

# TRANSBOUNDARY COOPERATION ON THE CONSERVATION OF AMUR TIGERS, AMUR LEOPARDS AND SNOW LEOPARDS IN NORTH-EAST ASIA



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**PROJECT COMPONENT (3)  
ASSESSMENT OF THE CURRENT  
STATUS OF TWO SNOW LEOPARD  
SUBPOPULATIONS IN  
TRANSBOUNDARY AREA  
BETWEEN MONGOLIA AND THE  
RUSSIAN FEDERATION**

# Goal and Objectives



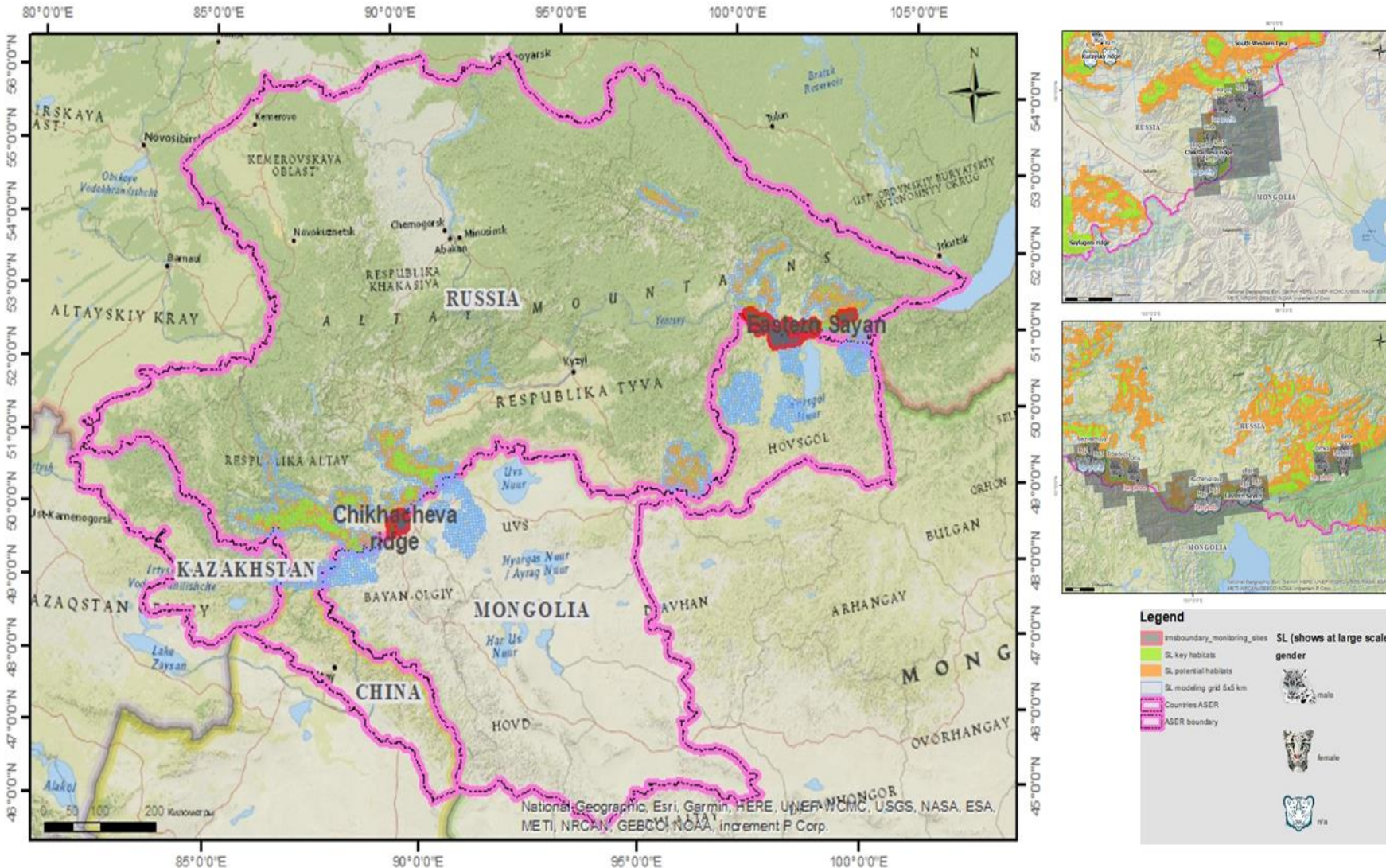
- 2020 to 2023, was conducted a project titled “Transboundary cooperation on the conservation of Amur tigers, Amur leopards and Snow leopards in North-East Asia” to conserve big cats in North-East Asia
- Initiated with approval in 2019 funded by the Russian Government
- The effort involved collaboration on transboundary environmental cooperation with China, Mongolia, and the Russian Federation
- A key workshop in October 2021 highlighted the necessity of cross-border protected areas and ecological corridors, alongside effective cooperation for habitat management
- Following this, in 2022, an additional component was conducted to evaluate the status of transboundary snow leopard populations between Mongolia and the Russian Federation, marking a continued commitment and sustainability to these conservation efforts

**Goal:** Assess the current status and identify individuals of Snow leopards in the Russian-Mongolian border areas.

## Objectives:

- Snow leopard population monitoring collecting data using camera traps in the transboundary areas of Russia and Mongolia
- Data analysis of all transboundary data.

# Project sites



- **Chikhachev ridge**  
(Kosh-Agach district of Republic of Altai of the Russian Federation and Bayan-Ulgii aymag of Mongolia);
- **Eastern Sayan ridge**  
(Okinsky district of Republic of Buryatia of the Russian Federation and Hovsgol aymag of Mongolia)

# Time Frame (Russia, planned)



Activities	Data collection from camera trapping of Snow leopards in the Russian Federation	Responsible Entity	Time Frame
1.1.	Inception meeting for Russian experts	Partner Institution	May 2020
1.2.	Set up camera traps in Eastern Sayan ridge of Okinsky district in the Republic of Buryatia	Partner Institution	May 2020
1.3.	Set up camera traps in Chikhachev ridge of Kosh-Agach district in the Republic of Altai	Partner Institution	June 2020
1.4.	Check camera traps in Eastern Sayan ridge of Okinsky district in the Republic of Buryatia	Partner Institution	August 2020
1.5.	Check camera traps in Chikhachev ridge of Kosh-Agach district in the Republic of Altai	Partner Institution	September 2020
1.6.	Compile camera trapping data	Partner Institution	October 2020

Activities	Comparative analysis of camera trap data collected from Mongolia and the Russian Federation	Responsible Entity	Time Frame
2.1.	Manage and coordinate the collection of camera trap data from Irbis Mongolian Center	Partner Institution	November 2020
2.2.	Conduct comparative study to identify snow leopard individuals and their transboundary movement in the Mongolian-Russian border	Partner Institution	December 2020 – February 2021

Activities	Project report with priority action plans	Responsible Entity	Time Frame
3.1.	Prepare a project report including analysis of outcomes from Activities 1 and 2, as well as priority action plans	Partner Institutions of Mongolia and the Russian Federation	March 2021

# Time Frame (real)

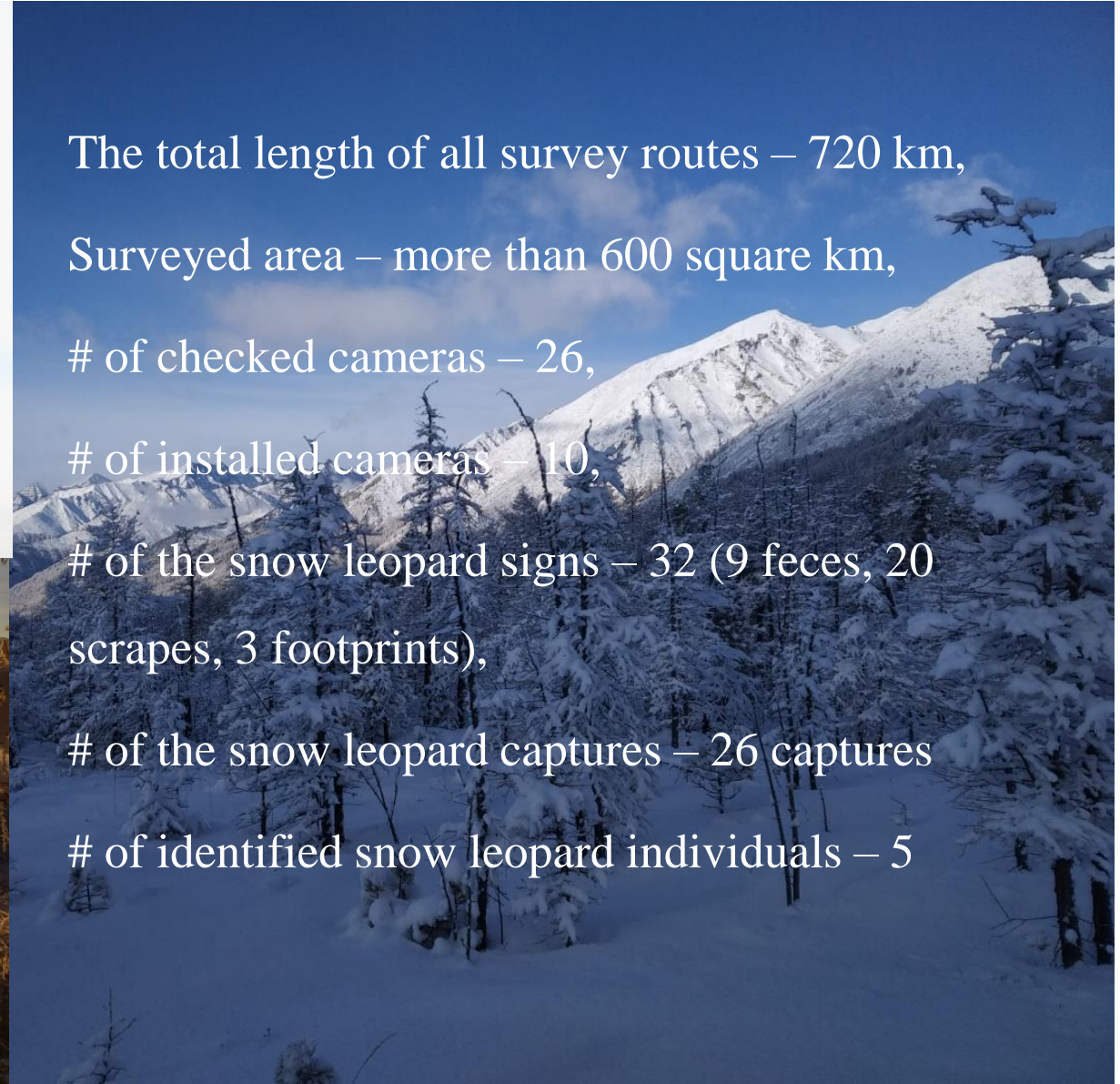


<b>Date</b>	<b>Activity</b>
June 8, 2020	Inception meeting
June 15-June 30, 2020	Field trip in Russian side of Chikhachev ridge
July 8-July 31, 2020	Field trip in Russian side of Eastern Sayan ridge
September 1-15, 2020	Preparation of interim report
10-30 September, 2020	Field trip in Russian side of Chikhachev ridge
1-10 October, 2020	Field trip in Russian side of Eastern Sayan ridge
15-31 October, 2020	Data exchange with Mongolian colleagues
December 1-15, 2020	Preparation of the year-end report
February 1 – March 30, 2021	Spatial analysis of Russian field data
April 1-30, 2021	Data exchange with Mongolian colleagues
May 1-15, 2021	Comparative study to identify snow leopard individuals
May 16 – June, 2021	Spatial analysis of transboundary data
May – June, 2021	Preparation of the final report

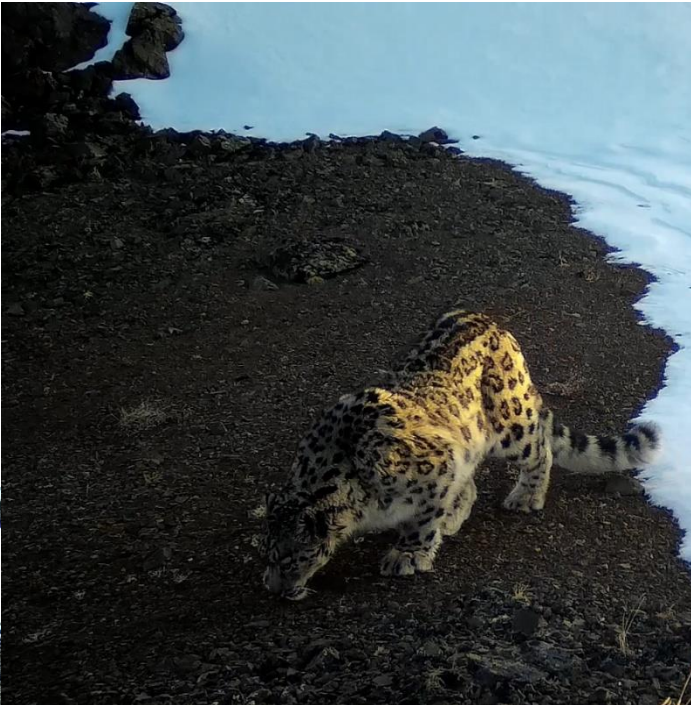
# Project site 1. Eastern Sayan



The total length of all survey routes – 720 km,  
Surveyed area – more than 600 square km,  
# of checked cameras – 26,  
# of installed cameras – 10,  
# of the snow leopard signs – 32 (9 feces, 20  
scrapes, 3 footprints),  
# of the snow leopard captures – 26 captures  
# of identified snow leopard individuals – 5



# Project site 1. Eastern Sayan



# Project site 2. Chikhachev ridge



The total length of all survey routes – 270 km,

Surveyed area – more than 1000 square km,

# of checked cameras – 37,

# of installed cameras – 12,

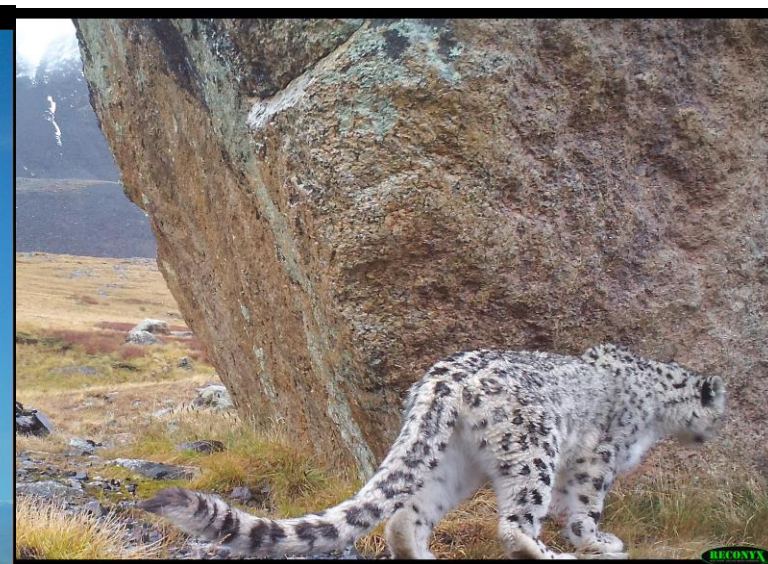
# of the snow leopard signs – 43,

# of the snow leopard captures – 12 captures

# of identified snow leopard individuals – 8 (in Russian side)



# Project site 2. Chikhachev ridge

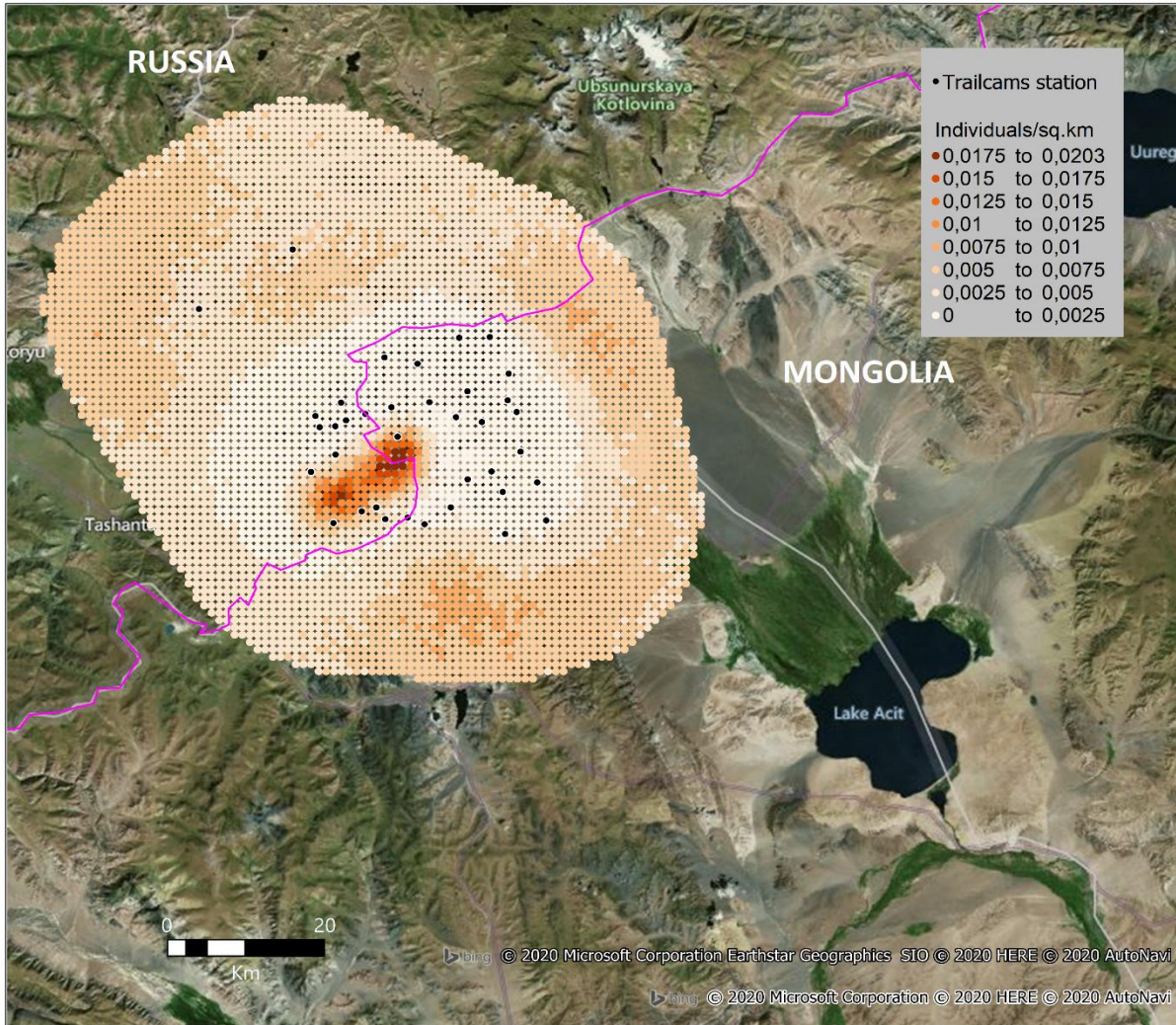


RECONYA

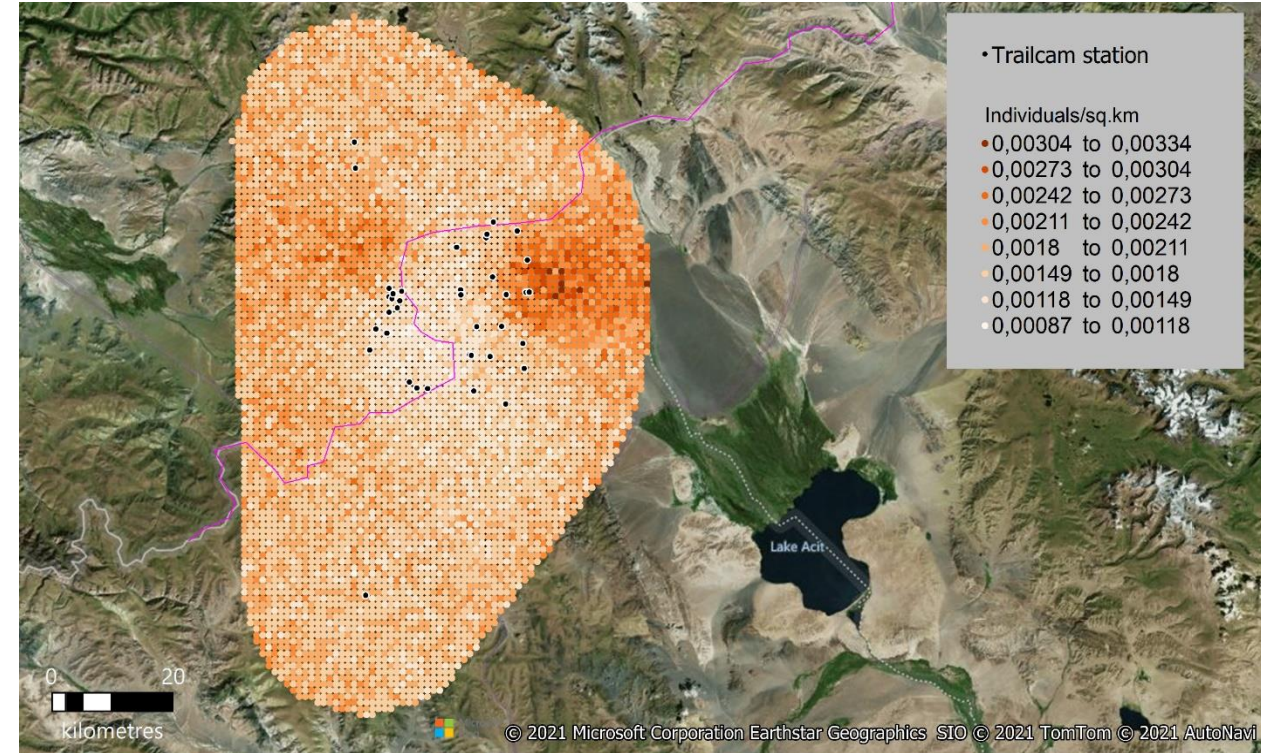
# Spatial analysis. Chikhachev ridge



## 2018



## 2020

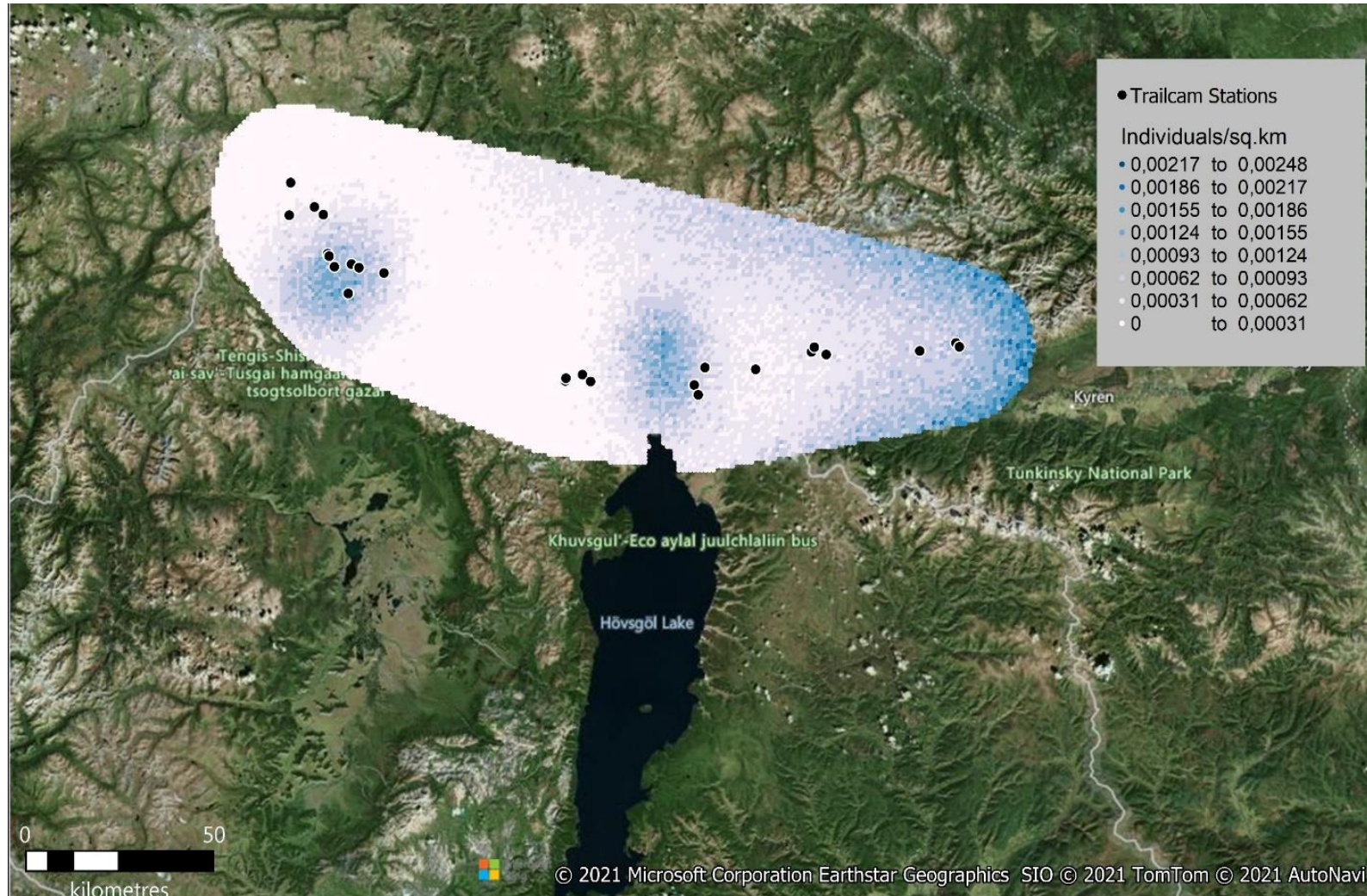


Year	Density	N
2018	0,43±0,11	22.06
2020	0,17±0,05	10.68

# Spatial analysis. Eastern Sayan



## 2020



Year	Density	N
2020	0,04±0,01	5.99

It's not transboundary data, only from Russian side of the ridge.

in Ikh Soyon ridge in Mongolia – 2 individuals were identified



# Distribution of the snow leopard in transboundary area between Russia and Mongolia



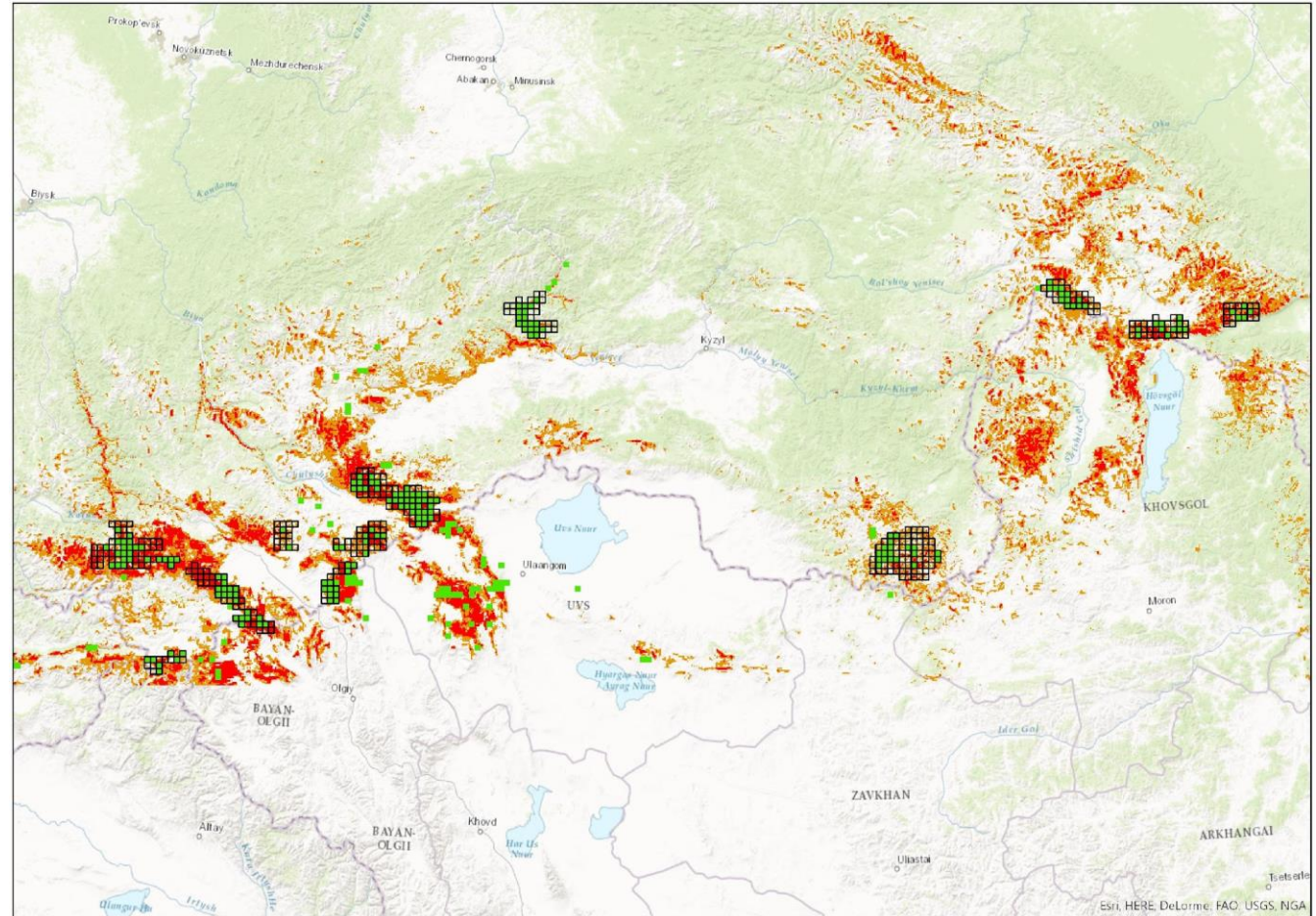
5 transboundary subpopulations

60 000 km<sup>2</sup> - potential

11 000 km<sup>2</sup> - key habitat



SEELock M 14/02/2018 16:27:09 ○ -14°C

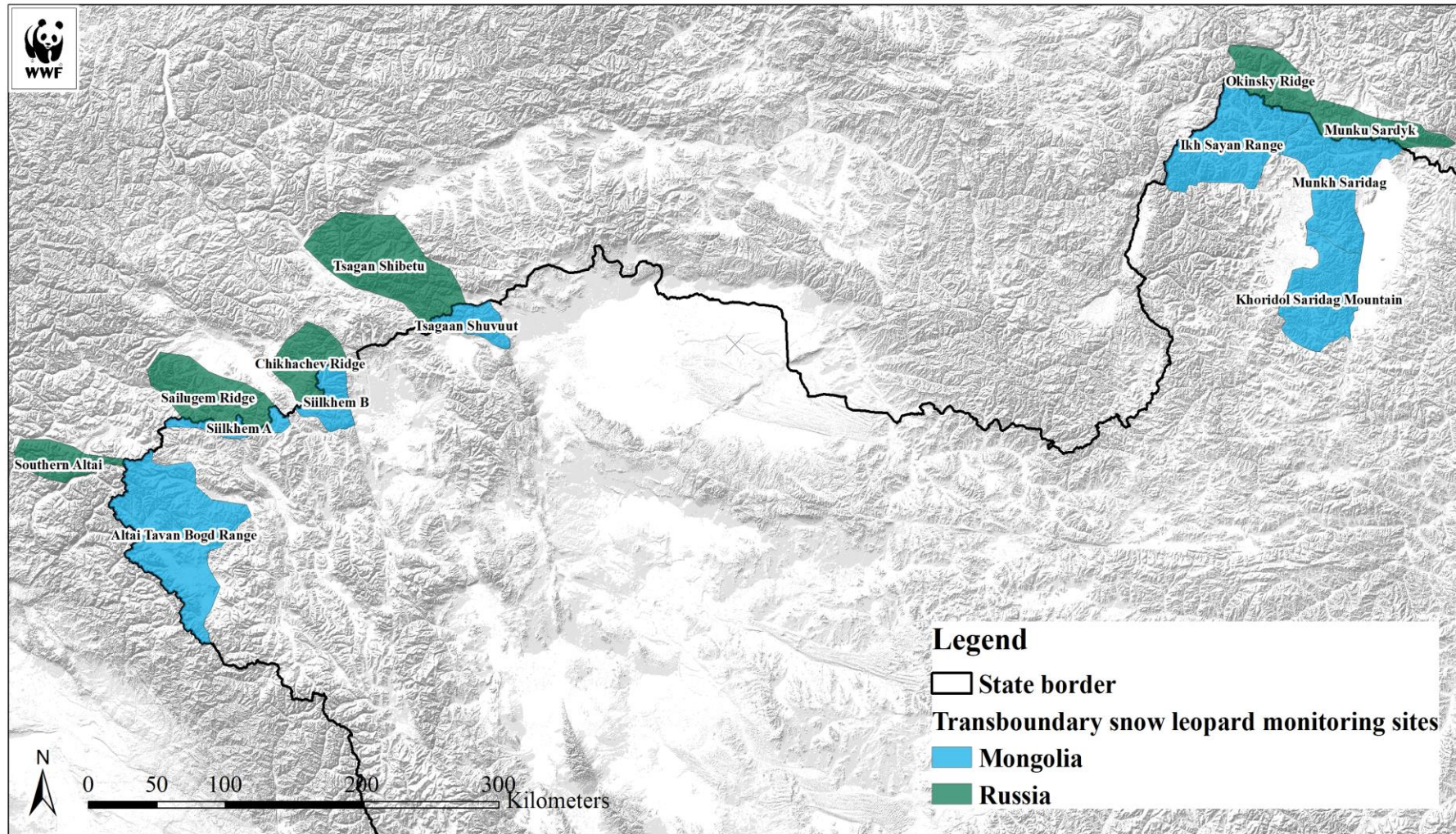


# 2<sup>nd</sup> phase of the project



## EVALUATION OF THE CURRENT STATUS OF

## TRANSBOUNDARY SNOW LEOPARD SUBPOPULATIONS IN THE BORDER AREA BETWEEN RUSSIA AND MONGOLIA



5 transboundary subpopulations

New project sites:  
Southern Altai,  
Sailugem, Tsagan-  
Shibetu

Regular monitoring  
every 2 years

- 
- Project name:* Evaluation of the current status of transboundary snow leopard subpopulations in the border area between Russia and Mongolia
- Agreement:* LOA 2022-0017 Irbis Mongolia Center
- Duration of the project:* July 2022 – November 2023
- Project sites:* Southern Altai, Siilkhem, Chikhachev (I), Tsagaan shuvuut (II) and Eastern Sayan (III) mountain ranges in the transboundary areas of Mongolia and Russia
- Principal investigators:* Associate professor, doctor Bariushaa Munkhtsog, Executive Director Irbis Mongolia Center NGO and  
Mr. Alexander Karnaukhov Senior Project coordinator, Altai-Sayan Programme, Vsemirnyi Fond Prirody (WWF).
- Local partners:* Altai tavan Bogd, Siilkhem A, Siilkhem B National parks, Tsagaan shuvuut and Ulaan taiga Strictly protected areas of Mongolia and Sailugem National park and Ubsunurskaya Kotlovina Nature Reserve, Russia

# Result 1: Data collection from camera trapping of Snow leopards



Activities		Responsible Entity	Time Frame
1.1	Inception meeting with experts, protected areas and park staff	Partner Institution	August 2022
1.2	Training of officials of the province nature conservation department and staff and rangers of protected areas and national parks on how to use camera traps for snow leopard surveys	Partner Institution	August 2022
1.3	Training on standardized snow leopard monitoring programmes using mobile applications	Partner Institutions	August 2022
1.4	Set up camera traps in Southern Altai, Siilkhem, and Chikhachev mountain ranges	Partner Institution	September - October 2022
1.5	Set up camera traps in the Eastern Sayan mountain range	Partner Institution	September 2022
1.6	Set up camera traps in Tsagaan shuvuut mountain range	Partner Institution	September 2022
1.7	Checking and monitoring camera traps by staff and rangers in Altai range, Uvs late basin, Ulaan taiga, Sailugem, and Tunkin protected areas	Partner Institution	November 2022-May 2023
1.8	Collect camera trap data in Eastern Sayan and Tsagaan shuvuut mountain range	Partner Institution	June 2023
1.9	Collect camera trap data in Southern Altai, Siilkhem, and Chikhachev mountain ranges	Partner Institution	July - August 2023
1.10	Compile camera trapping data for joint analysis	Partner Institution	August - September 2023

## Result 2: Comparative analysis of camera trap



Activities		Responsible Entity	Time Frame
2.1	Conduct a comparative study to identify snow leopard individuals at the study sites and their transboundary movement and migration between Mongolia and the Russian Federation	Partner Institution	Sep-Oct 2023

## Result 3: International Snow Leopard Conference

Activities		Responsible Entity	Time Frame
3.1	Organize an International Snow Leopard Conference	Partner Institution and ESCAP	Sep 22-23, 2022

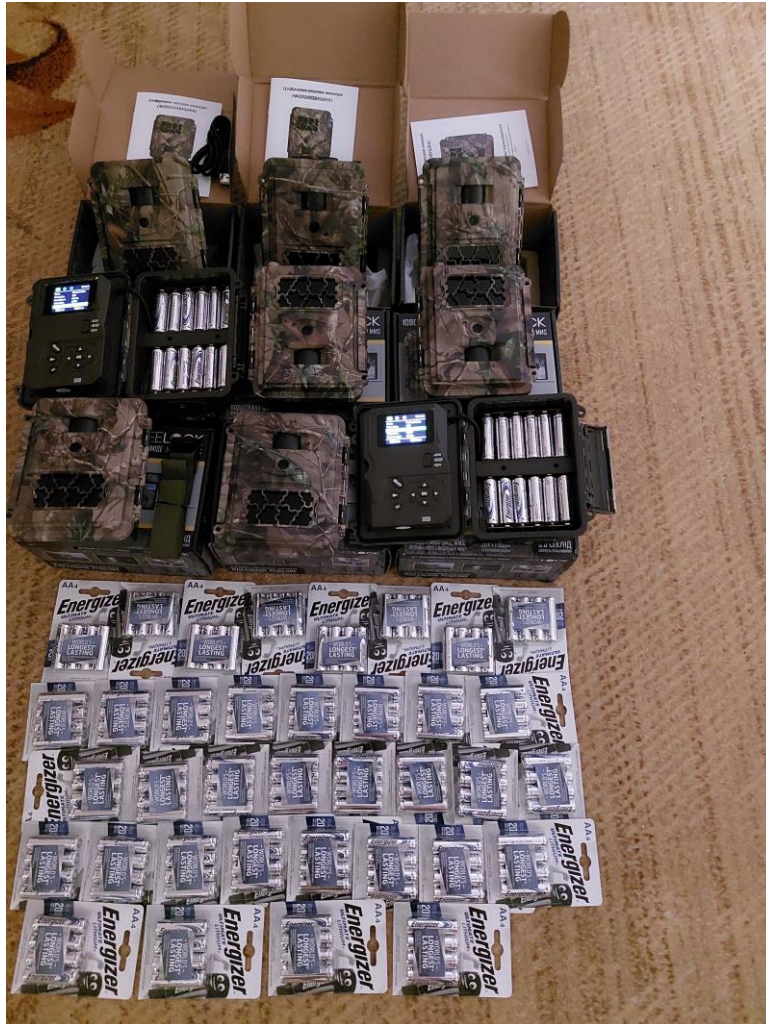
## Result 4: Project report with priority action plans

Activities		Responsible Entity	Time Frame
4.1	Prepare and submit a project report from Activities 1 and 2, as well as priority action plans.	Partner Institution and ESCAP	October – November 2023





# Camera traps used



January 12-15, 2023

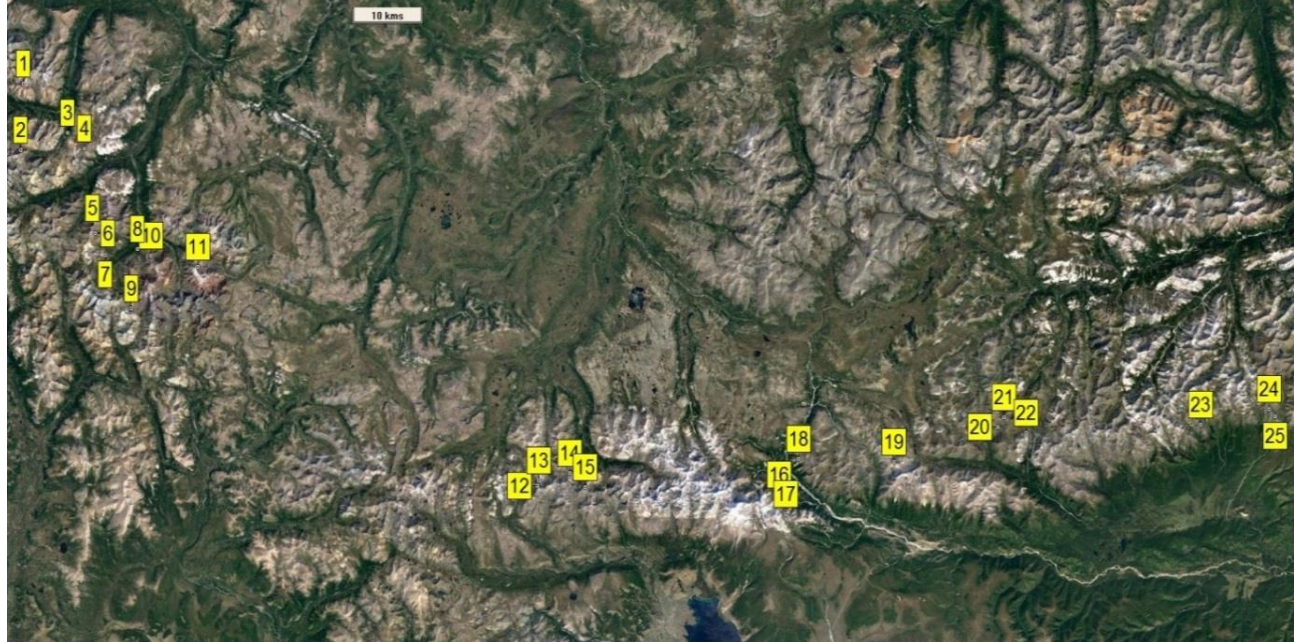
April 19, 2023



МОНГОЛ АЛТАЙН НУРУУНЫ УТХГ-ЫН  
ХАМГААЛАЛТЫН ЗАХИРГАА



# Camera trapping in the Eastern Sayan mtn ridge



# Camera trapping in the Tsagaan shiveet mtn ridge



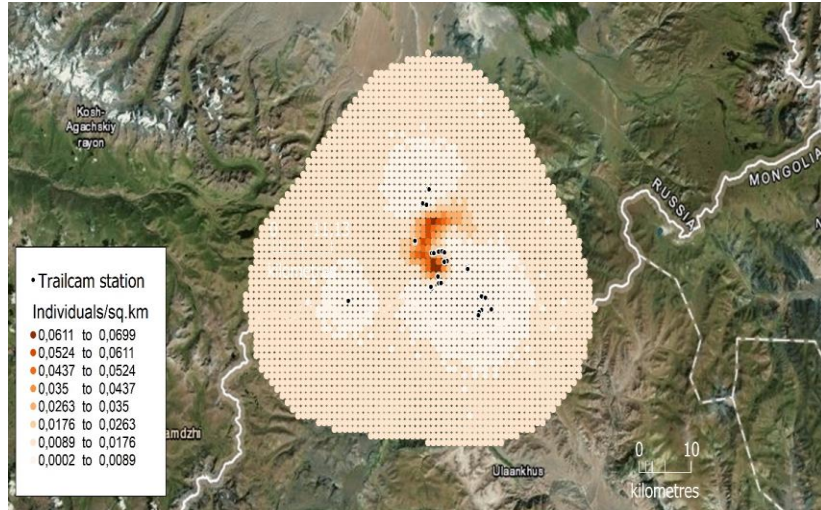
Camera trap ID #	Name of the protected area	Name of the place	Camera trap coordinates
1	Tsagaan shuvuut strictly protected area	Valley with snow leopard	N: 50° 19' 47,5" E: 91° 11' 47,2" 2949M
2		Valley with snow leopard	N: 50° 19' 40,2" E: 91° 11' 37,2" 3001M
3		Tsagaan tolgoi	N: 50° 24' 25,56" E: 91° 05' 52,35"
4		Ikh Khosorlog	N: 50° 25' 00,13" E: 90° 58' 20,72"
5		Shar khamar	N: 50° 24' 10,78" E: 91° 01' 54,18"
6		Northern valley	N: 50° 17' 12,2" E: 91° 04' 0,6" 2073M
7	Tsagaan shuvuut strictly protected area	Northern valley	N: 50° 16' 49,1" E: 91° 03' 45,1" 2156M
8		Baga Khosorlog	N: 50° 18' 03,1" E: 90° 58' 27,1" 2466M
9		Baga Khosorlog	N: 50° 18' 08,4" E: 90° 58' 51,6" 2415M
10	Tsagaan shuvuut strictly protected area	Yol	N: 50° 16' 46,0" E: 91° 12' 07,3" 2380M
11		Yol	N: 50° 16' 42,2" E: 91° 12' 17,6" 2355M
12		Southern valley	N: 50° 16' 53,2" E: 91° 07' 03,9" 2107M
13		Southern valley	N: 50° 16' 53,2" E: 91° 07' 05,1" 2143M
14		Southern valley	N: 50° 16' 56,3" E: 91° 06' 57,7" 2068M
15		Southern valley	N: 50° 16' 58,8" E: 91° 06' 54,1" 2011M
16	Mergen valley	N: 50° 17' 35,66" E: 90° 47' 11,96"	
17	Surkhii valley	N: 50° 17' 54,15" E: 90° 51' 38,26"	
18	Surkhii valley	N: 50° 17' 38,18" E: 90° 51' 02,34"	
19	Burshboi valley	N: 50° 19' 35,04" E: 90° 49' 07,30"	
20	End of Ikh Khosorlog	N: 50° 25' 43,36" E: 91° 03' 44,84"	

Table. Spatial distribution estimates of snow leopard population density at three sites using spatial-explicit capture-recapture models (SECR, Spacecap for R) and three trailcams networks in transboundary areas of Russia and Mongolia during 2022-2023.

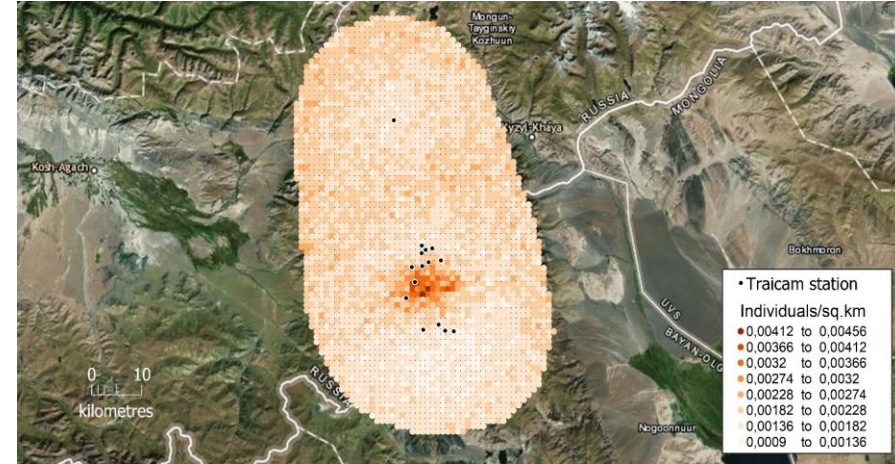


Site	Year	SS (matrix + 20 km)						
		Population density, Individuals/100 km <sup>2</sup>			$\sigma$ (M $\pm$ SD), radius, km	psi	p	N
		M $\pm$ SD	Min 95%	Max 95%				
Sailugem, Russia	2023	1.0 $\pm$ 0.42	0.27	0.17	3.9 $\pm$ 1.4	0.52	0.52	29.04
Chikhacheva ridge, Russia	2023	0.17 $\pm$ 0.09	0.12	0.34	139.7 $\pm$ 13.81	0.19	0.77	5.6
Eastern Sayan (Russia and Mongolia)	2022	0.037 $\pm$ 0.007	0.027	0.051	15.9 $\pm$ 2.4	0.21	0.66	9.4

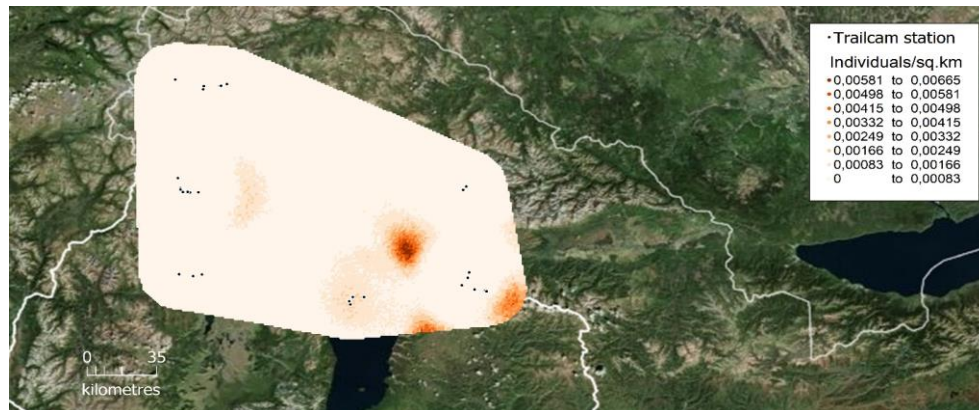
# Snow leopard subpopulations



Spatial distribution estimates of snow leopard population densities in Sailugem, Russia, during 2022-2023, using SECR models (Spacecap for R).



Spatial distribution estimates of snow leopard population densities at Chikhachev ridge, Russia, using SECR models (Spacecap for R) during 2022-2023.



Spatial distribution estimates of snow leopard population densities in Eastern Sayan, Russia, during 2022-2023, using SECR models (Spacecap for R).

# International snow leopard conference







UNITED NATIONS  
**ESCAP**

Economic and Social Commission for Asia and the Pacific



МОНГОЛ УЛСЫН ШИНЖЛЭХ УХААНЫ АКАДЕМИ  
**БИОЛОГИЙН ХҮРЭЭЛЭН**



# THE INTERNATIONAL CONFERENCE: TRANSBOUNDARY COOPERATION ON SNOW LEOPARD RESEARCH AND CONSERVATION

**MONGOLIA**  
**KHUSTAIN NURUU NATIONAL PARK**  
**SEPTEMBER 21-24, 2022**

# Priority action plans for conservation of snow leopard population at transboundary areas of Russia and Mongolia



- ❖ Expand transboundary cooperation for conservation and improve financing for it
- ❖ Establish transboundary protected areas for conservation of snow leopards, their habitat and prey species
- ❖ Summarize data on snow leopards subpopulations at project sites for last 30 years, accumulate well database, summarize and disseminate knowledge obtained
- ❖ Publish books, leaflets, education posters on snow leopards populations of Mongolia and adjacent territories in national and English languages to inform the public and decision makers on population status and conservation issues, problems and challenges.
- ❖ Develop 5 and 10 years conservation strategy of rare and very rare wildlife and plan activities to implement those strategies, make available funding sources.
- ❖ Assess snow leopard habitat fragmentation, pasture land and open water sources' resources for mountain ungulates the main prey species of the snow leopards.
- ❖ Conduct counting of Ibex and Argali sheep populations, assess the trends at border areas of Mongolia and Russia, recommend conservation actions to protect them, the main prey species of the snow leopards.
- ❖ Expand and intensify education and awareness activities supporting the organization of World snow leopard day festival /October 23 of each year/ by school kids, secondary school eco club activities for education and conservation.
- ❖ Improve involvement of local native communities in conservation making available for them low interest loan or small grants for conservation projects in their home land.

# Publications



1. Hacker, C., Atzeni, L., Munkhtsog, B., Munkhtsog, B., Galsandorj, N., Zhang, Y., Liu, Y., Buyanaa, C., Bayandonoi, G., Ochirjav, M., Farrington, J. D., Jevit, M., Zhang, Y., Wu, L. Cong, W., Li, D., Gavette, C., Jackson, R., Janecka, J. E., 2022. Genetic diversity and spatial structures of snow leopards (*Panthera uncia*) reveal proxies of connectivity across Mongolia and northwestern China. *Landscape Ecology*. <https://doi.org/10.1007/s10980-022-01573-y>
2. Barry Rosenbaum, Sebastien Comte, Andrey D. Poyarkov, Bariushaa Munkhtsog, Ochirjav Munkhtogtokh, Jose Antonio Hernandez-Blanco, Dmitry Y. Alexandrov, Buyanaa Chimeddorj, Bayandonoi Galtulga, Dalannast Munkhnast, Bayaraa Munkhtsog, Viatcheslav V. Rozhnov, 2023. Seasonal space use and habitat selection of GPS collared snow leopards (*Panthera uncia*) in the Mongolian Altai Range. *PLoS ONE* 18(1): e0280011. <https://doi.org/10.1371/journal.pone.0280011>
3. Arsen Dotsev, Olga Koshkina, Veronika Kharzinova, Tatiana Deniskova, Henry Reyer, Elisabeth Kunz, Gábor Mészáros, Alexey Shakhin, Sergey Petrov, Dmitry Medvedev, Alexander Kuksin, Ganchimeg Bat-Erdene, Bariushaa Munkhtsog, Vugar Bagirov, Klaus Wimmers, Johann Sölkner, Ivica Medugorac, Natalia Zinovieva., 2023. Genome-wide insights into intraspecific taxonomy and genetic diversity of argali (*Ovis ammon*). *Diversity* 15: 627. <https://doi.org/10.3390/d15050627>
4. Spitsyn, S.B., A.N. Kuksin, B. Munkhtsog, O. Munkhtogtokh., 2023. Snow leopards at mountain range Chikhchev and Siilkhem, Russia and Mongolia in 2011-2021. *Proceedings of the Altai SPA*. Approved for the publication.
5. Bayaraa Munkhtsog, Claudio Augugliaro, Rana Bayrakcismith, Bariushaa Munkhtsog, Thomas McCarthy, 2023 Snow Leopard Status and Conservation. Northern Range: Mongolia. Chapter in Book: [Snow Leopards](#) in a series “Biodiversity of the World: Conservation from Genes to Landscapes”. 2ns edition. Editors: Tom McCarthy and David Mallon. Elsevier Publications.

# Acknowledgements

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We are very grateful to all of those with whom we worked together in the field for almost 2 years, in remote areas, sometimes on very difficult field expeditions in snow and bad weather to reach the study site, install the camera traps at field stations, retrieve the camera traps.

We would like to thank my colleagues from Russia, who analyzed the collected camera trap data set, without it we do not pursue the as great results.

At last, but not at least we thankful Fund “Nature around you” of Siberian health LLC for additional donation and successful joint project to study and conserve snow leopard subpopulations along the border areas of Mongolia and Russia.

Thank you  
for your attention!

