

North-East Asian Subregional Programme for Environmental Cooperation (NEASPEC)

Project Concept Note

1. Overview

1. Project Title	Study on Transborder Movement of Amur Tigers and Leopards using Camera Trapping and Molecular Genetic Analysis
2. Goals	<ul style="list-style-type: none">• Strengthen scientific understanding and analysis capacity of Amur tigers and leopards and their habitat conditions through joint study using molecular genetic techniques;• Strengthen linkages between policy framework and scientific basis to conserve Amur tigers and leopards in transboundary areas in North-East Asia;• Provide scientific basis to protect and improve existing transboundary ecological corridors; and• Promote and strengthen bilateral, multilateral and international cooperation for Amur tigers and leopards
3. Key Expected Outcomes	<ul style="list-style-type: none">• Scientific assessment of target species status based on camera trapping and DNA analysis;• Policy recommendation for improved ecological corridor management and conservation plan; and• Knowledge transfer and enhanced capacity on molecular genetic techniques
4. Tentative Timeframe	April 2014-December 2015
5. Indicative Budget	USD 100,000
6. Lead Implementing Countries/Agencies	NEASPEC Secretariat and national institutions (<i>to be nominated by member Governments</i>)

2. Background

Amur tiger (*Panthera tigris altaica*) and Amur leopard (*Panthera pardus orientalis*), both designated as Critically Endangered (CR) under the Red List of the International Union for Conservation of Nature, have shown dramatic population reduction over the past century. Historically, Amur tiger and leopard ranged throughout the Russian Far East, northeastern China, and the Korean peninsula. Currently, however, only about 500 Amur tigers are left in the wild – 95 percent are inhabited in Sikhote-Alin Mountain area in the Russian Federation while the rest are distributed in Jilin and Heilongjiang provinces of China adjacent to the Chinese-Russian border; and there are only about 30-40 Amur leopards in the wild found in the Amur River Valley along the China-Russia Border and Ussuri River Valley along the China-DPRK border.

NEASPEC's work on Amur Tiger and Leopard: Considering the transboundary nature of habitats for Amur tiger and leopard in North-East Asia, it is essential to establish a close and efficient collaboration mechanism among all stakeholders including scientists in order to effectively monitor their status and provide scientific basis for developing effective and efficient policy measures. The NEASPEC Nature Conservation Strategy adopted by the 12th Senior Officials Meeting (SOM) in 2007 recommended several priority actions for Amur tiger and Amur leopard including: (1) encouraging and supporting range countries to work together for conservation of the species by, for instance, facilitating regular dialog with international counterpart working groups to coordinate actions or establishing international and national corridors to secure safe movement of the species, (2) providing regularly updated information of conservation status including *ex situ* population or collaboration activities, and (3) supporting range countries to work together in capacity building on habitat management, population management, monitoring and research, law enforcement, environmental education and community development, including such as establishment of genome resource bank.

To follow up the Strategy, NEASPEC implemented the project on “Establishing Coordination Mechanisms for Nature Conservation in Transboundary Areas in North-East Asia”, focusing on the conservation of Amur Tiger and Leopard between 2010-2012. Through carrying out review and consultation at national and subregional level, the project produced two reports, “Review of Environmental, Socioeconomic and Institutional Conditions and Experiences in Multi-/Bilateral Cooperation on Nature Conservation for the Amur Tiger and Amur Leopard in Transboundary Areas in North-East Asia” and “A cooperation framework for the conservation of the Amur tiger and Amur leopard in the Tumen River Area”. The Review report identified monitoring of tigers and leopards as the key agenda of conservation measures. Furthermore, it identified various available monitoring methods and techniques including photo traps, snow track counts, specialized loop-traps for catching tiger, pneumatic devices for immobilization the tiger, satellite collars, ecological niche factor analysis, resource selection functions, and molecular genetic methods. While most methods and techniques have not been fully utilized in

both China and the Russian Federation, the report indicated there is also a lack of large-scale comprehensive research using molecular and genetic methods in general.

The reports were submitted to the 17th SOM in 2012 and received an activity proposal from the Russian Government on “monitoring the transborder movement of Amur tigers and leopards by using up-to-date methods of automatic cameras and DNA analysis”, together with two other proposals on conducting “research on improvement of existing transboundary ecological corridors in protected areas located along the border of China and the Russian Federation”, and “economic and ecological feasibility study on the establishment of Komissarovsky nature reserve as a transboundary ecological corridor”. The 18th SOM then reviewed the results of NEASPEC secretariat’s preliminary situation analysis on the subject and concluded to support the proposal on monitoring which would involve the two range countries as well as the Republic of Korea and Japan.

Camera trapping: Camera trapping survey has become a routine procedure in the Russian Federation and China. Scientists in the Russian Federation have carried out extensive camera trapping and snow tracking surveys, such as using CamTraker systems. For example, camera trapping conducted during the last 10 years since 2002 in Nezhinskoe Hunting Lease and in the south-west of the Borisovskoe Plateau Wildlife Refuge in southwest Primorye, has identified 41 individual leopards and 17 individual tigers. In China, camera trappings at nature reserves including Hunchun and Wangqing have been carried out during last 10 years while the scale of such activities is relatively limited. Recently, a group of Chinese scientists was able to capture the first proof of breeding leopards in the country. Camera trappings in China also have benefited from collaboration with the Russian Federation. However, in order to accelerate the advancement of overall analytical capacity, there is a need to develop a common or harmonized analytic approach to collecting and analyzing data, identifying individuals and sketching population characteristics in the transboundary habitats.

Molecular genetic analysis: Specialized agencies and scientists in member States have carried out molecular genetic analysis (including DNA analysis) to identify history, geographic distribution, genetic diversity, population structure of tigers and leopards through genome sequencing and microsatellite analyses using tissue, blood or fecal samples. A research team in Japan has conducted research on genotypes using non-invasive samples of Amur tigers such as feces, hair and saliva, and comparison with results of snow track counts. Furthermore, Russia-China scientists have recently jointly developed advanced microsatellite analysis methods for forensic analysis, and are currently conducting collaborative genetic research on tigers and leopards. Scientists in the Republic of Korea completed the world first genome mapping of Amur tiger in 2013, which has enabled much more accurate genetic diversity monitoring and build sets of tiger lineage and diversity map with higher accuracy.

Building on the expertise and on-going efforts of the subregion in molecular genetic analysis, further collaboration among member States of NEASPEC will allow key barriers to be

addressed through filling (i) knowledge gaps in individual identification, genetic diversity, geographic distribution, genetic conditions for adaptation to the environment, etc., and (ii) science-policy gaps in utilizing results from scientific assessment with policy measures for the conservation of tigers and leopard.

3. Goals

Considering the significance of strengthening scientific knowledge on the conservation of tigers and leopards, and then incorporating such knowledge into the designing of conservation policies and programmes, this Project has the following goals:

- Strengthen scientific understanding and analysis capacity of Amur tigers and leopards and their habitat conditions through joint study using molecular genetic techniques;
- Strengthen linkages between policy framework and scientific basis to conserve Amur tigers and leopards in transboundary areas in North-East Asia;
- Provide scientific basis to protect and improve existing transboundary ecological corridors; and
- Promote and strengthen bilateral, multilateral, and international cooperation for Amur tigers and Amur leopards

4. Expected Outcomes and Activities

The project expects the following outcomes:

- Scientific assessment of target species status based on camera trapping and DNA analysis;
- Policy recommendation for improved ecological corridor management and conservation plan; and
- Knowledge transfer and enhanced capacity on molecular genetic techniques

4.1 Inception or Expert Group Meeting (EGM)

- Gathering national focal points, national and international experts, resource persons, and representatives from relevant programmes and organizations
- The EGM will:
 - Review existing experience and molecular genetic techniques related to conservation efforts on Amur tigers and leopards
 - Discuss expected outcomes and objectives, and draw up a project work plan

- Discuss scientific and technical approaches for the project, including transfer of knowledge and skills, and long term cooperation
- Explore ways in which scientific output can be translated into conservation plans and even wider policy decisions

4.2 Molecular Genetic Analysis including DNA Analysis

- Conduct DNA analysis to 1) determine demographic characteristics such as population size and trends including sex ratio and relationship between individuals, 2) monitor transboundary movement of target species, and 3) examine the genetic basis of animal adaptation and survival by complementary genetic analysis studies of feline coat color and pattern related genes
- Carry out genetic analysis through the use of the most up-to-date DNA analysis methods, and compare the results with Amur tiger genome map for more effective analysis
- First phase (April-December 2014)
 - Utilize existing samples including newly collected during the previous winter period (2013-2014)
 - Focus on sharing expertise and develop effective collaboration mechanism ways in DNA analysis
 - Present preliminary research results
- Second phase (March-November 2015)
 - Conduct second-round DNA analysis with samples collected during the joint field study (Item 4.3)
 - Present second/final research results and provide recommendations on conservation actions and policy implications

4.3 Joint Field Study

- Conduct joint field study in “Land of the Leopard” National Park in the Russian Federation and Jilin Province in China during winter (January to February 2015) for better preservation at low ambient temperature
- Collect non-invasive samples such as feces and hair for analysis, and conduct DNA extraction at the laboratory near/in the field to minimize DNA degradation

4.4 International Seminar on Subregional Cooperation for Science-based Conservation of Amur Tigers and Leopards in Transboundary Areas

5. Proposed Timeframe

Timeline	Activity
April 2014	Inception Meeting
April-December 2014	First phase of DNA analysis
	First report
January-February 2015	Joint field study for sample collection
	DNA extraction
March-November 2015	Second phase of DNA analysis
	Second (and/or Final) report
December 2015	International workshop
	Completion of the project (or start up new project for follow-up actions)

6. Tentative Budget Planning

Items	Amounts (in USD)
Inception Meeting/ International workshops	35,000
DNA analysis	50,000
Joint field study	10,000
Miscellaneous	5,000
Total Amount	100,000