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UNITED ADMINISTRATION OF THE «KEDROVAYA PAD» RESERVE AND THE «LAND OF THE LEOPARD» NATIONAL PARK

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NORTHEAST CHINA TIGER AND LEOPARD NATIONAL PARK

International cooperation for recovery of Amur leopard and Changbaishan population of Amur tiger

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Pacific Geographic Institute

Workshop on nature conservation and biodiversity for transboundary cooperation
Incheon, 28-29 August 2024

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FSBI Land of the Leopard field technicians

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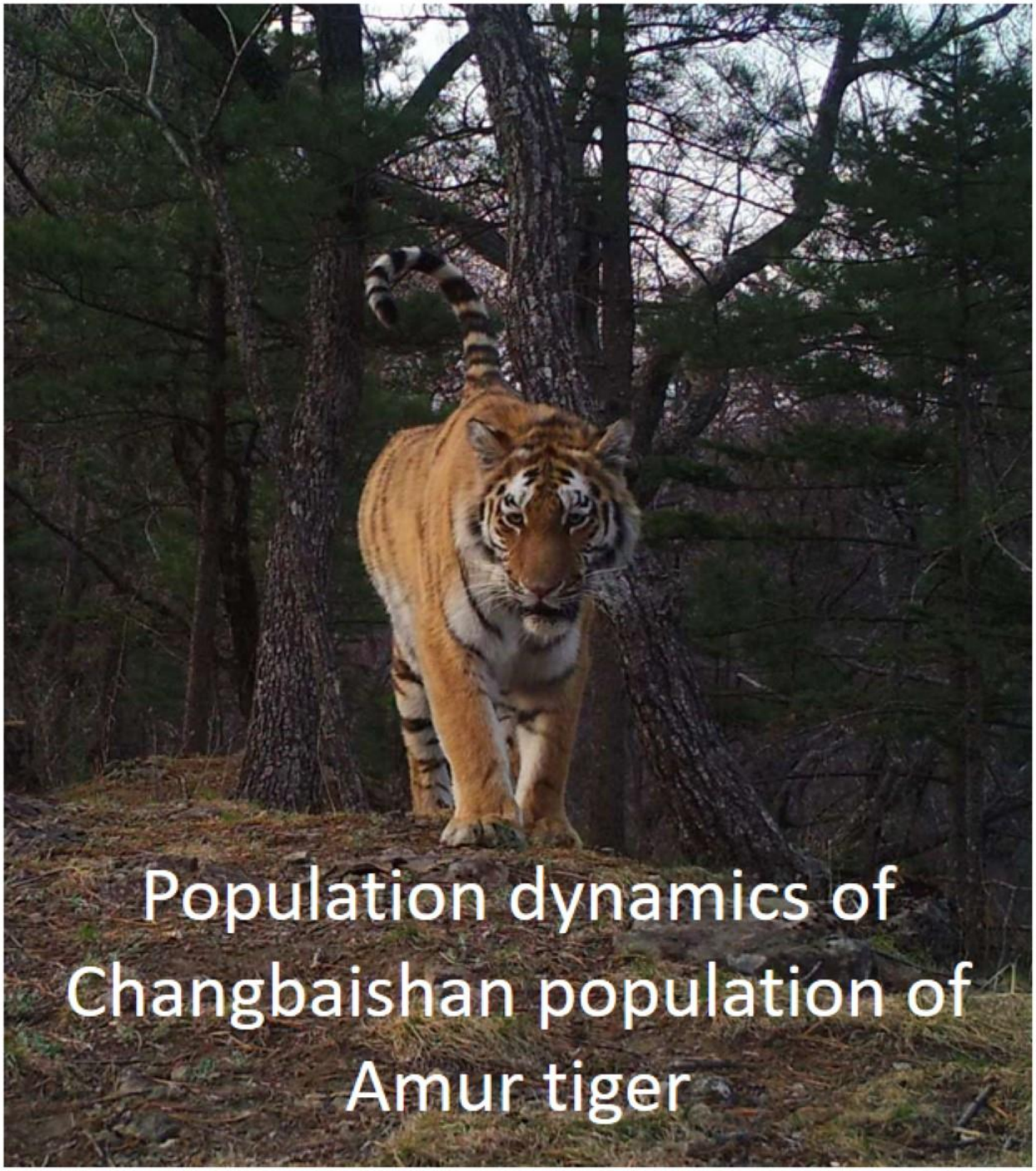
ДАЛЬНЕВОСТОЧНЫЕ ЛЕОПАРДЫ

WWF

ОБЩЕСТВО СОХРАНЕНИЯ ДИКИХ ЖИВОТНЫХ WCS МЫ ЗА ПРИРОДУ

РАН ТИГ ДВО


Population dynamics of
Changbaishan population of
Amur tiger

Meta-population structure of Amur tiger and transborder corridors

Tiger cross borders

Pompeevka - Taipingou

Khekhcir - Sanjiang

Lesser Khingan restored population

Strelnikov Wandashan

Sikhote-Alin main population

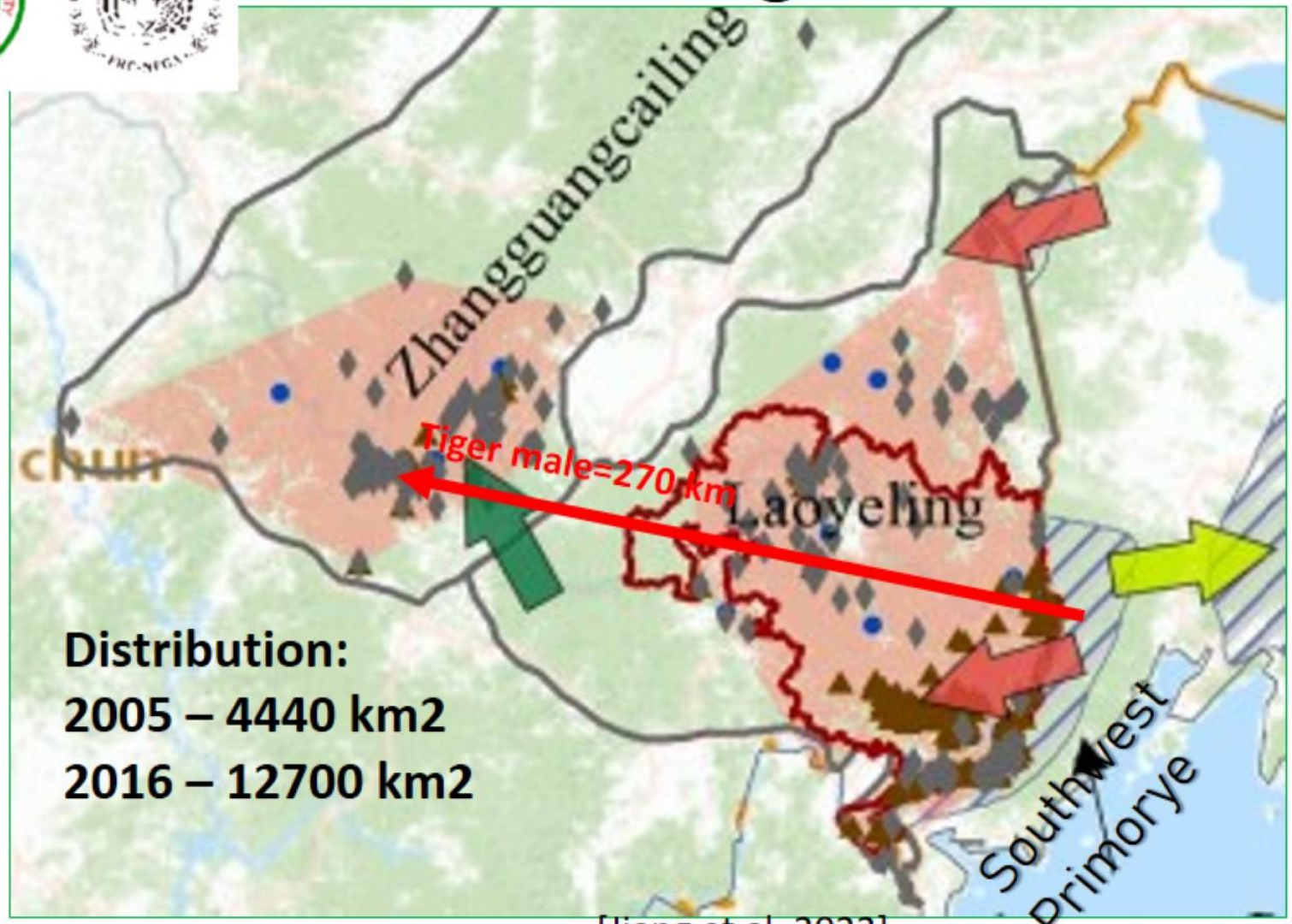
Chagbaishan/Eastern Manchurian population of Amur tiger

Komissarovsky – Fenhushuan&Erduan

Land of Leopard – Tiger and Leopard NP

Land of Leopard – North Korea

Changbaishan population of Amur tiger



[Jiang et al, 2022]

ЦЕНТР АМУРСКИЙ ТИГР

РАН ДВО

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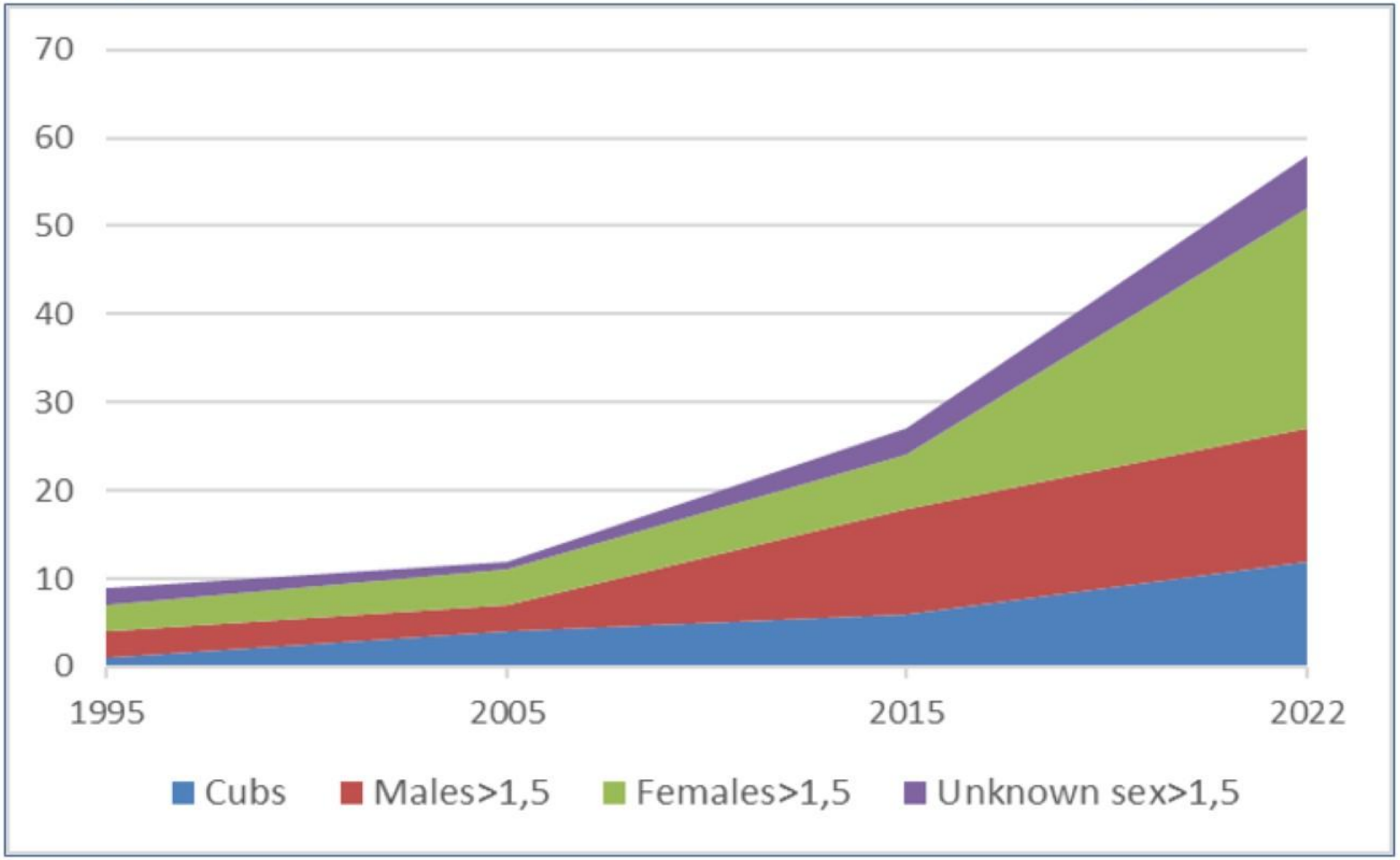
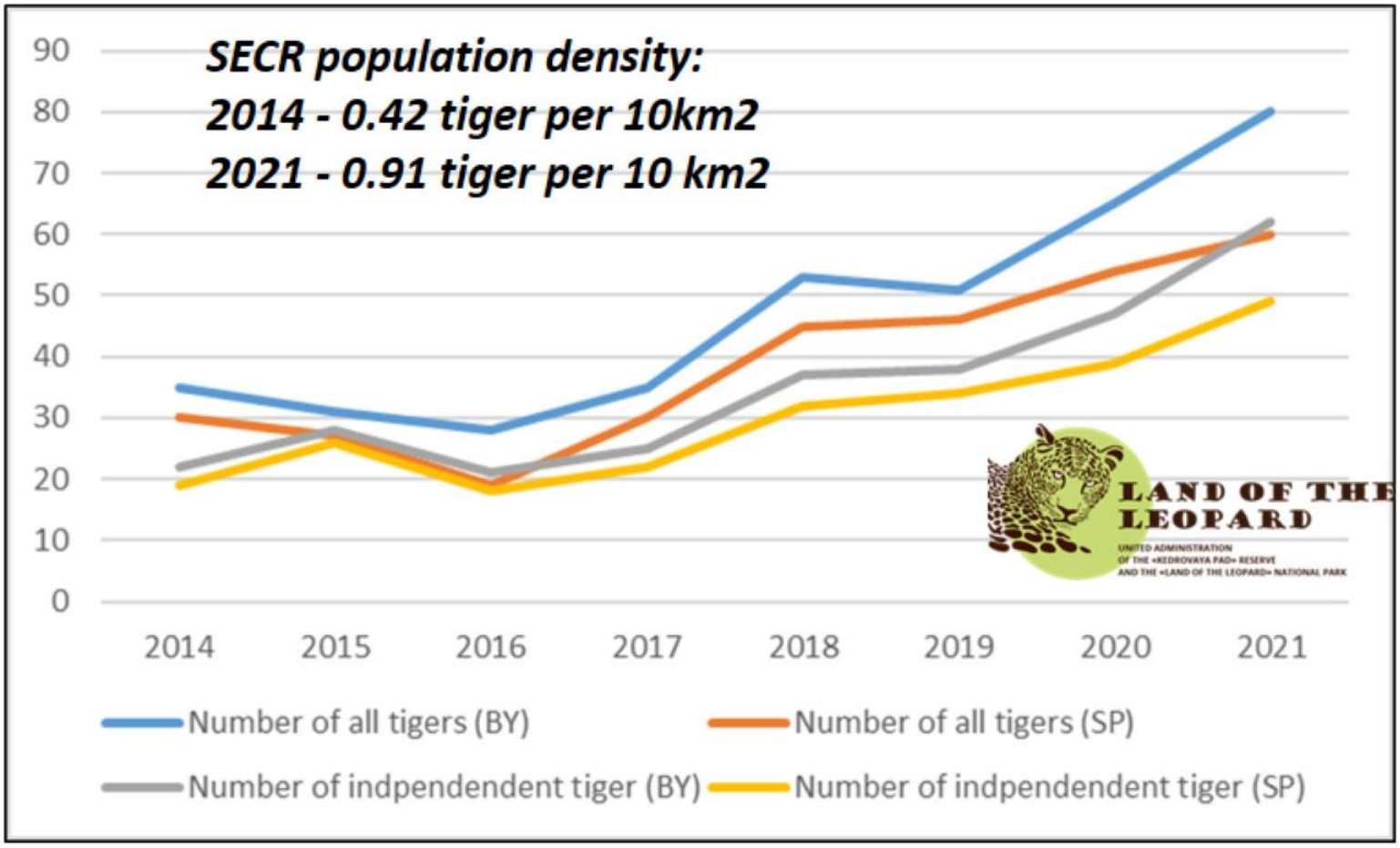
Amur tiger number in Southwest Primorye, Russia



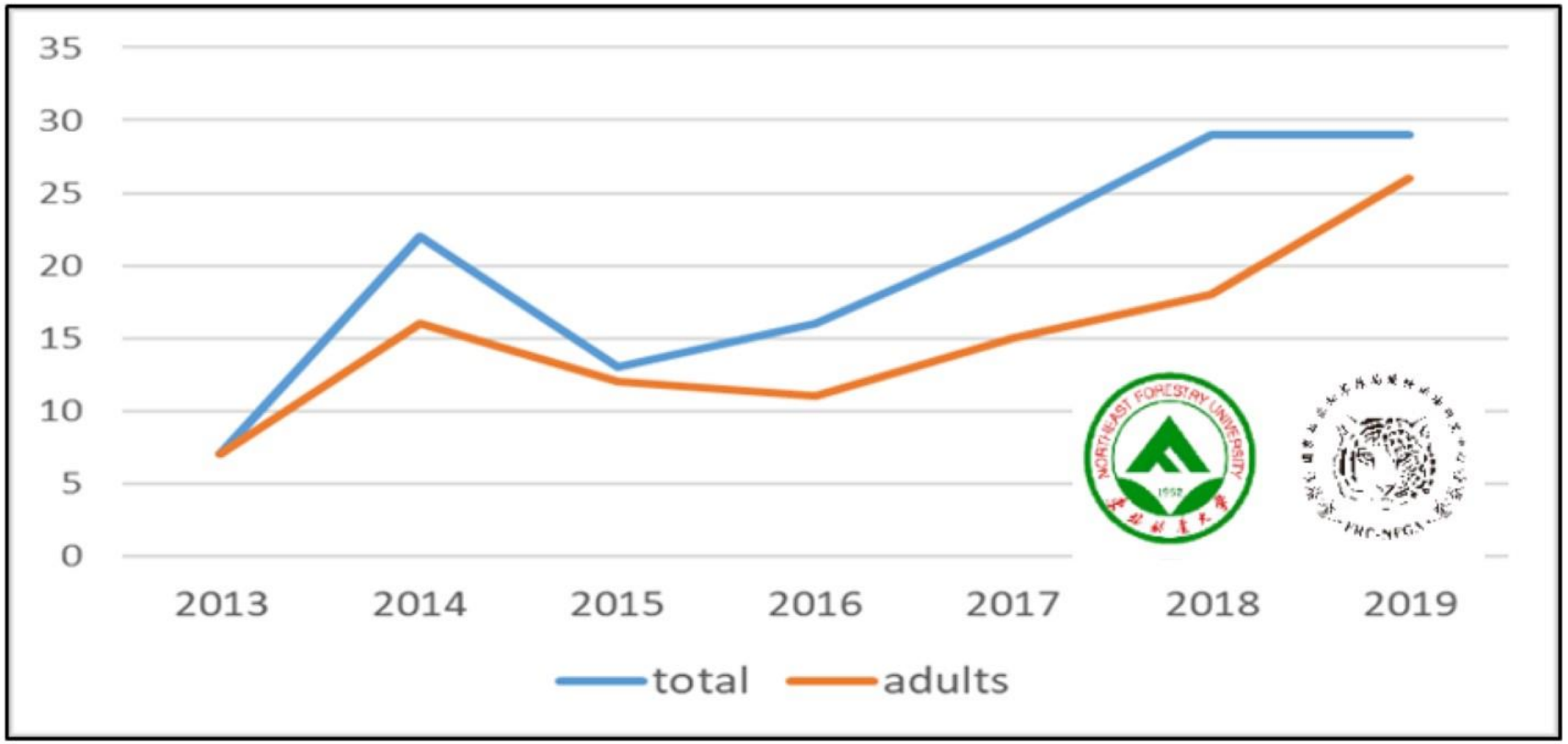
Based on snow footprint censuses [Matuishkin, 2005; Aramilev, 2015; Darman, 2022]

Trends in the absolute minimum number of the Amur tiger in Southwest Primorye, Russia



Based on camera trap monitoring data BY - biological year; SP - survey period [Matiukina et al, 2023]

Trends in the yearly absolute minimum number of the Amur tiger in Laoyeling Tiger Landscape, China



Based on to camera trap monitoring data [Qi et al., 2021 with amendment from Wen et al., 2022].

The yearly number of photographed adult Amur tiger of Changbaishan population

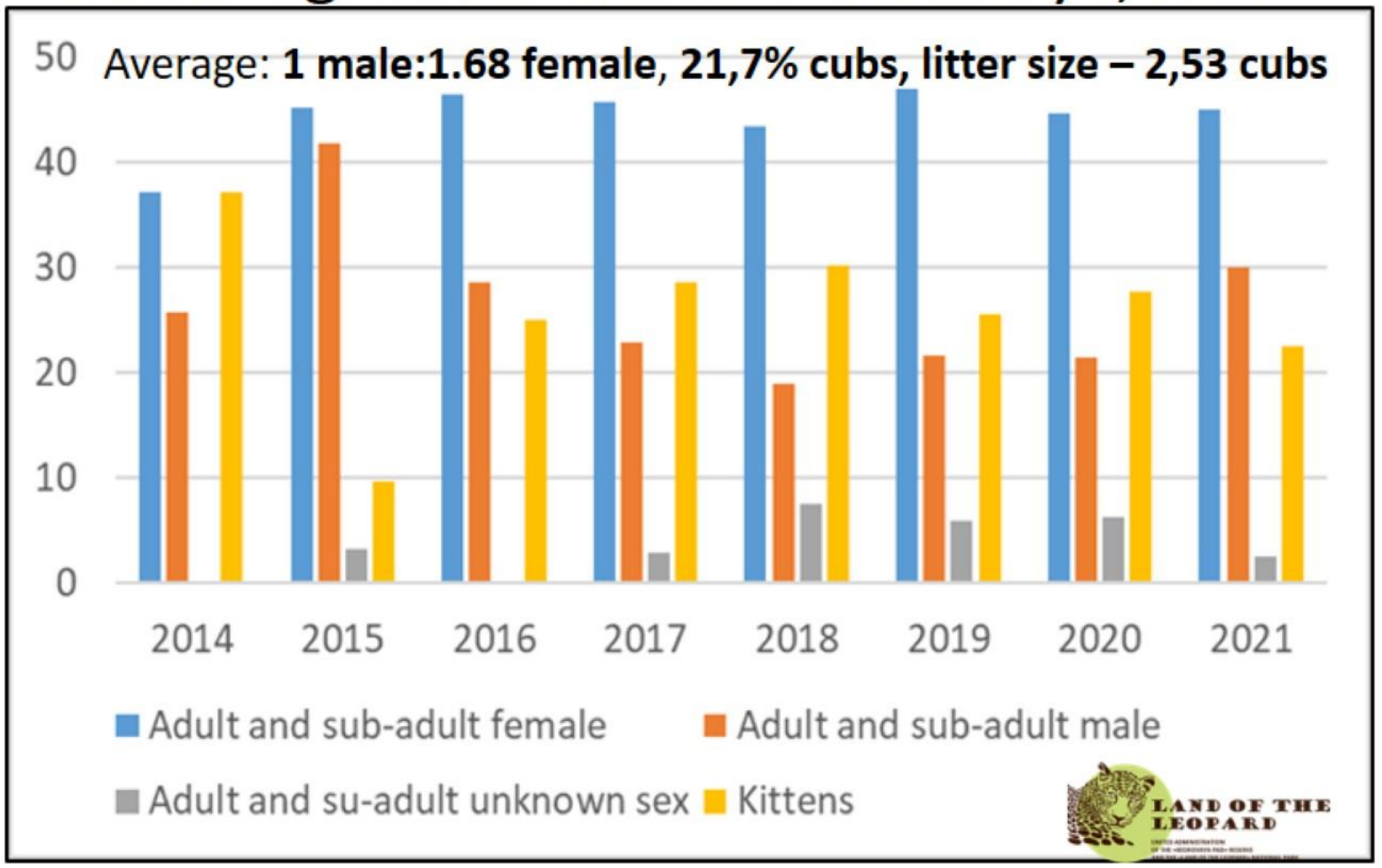
2023:
Russia – 56+21 cubs
China – 50+20 cubs?

42.2% shared between Russia and China

in accordance with parallel camera trap monitoring in Southwest Primorye, Russia, and Laoyeling Tiger Landscape, China [Matiukhina et al, 2022; Jiang et al, 2022]

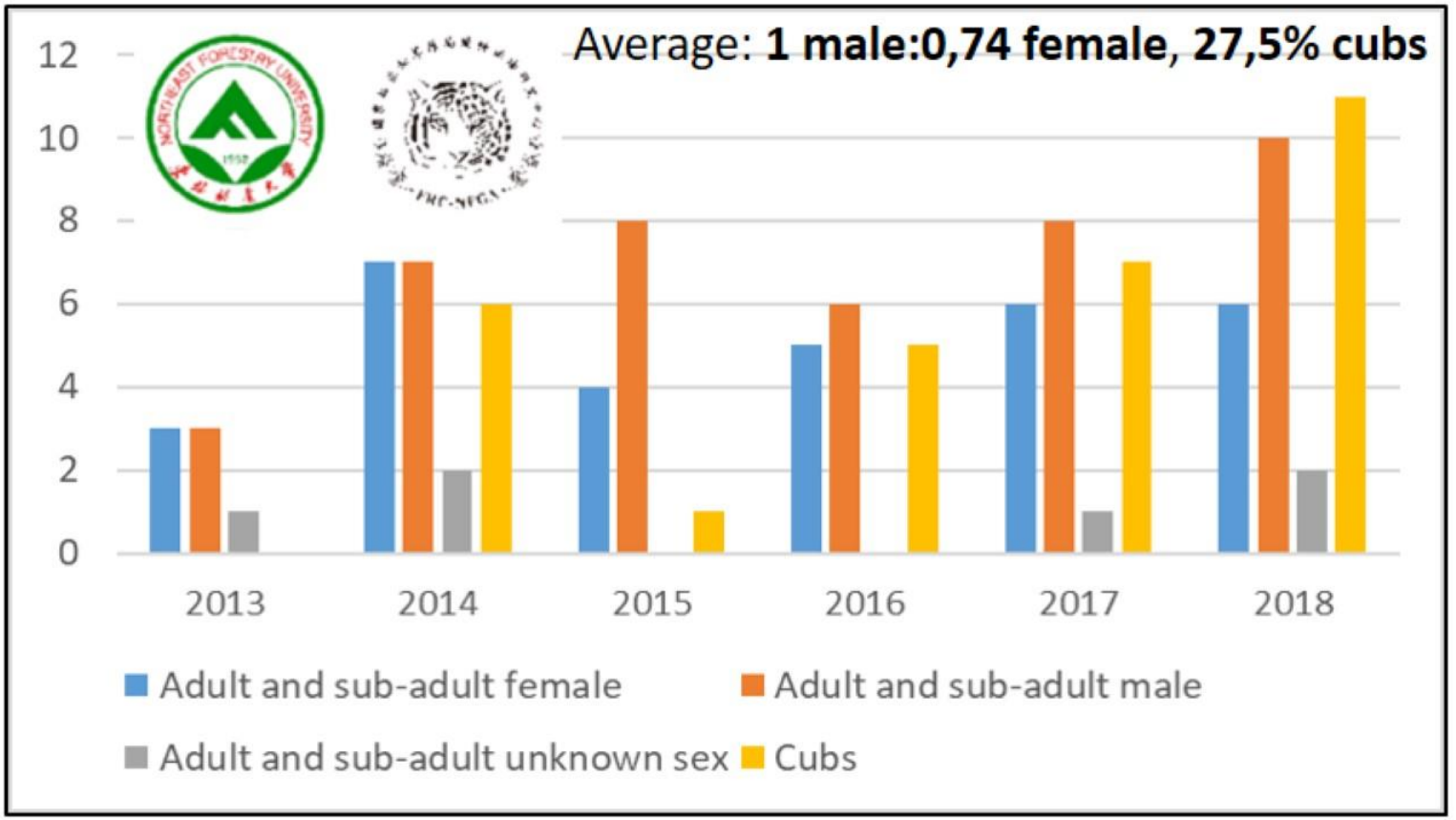
1998-1999 – 20 adults; 2015 - 35 adults; 2019 - 45 adults?; 2023 – 75 adults?

Sex and age structure of the population of Amur tiger in Southwest Primorye, Russia



Rate in population (%), based on the number of individuals identified during camera trap monitoring during biological year [Matuikhina et al, 2023]

Sex and age structure of the Amur tiger population in Laoyeling Tiger Landscape, China



Number of individuals identified by camera trap monitoring during biological year [based on: Qi et al, 2021].

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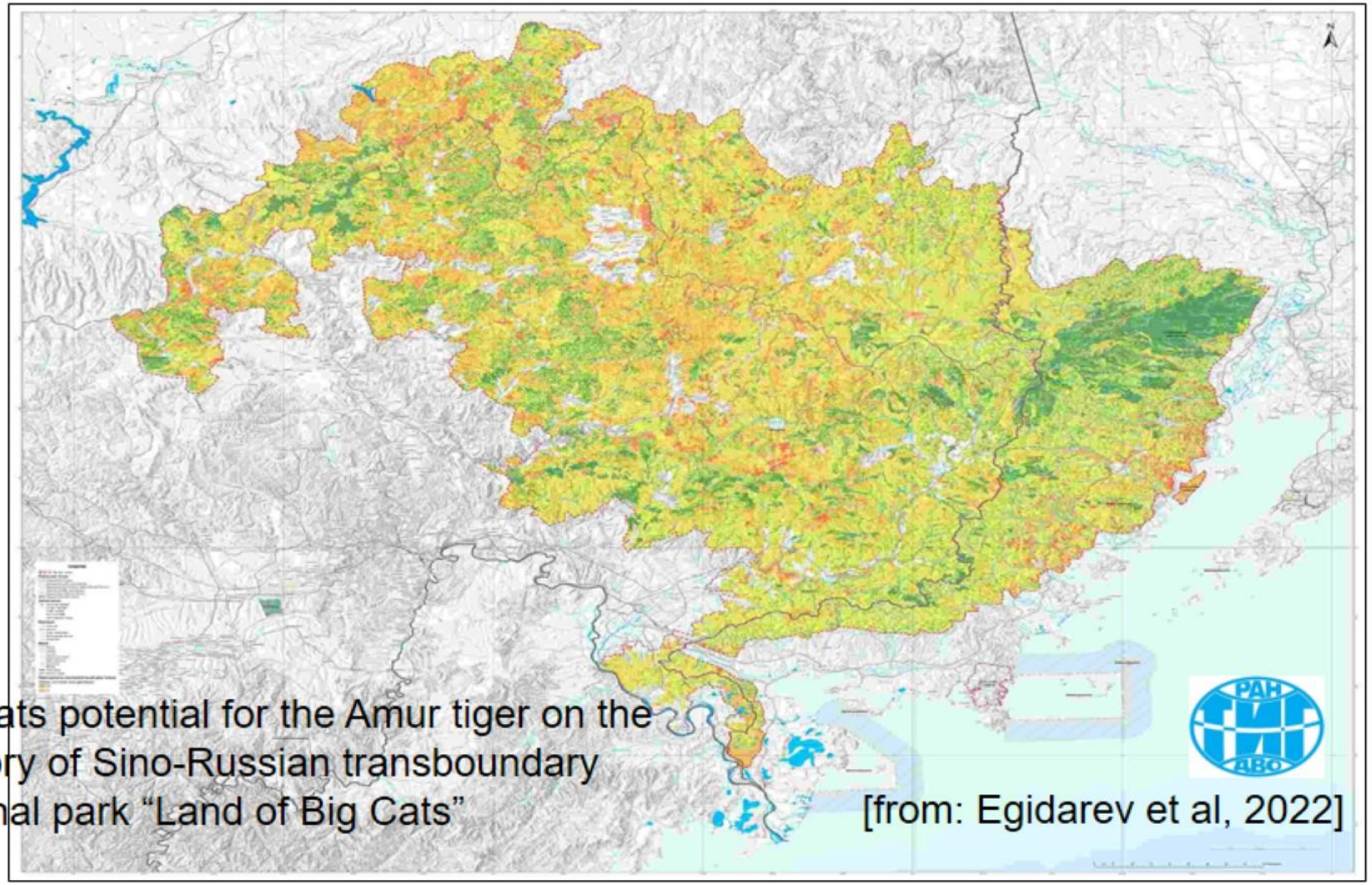

Habitats potential for the Amur tiger on the territory of Sino-Russian transboundary national park “Land of Big Cats”

[from: Egidarev et al, 2022]

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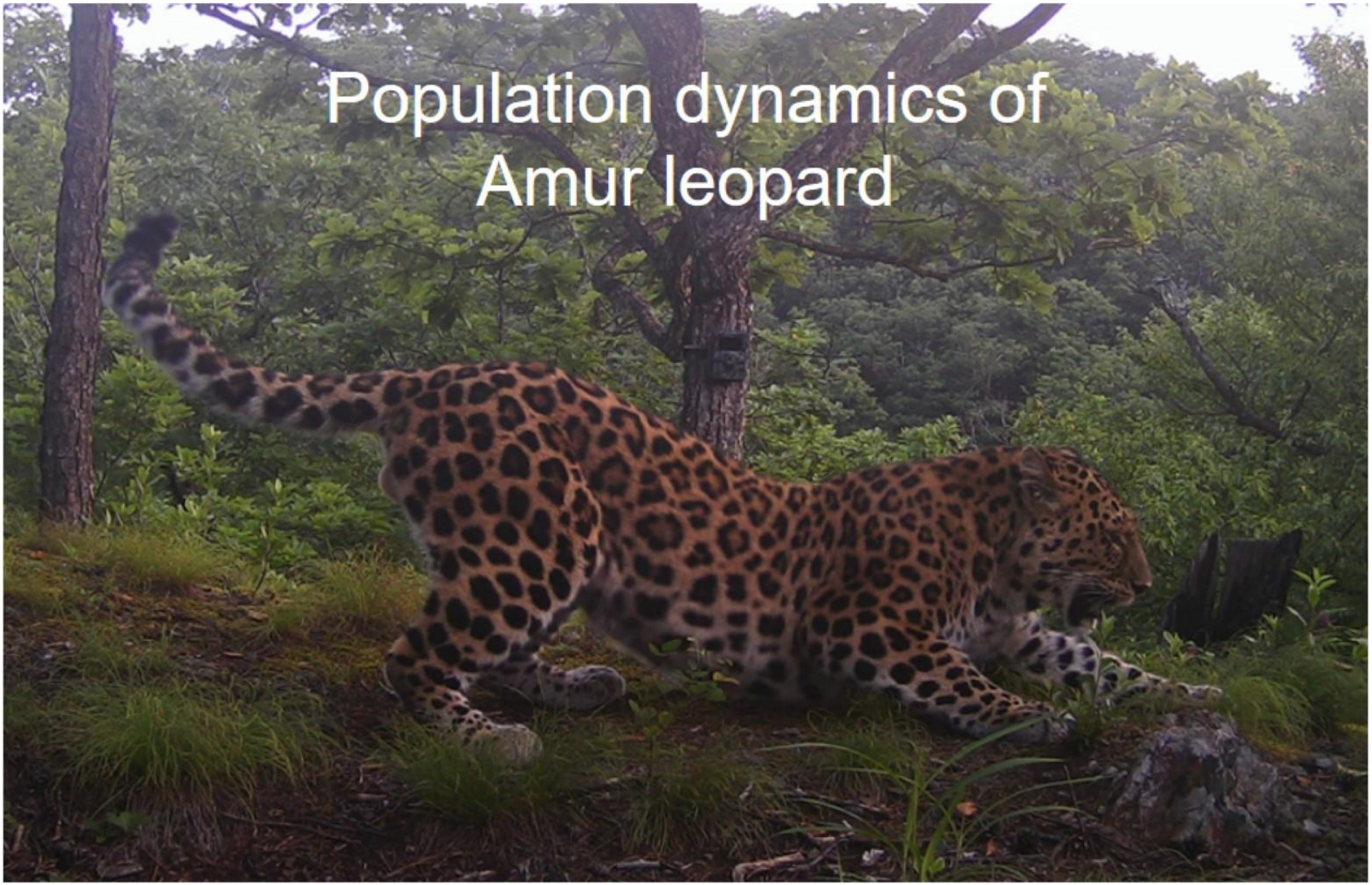
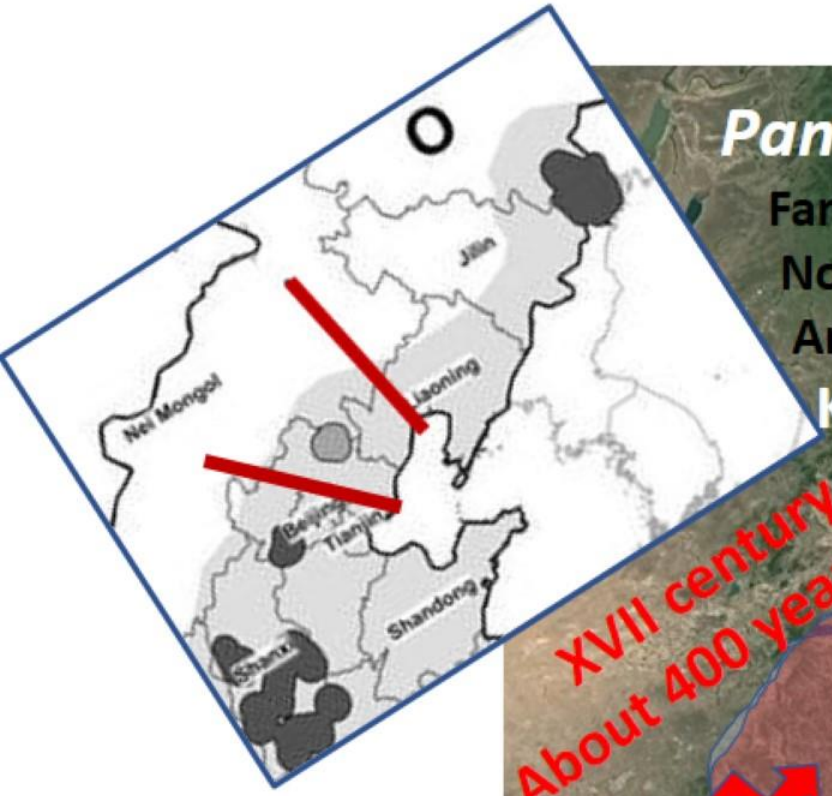
Potential habitats suitability for the Amur tiger on the territory of projected Sino-Russian transboundary national park "Land of Big Cats"

Country	Total area, km²	Potential habitats, km²			
		Not suitable	Minimum suitable	Medium suitable	Maximum suitable
Land of the Leopard, Russia	3706	612	1761	1207	126
NEC Tiger and Leopard NP, China	14837	3768	6950	2963	1156
Total	**18543**	**4380**	**8711**	**4170**	**1282**

Main habitats under protection – 5,452 km2, potential 14,163 km2

[from: Egidarev et al, 2022]


Population dynamics of
Amur leopard



Panthera pardus orientalis

Far Eastern leopard

Northeast China leopard

Amur leopard

Korean leopard

P. pardus orientalis

XVII century
About 400 years ago

Disjunctions

Existing populations

P. pardus japonensis

P. p. orientalis

1650th up 1000

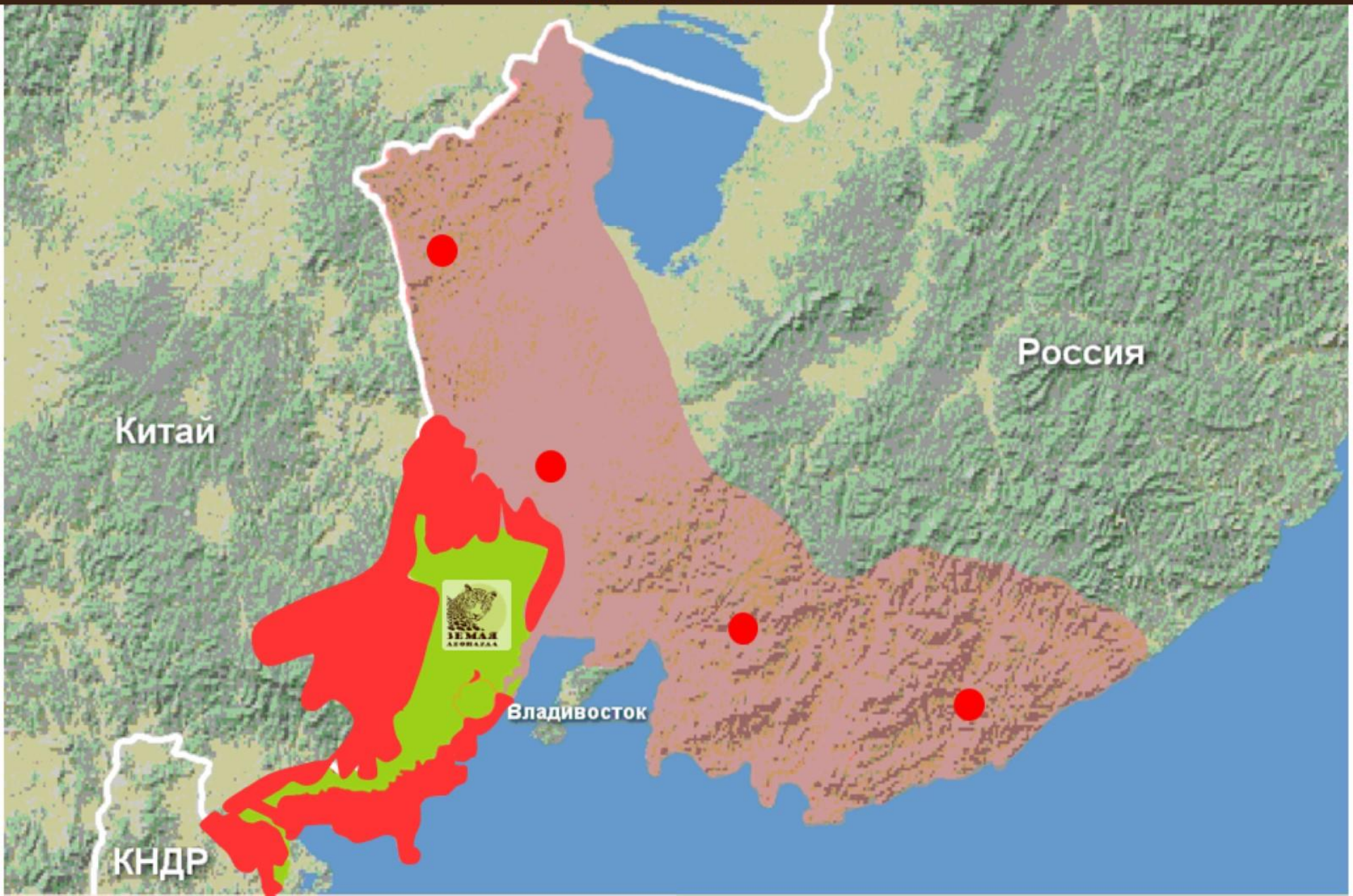
1940th – 400-500

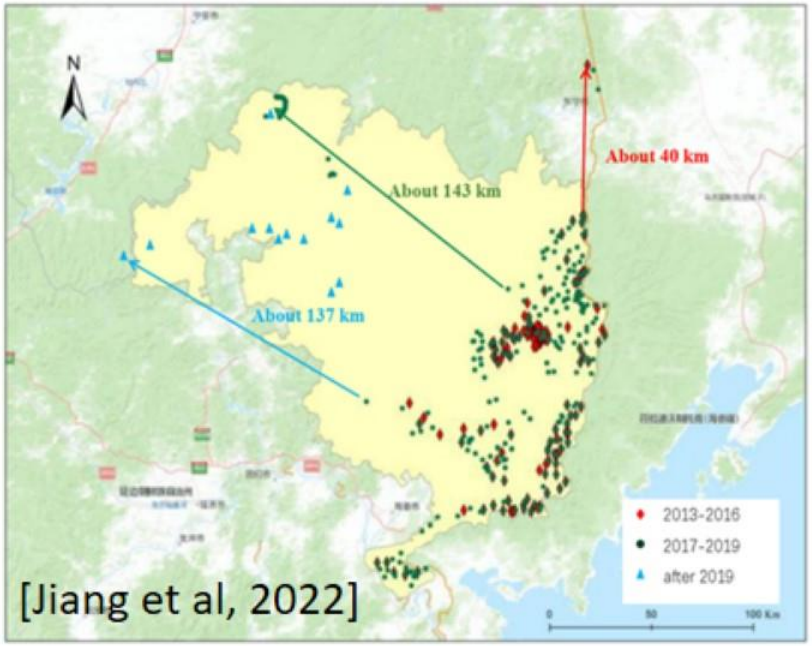
1990th – 30-40

2020th – 120-140

Separation of leopard subspecies

Restoration of the Amur leopard range in Russia and China in 2009-2022





China

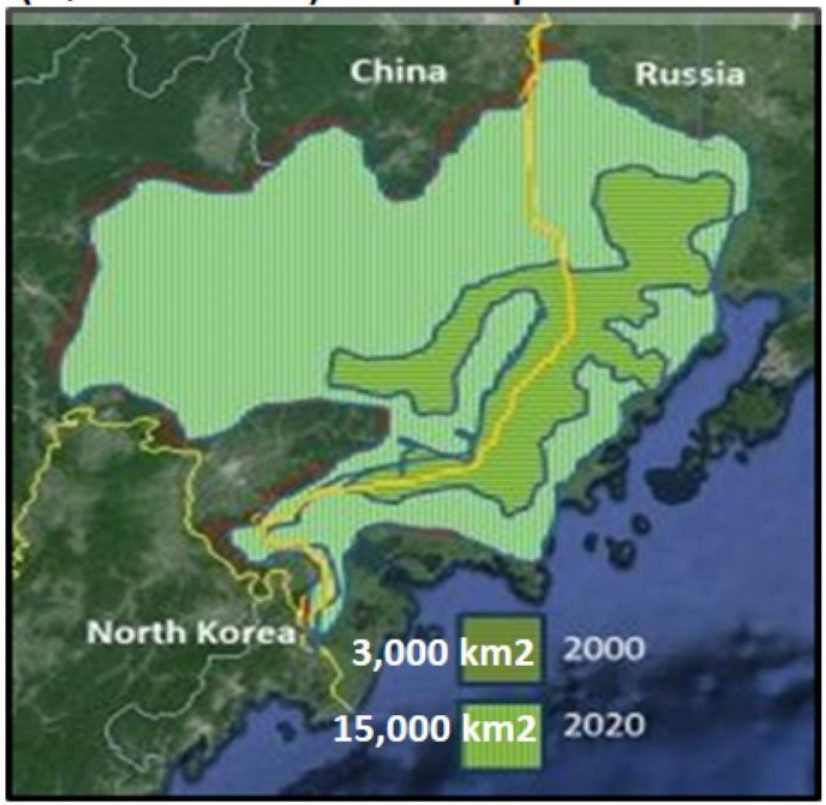
2001 - creation of Hunchun NR
2013 - creation of Wangqing NR
2014 - creation of Laoyeling NR
2019 – creation of NECTLNP

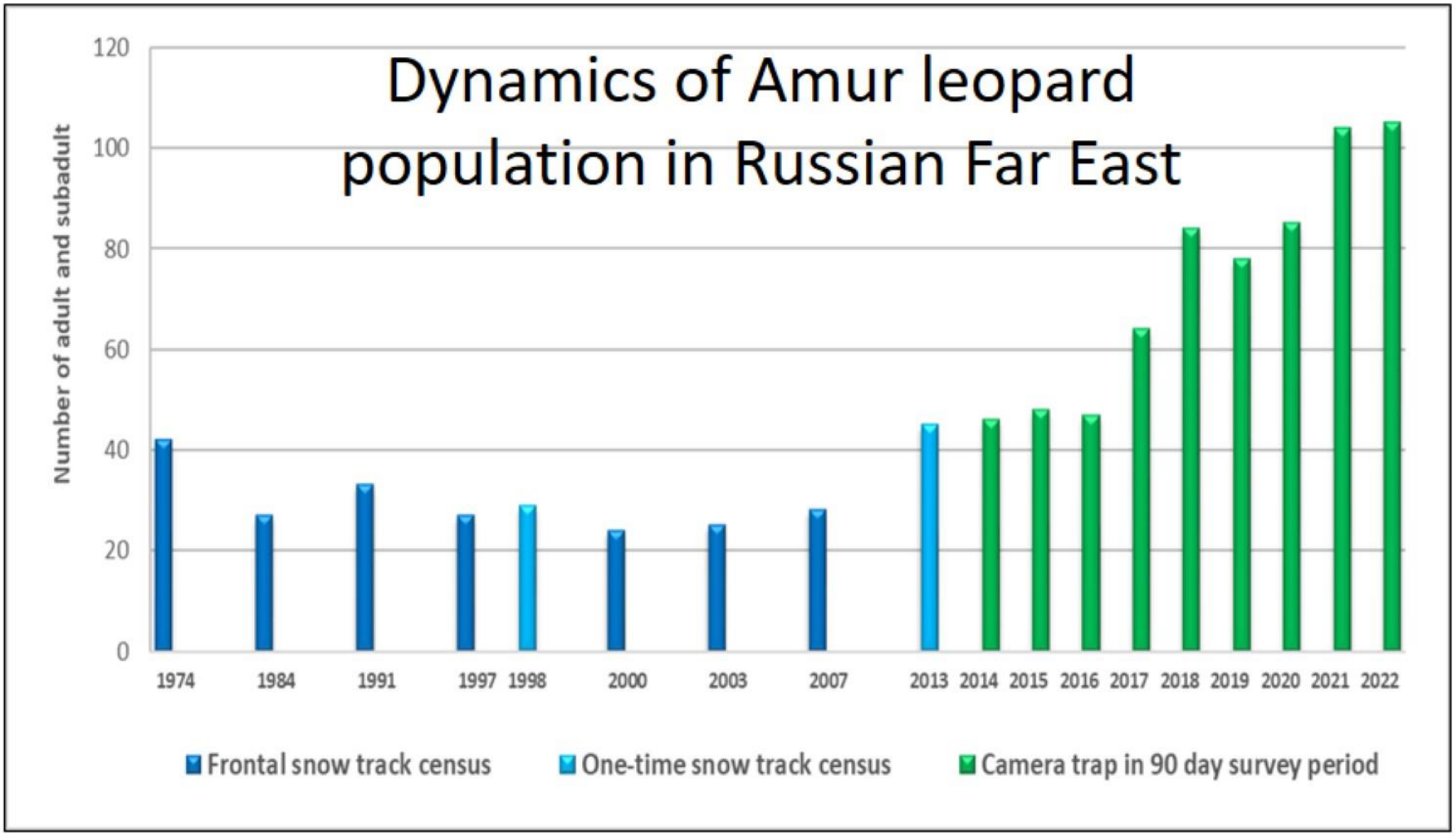
Inhabits 8,625 km2,
91% under protection

Russia

2001- start of leopard conservation project
2009 – creation of Leopardovy sanctuary
2012 – creation of Land of leopard NP
2013 – creation of buffer zone around PA
2019 – creation of Gamov cluster

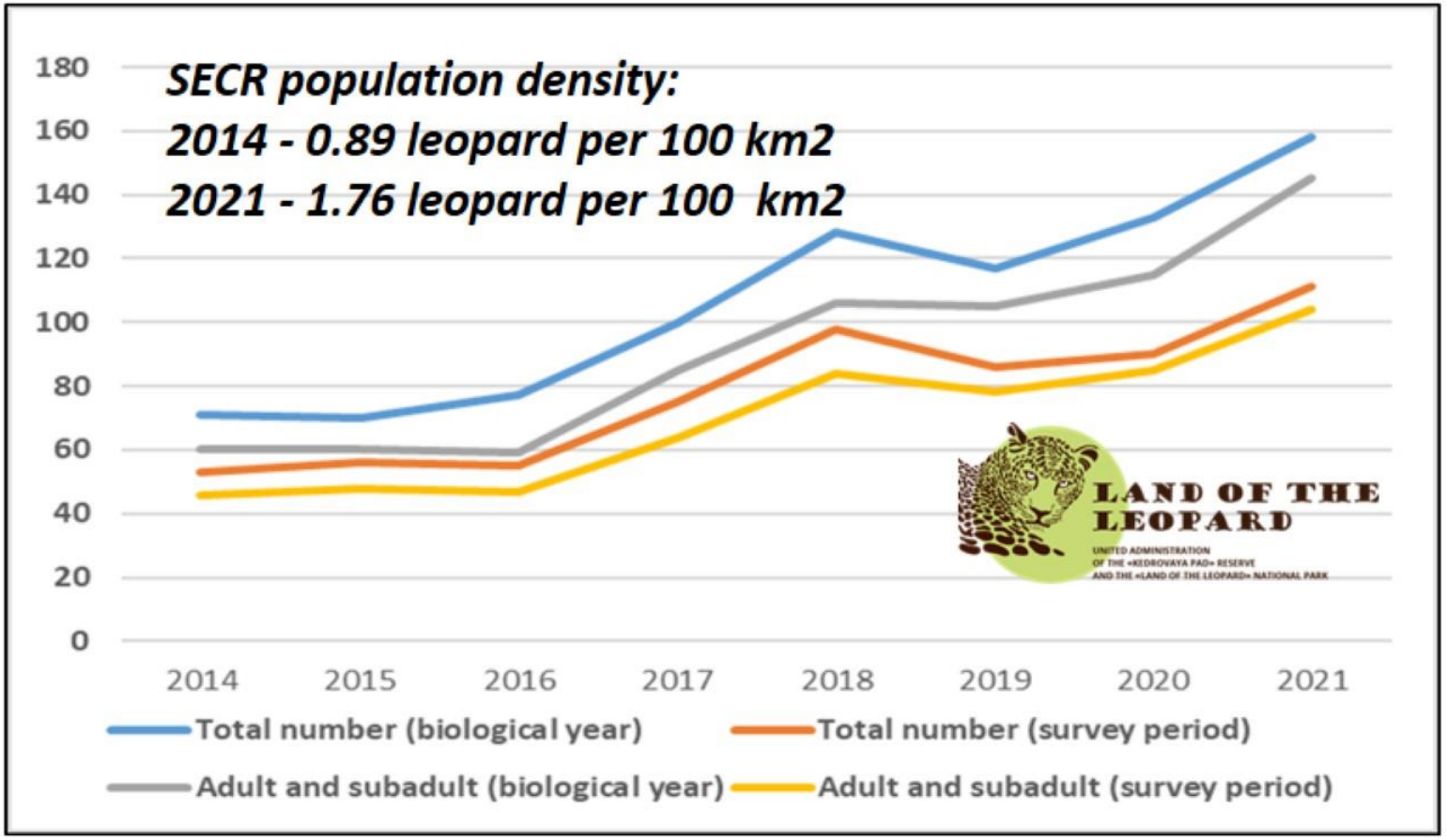
Inhabits 5,640 km2,
69% (3,688 km2) under protection





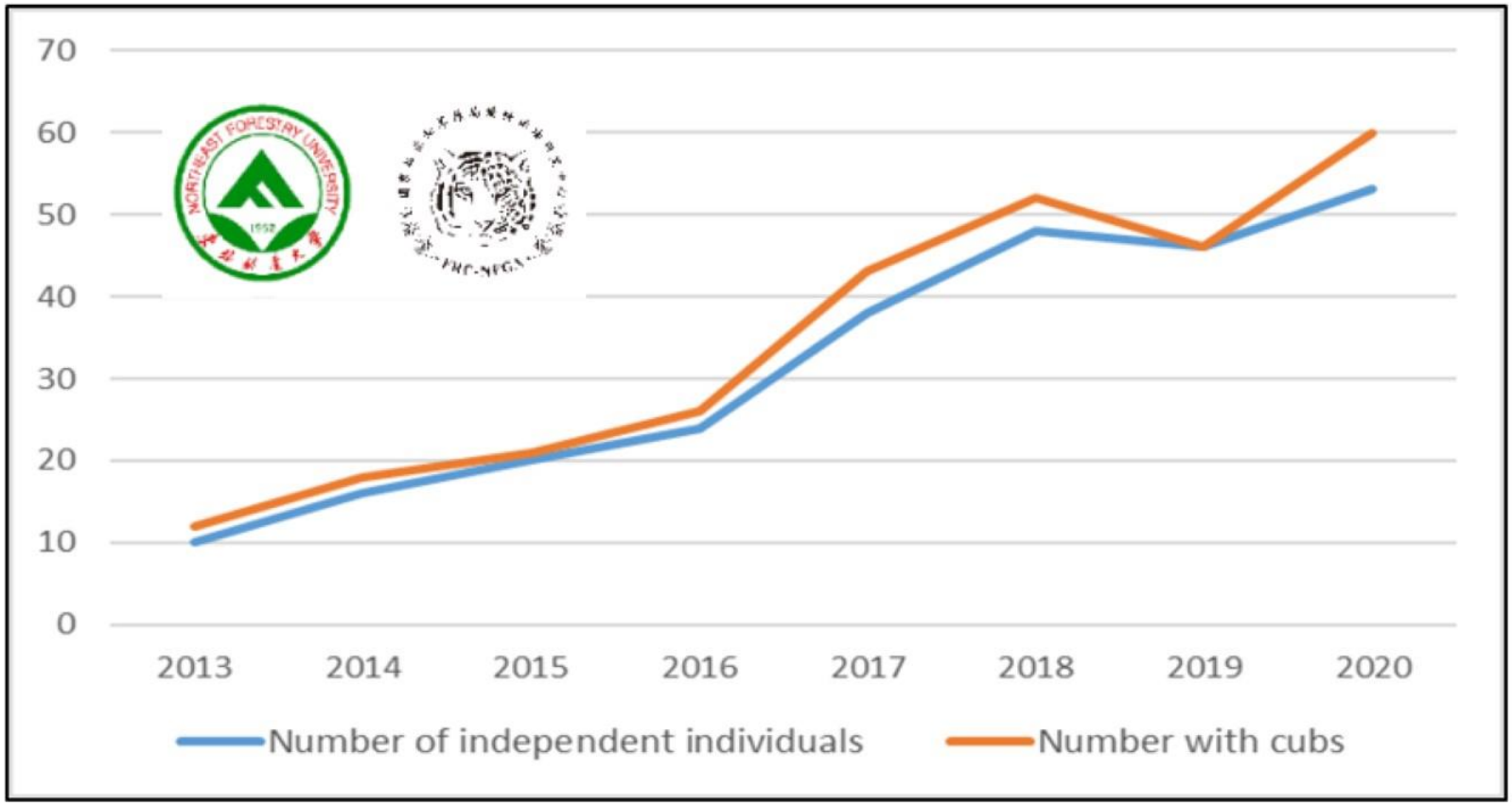
[By: Pikunov et al. 2009 and Vitkalova et al. 2023 with adds].

The absolute minimum number of the Amur leopards in Southwest Primorye, Russia



Based on camera trap monitoring data [Vitkalova et al, 2023]

The absolute minimum number of the Amur leopards in Laoyeling Tiger Landscape, China



Registered by camera trap monitoring during calendar years
[from: Jiang, 2022 with amendment from Wen et al, 2022].

The yearly number of photographed adult Amur leopard in Russia and China

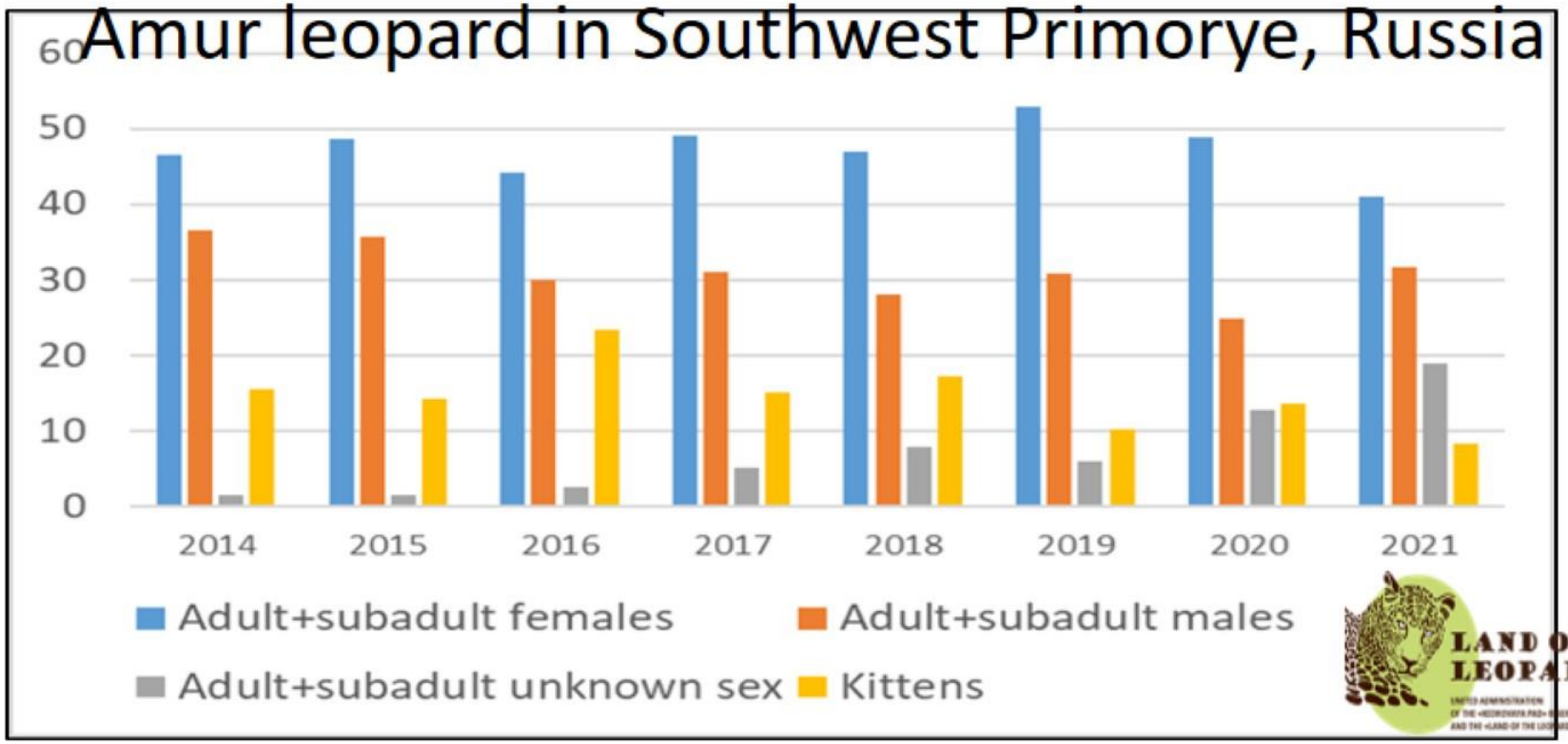
2023:
Russia – 129+14 cubs
China – 65+15 cubs?

21.5% shared between Russia and China

Parallel camera trap monitoring in Southwest Primorye, Russia, and Laoyeling Tiger Landscape, China.

2001-2003 – 30 adults; 2015 – 64 adults; 2018 – 119 adults?; 2023 – 154 adults?

Sex and age structure of the population of Amur leopard in Southwest Primorye, Russia

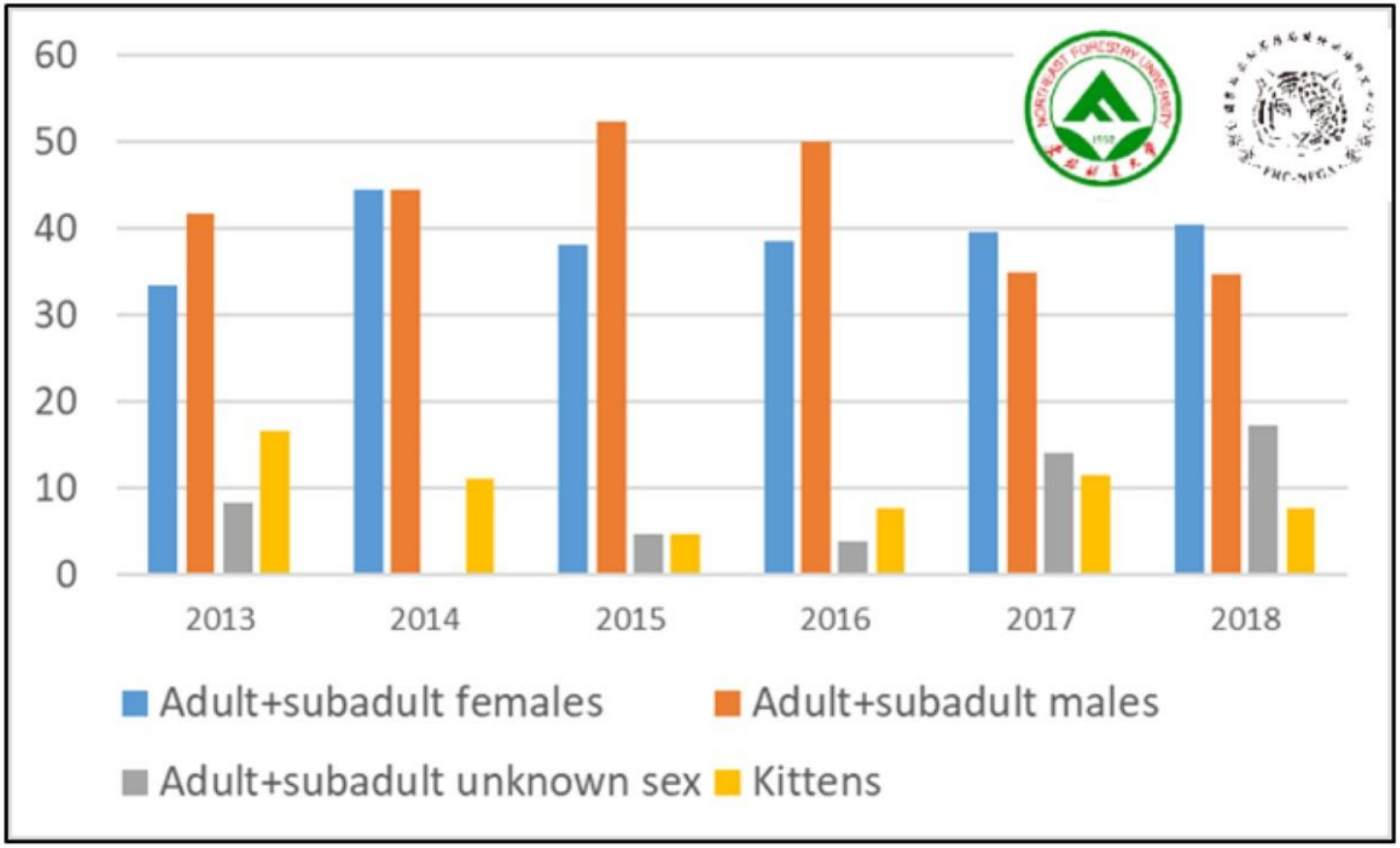


Rate in population, %%, based on the number of individuals identified during camera trap monitoring during biological year [Vitkalova et al, 2023]

The sex ratio *averaged 1 male:1.58 females (n=662), varying from 1:1.27 at population minimum to 1:1.97 at the growth*

The age structure *averaged 78-80% adults, 5-7% sub-adults and 13-16% kittens*

Sex and age structure of the population of Amur leopard in Laoyeling Tiger Landscape, China



Rate in population, %%, based on the number of individuals identified by camera trap monitoring during calendar years [from: Jiang, 2022]

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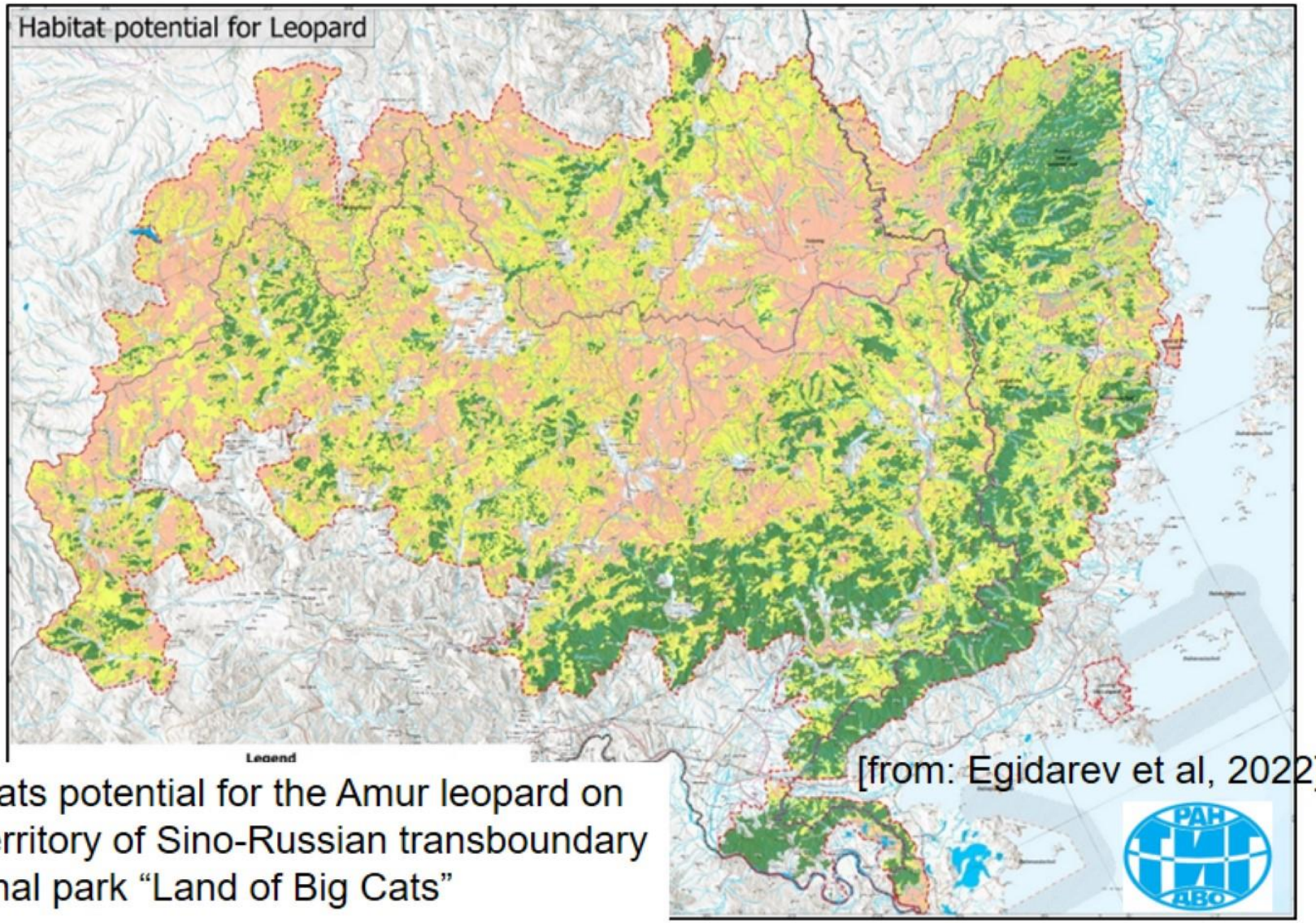

[from: Egidarev et al, 2022]

Habitats potential for the Amur leopard on the territory of Sino-Russian transboundary national park “Land of Big Cats”

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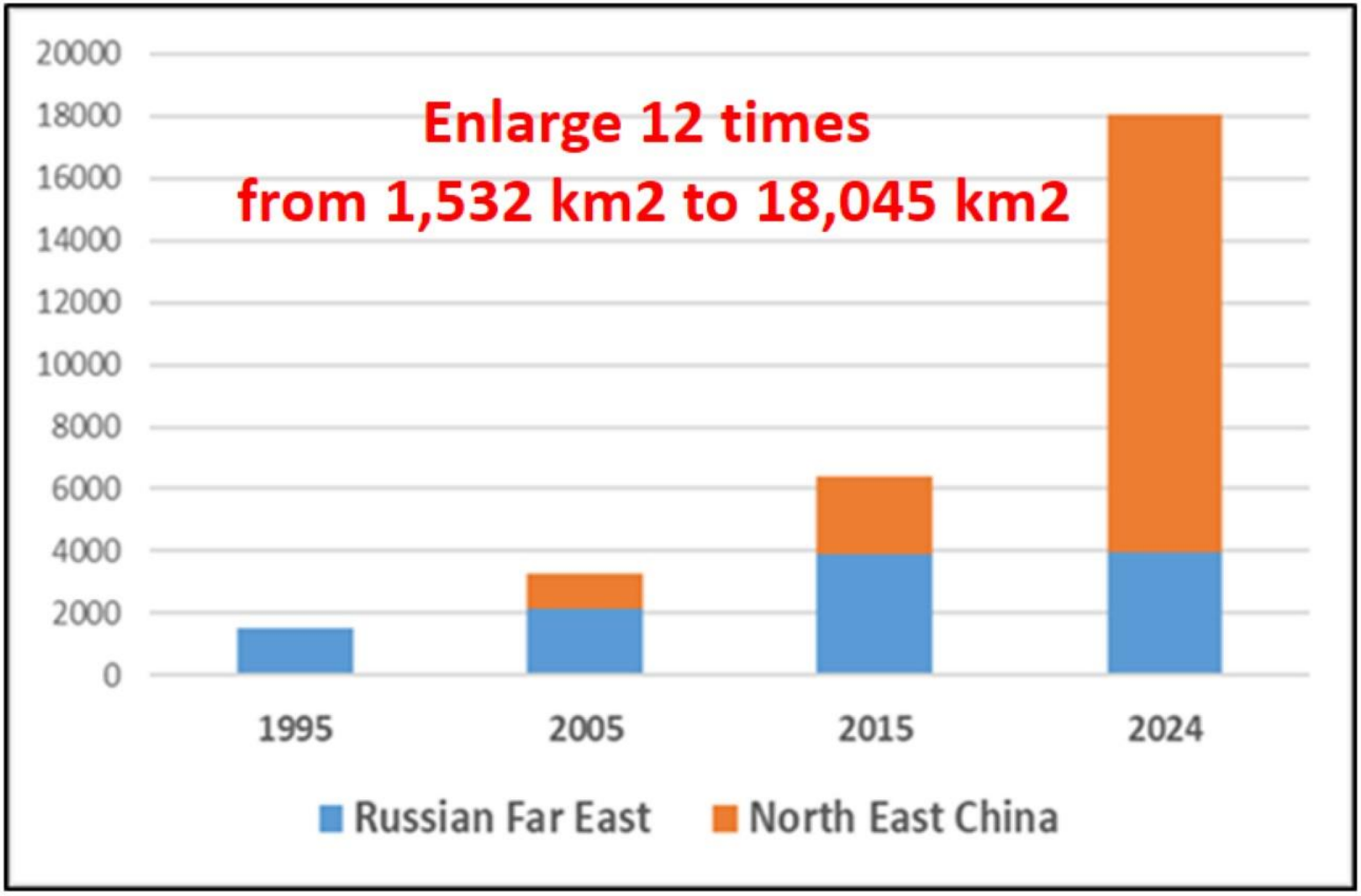
Potential habitats suitability for the Amur leopard on the territory of projected Sino-Russian transboundary national park "Land of Big Cats"

Country	Total area, km²	Potential habitats, km²			
		Not suitable	Minimum suitable	Medium suitable	Maximum suitable
Land of the Leopard, Russia	3705	129	619	1532	1425
NEC Tiger and Leopard NP, China	14838	1175	5051	5923	2689
Total	**18543**	**1304**	**5670**	**7455**	**4114**

Main habitats under protection – 11,569 km2, potential 12,873 km2

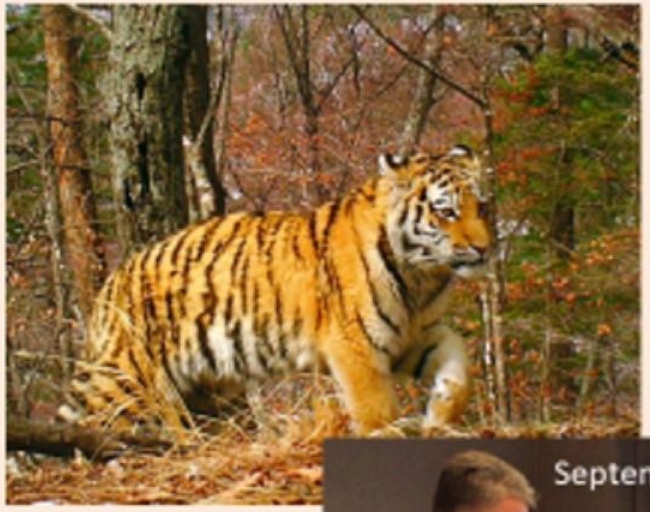
[from: Egidarev et al, 2022]

Protected areas in Amur leopard's and Changbaishan tiger habitats



International recognition of good management for big cats conservation

Land of the Leopard got CATS standard certificate



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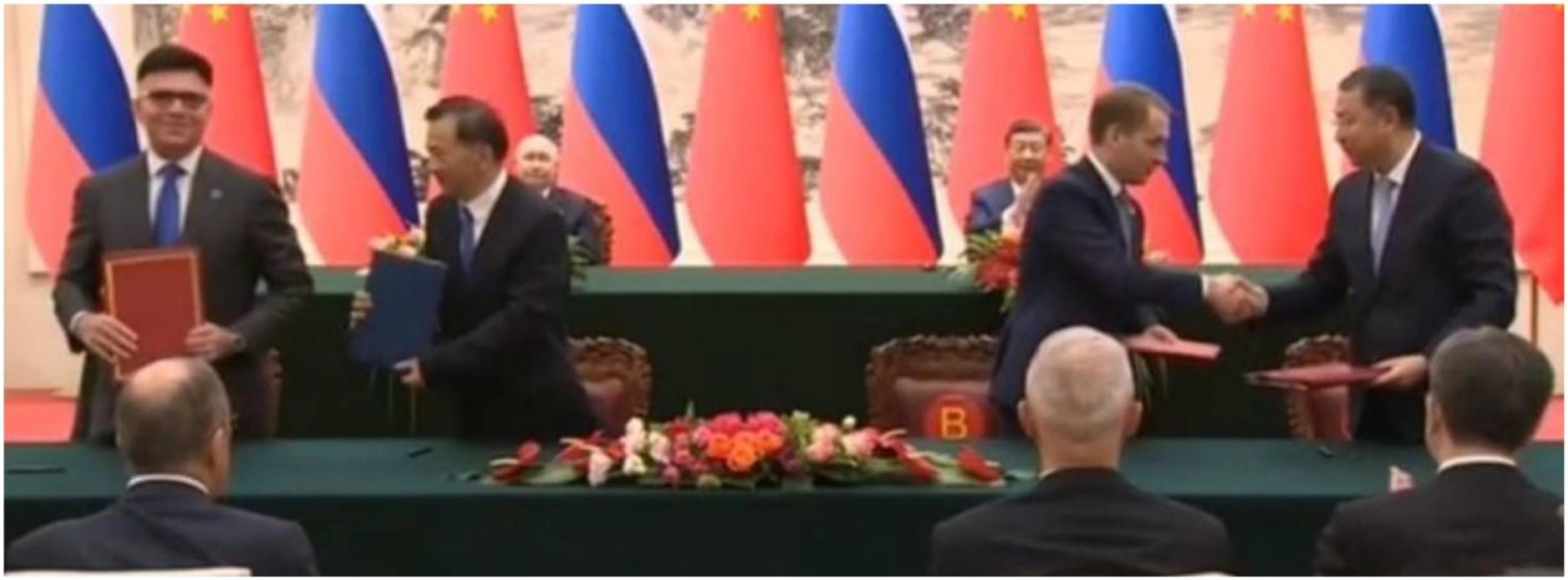
CATS
Conservation Assured
Tiger Standards

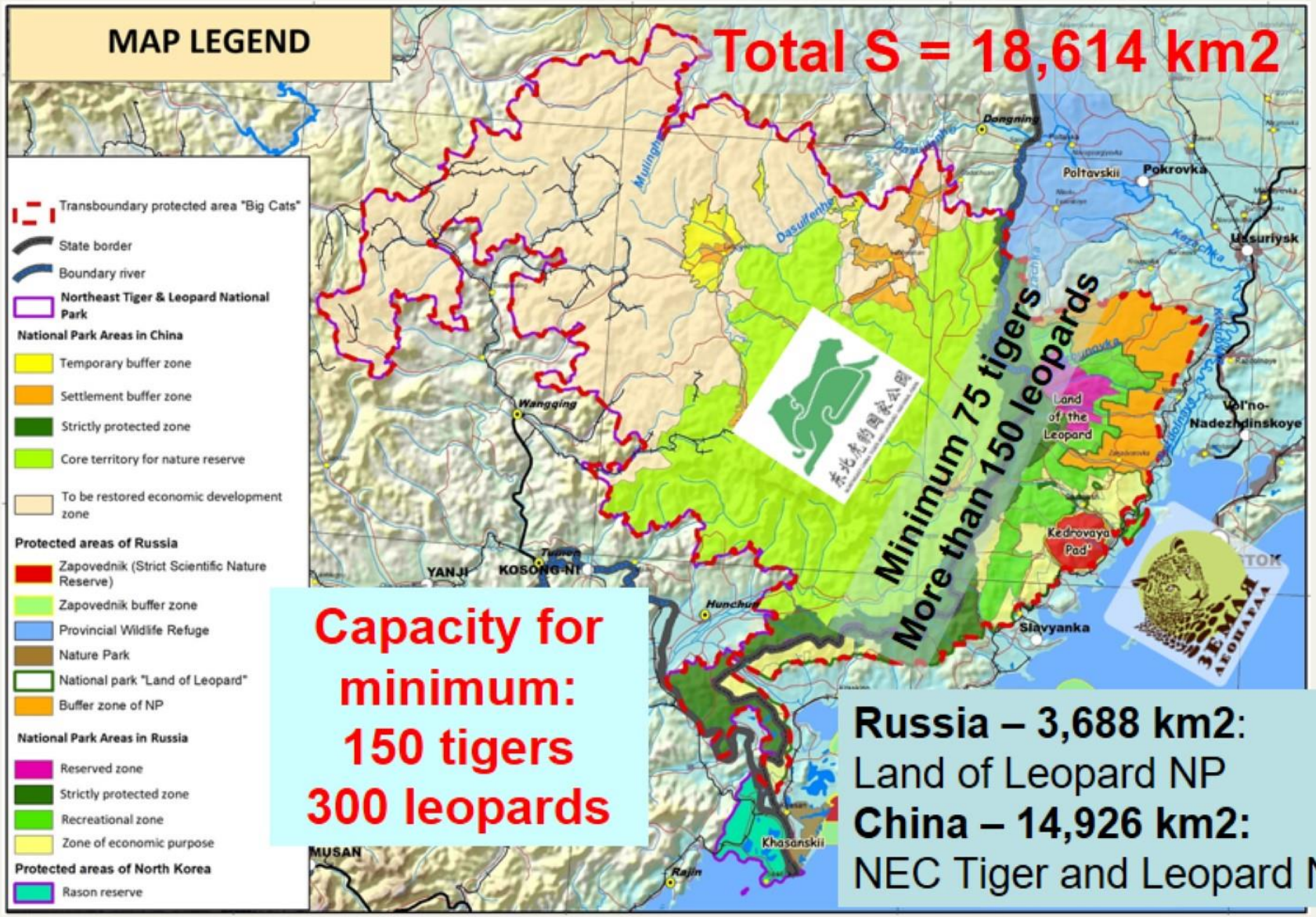


May 16, 2024

Agreement on establishment of Sino-Russian transboundary national park

“Land of Big Cats”

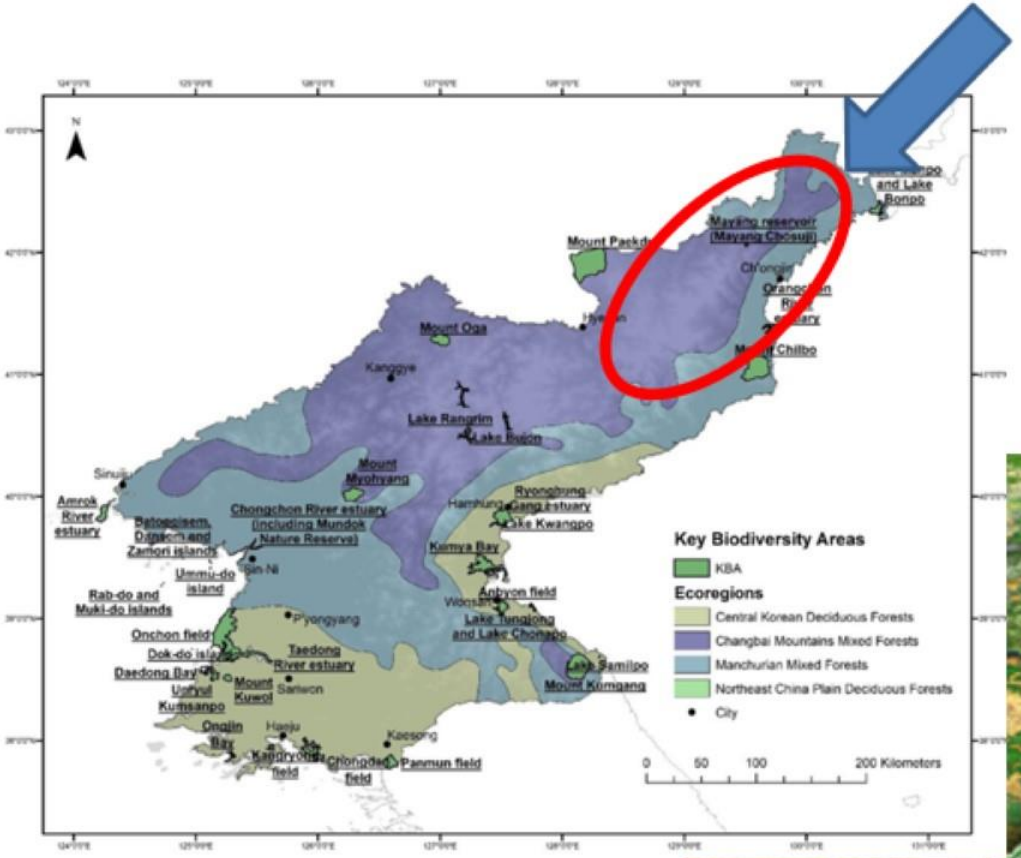
Sino-Russian transboundary national park “Land of Big Cats”



They are still about 1,000 km2 in tiger and leopard range in Southwest Primorye where we propose to establish buffer zone along the border of Land of the Leopard national park.

The satellite images have been identified good forest patches in North Hamgyong province of DPRK with two potential corridors for leopard and tiger re-settlement to North Korea from Russia via China.

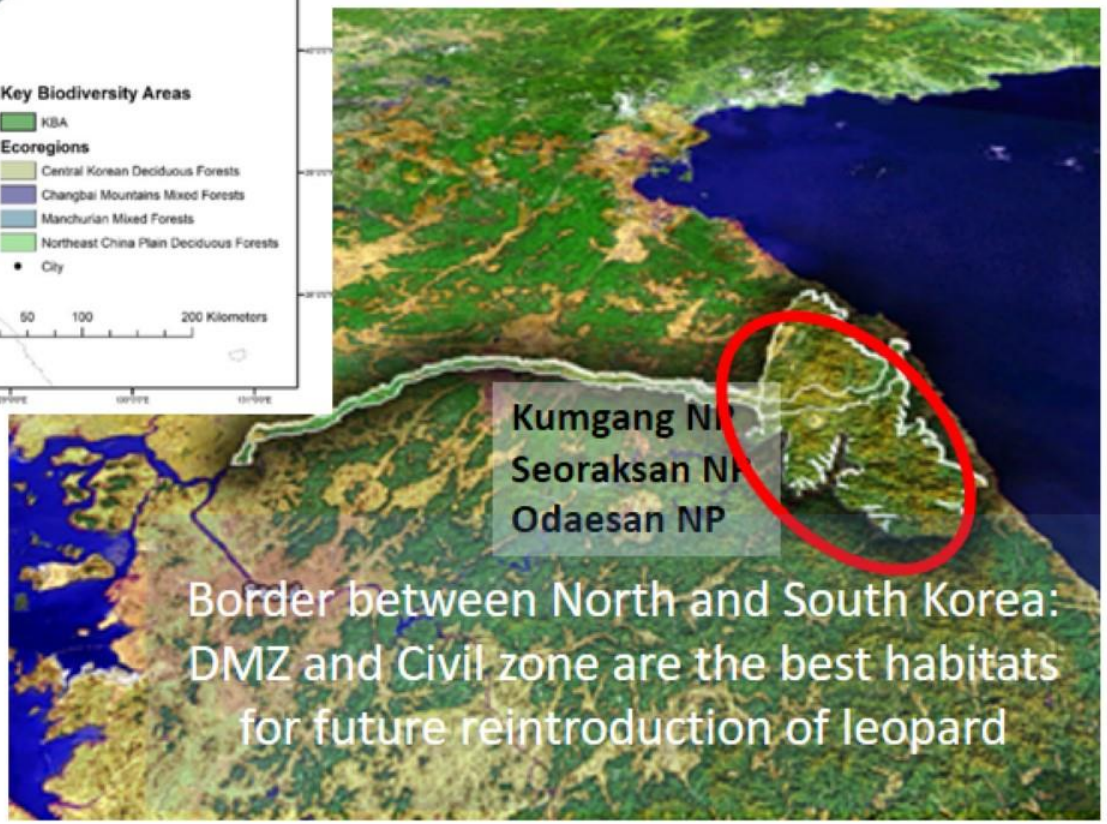
Korean National Institute of Ecology initiated feasible study on possibility for leopard's reintroduction to the suitable habitats with sufficient prey and relatively low anthropogenic impact at Taebaek Mountains in Kangwon-do provinces in South and North Koreas along DMZ.



국립생태원
NATIONAL INSTITUTE OF ECOLOGY

Territories for leopard reintroduction on Korea peninsula:

Hamgyong Mnts
(Hamgyong-bukto)
Taebaek Mnts
(Kangwon-do)



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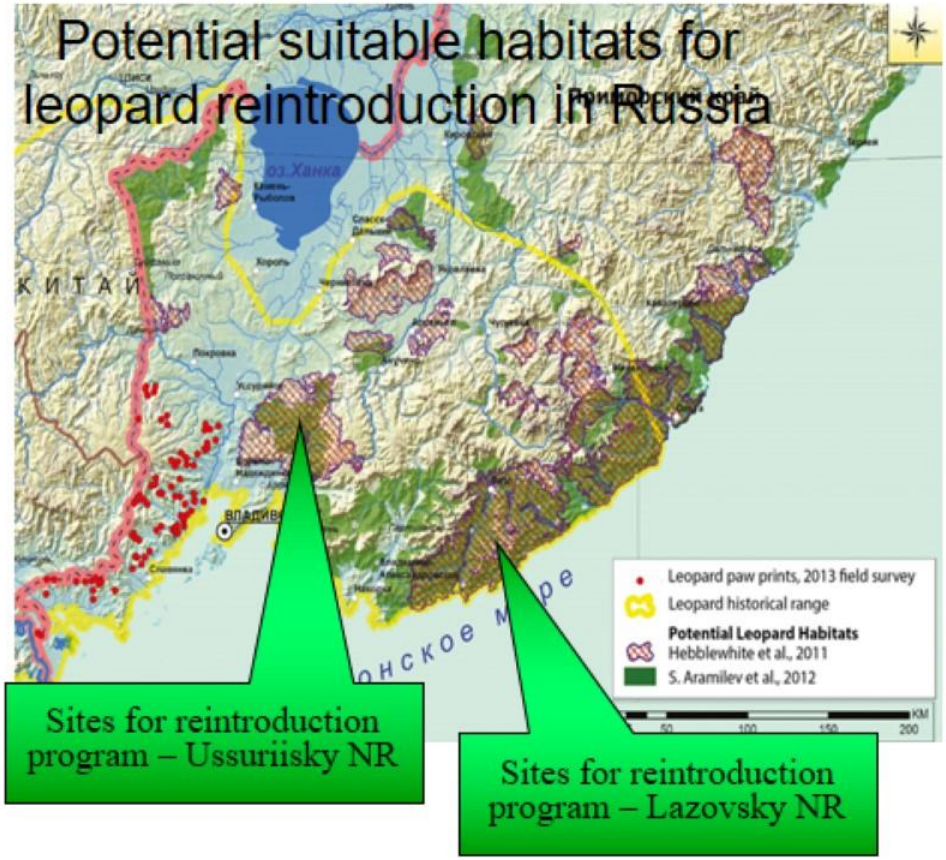
Reintroduction program:



The animals from the growing populations of tiger and leopard in Sino-Russian transboundary national park “Land of Big Cats” can be used as the sources for reintroduction projects to suitable habitats in former range of these species in China, Russia and Koreas.

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Due to efforts on law enforcement, struggle with smuggling and snare removal the direct killing of leopard is already suppressed in Russia and China.

But the problem of poaching on wild ungulates is still need control. Moreover, the number of prey may decrease dramatically due to catastrophic snowfalls or diseases.

In China, mass free grazing of livestock in the forest leads to the displacement of wild ungulates and the growth of conflict situations between predators and local peasants

Development of road network and raise of transport traffic lead to road killing and habitat fragmentation

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Fragmentation of area due to the linear transport infrastructure development to **minimum of 6500 km2**.

Highway A-370 in Russia
Highway S201 in China
Road G331 in China

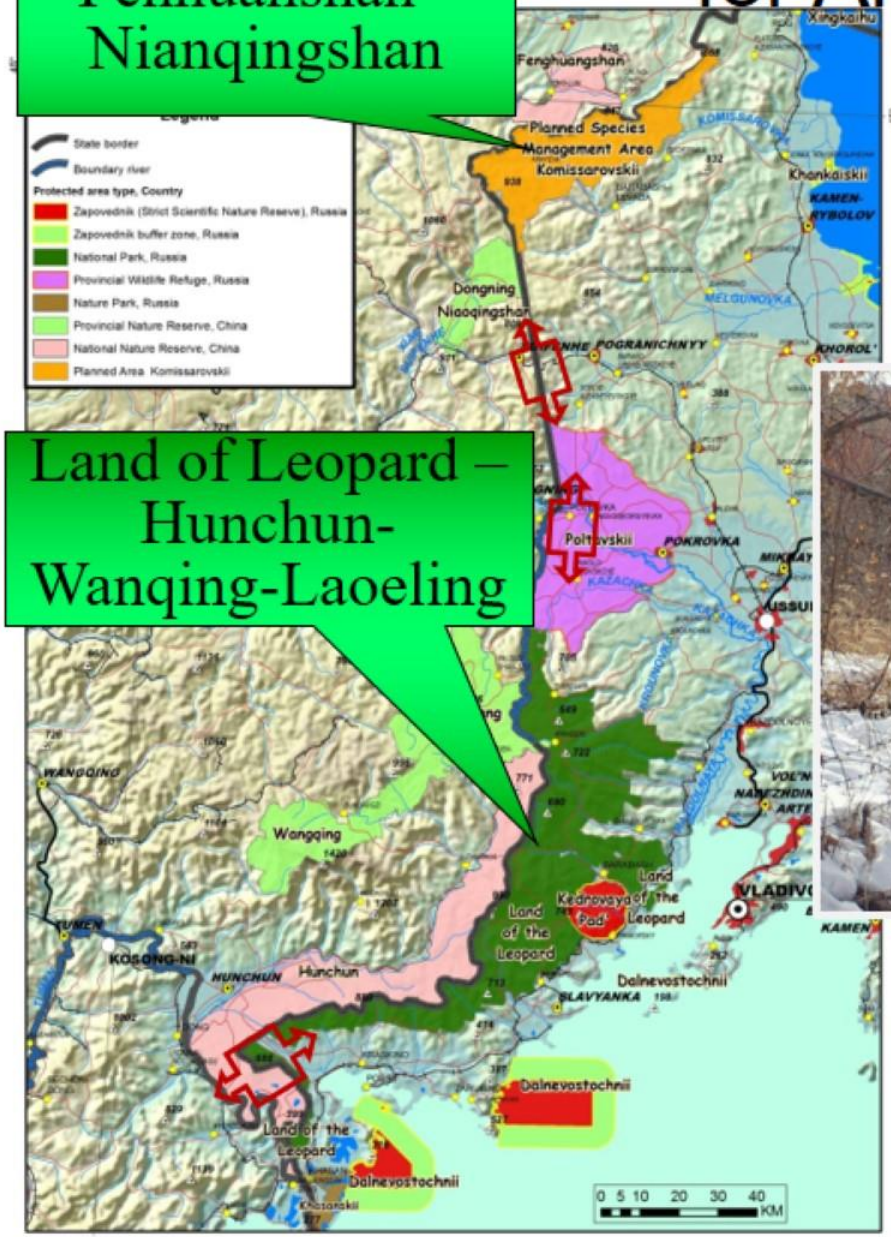
Sino-Russian bordering points:

- Pogranichny-Suifunhe
- Poltavka-Dunnin
- Kraskino-Khunchun
- Barabash-Chinhua

Corridors for border crossing for Amur leopard and tiger

Komissarovka-Fenhuanshan - Nianqingshan

Land of Leopard – Hunchun-Wanqing-Laoeling



Russia

China

Dangerous for tiger and leopard

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Due to the rapid economic development of transport and border crossing infrastructure under the Belt and Road Initiative, the growing range of Amur leopard can be dissected to several fragments.

In the worth scenario, only about 6,500 km2 can be kept as non-fragmented habitats along the Sino-Russian border. It is urgent need to put leopard's requirements into economic planning, implementing best practices of wildlife road crossing.

The free passages should be kept in the border fences along Sino-Russian border at least within the boundary of "Land of Big Cats" national park.

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Even the improvement of protection and increase of prey base, the recent microsatellite genetic analyses reveal a 38.3% reduction of genetic diversity in Amur leopard population over the last 27 years, raising the specter of future inbreeding consequences and already resulting in physical deformities.

Both, Far Eastern leopard and Changbaishan population of Amur tiger faced with a problem of inbreeding loss of genetic diversity, which urgently demand measures for blood refreshment and supporting corridors for meta-population exchange.

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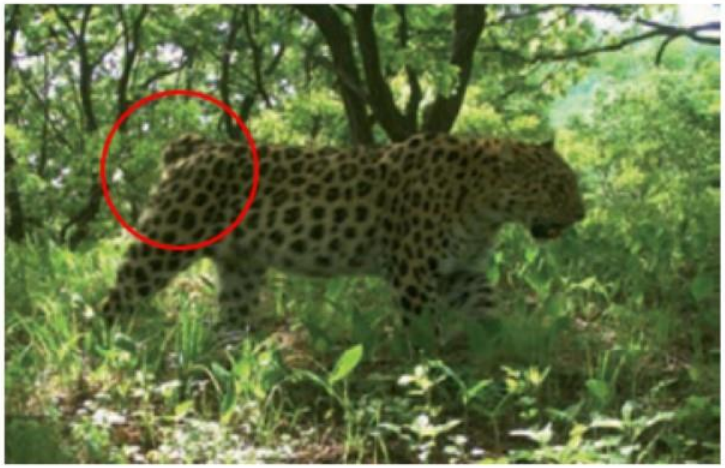
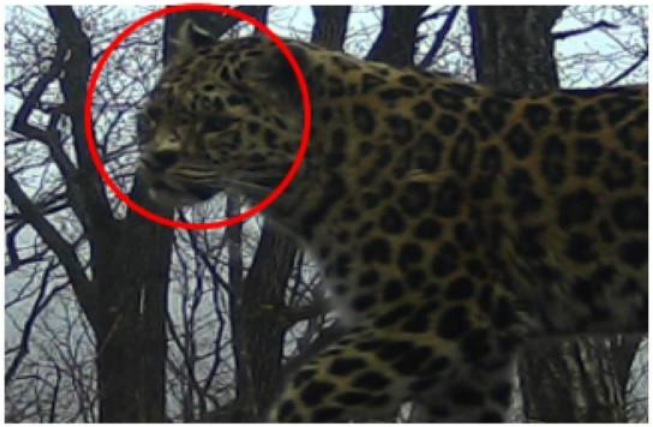
Indicators of inbreeding depression

In average 52% of leopard has white-pawed signs



Camera trap monitoring revealed 5 leopards with shortened tails, and another two with kinked tails



defect of the skull – possible brachycephaly (shortened skull shape)

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Problems with diseases

Canine
Distemper
Virus

Veterinary monitoring and control

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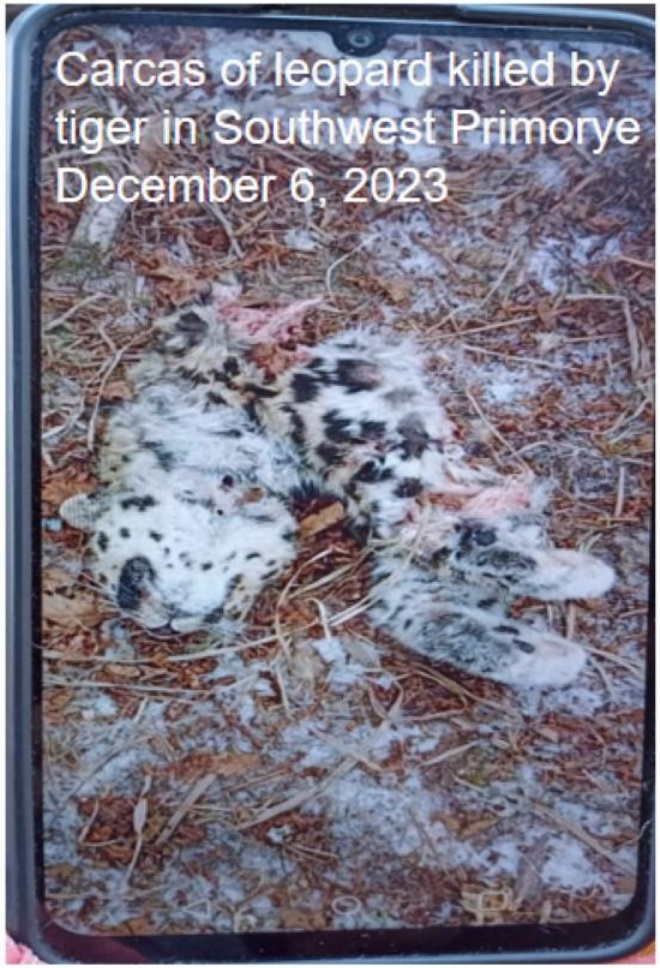

Carcas of leopard killed by tiger in Southwest Primorye December 6, 2023


Amur leopard found killed by tiger near the road in the Northeast China Tiger and Leopard National Park, Jilin Province, December 23, 2023

Interspecific competition between the two sympatric carnivores as their densities are rapidly increasing

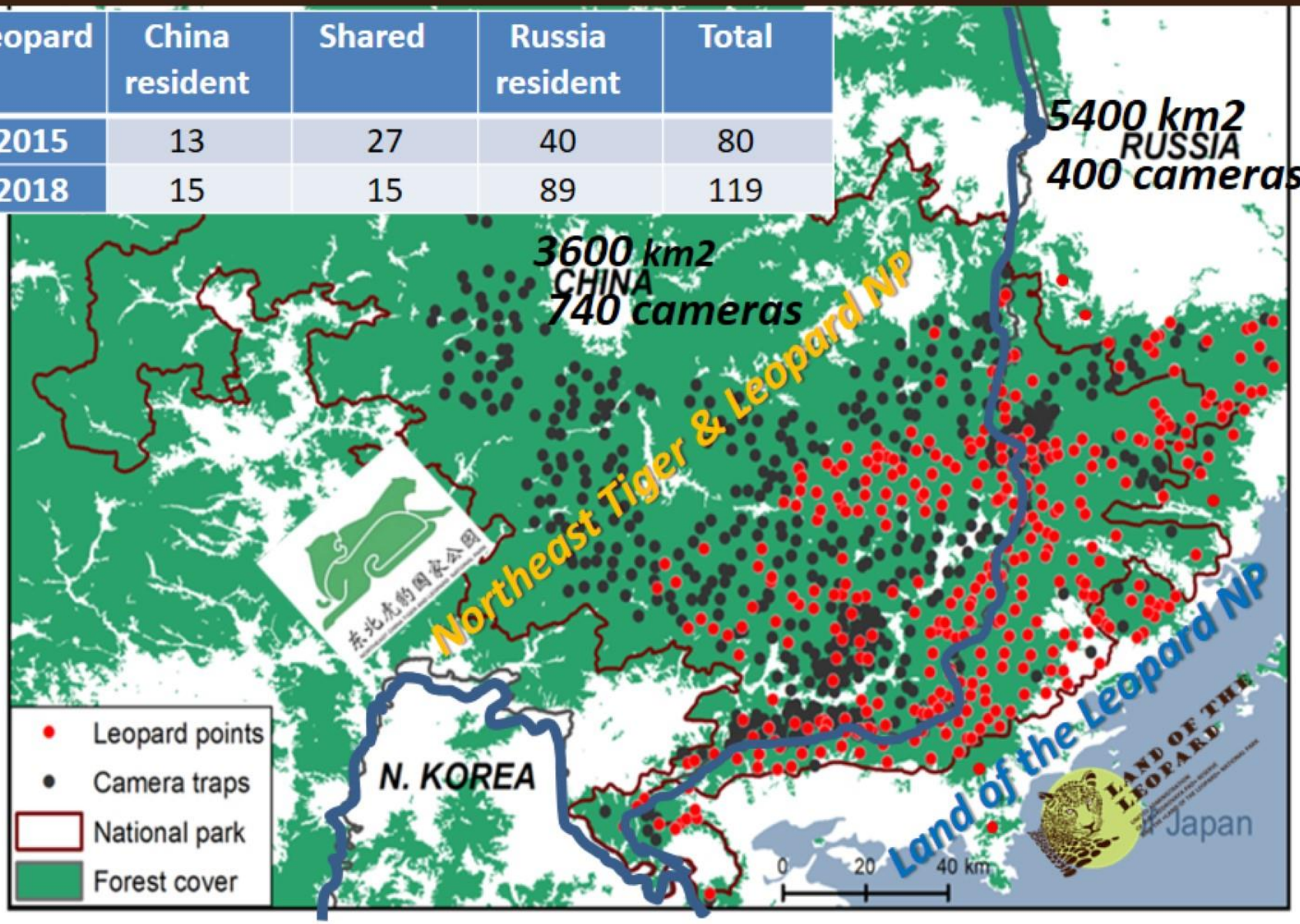
What is the solution of problem?

Problems with data exchange and information sharing

Who are responsible for camera trap monitoring in NEC TLNP?

Sino-Russian camera-trap network for monitoring of Amur tiger and Far Eastern leopard

Leopard	China resident	Shared	Russia resident	Total
2015	13	27	40	80
2018	15	15	89	119



LAND OF THE LEOPARD
UNITED ADMINISTRATION OF THE «KEDROVAYA PAD» RESERVE AND THE «LAND OF THE LEOPARD» NATIONAL PARK

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

东北虎豹国家公园

- Northeast Tiger and Leopard Biodiversity National Field Scientific Observatory of Beijing Normal University
- Northeast Tiger and Leopard Monitoring and Research Center of National Forest and Grassland Administration
- Key Laboratory of Conservation Ecology of the Northeast Tiger and Leopard National Park
- Feline Research Center of Northeast Forest University and NFGA

Future opportunities for collaborative work ahead, modeling the multi-year process of restoring populations of the Amur leopard and Amur tiger in the Eastern Manchurian Mountains/Changbaishan.

Main directions for cooperation within Sino-Russian transboundary protected area "Land of Big Cats"

Law enforcement

LAND OF THE LEOPARD

UNITED ADMINISTRATION OF THE «KEDROVAYA PAD» RESERVE AND THE «LAND OF THE LEOPARD» NATIONAL PARK

Research and monitoring

Forestry service, feeding of ungulates and fire extinguishing

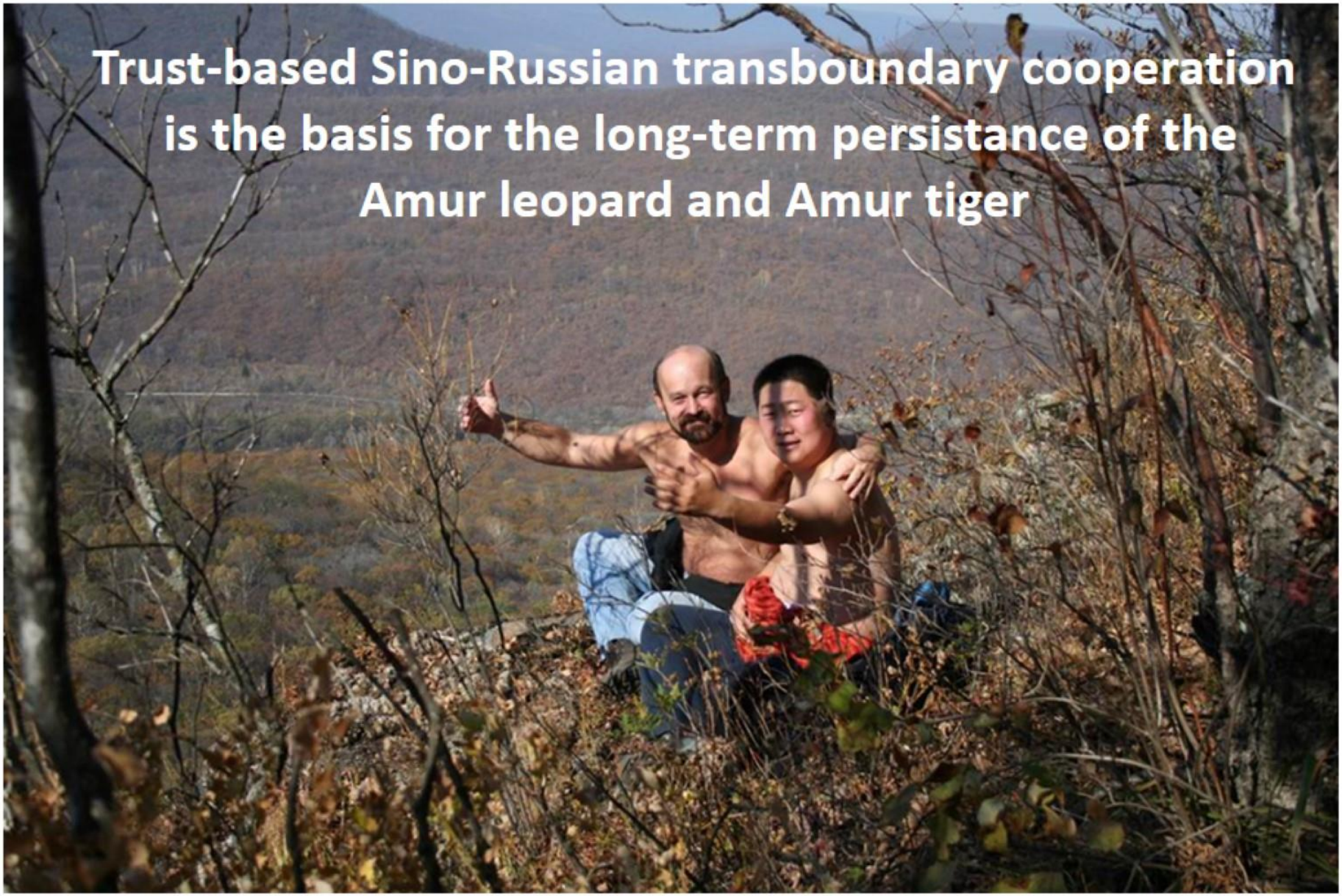
东北虎豹国家公园

NORTHEAST CHINA TIGER AND LEOPARD NATIONAL PARK

Environmental education and tourism

The recovery of Amur leopard and Changbaishan population of Amur tiger became a Global symbol of successful international cooperation

- in 20 years, the most rare Amur leopard from the edge of extinction has been recovered 5 times! Now not less than 150 adults in the World!
- Changbaishan population of Amur tiger was at minimum of only 20-25 animals, including cubs. It was tripled by 2023 to 75 adults.


Trust-based Sino-Russian transboundary cooperation
is the basis for the long-term persistance of the
Amur leopard and Amur tiger