(Draft Background Paper) A Framework for the Transboundary Cooperation Mechanism in the Lower Tumen River Basin

NEASPEC Secretariat

This paper is prepared to facilitate discussions among major stakeholders attending the Expert Group Meeting on Nature Conservation in Transboundary Areas in North-East Asia to be held on 2-4 November 2010 in Hunchun, China.

1. Background

The 12th Senior Officials Meeting (SOM) of North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC) in 2007 unanimously endorsed the NEASPEC Resolution on the Framework of Nature Conservation Programme and NEASPEC Nature Conservation Strategy. The Strategy identifies a concrete subregional conservation approach, with specific strategies to protect six flagship species. On the basis of the strategy, member countries at the 14th SOM in 2009 decided to undertake a follow-up project on the "Development of Cooperation Mechanisms for Nature Conservation in Transboundary Areas in North-East Asia". This project will provide NEASPEC countries with a vital opportunity to overview bilateral and multilateral cooperation on nature conservation in transboundary areas and further strengthen the existing mechanisms or develop new mechanisms. It is also an opportunity to take concrete actions under the Nature Conservation Strategy to protect flagship species, with a particular focus on the Amur Tiger and Amur Leopard (Far Eastern Leopard).

The background paper intends to: (1) provide a brief introduction of the Lower Tumen River basin and to highlight the necessity and importance of the establishment of transboundary cooperation mechanisms in this area; (2) review the existing mechanisms for transboundary cooperation in the world and draw lessons from them, with a particular reference to North-East Asia; (3) study previous programs and proposals suggested by different stakeholders for the development of transboundary cooperation mechanisms in the Lower Tumen River region. Based on these discussions, this paper intends to identify issues for further discussion concerning the development of a framework for the transboundary cooperation mechanism in the Tumen River basin.

2. Introduction of the Lower Tumen River Area Transboundary Nature Reserve

The Tumen River (Figure 2-1) is located in North-East Asia. Its lower basin covers over 13,000 km^2 and borders China, the Democratic People's Republic of Korea (DPRK), and the Russian Federation. This transboundary area encompasses some of the most diverse ecosystems in the world, characterized by

steppes, temperate forests, coastal wetlands and offshore areas. A study[1] by the United Nations Educational Scientific and Cultural Organization (UNESCO) found that these ecosystems provide a complex mosaic of habitats for 86 species of mammals and 370 species of birds, including nearly 40 endangered species listed in the Red Data Book of the International Union for Conservation of Nature (IUCN). In particular, the Lower Tumen River basin is one of the last remaining habitats on the earth for the Amur Tiger and Amur Leopard which were identified the flagship species for the subregion in the NEASPEC Nature Conservation Strategy.

<Figure 2-1> the Tumen River

Source: Emma White (2010) "Tumen River: The Greater Tumen Initiative (GTI)," Great Tumen Initative

According to the latest full-range survey [2] of the Amur Tiger conducted by the Wildlife Conservation Society (WCS) in collaboration with the World Wildlife Fund (WWF) and all responsible government entities in 2005, the Amur Tiger population in Russia was estimated at 428 to 502 individuals[3] (up from 415 to 476 during the previous survey in 1996). This is the largest, single, and unfragmented population located in the Sikhote-Alin-Wandashan Mountain Ecosystem in Russia, which represents at least 95% of the remaining wild Amur Tigers in the world. The majority of this population is situated in the Sikhote-Alin Mountains in Primorski and Southern Khabarovsky Krais. Tigers in the Wandashan Mountains of North-East Heilongjiang Province, China, are connected to the Sikhote-Alin metapopulation via the Strelnikov Range in the Russian Federation.

However, a smaller fragmented subpopulation was found in the Tumen River basin (Figure 2-2), which is defined as "Tumen River Tiger Population" by WCS. This subpopulation is situated in Southwest Primorski Krai (Khasan, Nadezhdinsky, and Western Ussuriski Raions), Western Primorye (Pogtranichny Raion) of Russia, Hunchun and Wangqing Counties of Jilin Province, Southern and

[1] UNESCO. "*Lower Tumen River Area Transboundary Biosphere Reserve Proposal*" (June 2004)
[2] D.G. Miquelle, etc. "*A Survey of Amur (Siberian) Tiger in the Russian Far East, 2004-2005"*
[3] Miquelle DG, Pikunov DG, Dunisheko YM, et al (2006) "*A Survey of Amur Tigers in the Russian Far East, 2004-2005: Final Report*"

Northern Laoyeling Region, and the Zhangguangcailing Region of Heilongjiang of China. According to the full-range survey conducted by WCS for the Russian Far East in 2004-2005, there were 10-13 tigers within Southwest Primorski Krai and Western Primorye. The latest survey of Amur Tigers in China was conducted between 1998 and 1999, which reported 12-16 tigers in the Tumen River basin, 4-7 tigers in Jilin Province and 1-3 in Heilongjiang Province. The estimated total number of the Tumen River Tiger Population was approximately 17-25 (see Table 2-1).

Due to limited access to information in DPRK, the situation on the Korean Peninsula is less clear, in spite of that, potential tiger and leopard population may exist in the border area. An elementary survey for the status of the tiger and its preys in the Paektusan area (6000 km² of Lyangan Province) of DPRK was conducted in 1998 by the Institute of Geography, Academy of Science of DPRK. Although the survey concluded that a large number of tigers inhabit this region, it failed to provide concrete evidence and the specific number of tigers due to the length and timing of the survey. [4]

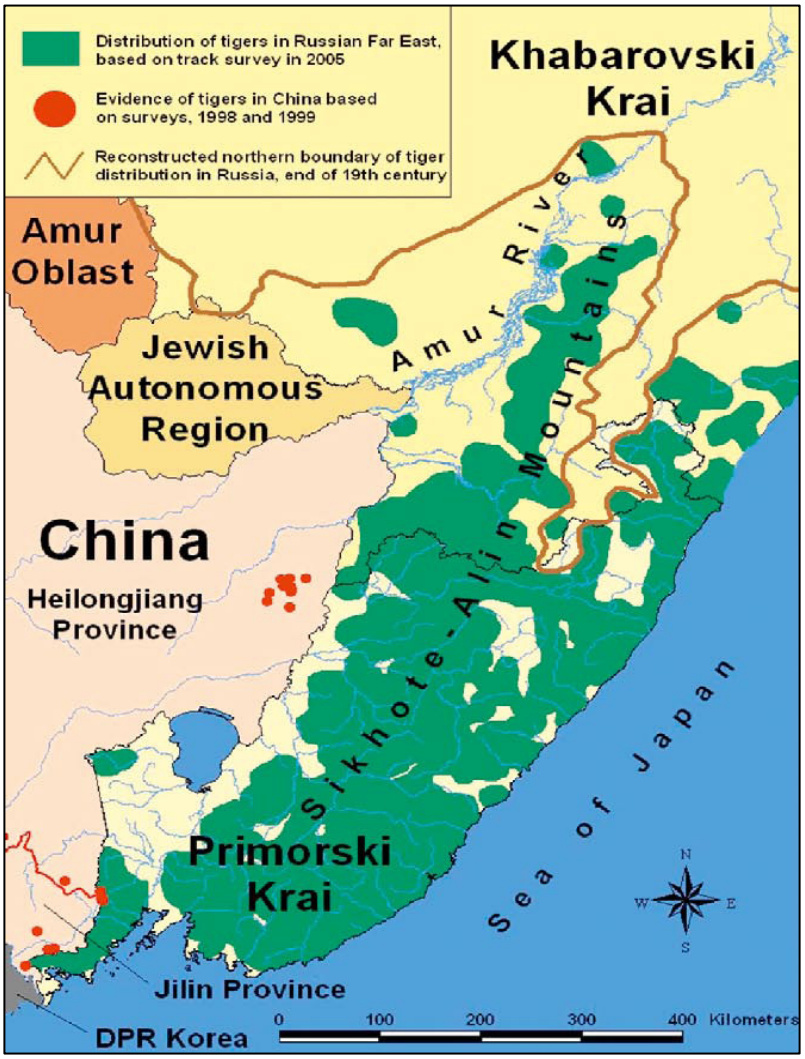
<Table 2-1> Amur Tiger – Tumen River Sub-Population

<table>
<tr><th>Country</th><th>Krai/Province</th><th>County/Local Region</th><th>Estimated Number of Tiger (adults, sub adults & cubs)</th><th>Total Estimated Number of Tigers</th></tr>
<tr><td rowspan="4">Russia</td><td rowspan="3">South-West Primorski Krai</td><td>Khasanski</td><td rowspan="3">10-13</td><td rowspan="8">17- 25</td></tr>
<tr><td>Nadesdenski</td></tr>
<tr><td>Ussuriski (western half)</td></tr>
<tr><td>West Primorski Krai</td><td>Pogranichnaya Raion</td><td>2</td></tr>
<tr><td rowspan="5">China</td><td rowspan="2">Jilin Province</td><td>Hunchun</td><td>4-6</td></tr>
<tr><td>Wangqing</td><td>0-1</td></tr>
<tr><td rowspan="3">Heilongjiang Province</td><td>Southern Laoyeling</td><td>0-2</td></tr>
<tr><td>Northern Laoyeling</td><td>0</td></tr>
<tr><td>Zhangguangcailing Region</td><td>1</td></tr>
</table>

Data Source: D.G.Miquelle et al, (2004-2005) "A Survey of Amur Tigers in the Russian Far East," Yang Shihe et al,(1998)"Report on the Sino-Russian Joint Survey of Far Eastern Leopards and Siberian Tigers and Their Habitat in the Sino-Russian Boundary Area, Eastern Jilin Province, China Winter 1998," and Sun Baogang et al, (1999)"1999 Survey of Amur Tigers and Far Eastern Leopards in Eastern Heilongjiang Province, China and Recommendations for Their Conservation"

[4] Institute of Geography, Korean People's Democratic Republic Academy of Science. "*A Survey of Tigers and Prey Resources in the Paektusan Area, Lyangan Province, North Korea, In Winter, 1998"*

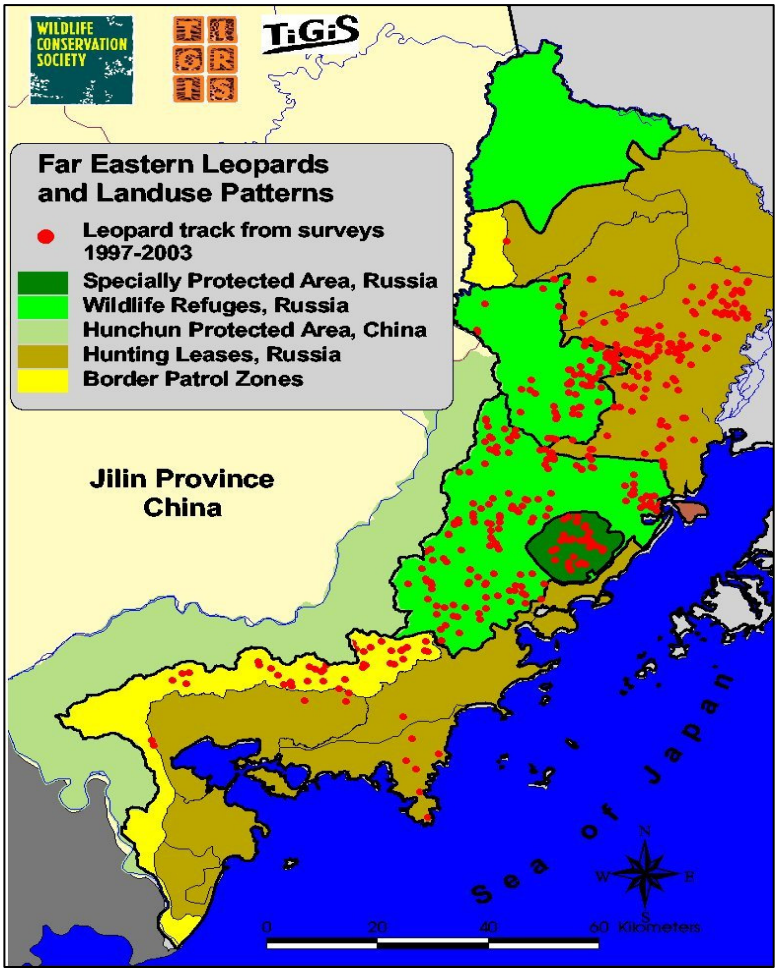
<Figure 2-2> Distribution of Amur Tigers (2005 for Russia; 1998-1999 for China)



Source: ALTA Amur Leopard Conservation: http://www.amur-leopard.org

In Russia, the Amur Leopard population now exists only in Sikhote-Alin Mountains of the Russian Far East, including less than 30 in the Amur River Valley along the China-Russia Border, and 10-12 in the Ussuri River Valley along the China-DPRK border. The only remaining habitat for the Amur leopard in China is the Hunchun Nature Reserve in Jilin Province. This Amur leopard population in China was formed as a result of migration from the Russian Federation.

<Figure 2-3> Amur Leopard Population Distribution



Source: ALTA Amur Leopard Conservation: http://www.amur-leopard.org

Despite its high biological importance, these ecosystems and species are under serious threats. Poaching, habitat degradation, and prey depletion are three most significant threats for Amur Tigers and Amur Leopards. Illegal hunting of tigers and leopards driven by the demand for tiger parts in traditional Asian medicines and leopard skins in the subregion continues to put these species under serious threat of extinction. Also, the increasing intensity of human land and natural resource use in the Lower Tumen River basin in recent decades, coupled with increasing human population, has put immense pressure on the environment through rapid urbanization, agricultural encroachment and forest destruction. This has resulted in the destruction and fragmentation of habitats of Amur Tigers and Amur Leopards. Disruption of the normal food chain is another important factor limiting the growth of tiger and leopard numbers in the Tumen River basin. Due to the reduction of suitable habitats and the excessive human harvest, ungulates such as red deer, roe deer and wild boar which are historically the most important prey species for tigers and leopards have witnessed an higher than average reduction rate. It is difficult for tigers and leopards to ensure their normal living conditions with such a low prey density.

3. Existing Protected Areas in the Lower Tumen River Area

Protected areas for Amur Tigers and Amur Leopards have been established along the Tumen River basin in all three countries. Table 3-1 identifies all of the protected areas in the transboundary ecosystem of the Lower Tumen River area.

<Table 3-1> Protected Areas in the Russian Federation, China, and DPRK in Tumen River Basin

Name	Location	Category and Status	Year of Establishment	Area (ha)
CHINA				
Hunchun	Hunchun Municipality, Yanbian Korean Autonomous Prefecture, Jilin Province	National Nature Reserve	October 2001established as provincial nature reserve and in July 2005 upgraded to national level	108,700
Dongfanghong	Wandashan forest near Ussuri river, Heilongjiang Province	National Nature Reserve	Dec 2009	31,516
RUSSIA				
Dalnevostochny Morskoi (Far East State Marine Reserve)	Offshore from Khasan-sky Raion, Primorsky Terriorty, in a cluter of four sepearte zones (Peter the Great Bay)	• Zapovednik (strictly protected area) • Man Biosphere Program (2003)	1978	63,000
Kedrovaya Pad	The south of Primorsky (Khasan-sky Raion) and centered around a valley and small mountain ridge	• Zapovednik (strictly protected area) • Man & Biosphere Program (2004)	1916	17,890
Barsovy	Barabash-Slavyanka & along Chinese border, Khasan-sky District	Federal Zakaznik (special purpose reserve)	1979	106,000
Borisovskoye Plato (Plateau)	Southwestern Primorsky, stretching along the Chinese-Russian border	Regional Zakaznik (special purpose reserve)	1996	63,429
Khasansky Park	Part of vast Tumen wetlands along the southeastern border of the Krai.	• Nature Park • Man Biosphere Program (2005)	1997	35,000
DPRK				
Sonbong Migratory Bird Reserve	Bonpo Wetland	Municipal level-status bird reserve	1959	3,200
Unmu Island Sea-Bird Breading Site	Natural Monument	strictly protected area	1976	85

Source: UNESCO/UNDP (2004) "Lower Tumen River Area Transboundary Biosphere Reserve Proposal"

The Russian Federation took the lead in development of protected areas, by establishing five protected areas in the Lower Tumen River area. Two of five are strictly protected areas at the national level, the Far East State Marine Reserve and Kedrovaya Pad, the latter of which was established as early as 1916, during the World War I. The Barsovy Nature Reserve is a federal reserve, specially created to protect the Far Eastern Leopards. The Khasansky Park is the only Nature Park in Primorsky Krai to protect part of the vast Tumen wetlands along the southeastern border of the Krai. China has also made remarkable progress in promoting biodiversity conservation in the Lower Tumen basin over the past decades. First, institutional mechanisms have raised the level of protection. The Jilin Hunchun Nature Reserve established in 2001 as a provincial level reserve has already achieved a State-level Nature Reserve status in 2005. Second, the number of protected areas in the Lower Tumen basin has grown gradually since 2000. In December 2009, Dongfanghong wetland was declared a state-level Nature Reserve, a habitat for 1,671 species of the wild fauna and flora, with the variety of species accounting for 40% of the entire Heilongjiang province. DPRK has also designated two major protected areas in the Lower Tumen River, the Sonbong Migratory Bird Reserve and Unmu island sea-bird breading site while lacking infrastructure, management institutions, and reliable full-range surveying.

Despite the fact that progress has been made, many ecologically-sensitive areas still remain unprotected in the Lower Tumen River basin. One important reason is that this area has a long legacy of fragmented national and subregional environmental management. There has been an absence of co-coordinated planning and integration, poor legal frameworks, lack of enforcement and implementation of existing regulatory instruments, insufficient public involvement, inadequate financial mechanisms of support, as well as inadequate capacity to monitor and assess ecosystems. Transboundary natural resource can be a supportive and practical tool for conservation and wilderness preservation purposes (Sandwith and Besançon, 2005).[5] It has been approved that transboundary natural conservations have performed relatively well in securing representative samples of biodiversity pattern (distribution of species, communities, and ecosystems). Practical approaches for such cooperation are supposed to create coordination mechanisms among national protected areas adjoining international borders or unified protected areas (such as Transboundary Protected Areas or Transboundary Biosphere Reserves), which will contribute not only to coordinated actions on biodiversity conservation, but also to building environmental confidence among States as well as local stakeholders sharing international borders.

4. Transboundary Conservation Initiatives: Trend, Objectives, Typology and Definitions

This section provides an overview of the trend, objectives, typology and definitions of different types of transboundary conservation initiatives. The clarification of these issues is important because it offers a good reference for the consideration of different options to establish a framework for transboundary cooperation mechanism in the Lower Tumen River basin.

[5] Trevor Sandwith and Charles Besançon (2005) "*Trade-offs among multiple goals for transboundary conservation"*

4.1. Trend

With the increasing global demand for natural resources as well as the international attention on sovereign rights and obligations of states (Singh, 1999)[6], the number and complexity of formalized transboundary natural resource management arrangements and agreements between countries has increased greatly over the past eight decades. Worldwide, at least 188 transboundary conservation areas, spanning the borders of 122 countries have been established (Besançon and Savy, 2005).[7]

4.2. Objectives

The main objectives of these transboundary conservation initiatives can be summarized as:

- biodiversity conservation
- cultural heritage and exchange
- international cooperation
- maintenance of peace and security
- promotion of sustainable development
- regional economic integration
- restitution of land tenure
- local economic development
- poverty alleviation

The rapid increase of transboundary conservation initiatives over the past decades reflects the achievement of all or some of the objectives given above.

4.3. Typology and definitions

Drawing on the existing literature and case studies, transboundary conservation initiatives can be divided into four main categories including (see Table 4-1):

1. Transboundary protected areas
2. Transboundary conservation areas
3. Parks for Peace
4. Transboundary migratory corridors

<Table 4-1> Typology of Transboundary Conservation Initiatives

Name	Definition	Typical examples	Other forms
Transboundary protected areas	An area of land and/or sea that straddles one or more borders between states, sub-national units such as provinces and regions, autonomous	• La Ámistad International Park between Costa Rica and Panama	• Transboundary parks • Cross-border parks • Transfrontier protected area

[6] Singh, J (1999) *"Global review: Lessons learned. Beyond boundaries: Transboundary Natural Resource Management in Southern Africa"* Biodiversity Support Program: Washington, D.C.

[7] Besançon, C. and Savy, C. (2005*) "Global list of internationally adjoining protected areas and other transboundary conservation initiatives"*. Transboundary Conservation: A New Vision for Protected Areas

	areas, and/or areas beyond the limit of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed cooperatively through legal or other effective means.	• The Kgalagadi Transfrontier Park between Botswana and South Africa • The Neusiedler See/Seewinkel - Fertö Hansag Transfrontier Park between Austria and Hungary	complexes • Adjoining protected areas transfrontier parks
Transboundary conservation areas	Land and/or sea that straddle one or more borders between states, sub-national units such as provinces and regions, autonomous areas, and/or areas beyond the limit of national sovereignty or jurisdiction, whose constituent parts form a matrix that contributes to the protection and maintenance of biological diversity, and of natural and associated cultural resources, as well as the promotion of social and economic development, and which are managed cooperatively through legal or other effective means.	• The Maloti-Drakensberg Transfrontier Conservation and Development Area (Lesotho-South Africa) • The cooperation between the Palatinate Forest Nature Park – Northern Vosges Regional Natural Park (Germany-France) • Sungai Kayan Nature Reserve and the proposed Pulong Tau National Park (Indonesia-Malaysia).	• Transfrontier Conservation Areas
Parks for Peace	Transboundary protected areas that are formally dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and to the promotion of peace and cooperation.	• The Si-a-Paz project (Costa Rica – Nicaragua) • The Waterton-Glacier International Peace Park (Canada – USA)	
Transboundary migratory corridors	Areas of land and/or sea in two or more countries that are not necessarily contiguous, but are required to sustain a biological migratory pathway, and where cooperative management has been secured through legal or other effective means.	• The Palearctic Flyway (Siberia to Senegal) • European Green Belt • The Meso-American Corridor	

Source: Author's summary based on Sandwith and Besançon (2005)

According to Sandwith and Besançon (2005), the concept of the four types of transboundary conservation initiatives can be defined as the following:

"Transboundary protected areas refer to an area of land and/or sea that straddles one or more borders between states, sub-national units such as provinces and regions, autonomous areas, and/or areas beyond the limit of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed cooperatively through legal or other effective means."

"Transboundary conservation areas can be defined as land and/or sea that straddle one or more borders between states, sub-national units such as provinces and regions, autonomous areas, and/or areas beyond the limit of national sovereignty or jurisdiction, whose constituent parts form a matrix that contributes to the protection and maintenance of biological diversity, and of natural and associated cultural resources, as well as the promotion of social and economic development, and which are managed cooperatively through legal or other effective means."

"Parks for Peace refer to transboundary protected areas formally dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and to the promotion of peace and cooperation."

"Transboundary migratory corridors refer to areas of land and/or sea in two or more countries that are not necessarily contiguous, but are required to sustain a biological migratory pathway, and where cooperative management has been secured through legal or other effective means."

5. Two examples of transboundary cooperation on nature conservation in North-East Asia

There are nearly a dozen or more key protected areas along the international borders in North-East Asia, particularly along the borders with the Russian Federation. Those protected areas include:

- The Tunkinskiy Natural Park of Mongolia, and Daurskiy Zapovednik and Ubsunurskaya Kotlovina Zapovednik of the Russian Federation;
- The Jilin Hunchun Nature Reserve and Heilongjiang Mudanfeng Nature Reserve of China, and Kedrovaya Pad Zapovednik, Bolshekhekhtsirskiy Zapovednik, and Khankaiskiy Zapovednik, Leopardoviy Federal Zakaznik of the Russian Federation;
- The Far East Marine Zapovednik and Khansanskii Nature Park of the Russian Federation and Rason Migratory Bird Reserve of DPPK; and
- Changbai Biosphere Reserve of China and Paekdu Bioshere Reserve of DPRK.

Recently, there are also bilateral initiatives including those between Russia and China, Russia and Mongolia, and China and Mongolia to establish transborder protected areas. For example, in 2008 Russian-Chinese Environment Joint Subcommission agreed to develop a Joint Strategy for Transborder Protected Areas System. Russia and Mongolia have been working on a bilateral agreement on transborder protected areas including Ubsunur-Uvsnuur, Tunkinsky-Huvsguul, Sohondinsky-Han-Henty and Onon-Baldzh. The remaining of this section reviews two cases of the transboundary nature conservations in the subregion. They are

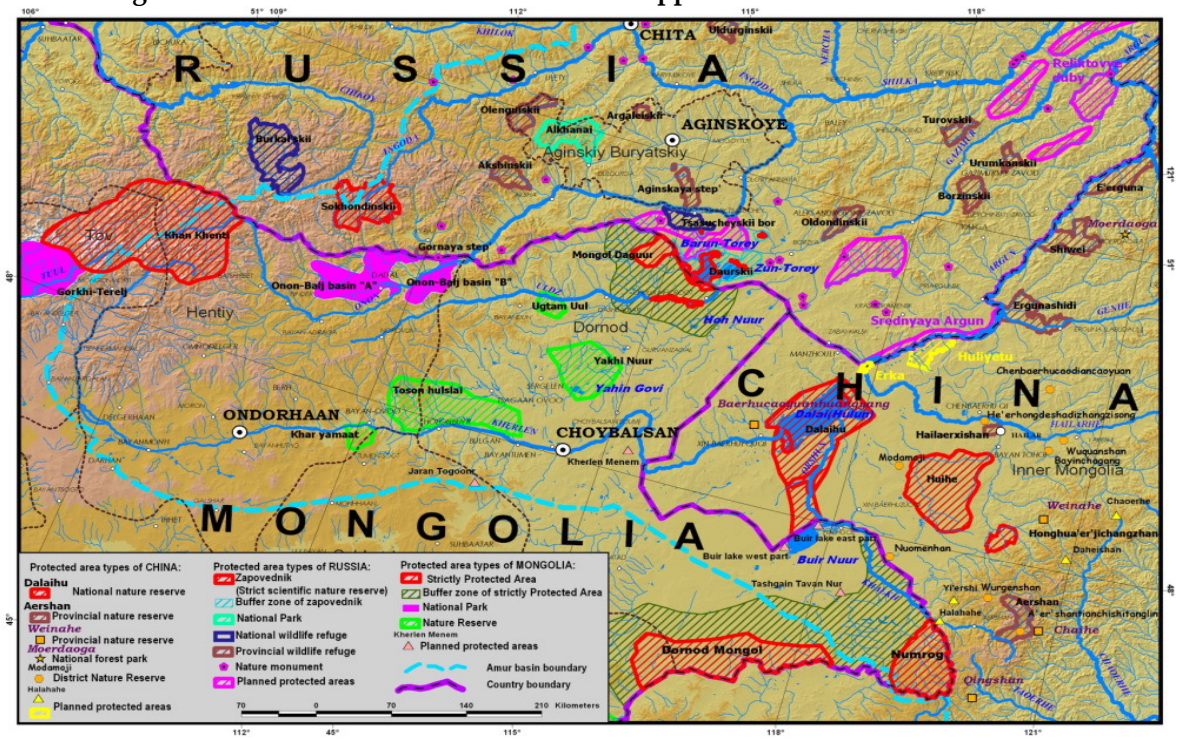
- Daurian International Protected Area
- Khanka-Xingkai Lake International Nature Reserve

5.1. Daurian International Protected Area (DIPA)

DIPA was established at the junction of the borders between the Russia Federation, Mongolia and China on 29 March 1994 (see Figure 5.1-1). Four protected nature areas of the three countries were combined to create the DIPA including

- Daursky Zapovednik (state nature reserve) and Tsasucheisky Bor National Wildlife Refuge under Zapovednik management in Chitinskaya oblast of Russia;
- Mongol Daguur strictly protected nature area in Dornod aimag of Mongolia, which borders on the Russian reserve;
- Dalai Lake National Nature Reserve in the Inner Mongolia Autonomous Region, China.

<Figure 5.1-1> Protection Areas in Daurian Steppe



Source: Amur Heilong Website: http://amur-heilong.net/

DIPA was established by a trilateral agreement between the Ministry of Environment and Natural Resources of the Russian Federation, the Ministry of Nature and Environment of Mongolia and the State Agency on Environment Protection of the People's Republic of China

The International Commission for the Russian-Mongolian-China Zapovednik "Dauria" has been established to advice and guide joint activities under DIPA. The IV Meeting of the International Commission the Russian-Mongolian-Chinese Zapovednik "Dauria" (25-28 October 2005, Chita, Russia), approved the draft Intergovernmental Agreement on the Russian-Mongolian-China Zapovednik "Dauria".

Major international agencies and non-governmental organizations' (NGOs) partnerships with DIPA include:

- The World Wildlife Fund (WWF)

- Wildlife Conservation Society (WCS)
- International Crane Foundation
- Wild Birds Society
- The Regional Ecological Center "Dauria"
- Non-governmental Environmental Fund "Baikal"

The creation of this trilateral protected area, consisting of connected wetland and steppe habitats was of special importance for biodiversity conservation in Dauria, particularly for the protection of migrant species of birds and mammals. The major targeted endangered species include the White-Napped, Hooded and Red-Crowned Cranes, the Swan Goose as well as the Mongolian Gazelle.
Besides biodiversity and ecosystems conservation, the main target of the international protected area is monitoring of natural processes and phenomena in the Dauria steppe ecosystem.

DIPA as an international reserve has been a conservation success. Since its existence, it has managed to promote cooperation in science and environmental education. Major achievements include the following:

1. Joint inventory of animals and plants within the reserves: since its establishment, more than 300,000 km^2 of the area has been investigated by joint scientific expeditions. Surveys also covered the upper reaches of the Amur-Heilong basin from Khentii to the Great Hingan Mountains. The total length of the expedition routes has exceeded 100,000 km. This enormous tri-national survey was a great opportunity to acquire data on biodiversity and distribution of rare species, define conditions of regional ecosystems, and also to select key areas for conservation of a number of species.
2. Joint research activities on ecosystem fluctuations and redistribution of animal populations have enabled DIPA to propose a number of conservation measures. These included: (i) an interconnected multi-level regional network of protected areas; (ii) programs for conservation of critically threatened species, and (iii) integration of economic development planning with conservation planning to achieve sustainability.

The protection work in DIPA provide valuable experience for transboundary cooperation on nature conservation. First, it is important to consider the interaction between DIPA and other reserves of the region to construct a network for protected areas in Dauria. This will promote the increase of intelligent research projects, targeted environmental educational programs, and international cooperation among the three countries. At present, joint activities in different fields bind the international protected area with Huihe National Nature Reserve and Sokhondinsky Zapovednik (Bioshere Reserve) in China and with Alkhanai National Park in Russia.
Second, cooperative environmental education in DIPA is one of the biggest advantages over a traditional piecemeal approach to nature conservation in protected areas. It is important not only for popularizing the protected area and raising the level of ecological awareness, but also for strengthening public relations between the neighboring regions of Russia, Mongolia, and China.

International environmental art competitions were organized for children. Examples of cooperative work now underway include the preparation and publication of jointly collected information in popular scientific editions, international environmental camps for children, seminars for the staff of the protected area, the design of a joint web-site, and a base for the development of national and international ecological tourism. At present, all national parts: Daursky, Mongol Daguur, and Dalai Lake reserves are listed as UNESCO Man and the Biosphere reserves.

Third, identification of common interest is important for successful cooperation. Socio-economic features of the border regions differ considerably in the type of settlements, the economic structure, and living standards. Yet the three countries share many social and ecological problems that DIPA can help resolve by promoting ecological and educational tourism in the region. Today all three reserves have worked out excursions and tourist routes and have constructed visitor centers.

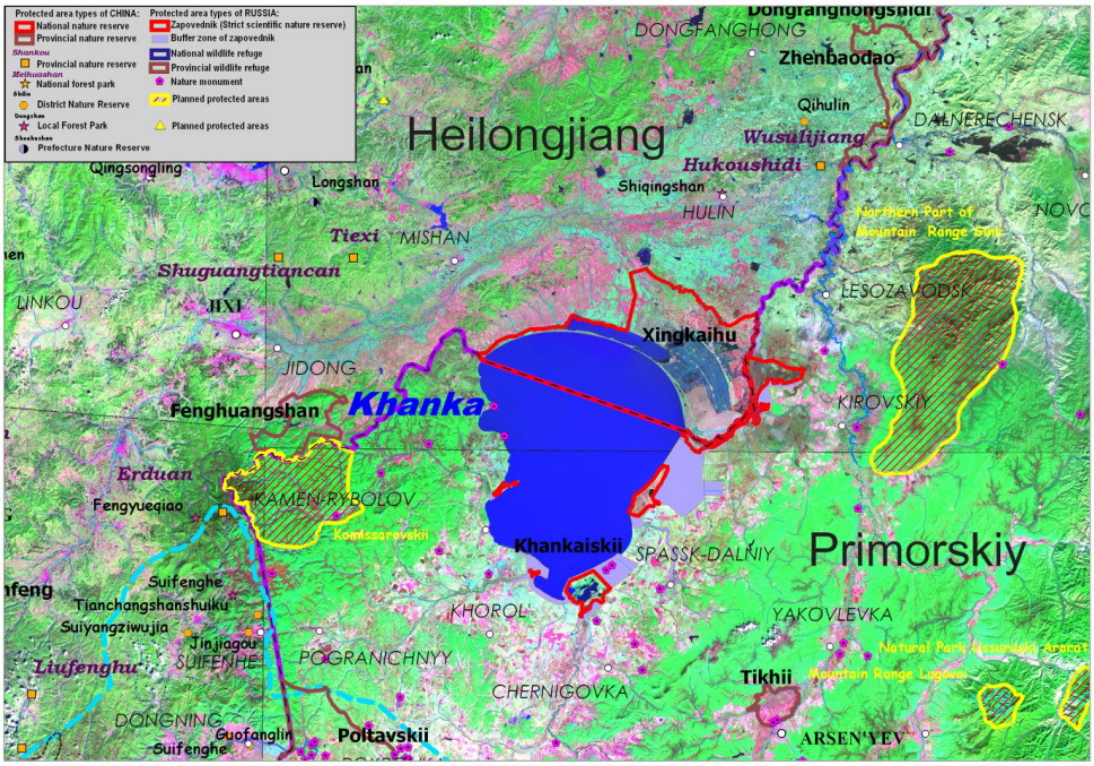
Furthermore, the experience of protection work in DIPA enables us to identify main problems of the international cooperation for DIPA as following:

- lack of state financing for international activities
- communication problems (absence of translators from reserve payrolls)
- difficulties in crossing the borders to work cooperatively in the border zones, which is mainly due to under-funding of international reserves as a special form of protected area by the national governments of the three countries.

5.2. Khanka-Xingkai Lake International Nature Reserve

Lake Xingkai-Khanka is located on the border of China and the Russian Federation (see Figure 5.2-1). It is the largest lake in Northeast Asia as well as a transboundary waterbody between China and Russia. The lake is called Khanka in Russian and Xingkai in Chinese. The lake consists of two parts - Small Xingkai Lake and Big Khanka-Xingkai Lake. Small Xingkai Lake lies completely within China and has an area of 180 km^2. The Big Khanka Lake watershed covers 16,890 km^2, of which 15,370 km^2 lie within Russia.

<Figure 5.2-1> Lake Khanka International Protected Area on satellite image background, 2000



Source: Source: Amur Heilong Website: http://amur-heilong.net/

The lake is a habitat for important animal and plant species of both countries, particularly the wetlands surrounding the lake. The Russian Federation designated the lake as a Ramsar Convention wetland site, due to its importance for migratory bird species. The reserve is an important breeding habitat for some of the first-class national protected species, such as the Red-crowned Crane, Oriental Stork, White-tailed Sea Eagle, and Golden Eagle. Second-class national protected species, such as the Red-necked Grebe, Chinese Egret, White Spoonbill, White-naped Crane, and White - fronted Goose, Whooper Swan, Whistling Swan, and Mandarin Duck are also breeding in the reserve.

Lake Khanka-Xingkai became an International Nature Reserve when the Agreement between the Government of the Russian Federation and the Government of the People's Republic of China on the Bilateral Cooperation of the Lake Khanka-Xingkai was signed on 25 April 1996. The cooperation mechanism is coordinated by a mixed Chinese-Russian Commission on Lake Khanka-Xingkai International Nature Reserve.

According to the bilateral agreement, the objectives for the establishment of the International Nature Reserve are:

- to protect biodiversity and ecosystems in the reserve
- to promote bilateral cooperation on environment protection, rationalized utilization of natural resources, long-term monitoring and research on ecosystems and biodiversity
- to raise awareness on the purposes and importance of natural protection in the two countries

Means of cooperation include:

- information exchanges
- personal exchanges
- scientific research and monitoring
- field and desk-based research
- exchange of methods of scientific research
- joint publications
- organization of scientific seminars and conferences
- organization of research and technical trainings
- other cooperative methods recognized by both parties

From 1996-2001, a series of cooperative plans were developed including

- Master Plan of Xingkai Lake Nature Reserve
- Conservation Plan of Xingkai Lake Biodiversity
- Construction Plan of Xingkai Lake Resorts
- Construction Plan of Ecological Demonstration Zone

Eight urgent tasks were also identified including

1. Establishing a strong unified conservation committee
2. Strengthening environmental education activities
3. Establishing a police station in the reserve
4. Developing green-food industry and organic agriculture
5. Promoting centralized management of water resources
6. Carrying out activities to promote eco-tourism
7. Conducting general survey of the resources in the reserve
8. Strengthening international cooperation

According to the work plan for 2009-2010, the following activities will be conducted

- conduct a joint survey on birds in the reserve
- collect material and compile a brochure about the reserve in Chinese and Russian
- compile a comprehensive map on the reserve in Chinese and Russian
- make an assessment of the tourist industry in the reserve and provide tourist assessment report
- compile a mid- and long-term plan for the bilateral cooperation on the reserve
- exchange of information etc

Although Khanka-Xingkai Lake International Nature Reserve has been established through the bilateral agreement, no concrete cooperative initiatives have emerged. The major problem identified is

the fragmentation of responsibility. On the Chinese side, management is difficult due to the presence on the ground (and water) of different administrative levels and actors, including the military. Lake Xingkai and its drainage basin belong to the People's Government of Mishan City, the Xingkaihu State Farm, Xingkaihu Agriculture Factory of Heilongjiang Province and Army in China. The Russian side is in a state of economic freefall, reducing pressure on water consumption but making governance more problematic. The result is a confused management due to the lack of a unified plan or authoritative organization, and transboundary cooperation and coordination

6. Existing Proposals for the Establishment of Transboundary Nature Conservation Mechanism in the Lower Tumen River Basin

Government agencies, NGOs and UN organizations have already proposed a number of constructive plans to develop transboundary nature conservation mechanisms in the Lower Tumen River basin over the past two decades. This section intends to summarize and analyze the existing proposals for a transboundary nature conservation mechanism with a focus on tiger and leopard protection. Reviewing these proposals will enable us to suggest pertinent and meaningful issues for further consideration and discussion, helping in the development of a transboundary cooperation mechanism framework in the Lower Tumen River basin.

6.1 Summary of Existing Proposals

This section summarizes six proposals which aim to promote the protection of flagship species and sustainable development in the transboundary area. A summary of each of the six proposals shows some common interests between the different stakeholders.

- **UNDP/UNESCO: Lower Tumen River Area Transboundary Biosphere Reserve Proposal**

  The United Nations Educational, Scientific and Cultural Organization (UNESCO) together with the United Nations Development Programme (UNDP) conducted a feasibility study on the establishment of the Lower Tumen River Area Transboundary Biosphere Reserve in 2001. Based on the review of conservation work from June 2002 to April 2004, UNDP/UNESCO proposed to establish a Transboundary Biosphere Reserve in the Lower Tumen River basin within China, DPRK, and the Russian Federation in its project final report. This proposal defined the boundaries and zonation for the protected area and suggested that the Transboundary Biosphere Reserve (TBR) was developed to coordinate conservation of ecological zones and corridors divided by international borders. This proposal also recommended organizing a Lower Tumen River Area TBR Coordination Council, in order to organize some crucial follow-up activities including fund raising, field study coaching, public education programs, anti-poaching programs, monitoring programs and forestry management programs.

- **NEASPEC: National Conservation Strategy of NEASPEC- Saving the Flagship Species**

  Between 2005 and 2007, officials and experts from NEASPEC member countries worked jointly on a nature conservation programme, identifying the flagship species of North-East Asia and developing a conservation strategy. After conducting the research on a nature conservation strategy for the flagship species, NEASPEC proposed priority action plans for the protection of each flagship species. For Amur Tiger and Amur Leopard protection, NEASPEC proposed several key strategies: increasing prey density, improving anti-poaching activities, facilitating international cooperation, promoting public awareness on conservation needs, supporting capacity building on habitat management, monitoring and community development.

- **UNDP/GEF: Tumen River Strategic Action Program- Transboundary Diagnostic Analysis**

  The UNDP/GEF Tumen River Strategic Action Programme was proposed specially to ensure the preservation and protection of the region's unique environmental assets for future generations, while at the same time allowing for the ecologically sustainable economic development in the area. This action programme proposed five principle interventions for nature conservation in TumenNET area. The interventions are coordination of environmental protection with international plans, coordination of environmental protection with national economic plans, improvement of biodiversity conservation, improvement of international cooperation in the management of Tumen River pollution, and policy measures to prevent and manage industrial pollution.

- **Heilongjiang and Jilin forestry Departments: Workshops on Recovery of the Wild Amur Tiger Population in China- Progress and Prospect**

  Heilongjiang Forestry Department and WCS worked together on an international workshop: the Wild Amur Tiger Population Recovery Action Plan in 2000, which provided strategies and plans of tiger conservation. After the workshop, the Forestry Administrations of Heilongjiang and Jilin, with the collaboration of WCS and support from the State Forestry Administration, conducted a series of conservation projects in Northeast China. In 2002, another workshop on the progress of recovery program was held in the Jilin Hunchun Nature Reserve to review the conservation work over the past two years and as well as to plan future work in the region. These two workshops proposed a comprehensive recovery plan, highlighting six priority actions: the establishment of conservation network, international cooperation improvement, poaching reduction, forest management improvement, facilitation of a public education program, development of a monitoring system, the Chinese government also recommended a compensation scheme for local communities and participation of NGOs in conservation activities.

- **WWF: Study on the Potential Tiger Habitat in the Changbaishan Area, China**
  In 2007, WWF proposed a bold plan to double the number of wild tigers by 2020, focusing on 13 landscapes identified as suitable areas for the expansion of world's tiger populations. WWF published the "Study on the Potential Tiger Habitat in the Changbaishan Area, China", suggesting a tiger conservation priority area in the Hunchun-Wangqing. Besides for the need for tiger conservation, WWF also advised for the need to protect habitat in tiger protected areas, recover prey populations, improve forest management, and promote policy supports by stakeholders.

- **WCS: A survey of Far Eastern Leopard and Amur Tiger Population in Southwest Primorski Krai, Russian Far East (February 2003)**
  After conducting a full-range survey for Far Eastern Leopards and Amur Tiger populations in Southwest Primorski Krai, WCS proposed specific protected areas for Far Eastern Leopard and Amur Tiger conservation in 2003. This survey indicated that the most important parameters necessary for conservation of large carnivores are high prey densities, low road densities and little human access. These parameters concur with recommendations to ban logging, prohibit construction of forest roads, and alleviate human activities in protected areas. The program on reintroduction of the Fast Eastern leopard into Southern Sikhote-Alin highlighted the prevention of forest fires, raising public awareness of biodiversity conservation, captive breeding of the Far Eastern Leopard, and improvement of international cooperation.

6.2 Analyses and Comments on Proposed Primary Actions

The summaries of existing proposals of the development of cooperation mechanisms for nature conservation highlight eleven major actions as principle methods for species conservation in the Tumer River basin.

- **Establishment of Transboundary Protected Areas**
  The establishment of transboundary protected areas plays an essential role in the wildlife protection in the tri-country border region. The territorial nature and the high dispersion capability of tigers and leopards require a huge area of land to ensure their population persistence. According to data collected in Russia, the home range of an adult female tiger averages 488 km^2 of non-overlapping habitat with adequate prey to survive and raise healthy cubs. In addition, male tigers will rarely settle in one location unless a female is presented and they can move up to 1000s km^2 from source populations in search of potential mates. [8] Female adult leopards require 35-45 km^2, while males will use an area 4-6 times larger than that of females. [9] This implies that there is a high possibility for tigers and leopards around the border area to migrate across borders for survival and reproduction. Ecosystems and species across

[8] WWF Study on the Potential Tiger Habitat in the Changbaishan Area, China (2010)
[9] NEAPECT Flag species

national borders may suffer from conflicting protection management and land use practices. For example, poachers can exploit the advantage of geo-political borders and gain more chance to flee, since the communication and coordination between two governing bodies can slowdown the response to illegal hunting. Nature reserves or protected areas divided by international borders may fail due to problems associated with international coordinated conservation. The large habitat requirements for the animals' survival necessitate transboundary protection mechanisms as an essential method for neighboring regions to protect and manage globally- important and sensitive ecology.

The relevant initiatives and experience in existing mechanisms for transboundary conservations at national and international levels reflect that there is a general consensus that transboundary resource management has been an effective tool for promoting sound management of species, biodiversity and ecosystems. Table 6.2-1 presents major protected areas which have been suggested in the existing proposals made by four different stakeholders. In spite of the different location and boundary designs for priority protected areas, all these proposals share the same interest in the creation of transboundary protected areas. The first step suggested that the recovery and conservation is needed to provide a safe and an adequate space where tigers and leopards can settle down and successfully raise young. Establishment of a transboundary protected area in the tri-country border region will be a must for the development of a transboundary cooperation mechanism in the Lower Tumen River basin.

<Table 6.2-1> Summaries of Protected Area Design in Existing Proposals

Chinese Government (Proposals for Recovery of the Wild Amur Tiger Population in Northeast China, 2002)
• The region surrounding Shendingfeng (Eastern Wandashan Mountain) • The southernmost portion of Suiyang Forest Bureau (Laoyeling) • The Dalongling region of Hunchun (Laoyeling-Dalongling Mountains)
WCS (A Survey of Far Eastern Leopard and Amur Tiger Populations in Southwest Primorski Krai, 2003)
• Territory within Nezhinskoe hunting lease to a "no-hunting zone" • Existing protected area (two zakazniks and one zapovednik) along with proposed "no-hunting zone" will be the main protected habitat for tigers and leopards in southwest Primorye
WWF (Study on the Potential Tiger Habitat in the Changbaishan Area, China, 2010)
• Top priority protected areas: Hunchun-Wangqing and Changbaishan • Second priority protected areas: South Zhangguangcailing and Mulin • Marginal protected areas: Huadian, Northern Zhangguangcailing, Baishan Tanghua-J'ian, Lushui-Doingjiang, and Jingyu-Jiangyuan
UNDP/UNESCO (Lower Tumen River Area Transboundary Biosphere Reserve Proposal 2004)

- The core area: Kedrovaya Pad Strictly protected area, the strip of high elevation land on the Russian side between the border and the patrolled Russian border fence, the core area of the Far East Marine Biosphere Reserve (FEMBR) , the core southern area of the Khasansky Nature Park, and the core area of the Jilin Hunchun Nature reserve on the Chinese side
- The buffer Area: in the north: Barsovy Rufuge and Borisovskoye Plateau Refuge, and the town of Barabash; in the south: northern part of the Khasan Wetlands and wetlands and oxbow lakes next to the Tumen River
- The transition area: Southern Russian cluster centred on the Gamov Penisula and the northern Khasan Wetlands contiguous with the FEMBR

- **Establishment of Ecological Corridors**

Establishing ecological corridors is also considered as a critical method for conservation of wildlife animals. It is believed that ecological corridors would facilitate the protection of animals with large habitat needs by ensuring the ability of these animals to migrate and reproduce. In particular, the habitat fragmentation of the Amur Tiger population reinforces the necessity for the establishment of ecological corridors. Figure 6.2-1 and Table 6.2-2 demonstrate the four fragmentation points in the Amur Tiger habitat. Since our project only focuses on "Tumen River Population", only point 2 and point 4 shown in the map will be covered in the discussion.

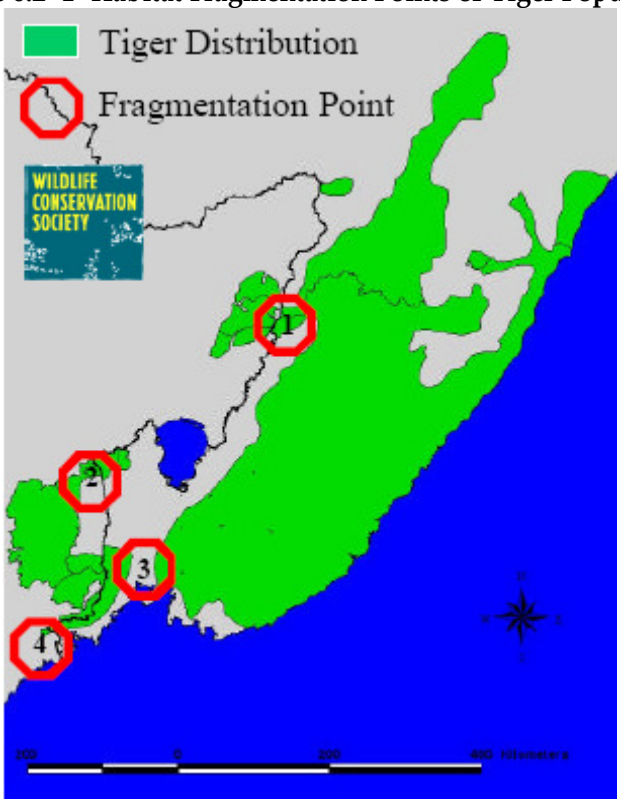
<Table 6.2-2> Fragmentation Points for Amur Tiger Population

Fragmentation Point	Areas
Point 1	between North Primorsky Krai and Wandashan
Point 2	between Pogranichny and Southwestern Primorye
Point 3	between Hunchun/Ussurisk/Khabarovsk and Southwest Priorsky Krai
Point 4	between Hunchun and DPRK

Source: author made based on information from Dale Miquelle and Zhang Endi[10]

[10] Dale Miquelle and Zhang Endi.(2002) *"A Proposed International System of Protected Areas for Amur Tigers,"* WCS Russia and East China Normal University

<Figure 6.2- 1>Habitat Fragmentation Points of Tiger Populations



Source: Michiel Hotte (2003) "Amur Leopard and Tiger Conservation in a Social and Economic Context," Zoological Soceity of London/Tigers Foundation and Amur Leopard and Tiger Alliance (ALTA)

Fragmentation point 4 indicates that tigers in Northern Laoyeling and Pogranichny Raion may already be isolated from the Sikhote-Alin population. This fragmented population presently consists of approximately 9-15 animals, with the majority in Southwest Primorye. Leopards and tigers can only move between Pohranichny Rayon and SW Primorye (Jilin Hunchun along the Khasan border) through a corridor of remaining habitats in Heilongjiang province and Jilin province in China. Fragmentation point 2 reveals an increasing threat from small towns and roads crossing from Russia going south into Jilin and west towards Harbin in the Chinese territory of the border. Fragmentation point 3 is due to the development program including road and rail track construction from Ussurisk/Khabarovsk to Vladivostok, which may isolate tiger populations that inhabit Hunchun-Ussurisk, from the Sikhote-Alin metapopulation. The barrier for tiger population migration around the Hunchun-DPRK border area is reflected by fragmentation point 4, which is attributed to the road linking Hunchun to the DPRK

As shown in Table 6.2-3, stakeholders have already proposed the development of ecological corridors to link together fragmented tiger habitats. Major proposals argued that besides transboundary protected areas, ecological corridors are also needed for protection of tigers and leopards, because they could ensure a long-term recolonization of tiger and leopard populations in the Tumen River basin. Ecological corridors would provide a gateway through which an exchange of individuals and genetic material would be possible. Ecological corridors

also will act not only as a travel corridor for tigers and leopards, but as an ecological linkage for all components of the mountainous ecosystems of this tri-country region. Therefore, recovery of Tumen tiger and leopard populations are largely influenced by the connectivity of subpopulation in the tripartite region surrounding the Tumen River by ecological corridors.

<Table 6.2-3> Major Proposals for the Establishment of Ecological Corridors

Chinese Government (Proposals for Recovery of the Wild Amur Tiger Population in Northeast China, 2002)
• The ecological corridors among the Russian Federation, China and DPRK in Laoyeling-Dalongling Mountains • The ecological corridor between eastern Wandashan Mountains and tiger habitat in Russia via the Strelnikov Range • The ecological corridor between the southern and northern parts of Laoyeling Mountains • The ecological corridor between laoyeling Mountains and Zhangguancailing Mountains
WCS (A Survey of Far Eastern Leopard and Amur Tiger Populations in Southwest Primorski Krai, 2003)
• The southern territory along with Hunchun Reserve in China should act as an ecological corridor connecting southwest Primorye with the Korean Peninsula and eastern Jilin Province
WCS (A Proposed International System of Protected Areas for Amur Tigers, 2003)
• The Tumen River Corridor • The Laoyeling Corridor • The Zhangguangcailing Corridor
WWF (Study on the Potential Tiger Habitata in the Changbaishan Area, China, 2010)
• The southern territory along with Hunchun Reserve in China should act as an ecological corridor connecting southwest Primorye with the Korean Peninsula and eastern Jilin Province

- **Increase in the Prey Density**

Tigers and leopards need sufficient prey to settle down and breed young, and their home range adjusts to prey biomass. The preferred prey species of tigers and leopards are presently facing rapid population shrinkage, as a result of reduction in suitable habitats and over-hunting. The size of the suitable habitat for prey species of tigers and leopards has experienced a big decrease due to continuous, long-term logging activities. For example, of the key prey species for tigers, wild boar relies heavily on the Korean pine nuts for winter forage. The loss of the Korean pine forests resulted in making the habitat unsuitable for supporting the wild boar. Over-hunting of ungulates driven by the great interest in Chinese traditional medicine market has also rendered tigers and leopards short of food. For instance, 250-300 ungulates are the absolute minimum allowable to ensure normal living conditions for an adult Amur Tiger. The large-scale hunting of red deer and roe for their antlers, penis and placenta forced tigers to abandon their preferred habitat to obtain prey in other places.

- **Anti-poaching/Law Enforcement**

  Poaching damages the tiger and leopard population in two ways. First, poaching reduces the population numbers. When the decline reaches a certain level, self-recovery for the population becomes difficult. Second, poaching destroys the balance of population structure. Targeting large adult leopards and tigers for fur and bones breaks the age structure of their population. The distortion of the population structure could sharply reduce the possibility of reproduction. Poaching in North-East Asia is mainly driven by the potential profits derived from sales of skins and body parts of tigers and leopards. Tiger bones have been regarded as muscle strengtheners and a treatment for rheumatism in traditional Chinese medical science. Commerce in traditional patented medicines, put millions of units of tiger parts into international trade in early 1990s. Other tiger parts – including claws, teeth and whiskers – are also believed to provide good luck and protective powers. Moreover, clothes made of leopard skins also generate demand in Asian markets, especial in Russia and Northeast China with their cold winters. Demand for tiger and leopard skins is further exacerbated by growing human population and increasing levels of wealth.

  Amending wildlife protection laws and regulation is an essential measure to prevent illegal hunting. Table 6.2-4 indicates that the Chinese government has implemented a number of laws to improve the anti-poaching activities for tigers and leopards from early 1980s to early 1990s. For example, one effective law was *Prohibition of Trade in Rhinoceros Horn and Tiger Bone (NPTR&T)* issued on May 29, 1993 (Box 6.2-1 presents the major measures adopted by NPTR&T). In the following six years, the National People's Congress, the State Council, the People's Congress at local levels and government agencies at various levels have all discussed law enforcement efforts with a view to banning completely the trade in tiger bone and rhinoceros horn. All tiger bone stock within the Chinese territory was registered and stored up in state locations since 1993 and has not been transferred (Shown in Table 6.2-5)

<Box 6.2-1> Measures for the Prohibition of Trade in Rhinoceros Horn and Tiger Bone

- All internal and international trade of tiger bone is strictly prohibited, including trade in any identifiable parts and derivatives, medicines containing tiger bone, art work and all products which are claimed to contain the ingredients of tiger bone
- Transporting, carrying, and posting tiger bone is strictly prohibited
- The pharmaceutical criteria for tiger bone are cancelled, and the pharmaceutical use of tiger bone is prohibited
- Research on a pharmaceutical substitute is encouraged

Source: Author made based on Meng Xianlin and Zhao Baoguo (2002) [11]

11 Meng Xianlin and Zhao Baoguo (2002) *"Trade Prohibition of Tiger Bone and Related Issues,"* Endangered Species Import and Export Management Office and People's Republic of China

<Table 6.2-5> Stock of Tiger Bone

Province	Tiger Bone (kg)	Date
Beijing	80.4	25-01-1994
Shanghai	13.319	27-11-1993
Guangdong	41.6	11-01-1994
Sichuan	49.7	17-01-1994
Hubei	150.8	20-11-1993
Heilongjiang	138	01-02-1994
Total	625.429	25-01-1994

Source: Author made based on Meng Xianlin and Zhao Baoguo (2002)

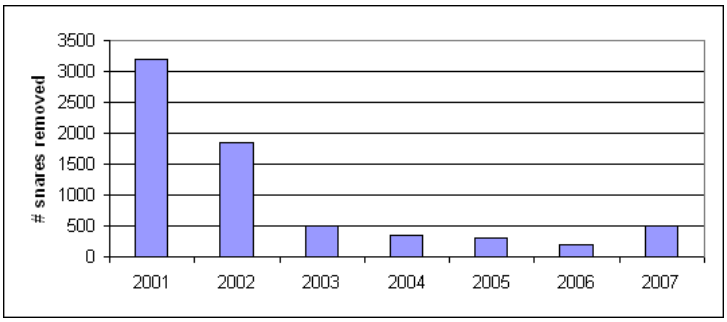
<Table 6.2-4> Selected Law Enforcement Activities Related to Tiger/Leopard Protection for the Chinese Government

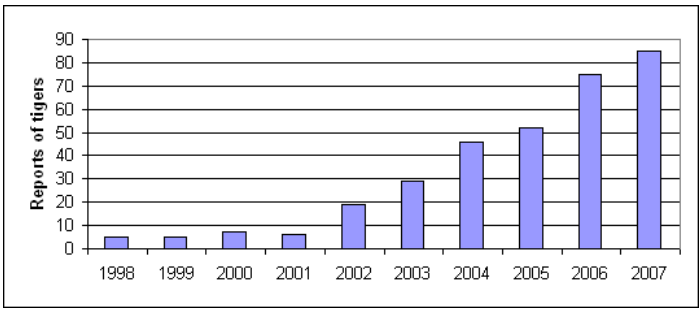
Date	Law Enforcement Activities for the Chinese Government
1983	Joining CITES
1988 Nov. 8	Wild Animal Protection Law
1988 Nov. 8	National People's Congress Standing Committee on the Punishment for crimes related to killing of state protected , precious and endangered wildlife - Supplementary Provisions
1989 Jan.14	List of National Key Protected Wild Animals
1990 Dec.15	Notice on Severe Punishment for Illegal Hunting, Purchasing, Resale and Smuggling of Wildlife
1992 Feb.12	Regulations for Protecting Terrestrial Animals
1993 May 29	Prohibition of Trade in Rhinoceros Horn and Tiger Bone (NPTR&T)

Source: Jilin Wildlife Conservation Administration (2010) "Achievement and Prospect for Wild Amur Tiger Population Protection,"

On top of law enforcement, the snare removal campaign made an extremely significant contribution to anti-poaching efforts. It is believed that widespread snares were killing both prey species and tigers and leopards. The snare removal event initiated by WCS, clearly demonstrated that the decline in snares in the reserve coincides with the increase tiger reporting (Shown in Figure 6.2-2)

<Figure 6.2-2> Snares Removal and Tigers Reports[12]





Source: WCS: http://www.wcsrussia.org/Projects/ChinaRussiaTransboundaryProgram/

- **Improvement of Forestry Management**

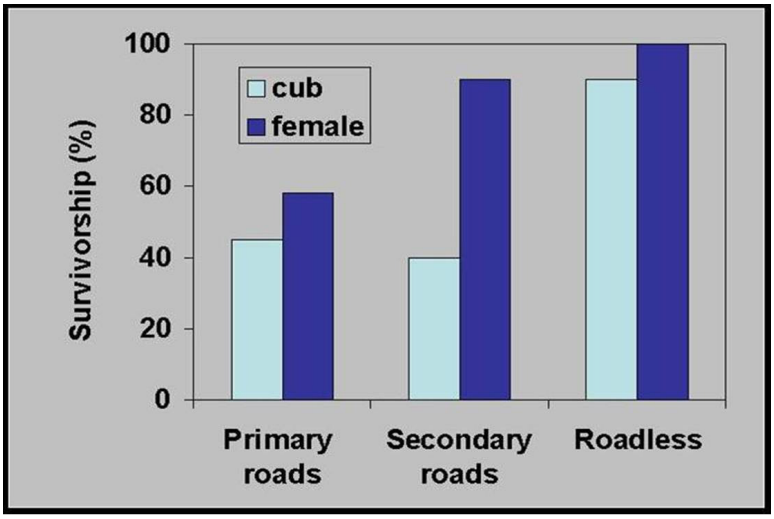
  Amur Tigers are commonly found in Korean pine-mixed deciduous forests while Amur Leopards prefer fir-spruce-pine-broadleaved and broadleaved forests on low mountain slopes. As a result, forestry management has major impacts on the habitat conservation for tigers and leopards. Habitat loss shrinks the landscape for tigers and leopards to live in and that of their prey hampering the reintroduction of tigers and leopards.

  Declines in habitats for tigers and leopards are attributable to unsustainable logging harvesting, road construction, and forest fires. To improve the tiger/leopard friendly forestry management, one measure is to shift the type of harvest from natural forestry to forestry plantation. A long-term attempt (1998-2050) called the "Natural Forests Conservation Project" has been launched by the State Council of China in 1997, with the aim to prevent further degradation of the forest ecosystems, protected forest biodiversity, and reduce logging intensity.

  In addition, forbidding road construction in mountain areas for natural forestation, will ensure suitable habitat for tigers and leopards. From 1992 to 2000, WCS studied the fates of radio-collared Siberian tigers living in areas with no roads, secondary roads and primary roads. The result[13] shows:

  - 100% survival rate for adult tigers living in areas with no roads
  - 89% survival rate for adult tigers living in areas with secondary roads
  - 55% survival rate for adult tigers living in areas with primary roads

[12] Figure source: WCS website:
http://www.wcsrussia.org/Projects/ChinaRussiaTransboundaryProgram/tabid/1462/language/en-US/Default.aspx
[13] Data and figure from WCS website
http://www.wcsrussia.org/Species/AmurTigers/ConservationThreats/tabid/1468/language/en-US/Default.aspx

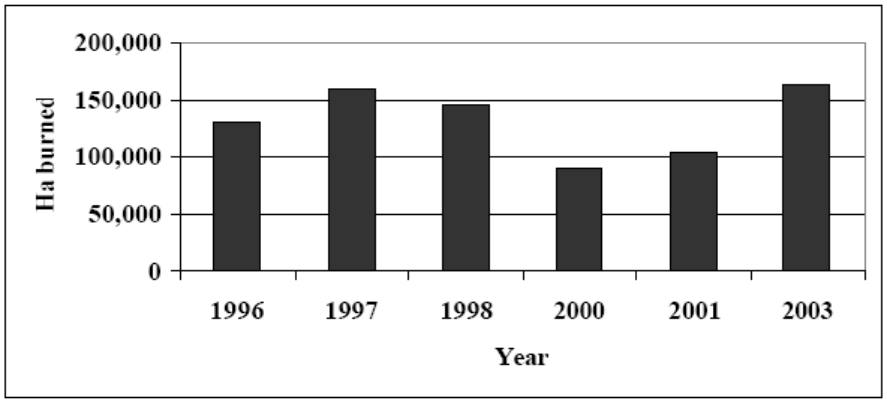


This study argued that roads not only allow greater access for poachers to tigers, leopards and their preys, but also increase animal mortality rate from vehicle collision. It also claimed that roads increase the probability of accidental encounters between animal and people, leading to tigers or leopards being shot out of fear or opportunity. For example, the road linking Hunchun to DPRK port is the primary threat that may act as a barrier to dispersal of tigers in the area. Many stakeholders have proposals to eliminate the barrier and create an ecological corridor in the region to facilitate the population exchange and reproduction.

The use of fire to increase the land productivity by farmers also puts pressure on forestry management in protected areas. Fire will cause the forest to retreat, reducing the area of quality tiger/leopard habitat. Tigers and leopards will avoid areas that have burned, as they provide neither adequate cover for hunting, nor the habitat needed for prey. One example comes from the forest habitat in Southweast Primorye which experiences the highest annual rainfall in Russia. However, only approximately 57% [14] of SW Primorye remains forested due to long and frequent fire history. Figure 6.2-3 indicates that approximately 113,000 ha area was burned in Southwest Primorsky Krai, representing 12-22% of the total area of the region. Shown in Figure 6.2-4, the border area surrounding the Lower Tumen River basin experienced the highest fire frequency in Southwest Primorye from 1996 to 2003. With repeated fires over time, the mature trees begin to die out and the forest slowly is being converted to grassland. Once meadows and scrublands are created, fires become even more frequent and intensive and this ensures that recovery of a forest stand becomes extremely unlikely. As a result, deliberate and accidental fires become a huge threat for habitats of tigers and leopards in the region.

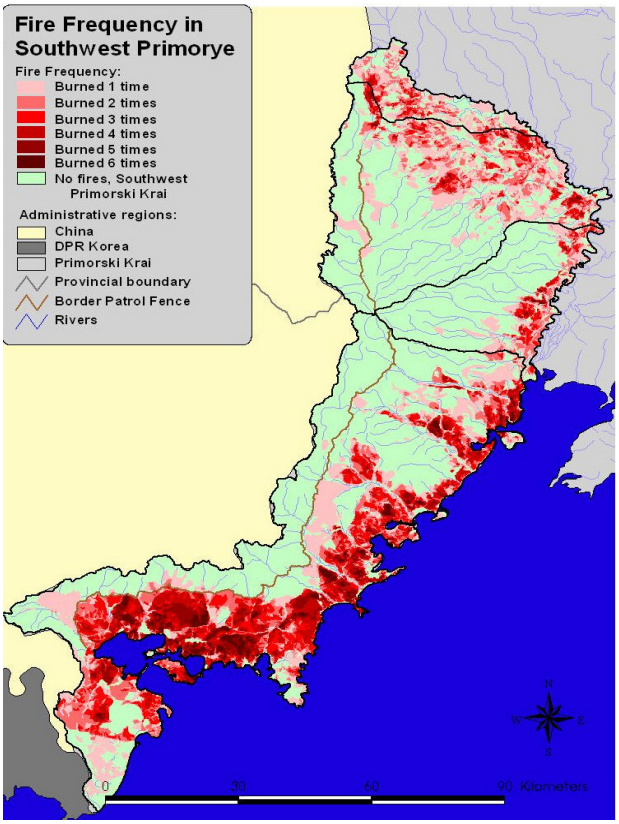
[14] Michiel Hotte (2003) *"Amur Leopard and Tiger Conservation in a Social and Economic Context in a Social and Economic Context"*

<Figure 6.2-3> Total Number of Hectares Burned in Southwest Primorsky Krai (1996-2007)



Source: Miquelle, D. G et al (2004) "An Analysis of Fires and Their Impact on Leopards in Southwest Primorye," Tiger Foundation and WCS

<Figure 6.2-4> Frequency of Fires in Southwest Primorsky Krai (summed over 6 years for which satellite imagery was available between 1996 and 2003)



Source: Miquelle, D. G et al (2004) "An Analysis of Fires and Their Impact on Leopards in Southwest Primorye," Tiger Foundation and WCS

- **Public Educational Activities**

  In order to raise the awareness of wildlife conservation and anti-poaching, public education activities become a critical method. These activities might include: the significance of protecting wildlife, a description of animals protected by the law, information on the punishments for breaking the law and case studies of previous poaching activities. The targeted audiences should be professionals of traditional Chinese medicine, students in elementary school and middle school, and potential fur buyers. Public education could influence professionals of traditional Chinese medicine to change their attitudes and practices so as to reduce the use of tiger ingredients and find alternatives to the medicines. Compared with adults, it is probably easier to enhance the consciousness of wildlife conservation for students in elementary schools and middle schools. Thus, school students should also be the targeted audiences in the public education activities. Table 6.2-6 presents major public education activities in tiger habitats for the past decade, which indicates that both government agencies and international organizations consider that raising public awareness is one of the essential ways to improve conservation work.

<Table 6.2-6> Summaries of Major Public Activities[15]

Date	Location	Activity Title	Activity Summary	Sponsor
2010 Sep.24	Vladivostok City, Russia	Tiger Day Festival	The Phoenix Fund organized the first Tiger Day Festival in Vladivostok and within a year it developed into a wonderful autumn festival that is celebrated across the country, from Moscow to Vladivostok. The festivals attract people's attention to the most burning issues of wildlife conservation in the region, as well as give them an opportunity to participate in their resolution	The Phoenix Fund
October 2004 and August 2005	Hunchun City, China	Training Workshop for Village leaders	More than 50 leaders from various villages attended the workshops. During the workshop information about tigers, leopards and their conservation was provided to the village elders, who also discussed possible methods of diminishing wildlife human conflicts with WCS and the reserve staff	21st CT
2006	Hunchun City, China	"Model School" Education Conservation Program	Schools that join the programme sign an agreement in which they promise to improve conservation awareness among the pupils of the school. The schools organize conservation events and integrate conservation	WCS, the Hunchun Nature Reserve and the education department of the Jilin forest bureau.

[15] Information Source: Michiel Hötte (Tigris Foundation) and Eve Li (WCS China) Amur tiger conservation in China Final Report to 21st Century Tiger (January 2006); The Phoenix Fund. Protection and Outreach Activities in tiger habitat in 2006 Final report (January 01 – December 31, 2006)

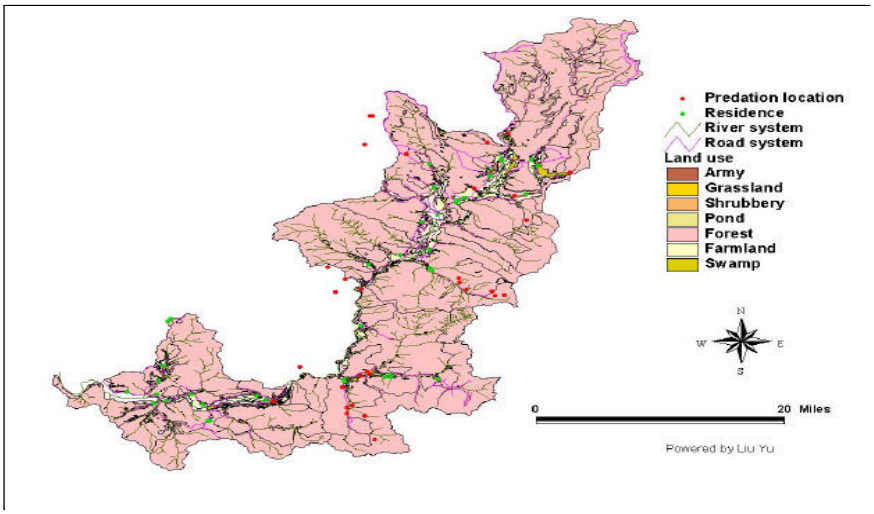
April and July in 2004 and during the same period in 2005	Hunchun City, China	An essay contest for school children	For each contest approximately 350 essays were selected from all primary and secondary schools in Hunchun. After each of the two contests, 20 children received a first prize, 40 a second prize, and 40 an encouragement prize. Twenty teachers /schools received a reward for their involvement in the organization of the contest. The prizes were mainly books, and the average value of the prizes was about US$ 6	Hunchun Nature Reserve Conservation and Management Bureau

Source: Michiel Hötte and Eve Li (2006) "Amur tiger conservation in China Final Report to 21st Century Tiger" Tiger Foundation and WCS China; The Phoenix Foundation (2006) "The Phoenix Fund. Protection and Outreach Activities in tiger habitat in 2006 Final report, January 01 – December 31, 2006," The Phoenix Fund

- **Compensation Scheme/Community Development**

  Due to reduction in prey, tigers and leopards sometimes are compelled to turn to domestic and semi-domestic animals as their food for survival. Figure 6.2-5 presents the livestock predated by Amur Tigers and Amur Leopards between May 2002 and October 2004. The depredations occurring on cattle, horses, and dogs imposed burdens on local people who cannot afford the loss of valuable livestock. The compensation scheme could decrease the conflicts between human and tigers/leopards, before sufficient prey can be reintroduced in the regions. Moreover, the depredation compensation program could be the most readily and quick way to avoid unnecessary backlash from the local populace.

<Figure 6.2-5> Location of the livestock predations (May 2002 to October 2004)



Source: The Phoenix Fund (2006) ". *Protection and Outreach Activities in tiger habitat in 2006 Final report (January 01 – December 31, 2006)"*

Before 2006, there was no formal compensation procedure for dealing with conflicts between local villagers and Amur Tigers or Amur Leopards. However, local governments as well as international organizations made compensation payment for several incidents occurring in Hunchun and Jiaohe (shown in Table 6.2-7)

<Table 6.2-7> Selected Compensation Payments for Livestock Predation Incidents[16]

Date	Animals and Numbers	Location	Value	Compensation	Funding Provider
1998 Jan	4 Cattles	Shuangshan Village, Jiaohe City	5,345 Yuan	70% Compensation: 770 Yuan, 945 Yuan, 976 Yuan and 150 Yuan	Jiaohe City Administration
1999 May	3 Horses	Yangmulinzi	3,290 Yuan	30% Compensation: 980 Yuan	Jiaohe City Administration
1999 Sep-2000 Oct	24 deer, 1 horse, 4 cows	Khasansky Raison	Unknown	11,233.6 Yuan	The Phoenix Fund

In October 2006, the Jilin Provincial Government issued *The Remedy Measures for Damage Caused by Key Protected Terrestrial Wild Animals to Personal Property in Jilin Province* and issued the implementing rules of this remedy measure in January 2007. The provincial government also established the *Jilin Provincial Office for the Compensation Management for Personal Property Damage Caused by Terrestrial Wildlife*. The office reported that 933 incidents were compensated by 2007 and the total payment was 2,476,000 Yuan (371,214 USD). Livestock predation incidents caused by tigers accounted to 51, which were compensated at 213,000 Yuan (31,834 USD). In the end of 2007, the office issued 18,000 sets of brochures and launched public training programs which informed local people the principles, procedures, and standards for compensation application.

Community development programs could create alternative ways for local people to make income, rather than relying on activities that may harm the protection of tigers and leopards. Sales of forestry products, like timber, acorn, and deer body parts, are main income sources for many local people in this area. For example, deer farming, one important income source for people in Primorskii Krai, restricts the access to prey species for tigers and leopards. Dear farming confines several hundred deer within large fenced territories in order to harvest their antlers for medicinal purposes each year. The community development programs could help local people develop other careers instead of deer farming. By doing so, those deer can be used to feed tigers and leopards so as to offer them adequate food to breed and raise young.

- **Monitoring System**

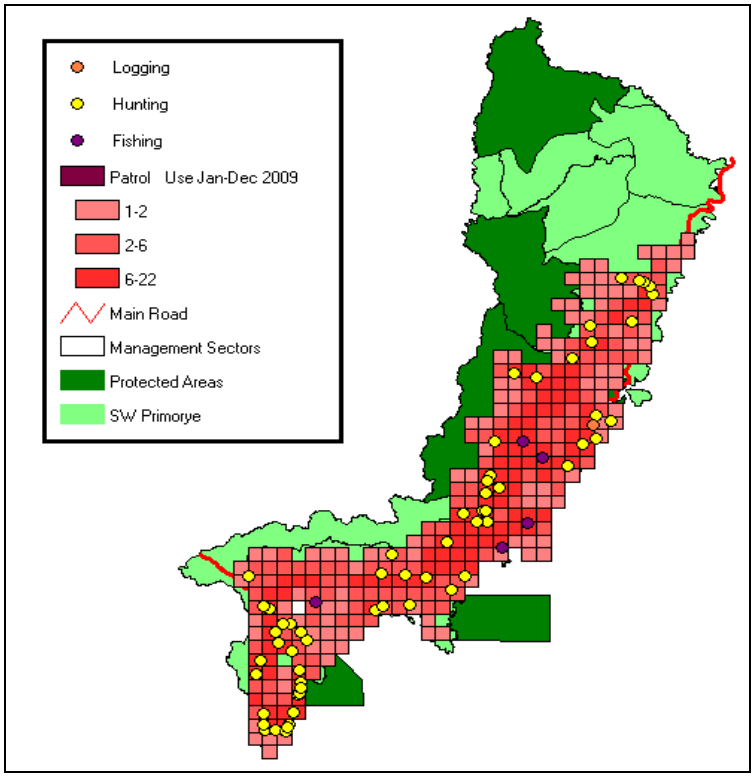
  Monitoring plays essential roles in obtaining precise data for surveys and scientific studies, as well as strengthening anti-poaching activities. However, the rarity, sparse distribution and secretive nature of tigers and leopards make the monitoring work dramatically difficult,

[16] Source: Li Tong Impact of Tigers and Leopards on Livestock and a Livestock Compensation Program. Jilin Wildlife Investigation Team; Sergei Beregei Bereznyuk (Phoenix Fund, Russia) and Michiel Hotte (Tiger Foundation, Holland). A Compensation Program in Khasan Raion, Russia Far East

unreliable and expensive. Since the primary productivity and prey densities are low in Russia and Northeast China, subsequently the home range sizes of tigers and leopards are even greater than the average. According to studies conducted by WWF, each female requires approximately 400 km^2 of non-overlapping habitat with adequate prey to survive and raise healthy cubs. To solve these difficulties, strong patrol teams, well-developed monitoring technologies and efficient monitoring management are required.

The Russians have already developed excellent monitoring systems and conducted a series of excellent surveys with the help of the monitoring system, such as the annual survey of Amur Tiger and Far Eastern Leopard since the early 1990s. In addition, WCS Russia is presently applying MIST (Management Information SysTem), a GIS (Geographic Information System) database, into the monitoring work. MIST allows the comparison of effectiveness between teams, conservation sites and time periods based on the standardized indicators, as well as the ability to show location and frequency of event occurrence on the map. For example, Figure 6.2-6 made by MIST demonstrates those areas where numerous violations were discovered relative to the patrol intensity, deserving a continued or increased attention from patrol teams.[17] In order words, MIST could reveal the mistakes or weakness of anti-poaching activities and thus enable patrol teams to correct and improve their work.

<Figure 6.2-6> Violations and patrol intensity in SW Primorye in 2009



Source: Michiel Hotte et al, "Monitoring the Effectiveness of Anti-Poaching Patrols with MIST" WCS Russia

[17] Michiel Hotte etc. Monitoring the Effectiveness of Anti-Poaching Patrols with MIST.

WCS China established Amur Tiger protection monitoring stations in Raohe County and Dongning County, and monitoring units in Anningxiaobeihu, Jidongfenghuangshan and Hulinzhenbaodao in Jilin Province. From 2005 to 2006, Heilongjiang Forest Industry Bureau with the cooperation of WCS China developed a plan for Wild Amur Tiger monitoring. Consequently, eight key monitoring units, Qiyuan, Wulindong, Dadai, Wupao, Sanxinshan, Yeshuhe, Nuanquanhe and Shuangqiaozi, have been established in Heilongjiang Province.

- **Establishment of Coaching Program for Field Work/Technical and Training Assistance**

  It is evident that developing coaching programs for the field work and technical training should be an important and indispensable component of a recovery plan for tiger and leopard populations. It could facilitate experience sharing between experts and improve the monitoring system, anti-poaching activities and international cooperation. The Chinese have started to support the development of coaching programs to gain experience from the experienced Russian experts and receive help from professional organizations. Major training programs developed in China are:

  - In 2002 WCS and the Hunchun Nature Reserve held International Workshop for Monitoring of Wild Amur Tiger and Prey Species (Ungulates)
  - In 2005 WCS and Heilongjiang Forest Industry Bureau held a Training Program for Monitoring of Wild Amur Tiger
  - In Feb., 2007 WCS and the Hunchun Nature Reserve held a Sino-Russian Training Seminar for Amur Tiger Monitoring
  - In May, 2008 WWF and Changbaishan Nature Reserve held Management Training for Resource Monitoring in the Changbaishan Nature Reserve.

  In addition, WCS China introduced MIST and GIS GPS into the Hunchun Nature Reserve, which was implemented in May, 2008. In November 2008, WCS conducted a MIST training program for the front-line patrol officers and also contributed GPS, compass, camera, binoculars, clothing, and other patrol equipments to six protection stations in the Hunchun Nature Reserve.

- **Strengthening International Cooperation**

  The establishment of transboundary protected areas and ecological corridors in the tri-country region will depend significantly on cooperative efforts on connecting protected areas on all sides of the international boundaries. Therefore, international corporation and regional conservation plans are extremely critical for protection activities in transboundary areas.

  In particular, recovery of northeast China's tiger and leopard populations is largely affected by the connectivity with tigers in Russia. Under present conditions, the scattered individuals in Jilin and Heilongjiang do not represent a viable breeding population of tigers and are likely to go extinct without emigration from Russia. If habitats are protected in China along the China-

Russia border, and ungulate populations increase, emigrating tigers will establish permanent residence in China, and, as protection increases and prey population reaches sufficient densities tigers will begin to reproduce. Long-term viability of tigers on both Russian and Chinese side will be greatly enhanced if tigers are managed jointly as a single transboundary unit.

A formal transboundary protection agreement signed by the Jilin Provincial Forestry Department of China and two Russia agencies –the Wildlife and Hunting Department of Primorsky Province and Special Inspection "TIGER" of Russia (official name of the Bureau on Protection of Rare and Endangered Species of Flora and Fauna)[18] has been realeased recently. It is believed that this agreement will eventually facilitate the establishment of a transboundary protected area encompassing the border region between Jilin province in China and the neighboring Primorsky province in Russia. Although this is only a provincial level agreement, it will provide encouragement and inspiration for the future country-level transboundary cooperation mechanisms.

- **Improvement of Management capacity/Institution Arrangement**

  The complicated nature of international cooperation requires the improvement of management capacity of stakeholders involved in the cooperation. Institutional arrangements and management capacity serve as foundation for transboundary mechanisms to implement the specific programs mentioned above (or any additional Aur Tiger and Amur Leopards protection). Appropriate institutional arrangements lay the groundwork for an effective management capacity of management bodies of a transboundary cooperation mechanism.

  The practice guidelines introduced by the World Commission on Protected Areas (WCPA) for the design of transboundary protect areas, suggest the adoption of certain principles when creating the institutional arrangement and management structure for the transboundary cooperation scheme. The principles are:

  - Identifying key stakeholders and the common values
  - Involving the interest of local level
  - Identifying the authority and obligation for each agent
  - Creating sustainable funding scheme
  - Establishing monitoring, reporting and assessing system
  - Dealing with tension and conflicts
  - Creating efficient communication mechanism

  In particular, UNESCO/UNDP provided a detailed proposal for the institutional mechanisms in *the final report of the Lower Tumen River Area Transboundary Biosphere Reserve Proposal*. Establishment of a Lower Tumen River Area TBR Coordination Council is the foundation for developing the transboundary cooperation mechanism. The main principles recommended by the report are:

[18] WWF Website: http://wwf.panda.org/wwf_news/?uNewsID=194700

- Identifying representation of China, the Russian Federation and DPRK for the Coordination Council

  The council comprises seven representatives from each country, representing various administrative units, scientific institutions, as well as the protected area authorities, local communities, non-government organization and the private sector.
- Confirming the Frequency of Meetings

  The Coordination Council meets at least twice per year, meeting alternatively on Chinese territory at Hunchun and on Russian territory in Khasan District.
- Authorizing the Organization of Meetings

  Organization on the Chinese side would be by the Hunchun Nature Reserve while on the Russian side the intermediary non-government organization, WWF RFE (owing to the fact that there are five protected areas).
- Identifying Responsible Persons

  In the holding and operation of the Coordination Council, one person will be designated on each side to act as a focal point.
- Ensuring Fund Raising

  Both national organizations, as well as the Coordination Council itself, would separately seek to raise funds for the operation of the Coordination Council and its events as well as for the proposed TBR.
- Establishment of the Thematic/Working Groups

  Other TBR Coordination Councils have complemented their operation by establishing specialized thematic or working groups, on an ad-hoc basis, in order to create a platform for discussion among specialized stakeholders from the concerned countries.

  On top of this proposal, the trilateral agreement for the Daurian International Protected area as well as the agreement on the Khanka-Xingkai Lake International Nature Reserve will also offer great experience for institutional arrangement and improvement of management capacity for the transboundary cooperation mechanism for tiger and leopard protection in the Lower Tumen River basin. A mixed commission was developed for the Khanka-Xingkai Lake International Nature Reserve to make protection plans and implement conservation projects. Appendix I and II list the working instruction and 2009-2010 work plans for the mixed commission of the Khanka-Xingkai Lake International Nature Reserve. These two documents could serve as references for the institutional arrangement of the transboundary cooperation mechanism in the Lower Tumen River basin.

7. Conclusion

There is no doubt that the development of a transboundary cooperation mechanism is essential to Amur Tiger and Amur Leopard protection in the Lower Tumen River basin. The Hunchun Expert

Group Meeting to be held on 2-4 November intends to facilitate discussions among key major stakeholder groups on the needs and approaches to cooperation mechanisms. The meeting is also expected to provide concrete guidance for the implementation of the project that would focus on the following key issues of analyses and consultations among stakeholders:

- Mechanisms and outcomes of joint work in the Daurian International Protected area and the Khanka-Xingkai Lake International Nature Reserve
- Protected areas to be involved and the ecological corridors to be developed in the Transboundary Protected Area of the Lower Tumen River basin
- Methods on reducing poaching activities of Amur tigers and leopards and their preys
- Land use planning in the Lower Tumen River basin and forest recovery plan
- Public education programs to raise public awareness on wildlife conservation
- Joint monitoring and training
- Compensation schemes and alternative income sources for local communities
- Mechanisms for sharing and exchanging information regarding experience on conservation work and institutional arrangement among the stakeholders
- Funding schemes for implementation of activities under the designed framework for transboundary cooperation
- Communication mechanisms and governing-bodies to facilitate coordination and harmonization via transboundary cooperation.

APPENDIX I The Working Programme for the Mixed Commission of the *"Agreement between the Government of the Chinese People's Republic and the Government of the Russian Federation on the Bilateral Cooperation of the Lake Khanka-Xingkai Nature Reserve"*

General Principles

1. According to the agreement between the Government of the People's Republic of China and the Government of the Russian Federation on Lake Khanka-Xingkai Nature Reserve (here in after referred to as Agreement) signed on April 25, 1996, China and Russia established the mixed commission.
2. The mixed commission will work in accordance with the agreement and the working instruction.

Responsibility

1. The mixed commission is responsible for coordination between China and Russia in implementing the Agreement. It will also supervise and evaluate the coordinated protection work in the reserve.
2. The mixed commission will guide and coordinate the two countries to:
   - promote bilateral cooperation on Lake Khanka-Xingkai Nature Reserve
   - protect the biodiversity and manage the natural resources in the reserve
   - improve the policy and law of Lake Khanka-Xingkai Nature Reserve
   - Promote the publicity of Lake Khanka-Xingkai Nature Reserve
   - support eco-tourism in the reserve
   - organize and conduct scientific research in the reserve

Executive Committee

1. The committee has two Chairmen, one from each country. The Chairmen implement the Agreement in their respective countries. The two chairmen are selected from representatives of the executive body of the commission.
2. Each country appoints its own secretary-general who is in charge of communication and coordination among commission departments
3. Both countries should inform each other about its personnel appointments and changes one month before the mixed commission meeting.

Work Form for the Mixed Commission.

1. The mixed commission meeting will be held alternatively in China and Russia once every two years. The host country Chairman presides over the meeting as the Executive Chairman. .
2. Meetings should be confirmed and meeting topics should be identified one month before the actual event.

3. Each meeting will discuss and evaluate progress over the last two years as well as setting the agenda for the coming years. Other issues of common interest may also be discussed.
4. Meeting minutes will be signed by both sides at the end of each mixed commission meeting. The meeting minutes should be in both Chinese and Russian.
5. Expenses related to documents copies, transportation and meeting room reservation will be covered by the host country, while international travel and board expenses are not.

Subsidiary bodies

Each side establishes its own working groups (one or more). The group leaders for both sides will be appointed by the mixed commission, who are in charge of implementing work plans, facilitating communication, reporting project progresses to the mixed committee.

The Supplementary Instruction

1. This working instruction was approved by the mixed commission in the first conference.
2. Any complementation or modification for this working instruction has to be discussed in the mixed commission meeting. None of them is valid until receiving approval from the commission.

APPENDIX II 2009-2010 Cooperation Plan for Khanka/Xingkai Lake International Nature Reserve

The Khanka/Xingkai Lake, a transboundary lake shared by the People's Republic of China and the Russian Federation, is the largest freshwater lake in Northeast Asia. The agreement between the Chinese People's Republic and the Government of the Russian Federation on the Bilateral Cooperation of the Lake Khanka-Xingkai was signed in 1996, which promoted the Khanka-Xingkai Lake to an International Nature Reserve.

To strengthen the cooperation on conducting surveys, developing the monitoring system, expanding public education programs, facilitating environmental protection, promoting biodiversity conservation, and improving economic development in the Khanka/Xingkai Lake International Nature Reserve, the mixed commission proposed the 2009-2010 work plans.

2009 Work Plan

1. Holding the first commission meeting to establish the China - Russia Khanka/Xingkai Mixed Commission and finalize the working instruction. The meeting time will be approximately in the end of March.

2. Conducting cooperated researches on the Khanka/Xingkai Lake. Chinese and Russian researchers will conduct a survey on Red-Crowned Crane inhabiting the Chinese territory around Lake Khanka/Xingkai. The survey time will be between April and June and it will last for 15 days.

3. Launching public education programs in schools and local communities during the ecological festival on April 25.

4. Making brochures for Lake Khanka/Xingkai Nature Reserve. Creation of a comprehensive map for the Khanka/Xingkai Nature Reserve and publishing in Chinese and Russian between June and October.

5. Evaluating the development of the tourism industry in the Khanka/Xingkai Lake and submitting the evaluation report to the commission between June and November.

6. Preparing the long-term work plan for cooperation between Russia and China in the Khanka/Xingkai Lake Nature Reserve. This work plan is scheduled to be finished by 2010.

7. Facilitating information exchange between protected areas in the Khanka/Xingkai Lake Nature Reserve

2010 Work Plan

1. Organizing the monitoring seminar on key bird species, especially cranes, protection in Lake Khanka/Xingkai. The seminar will be held in the Russian side of the Khanka/Xingkai Lake and time will be in March. Four people from each country will attend.
2. Chinese and Russian scientists will conduct a 15-day survey on the crane species in Lake Khanka/Xingkai between April and June.
3. Launching campaigns for the protection of the Khanka/Xingkai Lake Nature Reserve during the ecological festival on April 25th.
4. Preparing the wildlife directory for the Khanka/Xingkai Lake Nature Reserve.
5. Facilitating the visiting staff exchange between China and Russia to share experience on protection and management practices. The exchange program will last for 15 days between January and December (7 days in China, 7 days in Russia and each staff group has 6-8 people)
6. Sending ornithologists and staff (2-3 people in total) from China and Russia to coordinate a fall bird migration survey. The survey will last for 10 days between September and October.
7. Conducting a feasibility study for the development of an international eco-tourism industry in the Khanka/Xingkai Lake region
8. Facilitating the information exchange of protection practices between China and Russia