is part of a pressure element for Mongolia.



<Figure 3-11> Population Growth in East Mongolia (2008-2016)

Source: National Statistics Office of Mongolia (2017)

East Mongolia is a major uranium field and in Dornod there are 3 uranium mines. As of 2017, in East Mongolia, there are 192 mining companies with special licenses to mine. Among these mining companies, 89 have exploration licenses and 40 have mining licenses. These companies take up 13.2% (4967km^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 resource. As Ulz River has been going through continuous drought and reduction in quality/quantity of water, there needs a cautionary plan for water resource. Furthermore, the newly constructed transportation infrastructure near the mine, such as roads, railways etc., can also cause an acceleration in the migration of bio-species.

[4] Simonv and Wickel(2014), p.51.

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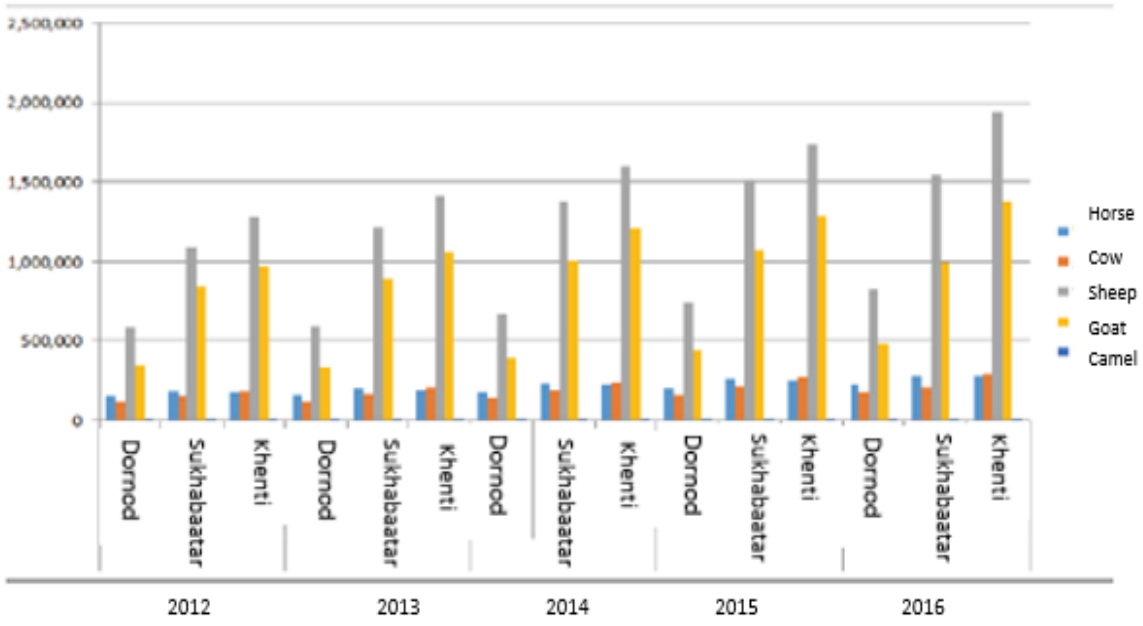
As Mongolia is a country with a long history of the nomadic tribe, its economic activity is based on agriculture. Therefore, the majority of economic activity in the country is based on pastureland, ranching, agriculture and water resource.[5] The growing trend for each type of cattle in East Mongolia can be observed through <Figure 3-12>. Population for goat has especially increased by 1.52 times in comparison. This sudden growth in the number of goats is due to the reason that cashmere products are major exports for Mongolia. Mongolia produces around 8,000 tons of cashmere, which contributes to 30% of world cashmere production[6]. Because goats are less tolerant to coldness and they eat the roots of grass, they cause land degradation and negatively influences on plant species. Thus, the socio-economic structure of Mongolia is shaped to allow extensive cattle raising.



<Figure 3-12> East Mongolia Regional Cattle Number (2012-2015)

Source: own creation

3.3-2 Environmental factors

According to the Mongolian weather survey between 1940 and 2008, the average temperature for Mongolia has risen by 2.14°C. The surface area for glacier has decreased by

[5] Choong Ik Choi(2013) http://s-space.snu.ac.kr/bitstream/10371/129994/1/000000137242.pdf
[6] William Danforth(2017)
http://www.frontiers-capital.com/wp-content/uploads/2017/02/Mongolias-Cashmere-Report-Febuary-2017.pdf

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12.3% in 1940-1990, by 9.8% in 1990-2000 and by 11.7% in 2000-2010, indicating the impact on climate change on Mongolia's atmospheric temperature. Furthermore, rainfall is unevenly distributed for SPA and surrounding cities. Although the rainfall is the highest for June to August, the wetland has been dry due to continuous summer drought for the past several years (Refer to <Table 3-4>).

<Table 3-3> Mongol-daguur Strictly Protected Area's 2000-2010 Average Temperature

Month (2000~2010)	°C	Month (2000~2010)	°C
January	-22.8	July	17.5
February	-17.8	August	16.2
March	-8.1	November	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 3-4> Mongol-daguur Strictly Protected Area's 2000-2010 Average Rainfall

Month (2000~2010)	mm	Month (200~2010)	mm
January	4.8	July	50.6
February	4.1	August	43.3
March	4.9	November	19.6
April	5.8	October	9.2
May	17.8	November	5.7
June	29.1	December	6.8
Annual Rainfall: 15.9mm			

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

Furthermore, according to the surface water survey in 2003, 5565 rivers and 683 lakes are dry. Compared to the situation in 2003, there has been an increase in evaporation of ground water by 30% in 2007. Although Mongolia's flux of river has increased from the end of 1970 to the beginning of 1990, there has been continuous low flux from 1996 to 2008.

Due to East Mongolia's extreme weather and fragile ecosystem, it is facing a crisis of water resource shortage. In the past few years, river and lakes have been disappearing (Refer to <Table 3-5>). Furthermore, due to a high mixture of salinity and minerals, East Mongolia also has a low quality of water resource. Therefore, water resource shortage and low-quality water resource act as pressure elements for biodiversity of Mongolia.

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<Table 3-5> Comparison of Groundwater Evaporation in East 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 biodiversity of Mongolia. Due to reckless cattle raising and climate change, 72.6% of total cattle prairie have been degraded (Refer to <Table 3-6>). There are two reasons for desertification in Mongolia. First, there is a lack of water supply for grassland. As there is a lack of moisture for soil, vegetation struggles to thrive and the soil becomes infertile. Second, due to excessive free grazing, inappropriate increase for cattle number and proportion of species occurs, which leads to overgrazing.

<Table 3-6> The Area of the Degraded Land at Different Level for East Mongolia

Aimag	Non-degraded	Small /10%/	Medium /20%/	More degraded /30%/
Dornod	-	2125.2	7332.0	1168.9
Sukhabaatar	-	772.6	6181.8	727.7
Khenti	305.5	1181.2	2066.9	2066.9
Sum of East Mongolia	305.5	4079	15580.7	4008.5

Source: National Statistics Office of Mongolia (2017)

Furthermore, large-scale fire from Russia crosses the border and spreads to Mongolia1 to 2 times per year. However, despite several attempts like 'Forest and Steppe Fires in Mongolia: An Inter-Agency Meeting to Define the Way Ahead, 2008', little has been done regarding to the prevention of cross-border fire. Although wetlands are protected through international organizations or domestic protected area bureau, there is not much management mechanism for fire, as there is low awareness as a pressure factor.

3.4 Implication

Climate change is the common environmental pressure point faced by all three countries, China, Mongolia and the Russian Federation and impacts biodiversity in all regions. Severe drought has especially caused abrupt change in biodiversity at the Dauria region. Protected areas currently do not take the impact of climate change into consideration. Accordingly, DIPA needs flexible management in the face of climate change, such as expansion,

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reduction, and cancellation of protected areas. It needs an approach to determine the system for protected areas and come up with an expansive international conservation strategy mutually reinforcing the mitigation and adaptation measures at local level.

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IV. State of Biodiversity in DIPA and Neighboring Areas

4.1 The Russian Federation

4.1-1 Status of key species

The Daursky Nature Reserve in Russia provides habitat for 593 plant species, 1326 insects, 379 vertebrates (7 species of fish, 2 amphibians, 3 reptiles, 45 mammals, 321 birds) (Refer to <Table 4-1>). The IUCN Red List contains 21 bird species and 1 mammal species.

<Table 4-1> Status of Major Species of Daursky Nature Reserve in Russia

Taxonomic groups	Total number of species	Number of species included in the IUCN Red List	Number of species included in the national Red Book of the Russian Federation	Number of species included in the regional Red Book of Zabaykalsky Krai
Plant species in total	593	0	5	44
Insects	1326	0	2	26
Cyclostomes	-	-	-	-
Fish	7	0	0	0
Amphibians	3	0	0	1
Reptiles	3	0	1	2
Birds	321	21	39	65
Mammals	45	1	4	7
Vertebrate animal species in total	379	22	44	75
Animal species in total	1705	22	46	101

Source: Own creation

The water birds, fish and reptiles in the Daursky Nature Reserve are mainly found in wetlands such as Torey Lake, the Ulz river and the Borgia river. In particular, Torey Lake is famous for habitat and breeding ground for a variety of representative species of Northeast Asia. Furthermore, the Daursky Nature Reserve has 21 species of IUCN Red List Birds (CR: 2 species, EN: 4 species, and VU: 15 species). In addition, one of the mammals of the Russian Daursky Nature Reserve, Tarbagan Marm, is listed on the IUCN Red List. And, as <Figure 4-1> shows, several globally threatened protected species are distributed in Daursky Nature Reserve.

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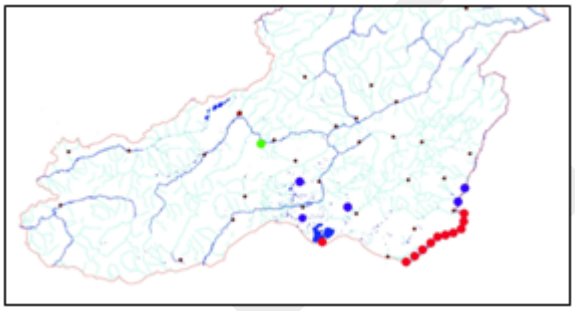
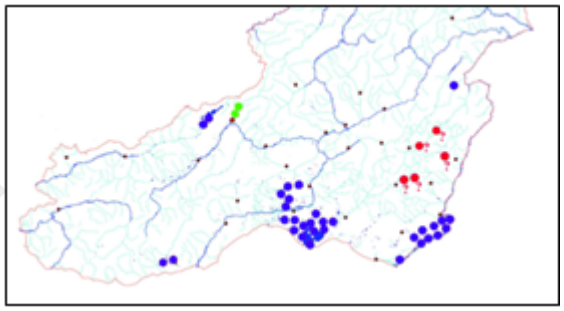
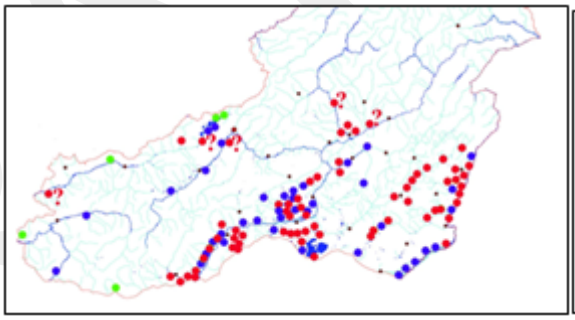


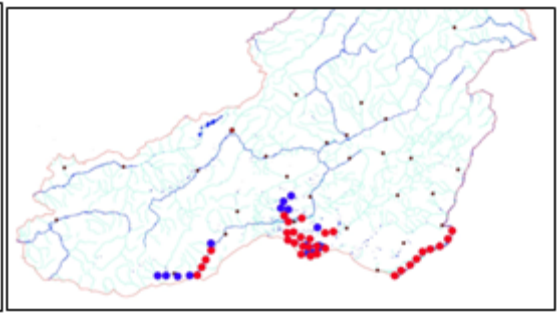
Red-crowned Crane



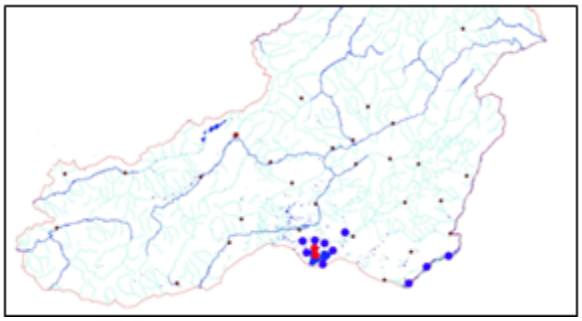
Hooded Crane



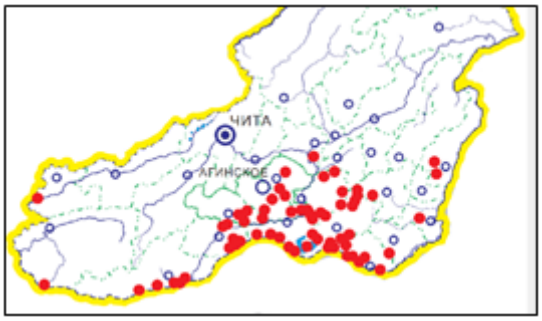
Great Bustard



Swan Goose



Relict Gull



Tarbagan Marmot

Saker Falcon

Steppe Eagle

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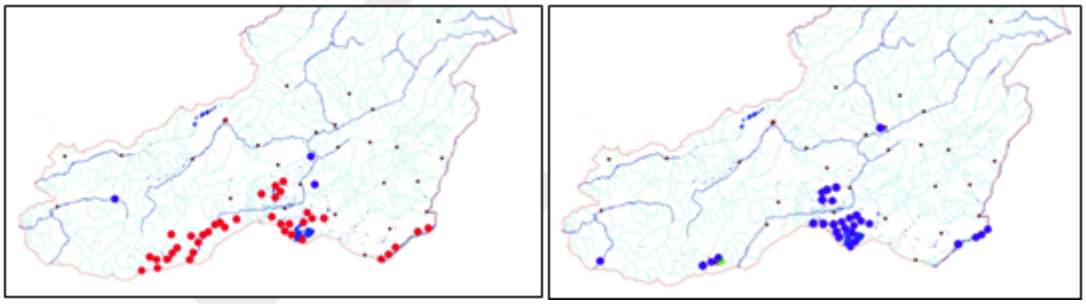


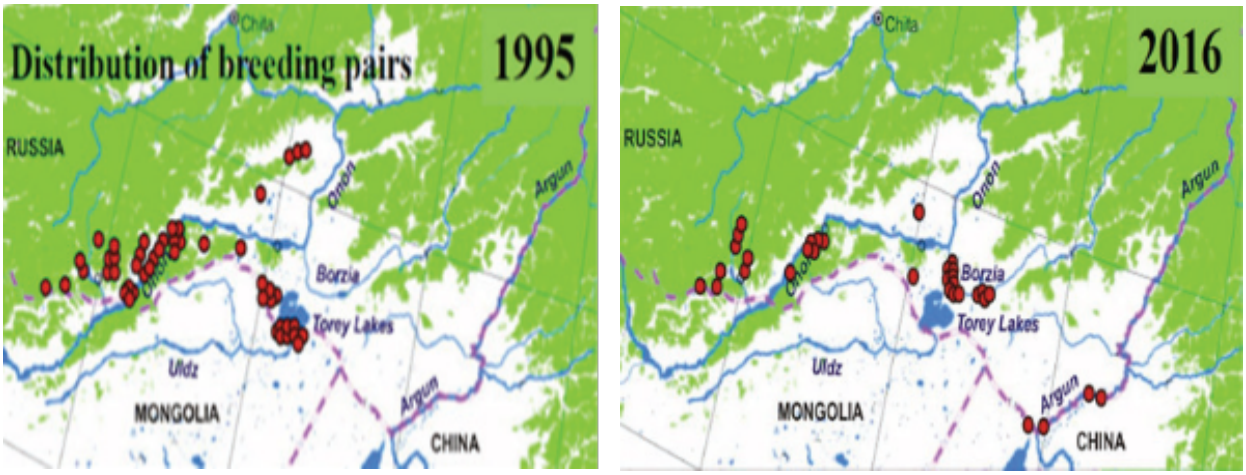
White-naped Crane Siberian Crane

Note: 1) Gray: Breeding place, 2) Red spot: Breeding place, 3) Blue spot: Travel route, 4) Green spot: Past record

<Figure 4-1> Distribution of Key Globally Threatened Protected Species (2012)

Source: Red Book of Zabaykalsky Krai (2012)

According to the report of Conservation and Rehabilitation of Habitats for Key Migratory Birds in North-East Asia by NEASPEC (2016), the population of the white-naped crane has been greatly reduced over the last 20 years[7]. In particular, the breeding population of white-naped crane decreased to half. About 100 pairs of the white-naped crane were discovered in 1995 but only 45 pairs remained in 2016(Refer to <Figure 4-2>).[8] However, a bigger problem is that the breeding success rate has also been reduced by about one-half and in 2016 only 36% of the 45 breeds were able to breed. Furthermore, about 98% of white-naped crane breeding habitats are unprotected.



<Figure 4-2> Comparison of White-naped Crane Breeding in 1995 and 2016

Source: Korean Society of Environmental and Ecology (2016)

[7] Medeura Gangsopdeu(2016), p.25

[8] Goroshko(2012)

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4.1-2 Status of ecosystem

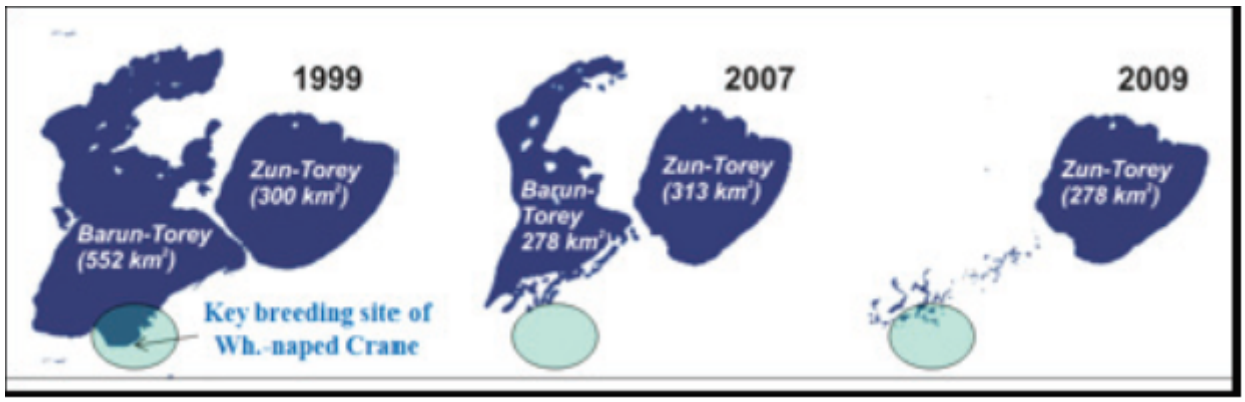
The status of habitats in the Russian Daursky Nature Reserve is as follows (Refer to <Table 4-2>). Most of the protected areas' ecosystems consist of steppe and grassland 69.2 ~ 86.6%, forest 12%, and lake 1~18%.

<Table 4-2> Types and Structure of Habitats in Russian Daursky Nature Reserve

Habitat	Portion of area (%)
Forest	12
Bushes	0.2
Steppe and meadow grasslands	69.2- 86.6
Marshes and reeds	0.1 – 0.5
Rocks	0.1
Lake	1 - 18

Source: Own creation

The largest habitat changes in the Daursky nature reserve can be seen through the Barun Torey River and the Zun Torey River, as they have been continuously decreasing (Refer to <Figure 4-3>). This has changed the breeding habitat of the white-naped crane. Currently, 98% of Russian white-naped crane breeding habitats are not protected. And, the breeding of white-naped crane outside the protected area has a very low success rate because of the many threats surrounding it. Therefore, it is necessary to adjust the protected area and to designate a new supplementary area.



<Figure 4-3> Change of Torey Lake
Source: Korean Society of Environment and Ecology (2016)

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4.2 China

4.2-1 Status of key species

The Dalainor Biosphere Reserve in China provides habitats for a variety of organisms. There are 486 higher plants, 330 birds, 30 fish, 2 amphibians, 26 reptiles and 26 mammals. 331 species of Perennial herb are distributed in Dalainor Biosphere Reserve and account for 68.1% of the total plants. Also, 199 species of xerophytic plants are distributed widely in wetlands of protected areas. In particular, Dalainor Biosphere Reserve recorded 330 species of birds, including 208 species of water birds. More than 80,000 water birds reside here each year.

<Table 4-3> Major Species and IUCN Red List in Hulun National Natural Biosphere Reserve Area

Classification	The number of species	IUCN Red List
Vegetation	593	0
Mammals	1326	0
Cyclostome	-	-
Fish	7	0
Amphibians	3	0
Reptiles	3	0
Bird	321	21
Mammals	45	1

Source: Own creation

Furthermore, Hulun Lake is a habitat for 30 species that make up most of the annual catches in Mongolia. And, these fishes migrate to shallow swamps to spawn. However, there is a threat of salt and alkaline concentration in these shallow swamps caused by climate change.

The representative mammal of the Dalainor Biosphere Reserve is Mongolian Gazelle. About 90% of the total population of Mongolian gazelles habituated at DIPA. But in recent decades, its population and survival coverage have declined. The most anthropogenic factor in reducing the number of Mongolian gazelles is the overgrazing of livestock. Excessive grazing, especially over the pasture capacity, has led to the destruction of vegetation in the steppes of China, impacting Mongolian Gazelle.

4.2-2 Status of ecosystem

The total area of Dalainor Biosphere Reserve is 7,400 km^2, and it is composed of wetland (3,253 km^2), grassland (4,083 km^2), sand and barren land (64 km^2). The Dalainor Biosphere Reserve is divided into the following main areas (5 zones) (Refer to <Table 4-4>).

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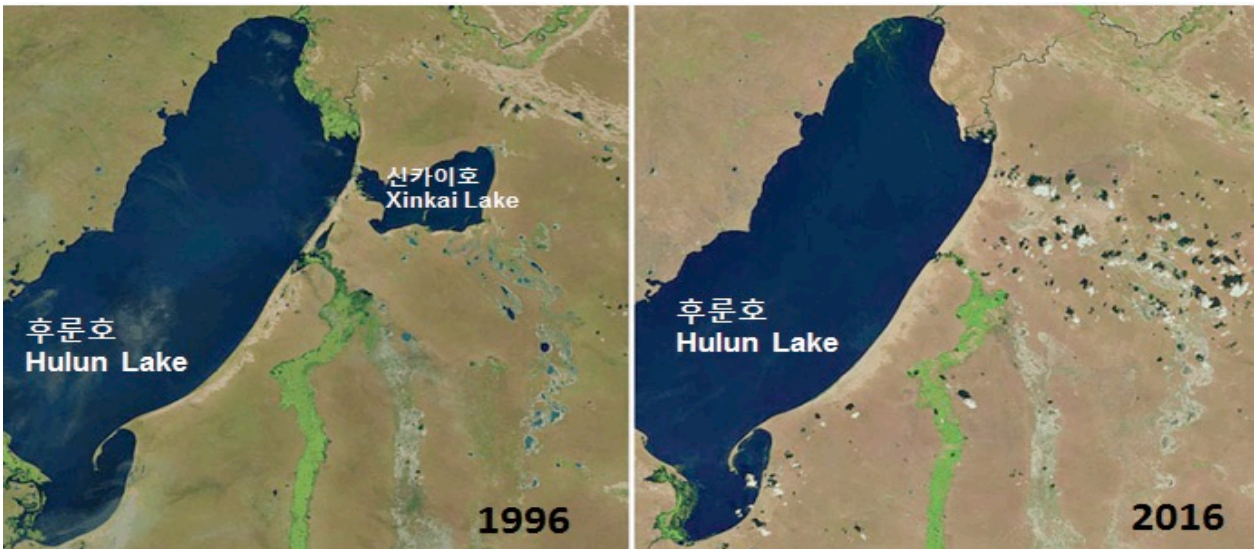
<Table 4-4> Classification of Dalainor Biosphere Reserve

Area Name	Location	Size	Type
Shuangshanzi	Dalainor Biosphere Reserve Northwest	5,895hm^2	Reed marshes, islands, mud coasts and small lakes, with no living organisms
Galadabaixin	Hulun Lake South	30,333hm^2	Reeds and reservoirs, stream forms, core areas
Wuersun	Wuersun River centered	21,393hm^2	Typical riverfront wetlands
Wulannuoer	Upper part of Wuersun River	10 535hm^2	River, main habitat of water birds, core areas
Beier Lake	China and Mongolia border	8,647hm^2	River, main habitat of water birds, core areas

Source: Own creation

Furthermore, in 1996, Xinkai Lake was spotted at the northeast of Hulun Lake but in 2016 the lake hid the appearance due to complete evaporation (Refer to <Figure 4-4>).



<Figure 4-4> Change of Hulun Lake (1996-2016)

Source: Google map

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4.3 Mongolia

4.3-1 Status of key species

Major species of Mongol-Daguur Strictly Protected Area can be observed through <Table 4-5>.

<Table 4-5> Mongol-Daguur Strictly Protected Area Major Species

Classification	Major Species
Vegetation (346 species)	Sawwort, Medicago, Polygonum, Chinese needlegrass, Caragana, French honeysuckle, Hard bluegrass etc.
Mammals (31species)	Mongolian gazelle, Roe deer, Wolf, Corsac Fox, Daurian hedgehog, Myotis mystacinus gracilis, Pika, Lepus coreanus etc.
Fish (7species)	Common carp, Crucian carp
Amphibians (2species)	Pseudepidalea raddei, Amur Brown Frog
Reptiles (4species)	Black snake, Solenoglyph, Natrix natrix, Mongolian racerunner
Bird (226species)	White-naped crane, Hooded crane, Common crane, Siberian Crane, bean goose, Relict Gull, Great bustard, mandarin duck, Lapwin, Heron etc

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

Plant species are mainly in the Ulz River and the surrounding wetland areas with the main species being willow species (shrubs). In the grassland area, the distribution of Elymus mollis, Feather grass (Needlegrass, Spear grass) can be mainly seen. The Mongol-Daguur strictly protected area zone provides habitats for rodents and carnivores, as well. Microtus Brandtii, a rodent species, has rapidly increased in recent 20 years undermining ecosystems.[9] As a result, the Mongolian government has carried out several removals through the area's local government but it has not been successful. It is also important to note that fish mainly reside at Tari Lake, Duruu Lake and Ulz rivers in protected areas.

The Ulz River in the Mongol-Daguur strictly protected area zone is an important protected area for habitats of rare birds, as well. It also provides habitats for bird species like

[9] Choybalsan(2014)

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the Siberian Crane, White-naped Crane and Great Bustard, which are globally endangered species. Recent threats, climate change, grassland degradation, and fire (forest fire) are putting pressure on this rich biodiversity.

4.3-2 Status of ecosystem

The ecosystem types of Mongol-Daguur strictly protected area zone are as follows. It is divided into rivers and lakes (2.1%), mountainous dry grasses (33.2%), flat dry grasslands (53.2%), river terrain and wetland grasslands (5.6%) and others (Cropland, residential area)[10]. Mongol-Daguur strictly protected area can be divided into two zones. Zone A is a region formed with forest and pasture. Zone B is formed with pasture and wetland (Refer to <Table 4-6>).

<Table 4-6> Mongol-Daguur Strictly Protected Area Zone Land Use Status (as of 2015)

Land use type	Zone A(km^2)	Zone B(km^2)
Agriculture and pasture	87,165	14,540
Urbanization area	-	-
Road network	85	4
Forest resources	108	-
Water resource	422	692
Protected area	-	-
Total area	87,780	15.236

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

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 1km from Lake Tari and 0.5km around the Ulz river.

Over the past several years, changes in major rivers, lakes and wetlands in the Mongol-Daguur strictly protected area zone have occurred due to climate change. <Figure 4-5> shows the evaporation of Khukh Lake in Mongol-Daguur strictly protected area Zone B for the last 20 years. In addition, rivers such as Guluut, Khunkher, Bus, Chuh, and Khorin Tsagaan in the Mongol-Daguur strictly protected area Zone have, already, disappeared by 40-60%. In addition, due to extremely dry weather, this year, Duruu Lake in Mongol-Daguur strictly protected area zone disappeared (See<Figure 4-6>).

[10] Medeura Gangsopdeu(2016)

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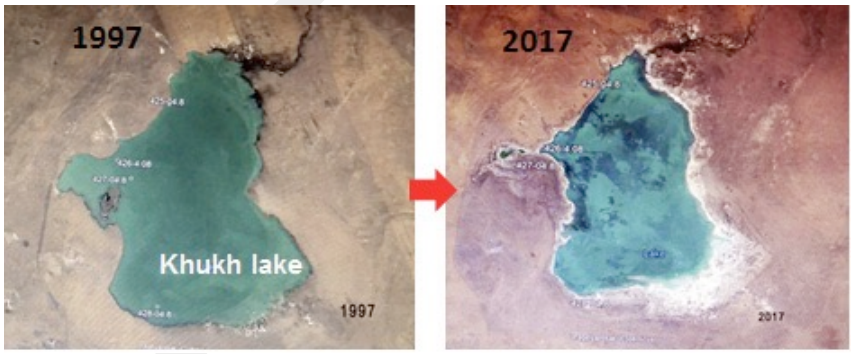

<Figure 4-5> Mongol-Daguur Strictly Protected Area Zone B: Khukh Lake change (1997-2017)

Source: Google Map

<Figure 4-6> Mongol-Daguur Strictly Protected Area Zone B: Duruu Lake change (1982-2017)

Source: Google map, Figure: Janchivdorj(2017.08.03.)

4.4 Implication

The number of species and habitats in national conservation areas in China, Mongolia, and Russia, which correspond to DIPA, are showing a declining trend. In particular, the decline of endangered species has a close relationship with the state of habitat. Deforestation, excessive grazing, mining of mineral resources, and construction of transportation network infrastructure directly destroy the habitat of endangered species. Furthermore, climate change acts as a factor disturbing habitats.

At present, white-naped crane distribution (monitoring) status survey in DIPA is being conducted by Mongolian-Russian-Chinese bird experts. However, there is no joint research on threats of habitat damage. Crane species' threats and habitat damages must be investigated in detail, and a scientific survey along with monitoring should be carried out.

Furthermore, the methodology, scientific research, and mapping are needed for future investigation and monitoring of species, which requires a precise monitoring system, like space mapping, to know the distribution of rare plants and animal species.

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V. DIPA Regional Biodiversity Response Analysis

5.1 Intergovernmental Cooperation Mechanism

DIPA Joint Commission

Cooperation between the governments of the Russian Federation, Mongolia and China for DIPA's conservation of wildlife and natural ecosystems is centered on the DIPA Joint Committee. The DIPA Joint Commission is the highest decision-making body of the DIPA. 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 of the three countries for the common preservation and management 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 Committee are as follows:

- First, organize and coordinate the cooperation activities of the three countries in DIPA.
- Second, propose cooperative activities that promote mutual understanding.
- Third, plan and implement a cooperative program in DIPA and assess the degree of implementation.
- Fourth, make decisions about the organizational and procedural process of DIPA cooperation activities.

The commission consists of 3 co-chairs, 3 deputies, representatives and secretariats of each member countries. Each country designates a co-chair, and the competent ministries of the Protected Areas Management and Preservation sector in each country designates members to the Joint Commission. The Secretariat must prepare and hold the regular meeting of the DIPA Joint Commission and keep the proceeding notes. Furthermore, the Secretariat must also create and maintain a document archive of 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 committee. Since the first DIPA Joint Commission was held in China in 1995, a total of six Joint Commissions were held until 2017.

DIPA Working Group

If the DIPA Joint Commission is the highest decision-making body of the three countries for DIPA's preservation and management, the unit for implementing the actual cooperation is the DIPA Joint Committee Working Group (DIPA Working Group). It was officially established at the Second DIPA Joint Commission in October 1996 in Mongolia. The Working Group has actively held bilateral meetings in Russia - Mongolia, China - Mongolia, depending on the circumstances and issues of all the three countries.

The DIPA Working Group organizes and administers all activities taking place in DIPA during the Joint Commission session. Daursky NR, the Mongolian-Daguur SPA, and Dalainor

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Biosphere Reserve management bodies, are responsible for the nature conservation zones of the three countries belonging to the DIPA.

- First, organize and coordinate activities for the implementation of DIPA Joint Committee decisions.
- Second, organize and coordinate DIPA cooperation activities during the period between sessions of the Joint Commission.
- Third, prepare and confirm the DIPA short-term cooperation plan (1-2 year).
- Fourth, coordinate and analyze the implementation of the adopted DIPA cooperation plan.

The managers of the protected regional management institution will participate in the working group meeting and these managers can determine the members 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 and the cost of hosting the conference will be borne by the host country while the cost of round-trip transportation for delegations will be borne by other countries. From 1995 to 2017, DIPA Working Group has organized more than 60 conferences.

The DIPA Working Group is actively developing and implementing a trilateral cooperation program for DIPA conservation and management. The DIPA Collaboration Program focuses on joint monitoring and field surveys of biodiversity, mainly on water birds, mammals, and vegetation, data and information sharing, training programs for practitioners in natural conservation areas, development and implementation of various public awareness programs, DIPA Co-Production, and joint international cooperation. Likewise, the DIPA Working Group formed the Dauria Transboundary Monitoring Network (DTMN) in 2010 for more scientific and systematic monitoring and research, noting the impact of climate change and anthropogenic factors on migratory waterbirds in DIPA.

The Dauria Transboundary Monitoring Network (DTMN) designates and monitors about 250 sites throughout the DIPA. Wetlands around DIPA lakes and watersheds are major monitoring points. Each monitoring site is divided into three groups according to the frequency of monitoring required. The goal of the Dauria Transboundary Monitoring Network (DTMN, Figure 5-1) is to analyze the changes in the DIPA ecosystem system to 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]

[11] Oleg Goroshko(2016), p.234

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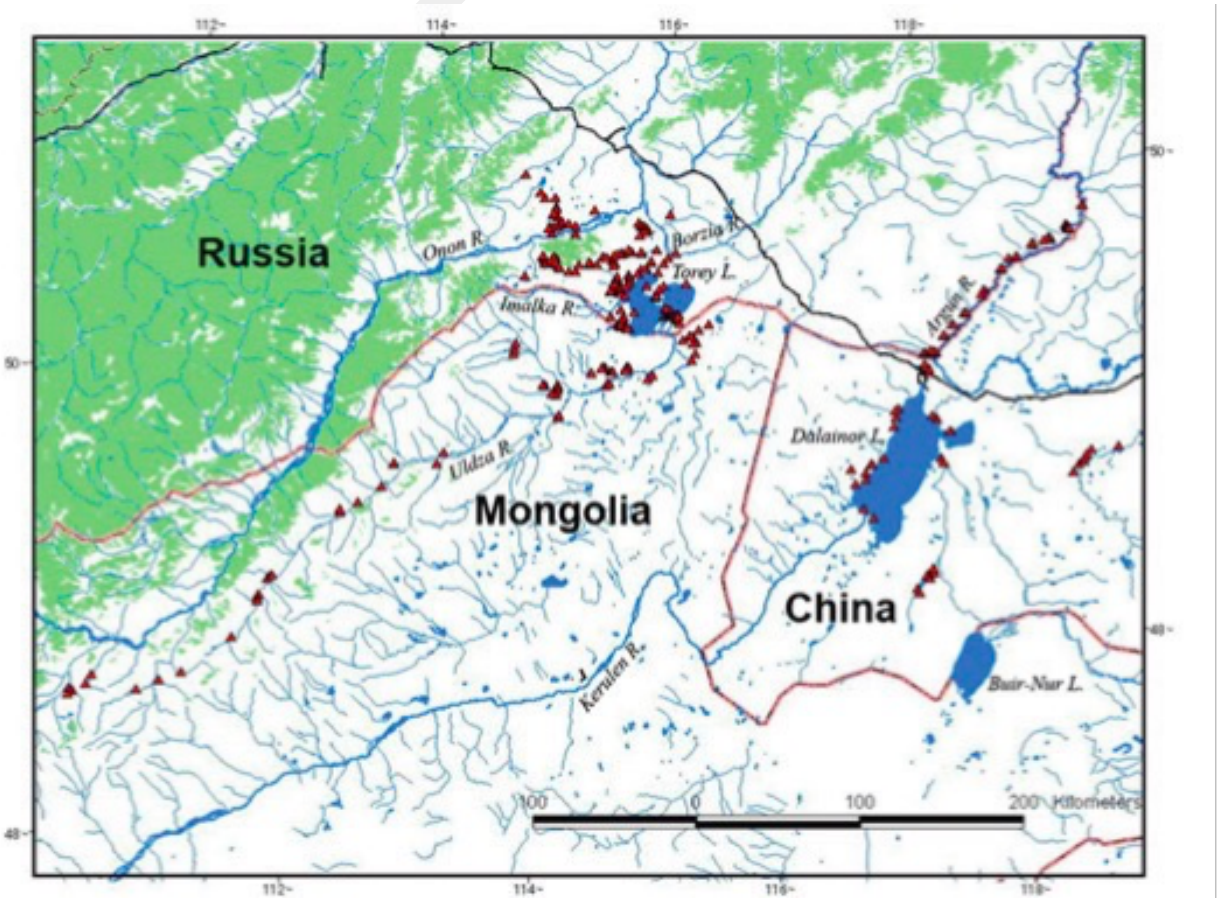

<Figure 5-1> 'Dauria Transboundary Monitoring Network' Status

Source: Oleg Goroshko (2016), p.234

Bilateral Cooperation Mechanism

The bilateral cooperation mechanisms between the two countries, namely Russia-China, Russia-Mongolia, China-Mongolia cover issues that may affect the preservation and management of DIPA. Environmental Sub-commission under the Commission on Regular Meetings of Russian and Chinese Heads of Government has been held annually since its establishment in 2006. The Environment Sub-commission, mentioned above, discusses mainly 1) conservation of biodiversity, protected areas, and ecosystem, 2) cooperation in the event of an environmental disaster, 3) 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 Subcommittee discuss the cooperation on the natural conservation zones located at the border region between Russia and China. Furthermore, DIPA related issues are also discussed here. In addition, through '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

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reasonable utilization and protection of transboundary waters', issues such as the Ulz River, the Borja River, the Arjuna River, Lake Torrey, etc., the border waters in the DIPA are discussed.

<Table 5-1> DIPA-linked Sub-regional Bilateral Cooperation Mechanism

Name	Form	Established Year	Cooperation contents
Environmental Sub-commission under the Commission on Regular Meetings of Russian and Chinese Heads of Government	Sub-commission	2006	-Biodiversity, -Protected Area, -Ecosystem preservation -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	-Establishing a working group annual plan and bilateral cooperation derived from it -Range: International Russian-Chinese Reserve "Lake Khanka"; Bolshekhekhtsirsky State Nature Reserve (Khabarovsk Territory, Russia), Bastak (Jewish Autonomous Region, Russia) and the Trekhrechye State Nature Reserve (Heilongjiang Province, PRC); The reserves of Khingansky (Russia) and Honghe (China); and 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, streams, etc.) located in China-Mongolia border area -Joint monitoring, investigation and cooperation on light water system dynamic, water resources, water quality, water system change, water pollution,

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			wild animals and plants
Mongolia-Russia Agreement on Protection and Use of Transboundary Waters	Bilateral Agreement	1995	- Flood forecast information exchange, - Co-investigate, evaluate and plan flood management - Common water quality monitoring and pollution prevention - Reduction and prevention of domestic development plans that may affect the border water system - Development of Integrated Boundary Water Management Plan
Russia-China Agreement on reasonable utilization and protection of transboundary waters	Bilateral Agreement	2008	- Border area contamination - Border protection area - Operation of Joint Environmental Working Group to promote network between Russia and Mongolia Nature Conservation Area

Source: Own creation

5.2 National governance

Domestic stakeholders and partners for DIPA maintenance management

In addition to the three national governments, the status of domestic stakeholders and partners such as NGOs, academia, local governments and international organizations participating in DIPA's conservation and management activities in Russia, Mongolia and China are shown in <Table 5-2>.

<Table 5-2> DIPA Stakeholders and Partners in Russia, China, and Mongolia

Country	Classification	Agency
Russia	The central government	-Ministry of Natural Resources and Ecology of the Russian Federation

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	(agency)	(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 of the Russian Federation 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
	International Programs	-UNDP/GEF Project 'Improving the coverage and management efficiency of protected areas in the steppe biome of Russia' (2010-2015)
Mongolia	The central government (agency)	-Ministry of Environment and Tourism (MET), Mongolia -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 (Chingis City, Khentii Aimag)
	Local government	-Eastern Mongolian Protected Areas Administration (Dornod Aimag)

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	(agency)	
	Academia	-Institute of General and Experimental Biology, Mongolian Academy of Sciences -Institute of Geography & Geoecology, 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 -TNC Mongolia Programme Office
	International Programs	-UNDP-GEF Project 'Improving the coverage and management efficiency of protected areas in the steppe biome of Russia' (2010-2015)
China	The central government (agency)	-Ministry of Environment Protection, China -State Forestry Administration, China - '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 Forest University -Tsinghua University
	NGO	-International Crane Foundation (China chapter in Harbin) -Wetland International -WWF China -Association of Friends of Wetlands
	International Programs	- UNDP-GEF Project 'Improving the coverage and management efficiency of protected areas in the steppe biome of Russia' (2010-2015)

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Source: Own creation

Since all the nature conservation zones of the countries belonging to the DIPA are national nature conservation zones, as well, all financial support and final decisions for the preservation and management of the DIPA are all part of the national central government. Russia by Ministry of Natural Resources and Ecology of the Russian Federation, Mongolia by Ministry of Environment and Tourism, and China by Ministry of Environment Protection and State Forestry Administration. Therefore, the support and cooperation of local governments, where actual conservation areas are located, is very important.

Domestic law system for DIPA maintenance management

Since DIPA is designated as a national-level conservation zone in Russia, Mongolia and China, it is managed according to the national laws of each country. The status of the establishment of domestic legal systems for DIPA maintenance and management in each country is shown in <Table 5-3>.

<Table 5-3> Domestic Legal System for DIPA Maintenance 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. for Ch.17 on Special Protected Natural Areas) - Forest Code (esp. for Ch. 17 on land use of SPNAs) - Water Code (esp. for Art.66 on specially protected water body) - Code of administrative violations (esp. for Ch. 8 on violations in Protected Areas) - Criminal Code of the Federation (esp. for 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

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	- 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 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)

Source: Own creation

Domestic governance of Russia Daursky NR: Cooperation and achievement between national nature conservation area and local governments

It was in 1982, about 35 years ago, that the Russian government first designated the Dauria area as a protected area. At that time, the water portion of the Torey Lakes and the Tsasucheysky Pine Forest, which are the core area of Daursky NR, were designated as Tsasuchaysko-Toreiysky Federal Refuge. Since then, the Russian government has designated Daursky NR as a "special nature reserve", Russia's top protected area, on December 25th, 1987 to protect the unique wetlands, steppes and forest ecosystem of the Dauria region. Daursky NR

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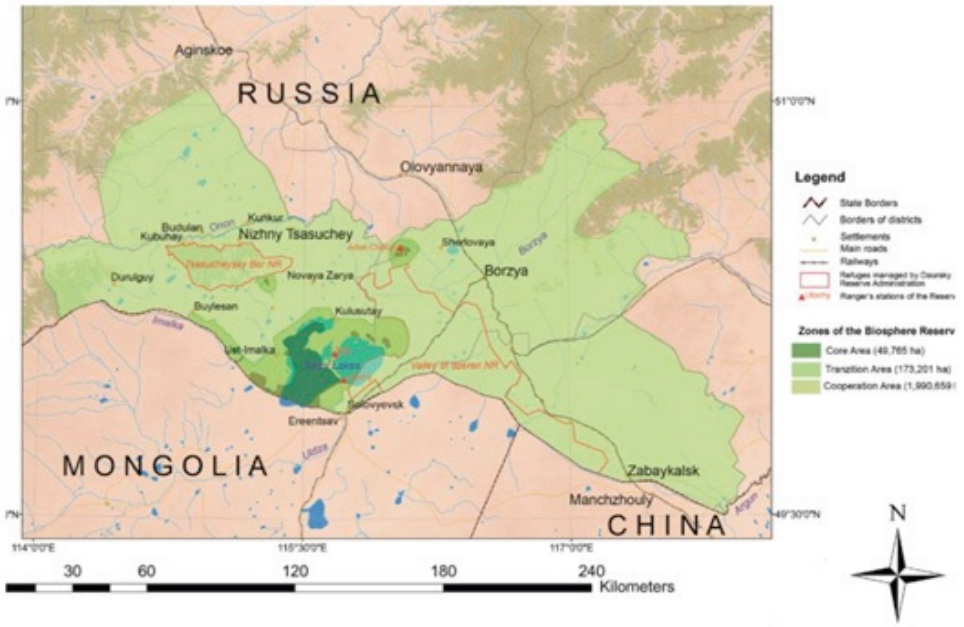
is currently comprised of a core area with 45,765 ha and a buffer zone of 173,201 ha. Within the buffer zone, the 'Tsasucheysky Bor' (a forest ecosystem, designated in 1987) and the 'Valley of Dzeren Nature' (designated in 2011) are designated as 'National Nature Refuges'. The Daursky NR Management Office is responsible for the maintenance of two national-level nature reserves in the core and buffer zones of Daursky NR.[12]



<Figure 5-2> Usage Zoning Status of Daursky NR and Surroundings

Source: Olga Kirilyuk(2017)

Daursky NR (Daursky National Natural Biosphere Reserve Area, State Nature Biosphere Reserve "Daursky") is designated as the most strictly regulated 'Special Protected Nature Areas' in Russian domestic protected area systems. It is regulated by the federal law "The Federal Law of Special Protected Natural Areas, established on March 14, 1995". Thus, the natural resources in the Daursky NR are strictly protected by the special regional environment protection law. Apart from the activities of the Daursky NR Management Office, other economic and social activities are prohibited. In the case of 'Federal refugee', which is a national nature conservation area, looser regulation is applied compared to Special Protected Natural Areas. Likewise, for ‘Federal refugee’ area, existing land ownership and use relationships in nature reserves may be removed or retained.

The Daursky NR Management Office has one director (general manager) and four deputy directors who are responsible for scientific research, conservation of natural conservation areas, environmental education and tourism, and administrative support. The work of the Daursky NR Management Office is divided into six main tasks as follows:

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

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First, activities to preserve the natural environment in the conservation area. For example, forest fire/steppe fire prevention and containment measures, biotechnological measures, facilities in the conservation management (sign boards, bulletin boards, etc.). Second, monitoring and restraining violations of laws/regulations on the use of natural environmental resources in conservation areas. Third, the performance of environmental education (museum and exhibition activities, press promotion and publishing, school education, ecotourism, etc.). Fourth, Research & Design execution. Fifth, environmental monitoring in the nature conservation area. Sixth, international cooperation on international environmental agreements related to Daursky NR (Ramsar Convention, UNESCO, etc.).

In addition, the director (general manager) of the Daursky NR Management Office must submit annual activity reports and environmental monitoring reports to the Russian Federation Natural Resources and Ecology Department, the federal government agency of Daursky NR.[13]

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

Currently, the Daursky NR Management Office is 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 state government and village residents. The details of the long-term agreements concluded with the State of Zabaykalsky in 2009 and the voluntary agreements concluded with villagers are shown in <Table 5-4>.

<Table 5-4> Details of Voluntary Agreement With Daurski NR Management Office, Local Government and Residents

Name of the Convention	Long-term cooperation in the sphere of biodiversity conservation and providing sustainable development of the South-East of Zabaykalsky Krai
Concluder of the Convention	A: Daursky NR Management Office B: Zabaykalsky Krai Natural Resources Department of Ecology
Year of the Conclusion	2009
Regional scope	steppe and forest-steppe areas of Ononsky, Borzinsky, Zabaykalsky, Krasnokamensky, Priargunsky and Aginsky districts
Convention goals	A. Inserting conservation and restoration of rare and endangered plants and animals in Russian Federation and Zabaykalsky Krai red book B. Promoting long-term sustainability of human activities in the steppe and

[13] Olga Kirilyuk(2017), “2017 Northeast Asia Peace and Cooperation Forum”

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	forest-steppe areas in the Dauria ecoregion C. Promoting ecological literacy of local residents D. Federal and State Government's Specially Protected Nature Areas: Promoting Governance Effectiveness of SPNAs E. Promoting communication between the federal government, nature conservation agencies, scientific research institutions, educational institutions, public agencies, commercial agencies, and environmental protection agencies
Means of achieving goals (cooperation)	Knowledge production joint preparation, Joint holding of knowledge sharing and awareness-raising activities, Monitoring in Nature Conservation Area, Creating a working group for a specific problem
Terms of Reference	Information exchange, 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 Convention 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 appropriate legal documents. Also, promote joint nature conservation activities with state government and involve state employees in appropriate seminars, workshops, and programs organized by the Management Office.

Name of the Convention (tentative)	Agreement about on fire extinguishing activities
	A: Daursky NR Management Office B: Residential villages in Nizhniy Tsasuchey
Year of the Conclusion	January - February 2017
Regional scope	Nizhniy Tsasuchey
Convention goals	Forest fires and steppe fires co-extinguishing activity coordination in protected areas of nature conservation areas
Means of achieving goals (cooperation)	Identify management responsibilities and provide human resources for forest fires and steppe fires
Terms of Reference	Daursky NR Management Office Director (General Manager manages forest fires and steppe fires extinguishing operations in nature conservation areas. And village residents (B) in the Nizhniy Tsasuchey area manage and execute the forest fires and steppe fires extinguishing work in each village. The Daursky

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	NR Management Office supports three people who can support the residential area's extinguishment work and the necessary equipment. Nizhniy Tsasuchey also supports three people. However, if needed to extinguish the fire in the nature conservation area, it will provide a larger number of volunteers. This Convention is valid until the end of 2017 and may be extended by signing new agreements.

Source: Own creation

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

5.3 Global governance

Established in 1994 as an international conservation area jointly managed by Russia, Mongolia and China, DIPA has been acknowledged in the international community for its ecological importance. Since the designation of Ramsar Wetlands (163,500ha), including the core area of Daursky NR, in September 1994, the three countries' national nature conservation zones, which are DIPA as of 2017, have each been designated as Ramsar Site, Flyway Site Network of EAAFP, Important Bird and Biodiversity Area of BirdLife International, and Biosphere Reserve of UNESCO MAB. In addition, in 2017, Russia Daursky NR (including core areas, buffer zones and nature reserves) and Mongolian-Daguur SPA were, jointly, approved as World Natural Heritage by the 41st UNESCO World Heritage Committee under the name of 'Landscape of Dauria'. Status of DIPA's 3 national nature conservation area's international mechanism can be found in <Table 5-5>.

<Table 5-5> DIPA International Protection Area System Designation Status

	Ramsar site (designated date)	**EAAFP FSN (Designated date)**	**UNESCO BR (Designated date)**	**IBA (Assessment date)**	**UNESCO World Heritage (Designate date)**
Daursky NR	Yes (1992-09-13)	Yes (1997-01-07)	Yes (1997)	Yes (2004)	Yes (2017)
Mongol-Daguur SPA	Yes (1977-12-08)	Yes (1997-01-07)	Yes (2007)	Yes (2009)	
Dalainor Biosphere	Yes	Yes	Yes	Yes	-

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Reserve	(2002-01-11)	(2001-01-31)	(2002)	(2009)	

Source: Own creation

However, constant cooperation program for DIPA conservation from international organizations, such as the Ramsar Convention and UNESCO, is not yet visible.

5.4 Implication

DIPA, which was founded in 1994 and already has about 24 years history of international cooperation, is a very valuable experience in North-East Asia where there are not many cases of long-term multi-national cooperation mechanism. It has achieved results in terms of joint research, monitoring and environmental education. Currently, DIPA governance is centered around the DIPA Joint Commission and the DIPA Working Group. Although the DIPA Joint Committee shows a very loose organizational structure, being held only every three to five years, there are other bilateral cooperation mechanisms that can complement it. Recently, the international community has emphasized 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, DIPA, as a representative of Multi-Internationally Designated Areas (MIDA)[14] in Northeast Asia, can coordinate the conservation policies and mechanisms of protected area institutions in Russia, Mongolia and China. It can also be a good example to test the integrated management of various international protected area systems for the conservation and efficient management of DIPA. Suggestions for more effective DIPA governance are as follows.

<Table 5-6> Policy Recommendations for DIPA Governance

- Long-term and stable financial resources for joint research, monitoring and research
- Reduced administrative and language barriers for better mutual visits and joint investigations and monitoring
- A more organic combination of the activities of the DIPA Working Group and the international community and their respective policy-making mechanisms
- DIPA Information accumulation and sharing system construction (ex. DIPA Information House or DIPA CHM)
- Expanded DIPA Community or DIPA International Forum to cover stakeholders and partners

[14] Multi Internationally Designated Areas: MIDA: Refers 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)

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interested in DIPA's conservation management in the international community including Russia, China, Mongolia as well as Korea, Japan and other WWF, WCS, ICF

Source: Own creation

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VI. North-East Asia Biodiversity Cooperation Network or Mechanism Promotion Plan

6.1 Basic direction

The objective of the Biodiversity Conservation and Border Cooperation in Northeast Asia is “to establish a network of protected areas along the North-East Asian border through communication, collaboration and coordination".

There are three basic ways of cooperation for this goal. First, strengthen cooperation in Northeast Asia biodiversity through information exchange and knowledge sharing through existing cooperation and networks. Second, cooperate and collaborate with various stakeholders, such as cross-border joint research and monitoring, and capacity building programs. Third, establish a stable biodiversity cooperation network through an identification of common goals by different stakeholders, joint planning of protected area management, and establishment of a joint committee on the coordination of health measures.

This year's research project, a case study of the "KEI-NEASPEC Joint Project - Biodiversity Conservation and Cooperation in Northeast Asia", reflects the experiences of the Dauria International Protected Area (DIPA). To promote the peace of inter-Korean relations through the basic cooperation platform and network, the biodiversity and habitat linkage preservation network and platform of the Tumen River area will be promoted as future tasks.

It is necessary to make better communication (overcoming the language barriers) among the practitioners of the DIPA administration in the three countries. Furthermore, improvement of administrative procedures and funding are also recommended, such as to make the immigration procedure easier for joint research and to finance the international cooperation program. In the case of DIPA, the budget for the management of the natural preservation area of each country is established, but there is no separate budget for the international cooperation program. Hence, it is urgent to provide stable financial resources for joint cooperation activities. This way, the ongoing communication of Mongolian, Chinese and Russian experts will help stakeholders achieve common goals and objectives for biodiversity conservation. In addition, Mongolia, China, and Russia should cooperate through related experts in the Dauria area to create an environmental infrastructure for information exchange and joint research by related experts. Therefore, the establishment of cooperative communication and the preservation of the border area’s 1-5 year mid-term research will be done.

'Transboundary Protection Area Network' to preserve biodiversity and habitat in Northeast Asia, similar to Natura 2000, will be established. As active cooperation between human and natural environment should be enhanced through monitoring system for human economic development activities, water monitoring system that can secure the water resources to sustain the ecosystem services of DIPA and continuously check the normal functions will be established.

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• Overview of Natura 2000

Natura 2000 aims to achieve nature conservation at the EU level to protect species and habitat threatened by the inclusion of nature reserves in the European Union (EU) region as a network. Natura 2000 began with the adoption of the 1979 Bird Directive, 79/409 / EEC and the 1992 Habitats Directive, 92/43 / EEC.[15] Natura 2000 is composed of SACs (Special Area of Conservation) designated by the Member States under the 'Habitat Recommendation', supplementing and integrating Special Protection Areas (SPAs) designated under 'Bird Recommendations'. Thus, 'Habitat Recommendations' and 'Bird Recommendations' provide the legal basis for the designation of the Natura 2000 protected area. Establishment of the Natura 2000 network is a part of the CBD (Convention on Biological Diversity) adopted in 1992 and gives it an international obligation to preserve biodiversity.

6.2 Future direction

The joint study recommends the following action to be considered as future direction. Development of a comprehensive monitoring that investigates all socio-economic and environmental factors impacting the biodiversity of DIPA is needed. As water has a considerable impact on wildlife and plants, the establishment of comprehensive water resource monitoring system and the investigation of the necessary water capacity are both needed to maintain DIPA ecosystem.

Furthermore, the 'DIPA Comprehensive Information Center' is needed, in which information can be shared and accumulated at all times among current constituents of DIPA, the national conservation zone institutions of Russia, China and Mongolia. If DIPA Comprehensive Information Center is constructed, DIPA information sharing platform can gather information through the monitoring system and share feedback with each other. The DIPA Comprehensive Information Center will become not only the hosting body of the DIPA monitoring system but also a place where the existing DIPA related data can be accumulated and shared.

As DIPA is the most important breeding ground for endangered birds in North Korea, South Korea, Japan and southeast China, it is necessary to constantly exchange information and seek cooperation to preserve the habitat of each country that is biologically linked to DIPA. Common International Information Network for DIPA Biodiversity Connectivity Conservation will serve as a primary information exchange network among governments and societies in each country. This will allow an establishment of a network for broad protection area in North-East Asia.

For conservation and peaceful usages of transboundary areas, such as Russia - China, Russia - Mongolia, China - Mongolia, Russia - China - Mongolia (DIPA), Russia - China - North

[15] European Commission Environment (2017)

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Korea (Tumen River estuary), South and North Korea – DMZ etc., it is necessary to establish North-East Asia Transboundary Protected Area Network. This will act as a priority agenda for North-East Asian countries to cooperate, implement joint programs under the common goal of preserving and better manage international protected areas. It can be a good testbed for developing inter-state cooperation and policy coordination. In addition, a short-term project focusing on the DIPA's water use status and establishment of a joint water monitoring system for economic development activities is proposed for 2018.

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Endnotes

Kim, B. (2011). Future outlook and current status of Inner Mongolia's mineral resource development. KIEP, 6.

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

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

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

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

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

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

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

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

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

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

Simonov, E and Wickel, B(2015), "Kherlen River the Lifeline of the Eastern Stepp". pp.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", pp.1- 14

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

Doopedia, "Kerulen River", http://www.doopedia.co.kr/mo/doopedia/master/master.do?_method=view2&MAS_IDX=101013000711919, Searched: 2017.11.1

European Commission Environment, "Natura 2000", http://ec.europa.eu/environment/nature/natura2000/index_en.htm, Searched:2017.12.3

UNEP(2015.7.25), "UNEP launches global connectivity conservation project", https://www.unep-wcmc.org/news/unep-launches-global-connectivity-conservation-project, Searched 2017.11.5

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