

Wild Cats of Family Felidae in Mongolia: Research, Conservation and Transboundary Cooperation

Snow Leopard by Gloria Este

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The Family *Felidae* in Mongolia has 4 species; namely *Panthera uncia*, *Lynx lynx*, *Otocolobus manul* and *Felis Silvestris*.

Snow leopard and Pallas cat population are been studied quite well, there are almost none of information on Lynx and Wild cat population in Mongolia.

Conservation status

SPECIES NAME	Red Data Book Mongolia	CITES appendix	Law of fauna, Mongolia
<i>Panthera uncia</i>	+	I	Very rare
<i>Lynx lynx</i>	-	II	-
<i>Felis Silvestris</i>	+	II	Very rare
<i>Otocolobus manul</i>	-	II	-

Pallas cats

- Small-sized wild cat with flattened face, stocky build, and long hair
- Coat is unique with black spots on the head and varying black stripes either on the back, tail, or both
- Body length of 50 –62 cm, with a tail of 23-31 cm
- Adult cat – about 40-50 cm at the shoulder
- Weight ranges from 2-4.5 kg in the adult cat



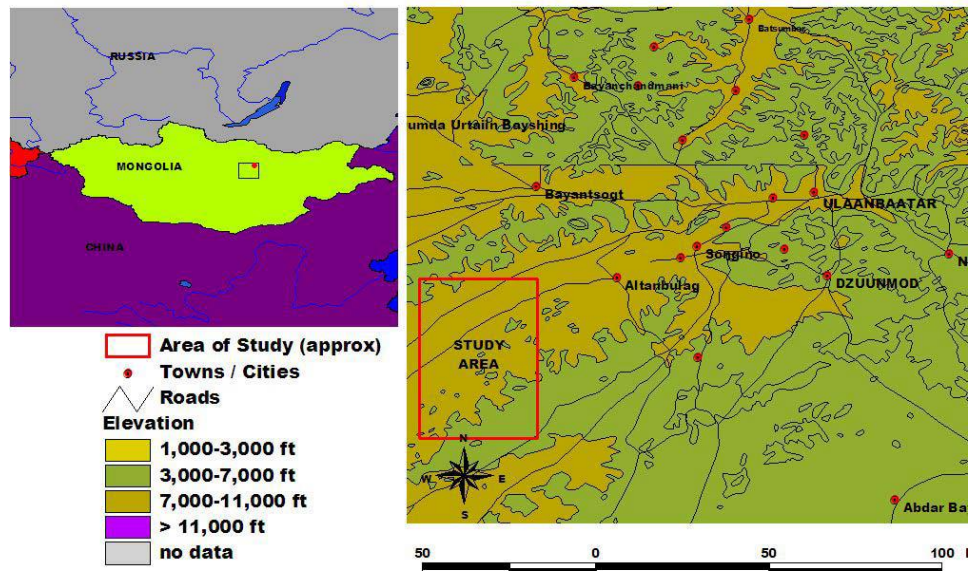


World distribution



Distribution, Density and Abundance

- Widely distributed throughout Mongolia, except taiga forest
- Population size unknown
- Density per 100 square km is 6-7 individuals at 1,200 km² study site in Altanbulag county, Central province, Mongolia -47.47N 106.01E.





Pallas cat habitat in Mongolia

- Pallas cats are inhabits rocky hills, rolling, grasslands, steppe, mountain steppe, semi deserts and on the edge of the forest
- Found at elevations as high as 700 m to 3000 m.
- Den in small caves and rock crevices, and may use old burrows of other animals such as marmot, fox.





Primary Threats

- Prey of birds
- Domestic dogs
- Uncontrolled hunting to use fat, meat for traditional medicine/in the trap for marmots.
- Poisoned crop to kill the vole, Brandt's vole.

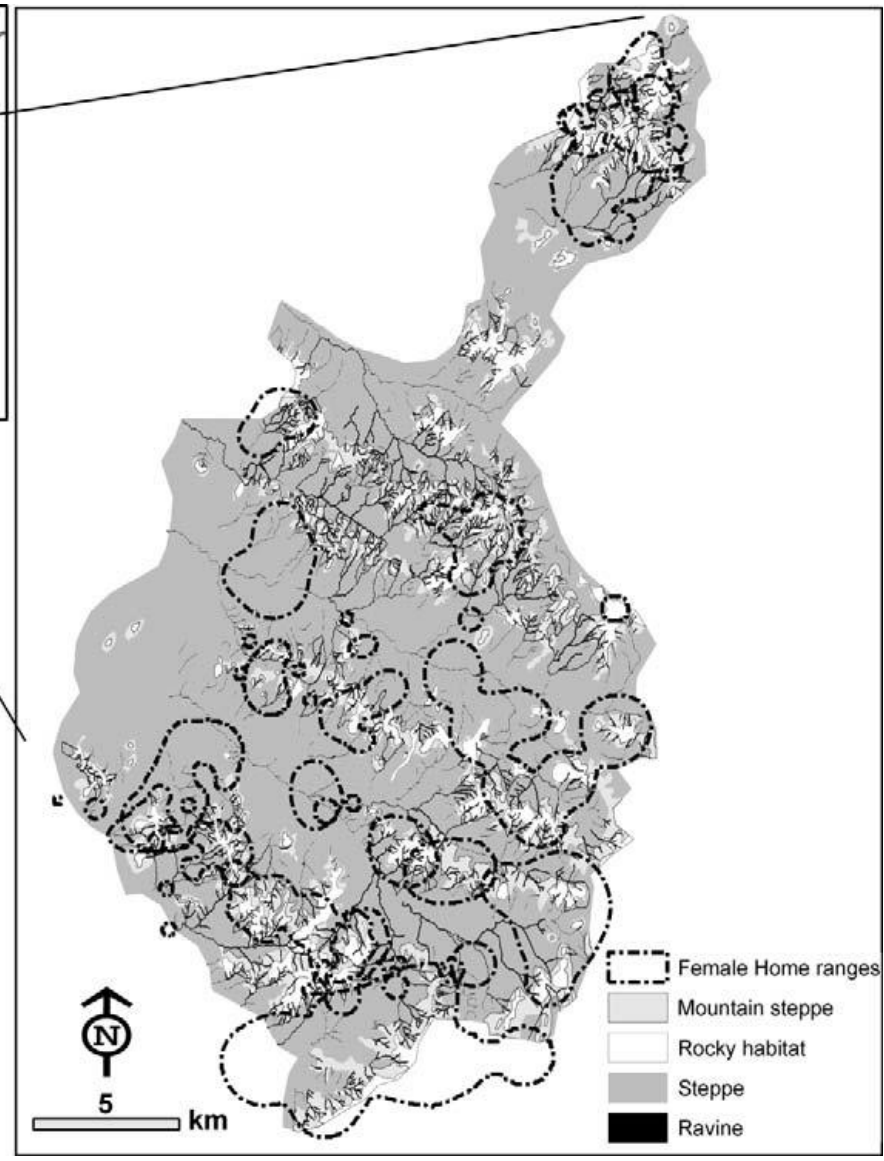
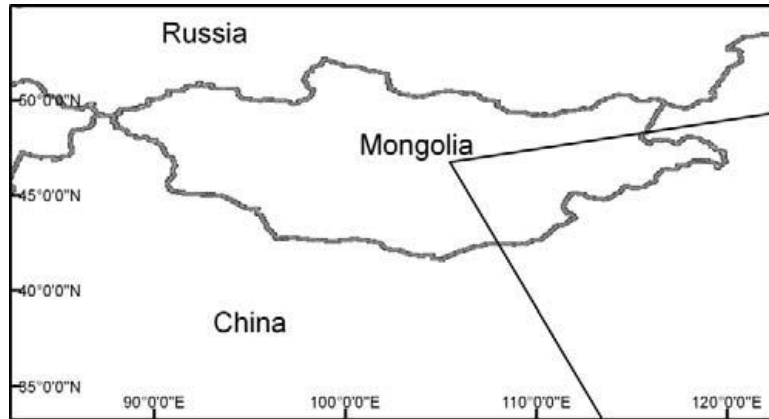




Home range

- Between 2005 and 2007 were estimated home-range size for 9 male and 16 female Pallas's cats. Cats used large and variable home ranges, with male home ranges 4–5 times the size of female ranges.
- Annual 95% kernel home ranges ranged from 20.9 to 207.0 km² for males, and ranged from 7.4 to 125.2 km² for females. Incremental cluster polygons indicated that core areas were most prominent using 60% of locations. Annual 60% core areas ranged from 5.7 to 50.3 km² for males and from 1.3 to 22.0 km² for females.
- Home-range size did not increase in response to prey availability or seasonality. Smaller home ranges were associated with higher coverage of preferred rocky habitats, where easy to hide. Larger home ranges were associated with higher connectivity of rocky habitats in the periphery of home ranges.
- The home range of cats are overlapped entirely
- Female with cubs remain near the den May to August

Homerange of the manul



Thinks I do not see it





Activity and movements

- Active at dawn and dusk, but also throughout of the day in winter
- Female with cubs were active 5 to 10 am and 16 to 22 pm in summer
- The cats move average 0.6 to 1.7 km per day (n=39)
- Maximum they are moving 15.6 km per day (n=3)
- In winter the cast are moving less, 0.3 to 1.2 km per day (n=22)
- Maximum the cats are moving is 8.2 km per day (n=2) in winter
- Female with cubs hunt within 0.5 km (n=5) from the den during nursing season



Diet of the Pallas cat



Analysis of 146 scats identified 249 prey items. Pallas's cats ate a broad range of small mammals, insects, birds, reptiles, and carrion, but Daurian pikas (*Ochotona daurica*) were the most frequently consumed prey. Small mammals accounted for 85.5%. Main diet is pikas, vole, mice, ground squirrel, hare, and small birds.

- Daurian pika – 39,6%, Mongolian gerbil 19,5%, Mountain vole (*Alticola* sp.) 17,5%, Brandt's vole (*Lasiopodomys brandtii*) 4,7%, Insects – 22.0%, Small birds – 12.0%, Daurian pika - up to 30,6% % of the cat's winter diet
- In captivity cats were using 6.7 to 12.1 gram meat per kg of body weight (Female 9.6 to 12.1, male 6.7 to 8.5) per day





Hunting

- 50 000 skins were exported in early 20th century
 - 4300 in 1927
 - 8400 in 1928
 - 6500 in 1929
 - 1800 in 1931
 - 2000 in 1932
 - 1000 in 1933
 - 600 – 650 in 1940 – 1950 (every year)
 - 83000 in 1967 – 1977 (total for the decade)
 - 7000 in 1970
 - 437 in 1979
 - 9185 in 1987
- No data since 1988



Culture and use

- It is believed that meat of the Pallas cat will treat the kidney
- Also meat is used to treat skin disease
- Born is used to treat nervous disorder, and rheumatic fever
- The hats, collar and “hoof” guff of Mongolian deel, are made with Pallas’ cat hide
- Rarely Mongolian deel are made with Pallas’ cat skin



Rodenticide applications

- A deadly rodenticide was used and poisoned over 250 non targeted birds and mammals in 2002
- Dozens of cranes, golden eagles, sakers, vultures, foxes and Pallas cats were killed
- Muscle of all animals were thickened
- In June 04, 2003 two manuul died + 3 nearly died, very hungry kittens found in the den next to Choiriin Bogd mountain, eastern Mongolia. Female probably died because of poisoning



Toxoplasma gondii



Summer 2000 to 2005

CAPTIVE

cat	Toxo IgG	PCR
198109	1:4096	N
195056	1:4096	N
960227	1:2048	N
960228	1:4096	N
960229	1:8192	N
96M010	1:4096	N
96M011	1:4096	N
195054	1:2048	N
195055	1:8192	N

Total: 9/9 100%

WILD

cat	Toxo IgG	PCR
Man001	1:1024	N
Man002	N	N
Man003	N	N
Man004	N	N
Man005	N	N
Man006	N	N
Man007	N	N
Man008	N	N
CMan9	1:512	N
CMan9-1	N	N
CMan9-2	N	N
CMan9-3	N	N
CMan1	N	N
CMan3	N	N
CMan7	N	N

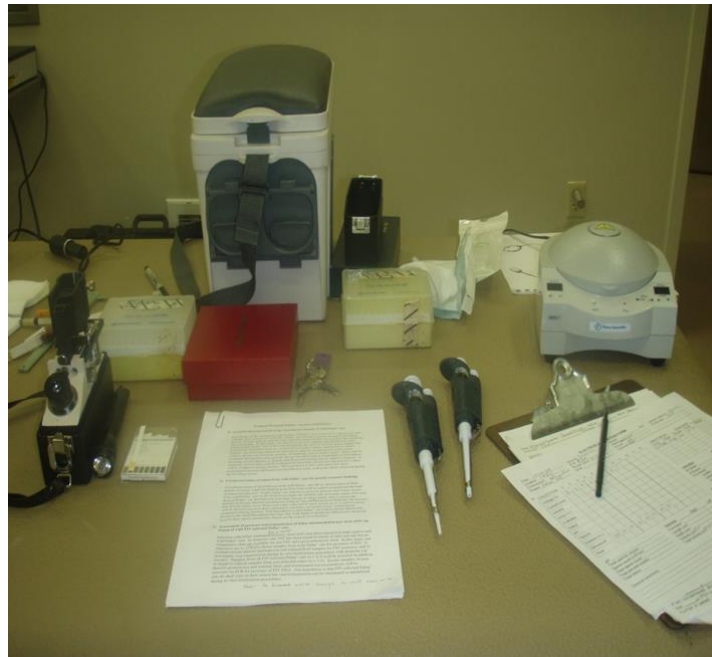
Total: 2/15 13%

Feline Immunodeficiency Virus (5/22 23%)

Canine Distemper Virus (1/12 8%)

Parvo virus (CPV-2) (1/12 8%)

Semen collection and check Seminal fluid for FIV testing



All ejaculates (n=6) collected during the breeding season contained concentrated spermatozoa (mean \pm SEM, 29.7 \pm 8.0 million sperm/ejaculate) with excellent progressive motility (range, 70-90%) and normal morphology (range, 29-62%). In contrast, only 3 of 11 ejaculates collected in the pre- or post-breeding season contained spermatozoa, with greatly reduced sperm numbers (1.0 \pm 0.7 million sperm/ejaculate), confirming the pronounced reproductive seasonality previously observed in Pallas' cats in captivity.

Semen was collected from 11 wild males captured on the Mongolian steppes, frozen in 115 semen straws stored in U.S.A tested for reproduction



Who did work at study site:

- Field team
- 3 PhD students
- 4 Master students
- 4 Bachelor students
- 30< Volunteers, max 8 person/year
- 20 Students from university of Miami, USA on Steppe ecology field course practice+year
- In 2009-2011 on field practice of vertebrate animals 80 biology students/year of 2nd grade National university of Mongolia

Pallas cat conservation in Mongolia

- In 1995 Mongolia became a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Protected areas in Mongolia





Bushnell

03-30-2013 11:43:20

BIG CAT-A LOT FUNDS

A SMALL CAT –
IS THERE ANY
FUNDING?





SNOW LEOPARD RESEARCH AND CONSERVATION IN MONGOLIA

Distribution and status

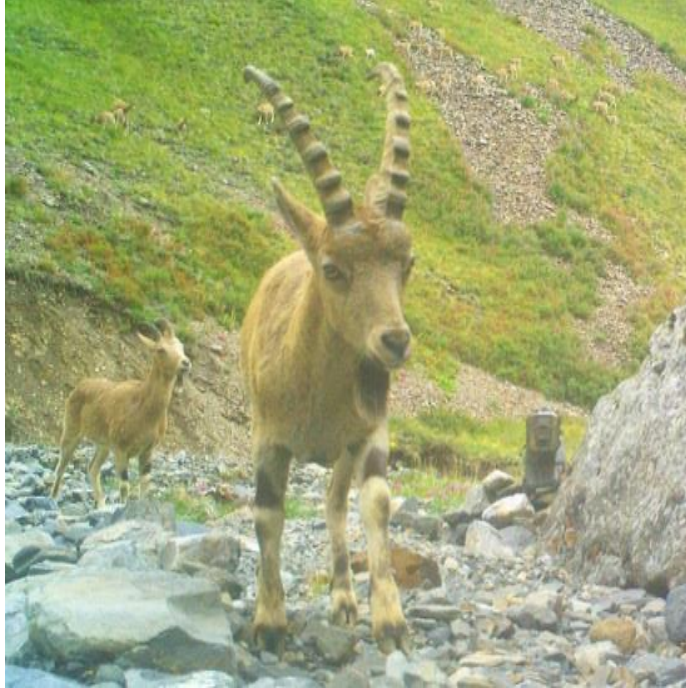


1000-1200 snow leopards inhabit 103000 km² territory in Mongolia in Altai, Gobi–Altai, Khangai mountain ranges, Trans Altai Gobi and Khuvsgul mountain.

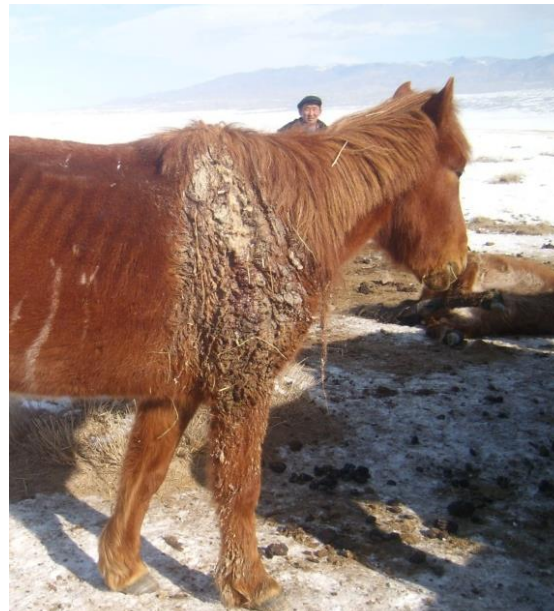
This is about 20% of the world snow leopard population.

Snow leopards are endangered and registered in Mongolian Red Data Book (1987, 1997, 2013) and Mongolia is a member of CBD, CMS, CITES.

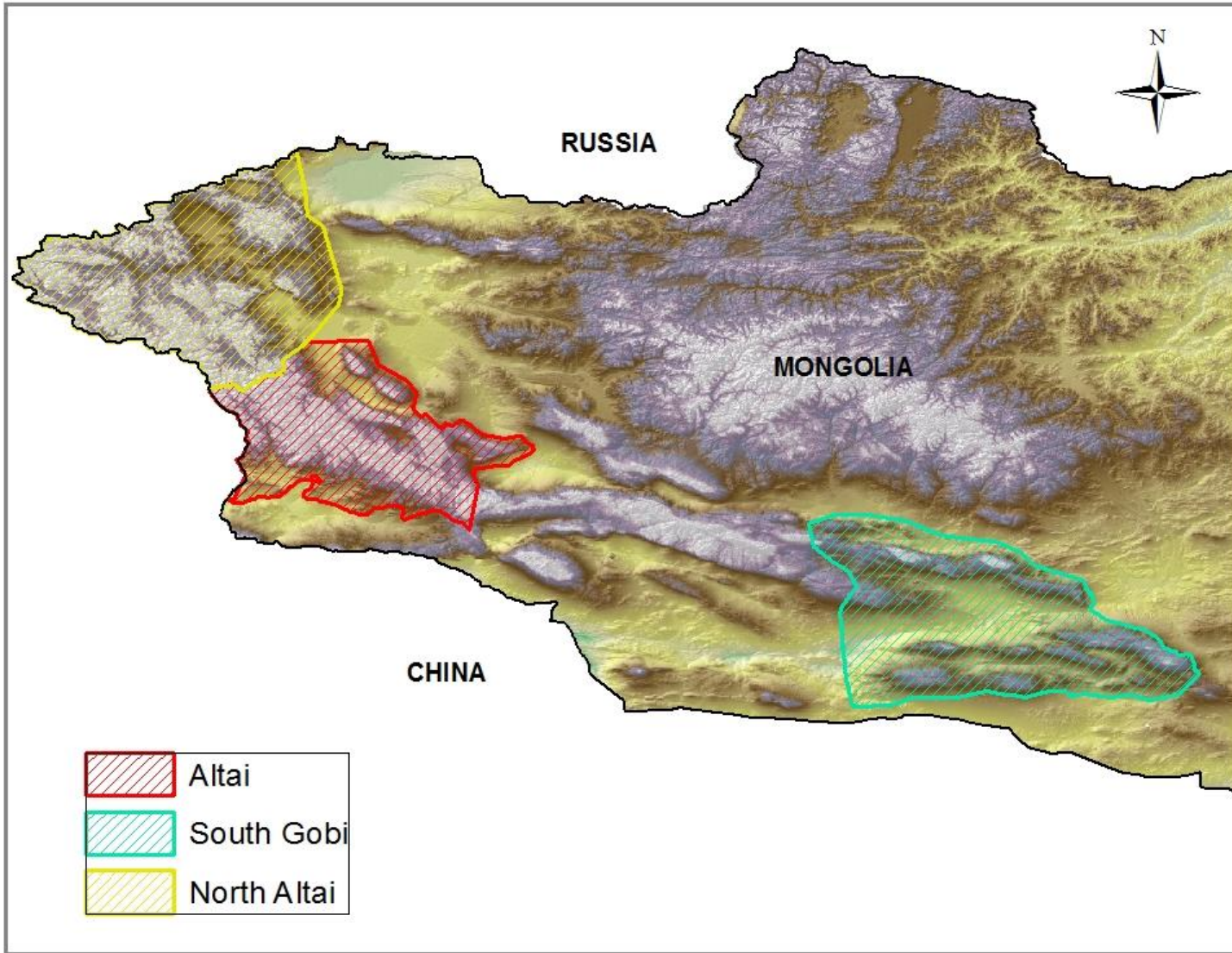
The threats to snow leopards in Mongolia



- Rapid decrease of mountain ungulates in 1990s and later due to competition for open water sources and pasture land with domestic livestock



- Illegal poaching
- Pasture land degradation due to increased number of livestock
- Habitat fragmentation because of development of mining and infrastructure



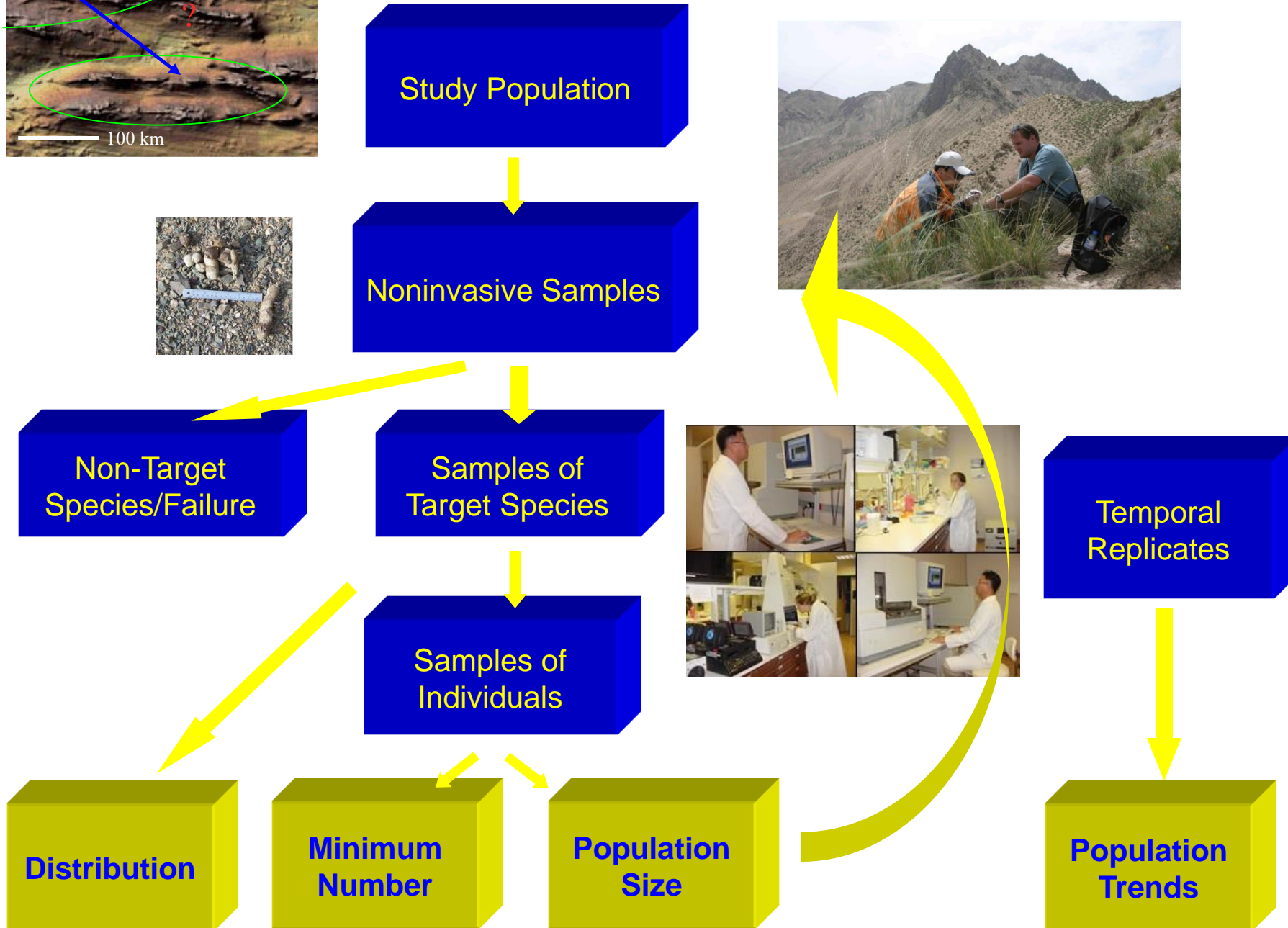
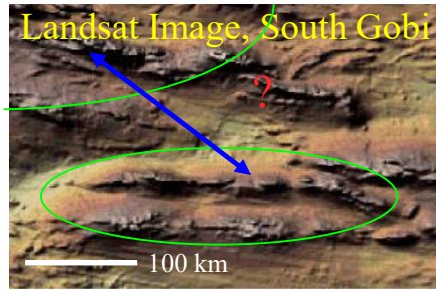
There are 3 Snow Leopard Landscapes in Mongolia within GSLEP

- Altai SLL – 56,000 km²
- Northern Altai SLL– 72,000 km²
- Southern Gobi SLL– 82,000 km²

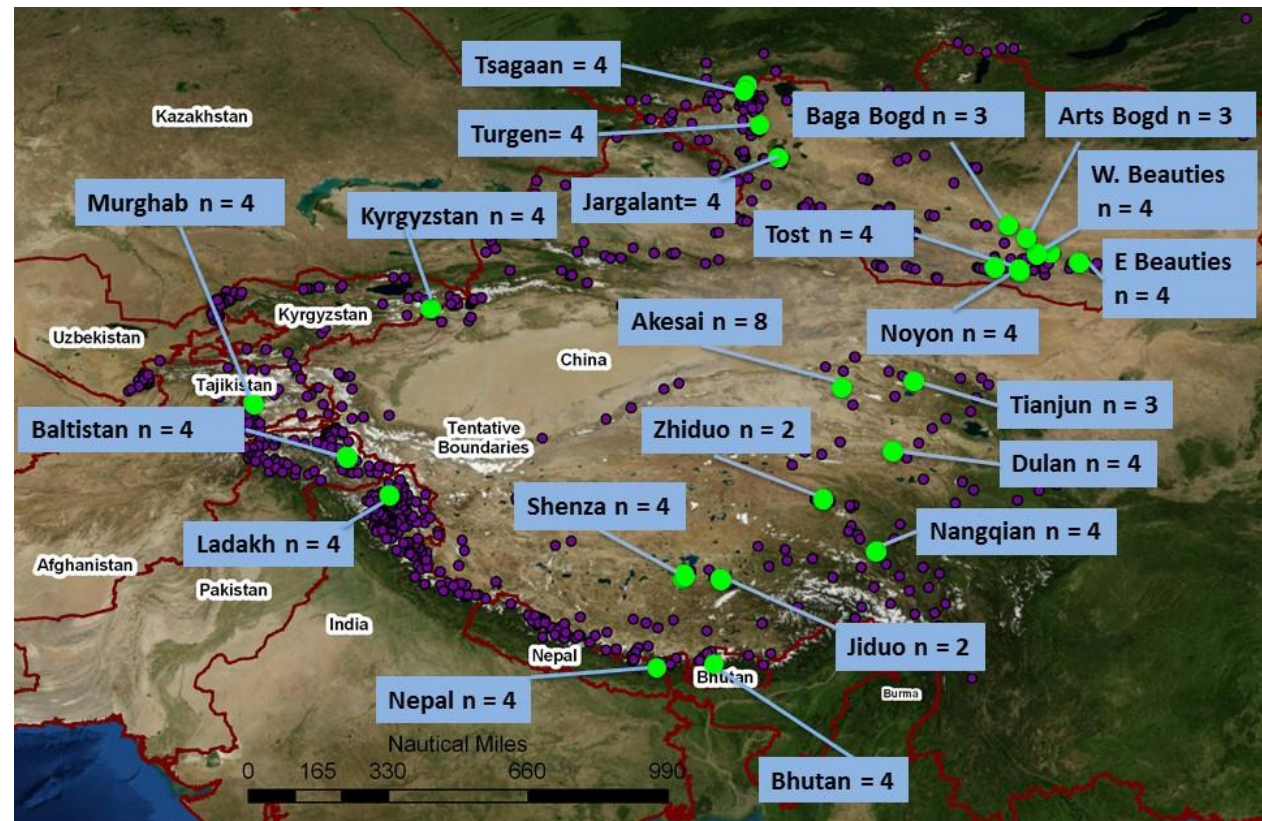
Traditional Surveys



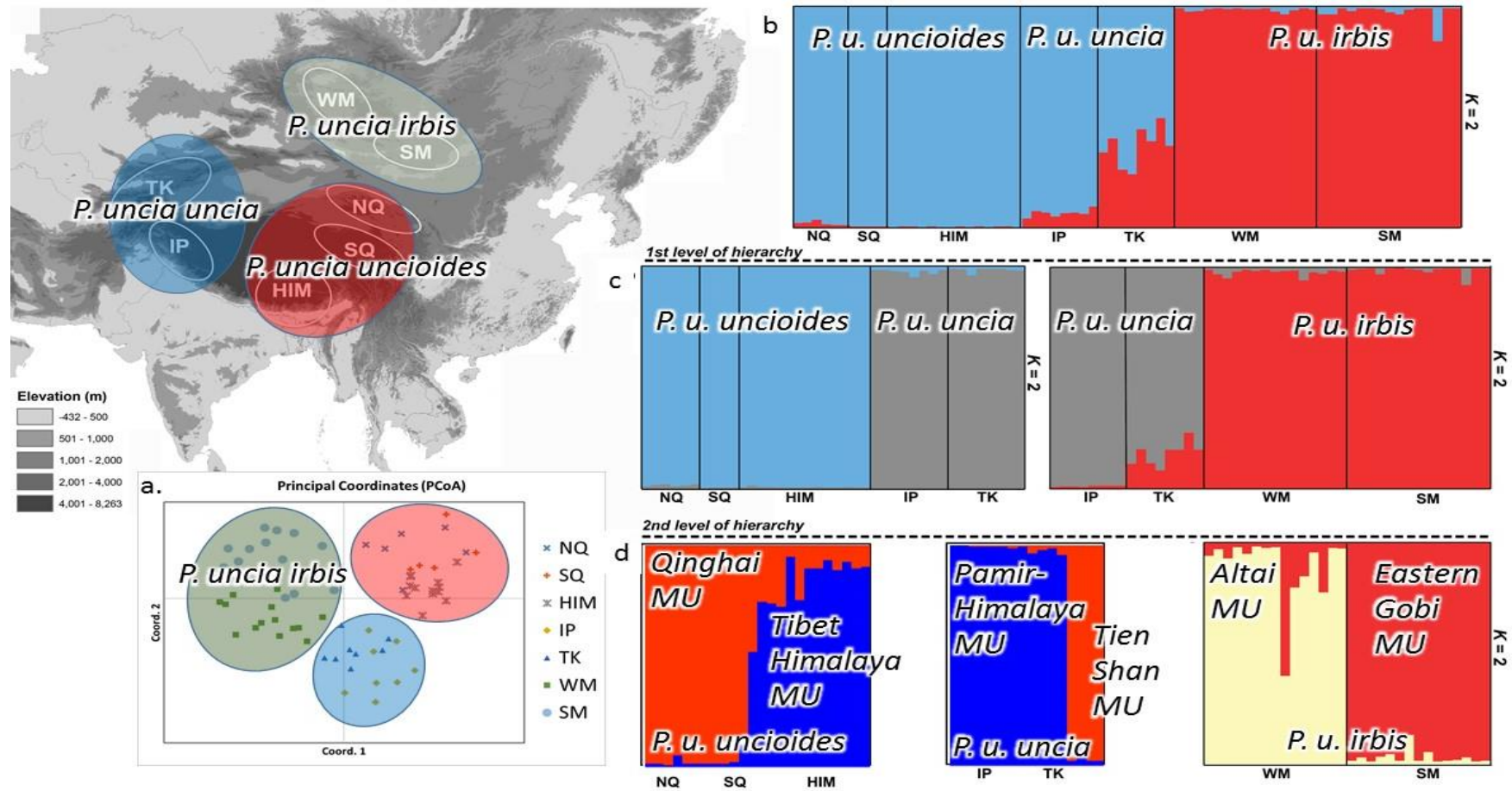
Non-invasive Techniques



Range-wide genetic assessment of snow leopards



We conducted the first range-wide genetic assessment of snow leopards within and among different geographic regions based on noninvasive scat surveys representing all major regions of the species range. Thirty-three microsatellites were genotyped and a total of 638-bp of mitochondrial DNA sequenced in 70 individuals. Snow leopards exhibit low genetic diversity at microsatellites ($A_N = 3.4$ and $H_O = 0.443$), virtually no variation at the mtDNA, and underwent a bottleneck in the mid Holocene (~6,000 years ago). Multiple genetic analyses recovered three primary genetic clusters: (1) Northern (the Altai region), (2) Central (core Himalaya and Tibetan Plateau), and (3) Western (Tien Shan, Pamir, trans-Himalaya region). Accordingly, we recognize three subspecies, *P. u. irbis* (Northern group), *P. u. uncia* (Western group), and *P. u. uncioides* (Central group) based upon genetic distinctness



Regions sampled and structure plots from 3 hierarchical analysis. a) The significant $K = 2$ clusters from STRUCTURE analysis of the full data set that delineated the two subspecies. b) 1st hierarchical level STRUCTURE plots showing lack of admixture in Western and Central groups and admixture in Northern and Western groups. d), e) and f) The 3rd level hierarchical analysis of Central, Western, and Northern groups, respectively, used to delineate management units (MU). WM = western Mongolia, SM = southern Mongolia, TK = Tajikistan and Kyrgyzstan, IP = India and Pakistan, HIM = Nepal, Bhutan, Tibet, NQ = norther Qinghai, SQ = southern Qinghai.

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○ -14°C

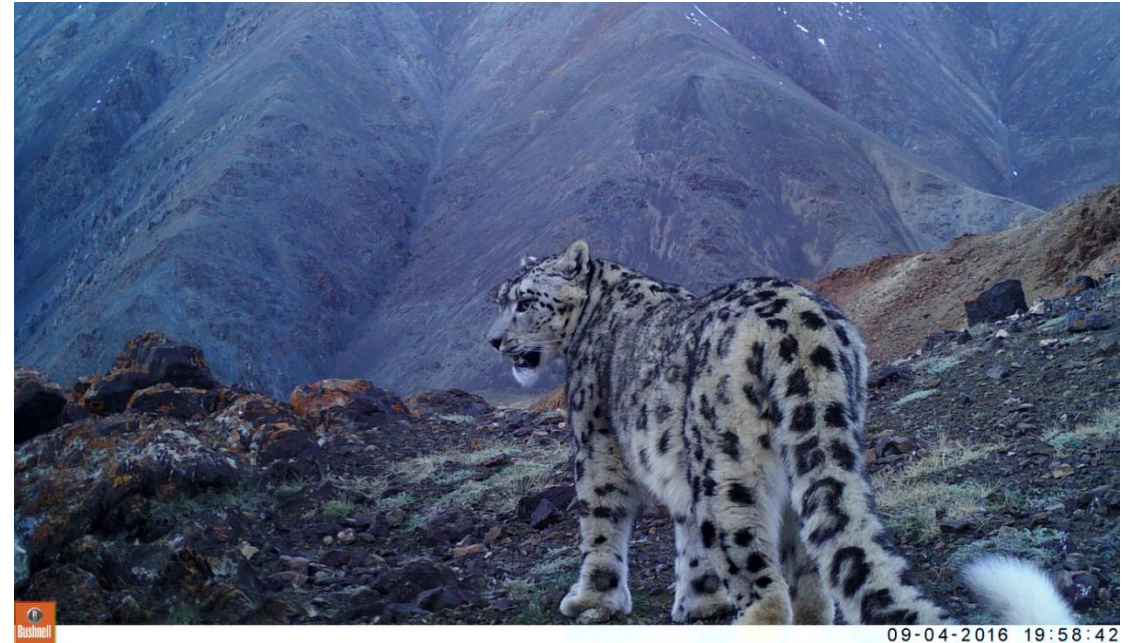
Camera trapping

IRBIS001

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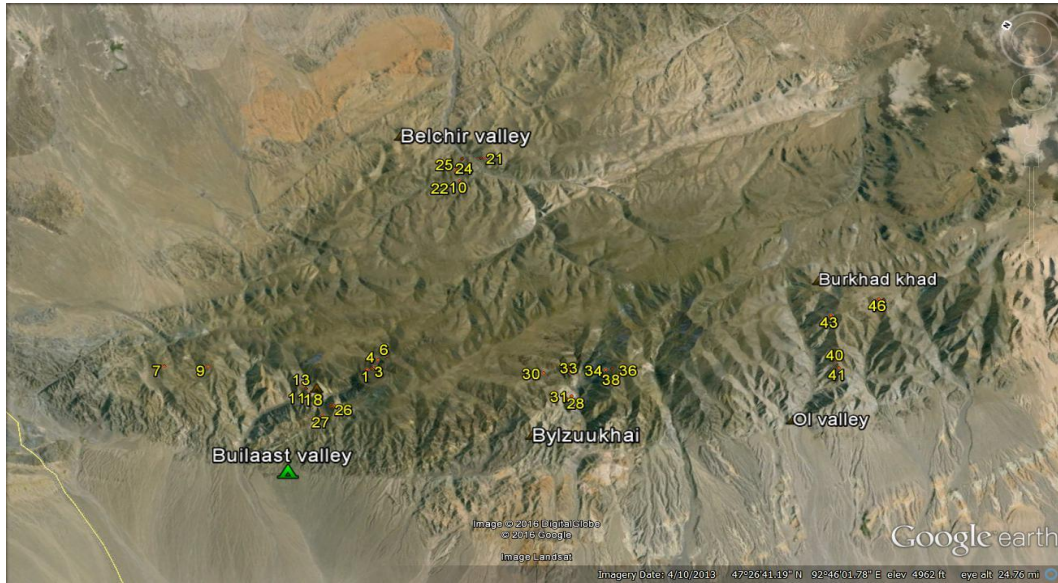
Camera trap surveys



- Camera trap survey to estimate Snow leopard population abundance in Bumbat and Sutai khairkhan mountain ranges, August-October, 2016
- Camera trap survey to monitor Snow leopard population in Sutai khairkhan mountain range, January – March, 2019
- Camera trap survey to estimate Snow leopard population abundance in Bumbat and Sutai khairkhan mountain ranges, August-October, 2016
- Camera trap occupancy survey to assess snow leopard population in Sutai khairkhan mountain range, March – June, 2019

Camera trap survey results

Camera trap survey to estimate Snow leopard population abundance in Bumbat khairkhan mountain range, August-October, 2016



46 camera traps installed in Bumbat khairkhan mountain worked at least 60 days in the field, capturing total 213 pictures and videos of snow leopards.

Analysis shows that 8 adult snow leopard live in in Bumbat khairkhan mountain by Oct 2016, including 1 in Belchir valley 3 in valley Oliin, 4 in valley Builaast.

Camera traps in Bumbat khairkhan mountain range, August-October, 2016

The population need to be surveyed more.



Camera trap survey results

Camera trap survey to estimate Snow leopard population abundance in Sutai khairkhan mountain range, August-October, 2016

Were placed total 47 Bushnell HD camera traps along the travel routes of snow leopards in mountain ridgeline and valley bottoms at marking sites of snow leopards, like little saddle, bottom of clips, and boulders .

Each camera trap was active at least 65 days capturing total 39,350 images and videos, including 749 pictures and videos of snow leopards in 26 camera traps .

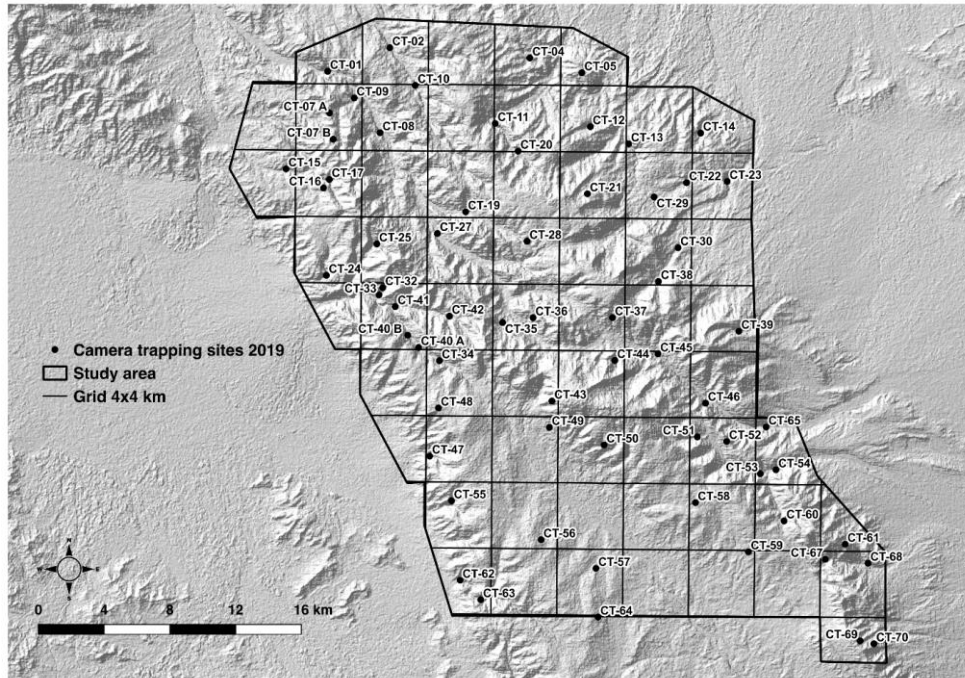
Results of these snow leopard videos and images shows that there are live permanently at least 1 adult snow leopard in Bayangol valley, 2 in Khavtsgait valley, 3 in Khuren zurkh mountain, 2 in mountain Hajin, 3 in Khokh asga, 2 in Mandalt valley, 2 in Tsagaan gol, 4 in Tsetserlegt, 4 in Khoshoot valley, 7 in symin am valleys , totalling 29-30 snow leopards at study area Sutai khairkhan mountain by October 2016.



4 adult snow leopards in Khoshoot valley

Camera trap survey results

Occupancy survey to estimate Snow leopard population abundance
in Sutai khairkhan mountain range, March – June, 2016



Assesment of a snow leopard population in Sutai khairkhan mountain using camera traps, with emphasis on patterns of co-occurrence with livestock and wild ungulates (3rd and concluding phase)

The area currently being surveyed in Sutai, covers approximately 1000 km² in the Hovd and Gobi Altai province. The area is an alpine massif with predominant habitat being mountain steppe and mountain desert and an elevation gradient from approx. 1,800 to the highest peaks >4000 m a.s.l.

The project goal is to determine the occurrence, the abundance and conservation status of snow leopard in the study areas.

Camera trap locations in Sutai mtn, March 2019

Camera trap survey results

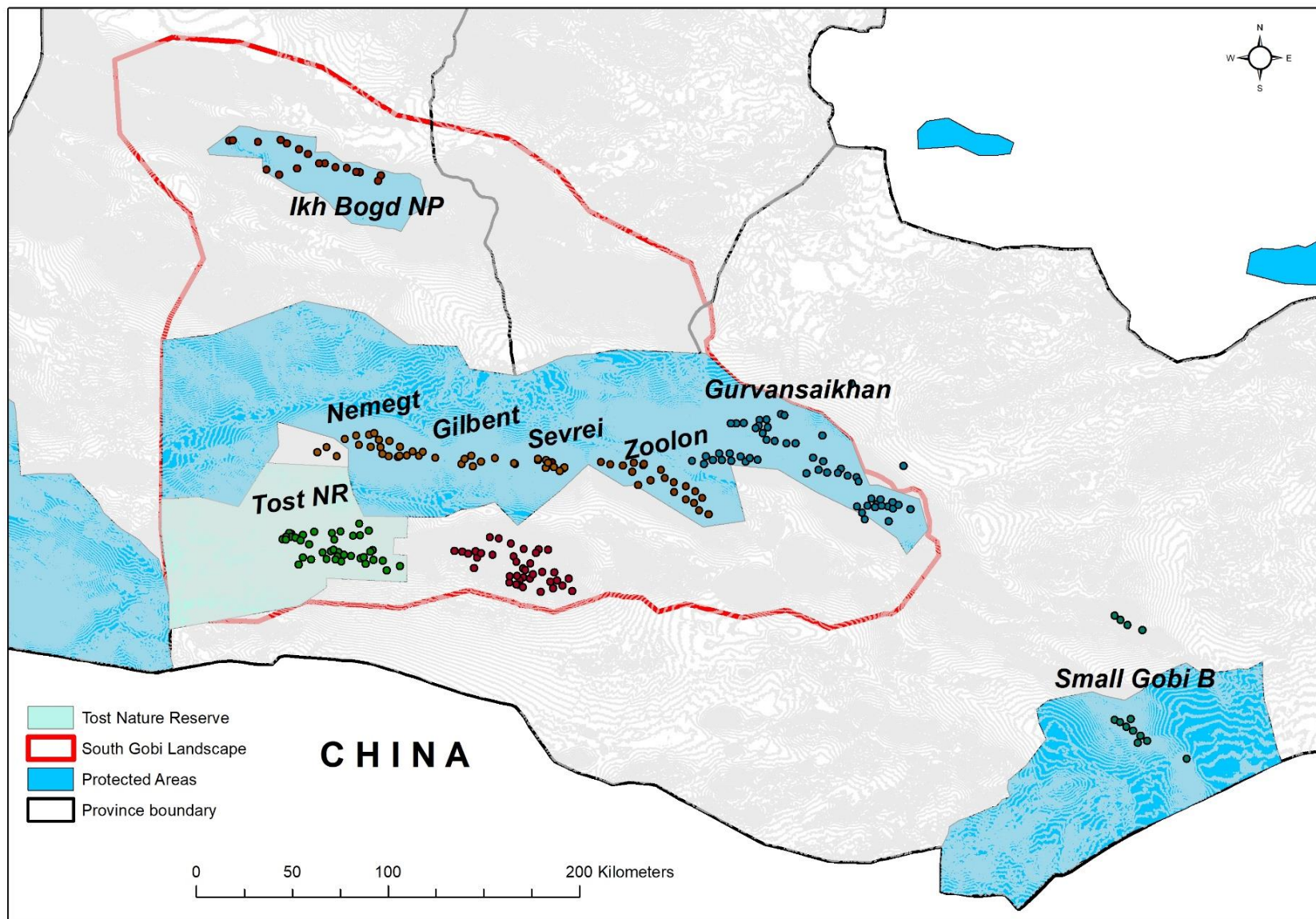


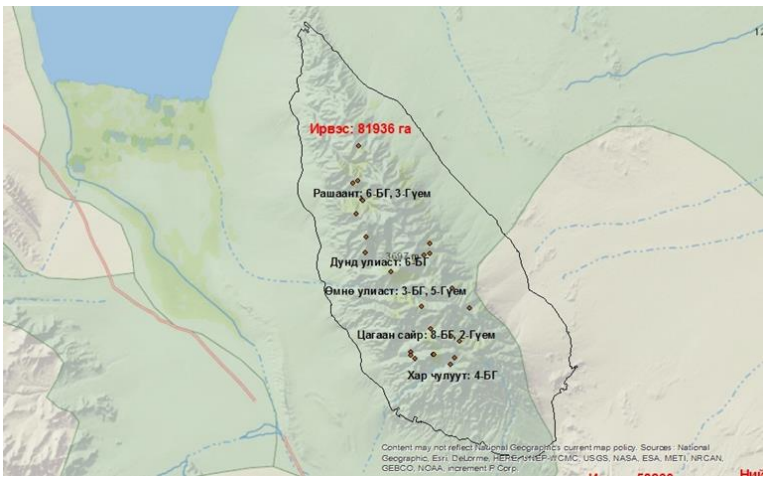
The project objectives are the following:

- To detect SL and other mammals, including free-ranging livestock, by completing an extensive camera trapping survey (66 camera trap sites set over 1,000 km²) in Sutai, that has begun in March 2019 and collected on June 16-30, 2019.
 - To complement primary data collection with data on local livestock presence, livestock keeping practices and herders' habits.
 - To determine patterns of co-occurrence in terms of impact of livestock on SL and on wild preys by analyzing data in occupancy framework using the analytics described below.
 - To estimate the local SL population.
 - To provide survey areas-specific as well as province-wide recommendations from study results that are relevant to threat reduction.
- Results:** The camera traps were collected back during the trip on June 16-30, 2019. Thousand of snow leopard pictures and videos are taken and will be analyzed by Oct 2019.



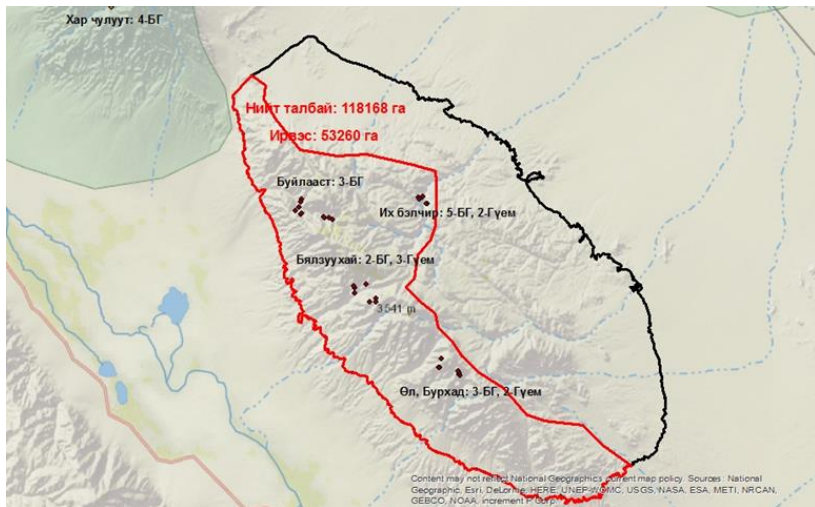
Research Programs: SLCF/SLT





Jargalant khairkhan mountain:
27 snow leopards

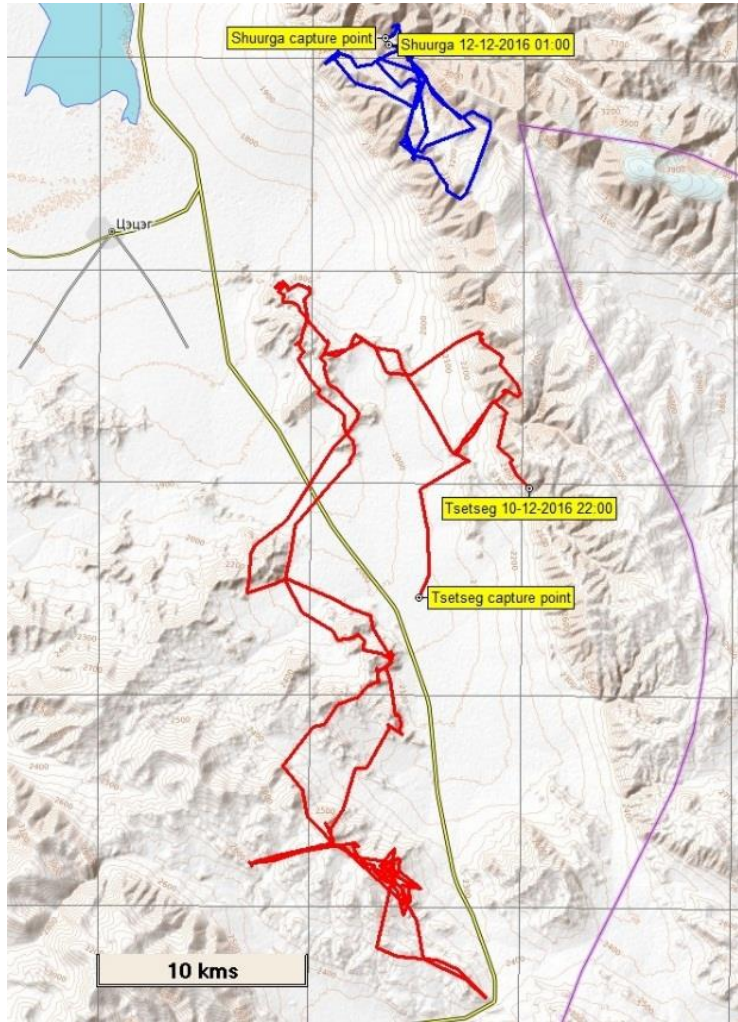
- During 7 months in Jargalant khairkhan mountain 41 camera traps were active /September 2013 to April 2014/
- During 9 months in Bumbatkhairkhan mountain 41 camera traps were active /July 2014 to April 2016/
- During 12 months in Sair khairkhan mountain were active 7 camera traps /2015/
- During 3 months in Siilkhem B NP 54 camera traps were active /March by June 2016/
- During 8 months in Baatarkhairkhan mtn were active 69 camera traps /September 2016 by April 2016/



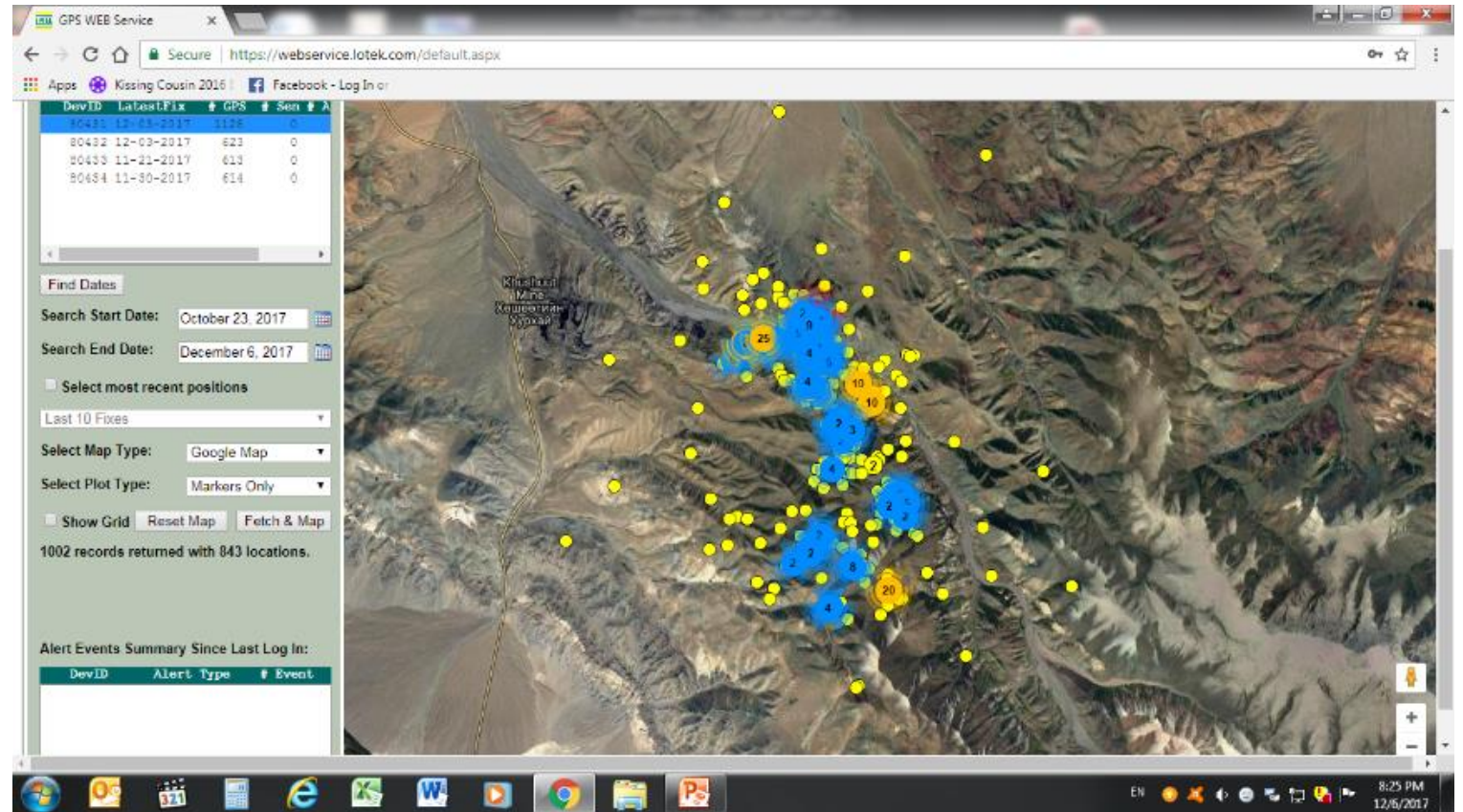
Bumbat khairkhan mountain:
13 snow leopards

- Munkhkhairkhan NP May –Aug 2017
- Siilkhem B NP in 2015-2016

Telemetry surveys



A



B

3 snow leopards were captured 4 times and fitted with a satellite collar during for 5 field trips in Sutai khairkhan mtn, western Mongolia in 2016-April 2019.

Maps: Home range /A/ and hourly movement /B/ of Shuurga and Tsetseg

Telemetry surveys



Snow leopard Shuurga, adult male, was captured in the Khoshoot valley, E 93.45639 N 46.74261, h= 2314 m, on Oct 23, 2017, which is world snow leopard day. The body length of Shuurga was 209 cm, length of tail is 103 cm, body weight is 44 kg, 6-7 years old, the body skin spots are black colored.

The snow leopard Shuurga was weighed, measured, and inspected for parasites, and wounds. We estimated age roughly by body size and tooth wear as 7 years old. Shuurga was fitted with standard 720-800 g Lotek Iridium LiteTrack 420 satellite radio collar /frequency 148.500, ID # of collar is 80431/ equipped with a motion sensor, temperature, etc. (Lotek Inc.). All these procedures were finished within less than 20 minute.

Telemetry surveys



The male Shuurga who was healthiest cat, when we captured and collared him on Nov 12, 2016. When we captured him again in another valley of same mountain on Oct 23, 2017 and replaced the damaged collar he had no fore left leg, he lost it. We were very sorry to see it, most probably was in leg hole trap, which locals put to hunt marmots for meat, in September 2017, the wound was quite fresh.

And also he had fresh wound from 5.6 mm fire gun at left side of his body. Seems, having lost one leg, he started to attack and feed on domestic livestock and herders tried to kill him in retribution of depredation.

Need to study more human wildlife conflict and prevent such as cases.

Telemetry surveys



The sites, where installed Aldrich and Belisle snares for snow leopard capture



On April 11th of 2019 the team has successfully captured young female of snow leopard at snare # 5 in Khavtsait valley and fitted with satellite collar. The young female was named Togtuun- Quite, her body length was 201 cm, tail length 86, and weighted 27 kg. She was about 23 months old, approximately was born in May-June 2017.





Research Programs: SLCF/SLT

COLLARED CATS- Long term ecological study (LTES)

- A total 30 snow leopards collared in Tost NR, southern Mongolia–2008-2019
- 17 Males, 13 Females
- A total 5 snow leopard den visits (cubs counted and microchipped)
- 249 prey sites visited from GPS clusters
 - 73% were wild prey, 27% werlivestock
- On average snow leopards consume a large prey every 8 days





Research Programs: SLCF/SLT

UNGULATE SURVEYS- Long term ecological study (LTES)

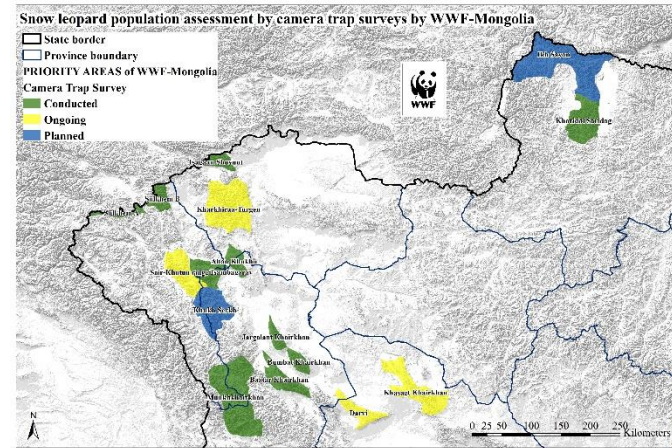
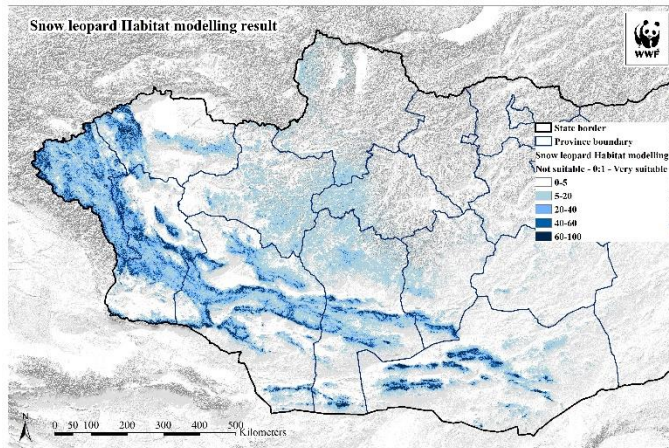
- Tost NR – 634 ibex, 203 argali in 2018 – (surveyed since 2012)
- Noyon soum - 1241 ibex, 179 argali in 2017 – – (surveyed since 2014)
- Great Gobi A – 239 ibex, 11 argali in 2017 – (surveyed since 2017)
- Nemegt Mountain- 553 ibex, 108 argali in 2018 – (surveyed since 2018)



Nationwide Snow leopard population assessment



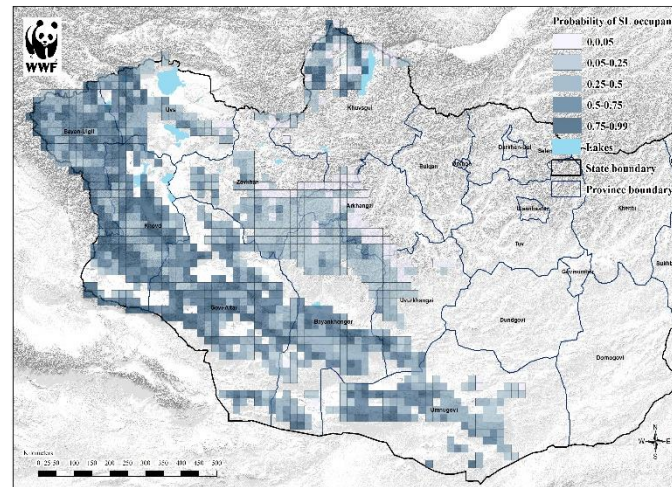
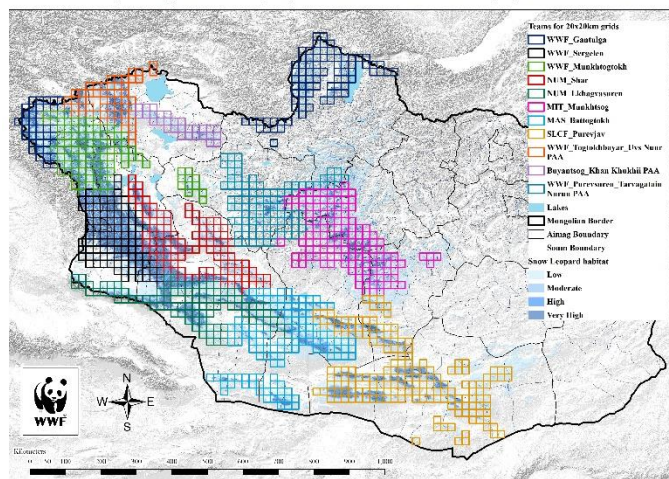
MINISTRY OF ENVIRONMENT AND TOURISM



Partners:

- WWF-Mongolia, leading organization
- Snow leopard Conservation Foundation
- Irbis Mongolian Center
- National University of Mongolia
- Mongolian Academy of Sciences
- Snow Leopard Trust
- Ministry of Environment and Tourism of Mongolia

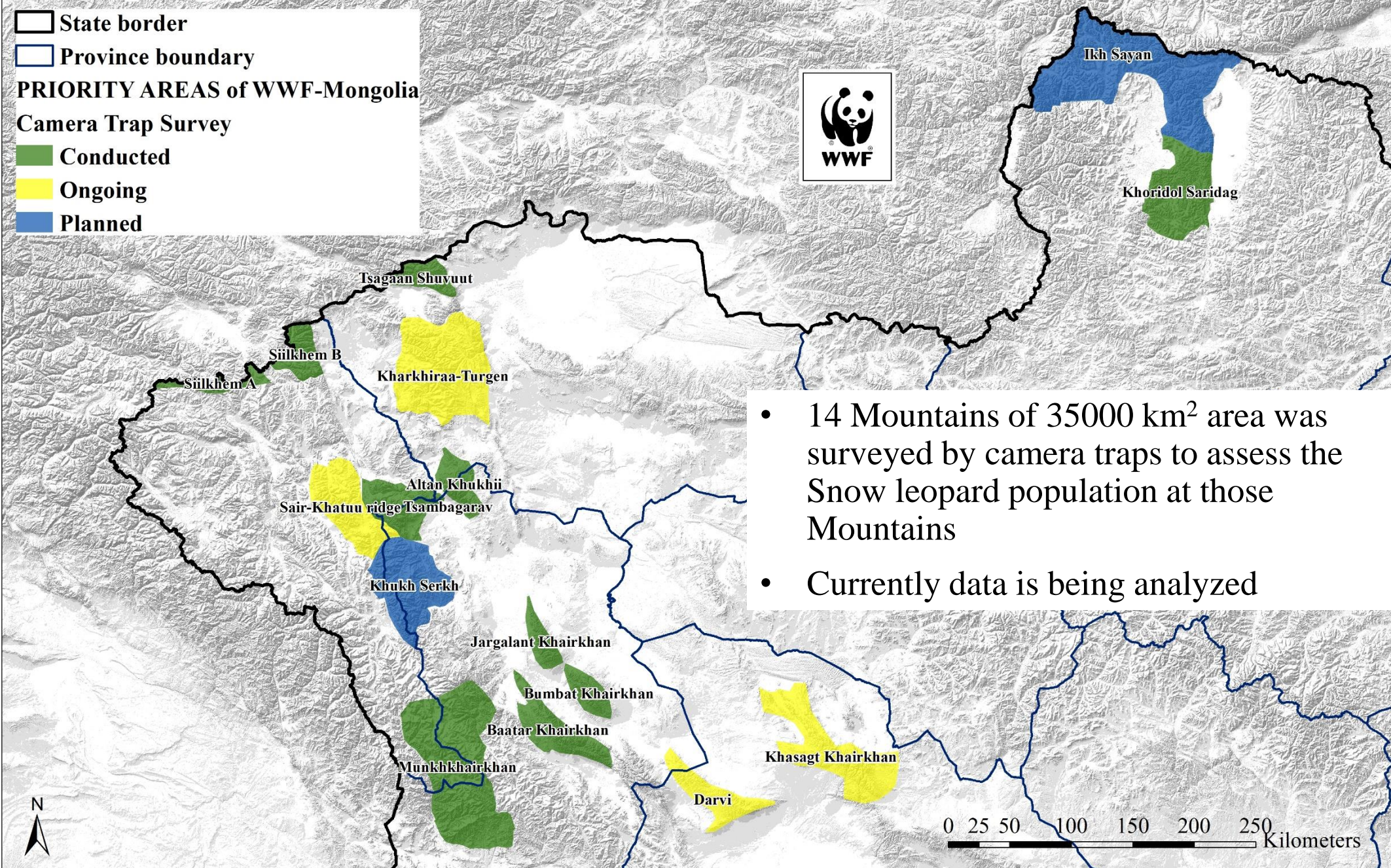
Field team planning for the occupancy estimate for Nationwide SL population assessment



Main funding sources

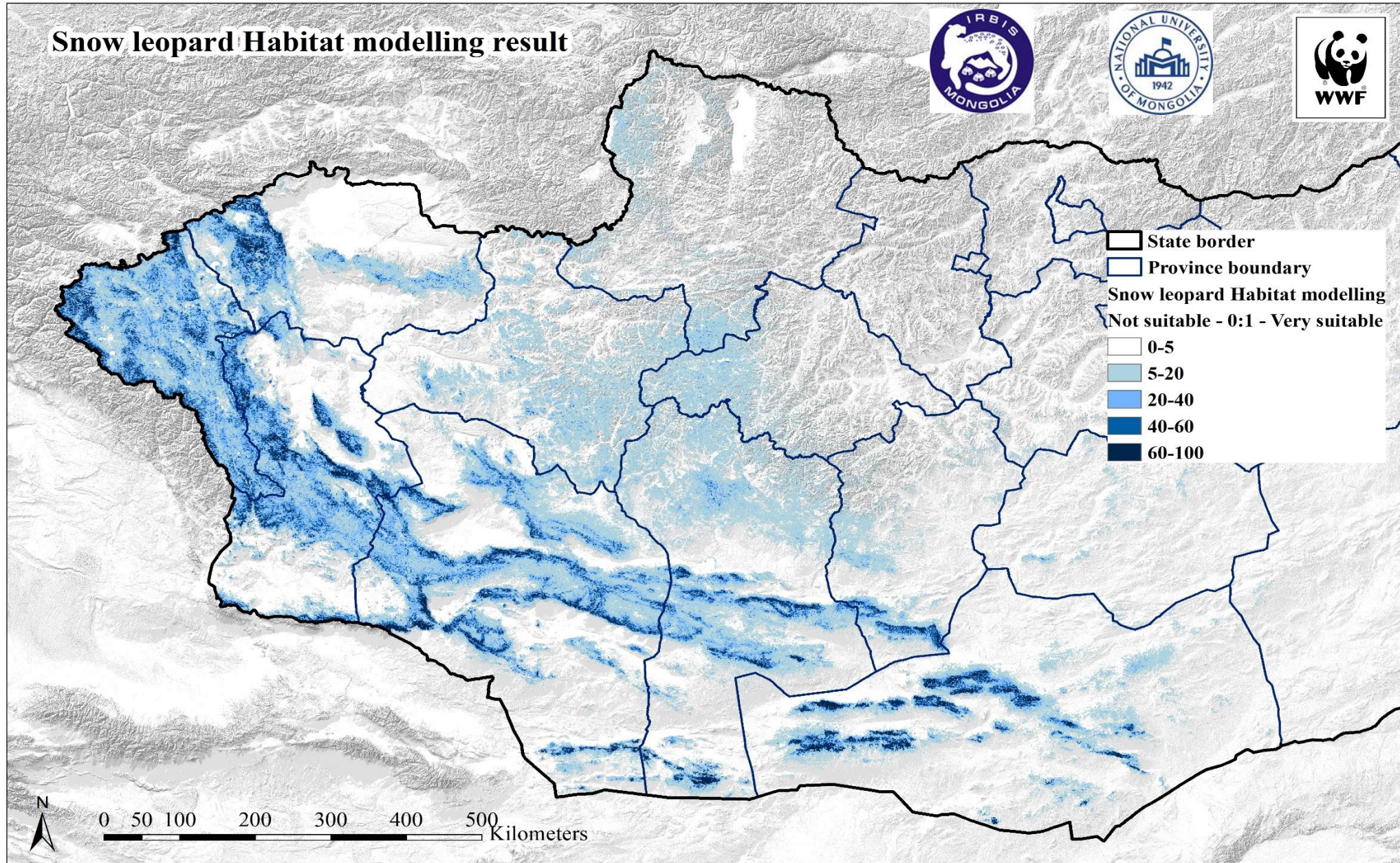
- WWF-Netherlands
- WWF-Germany

Snow leopard population assessment by camera trap surveys by WWF-Mongolia



- 14 Mountains of 35000 km² area was surveyed by camera traps to assess the Snow leopard population at those Mountains
- Currently data is being analyzed

Snow leopard Habitat modelling result from 26 000 locations from 15 SL

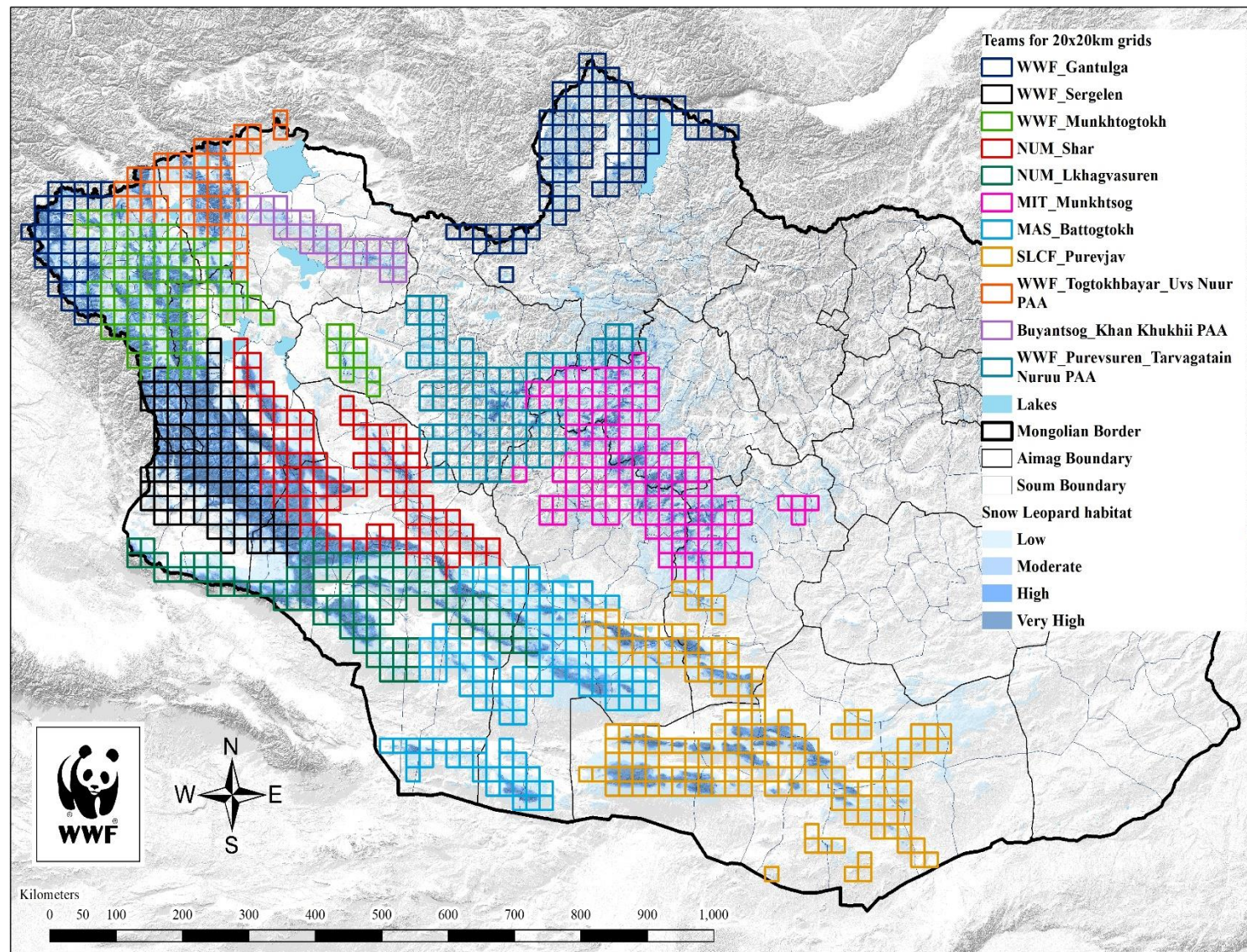


Snow leopard Occupancy survey field work

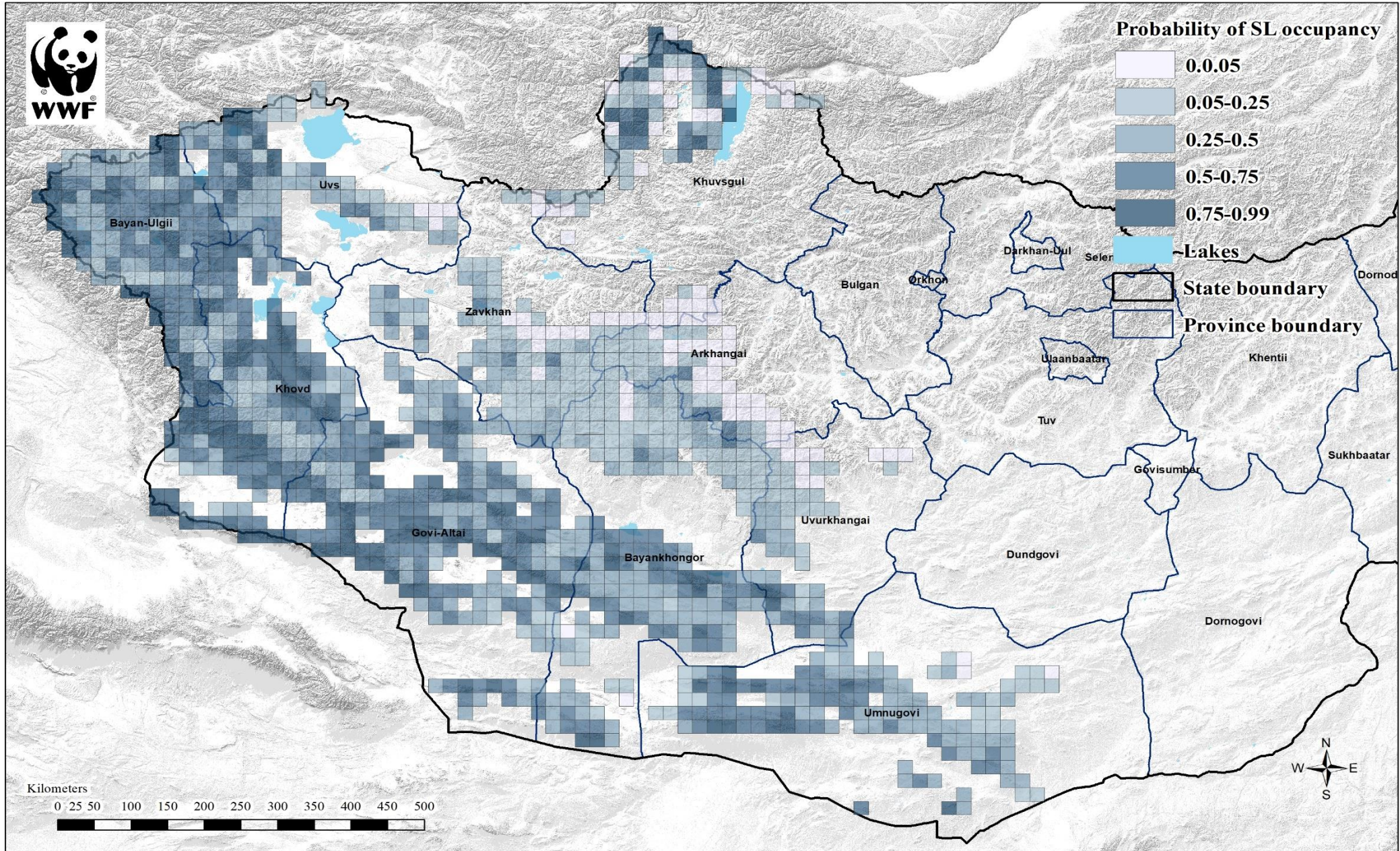
Field team planning for the occupancy estimate for Nationwide SL population assessment

Field work:

- August 2018 – November 2018
1 team in March 2019
- 20x20 km 1200 grids surveyed
- 12 teams of 217 personnel
 - WWF-Mongolia, leading organization
 - Snow leopard Conservation Foundation
 - Irbis Mongolian Center
 - National University of Mongolia
 - Mongolian Academy of Sciences
 - Snow Leopard Trust



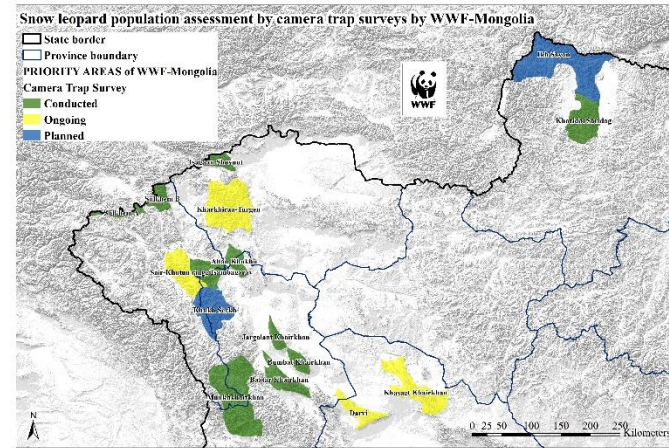
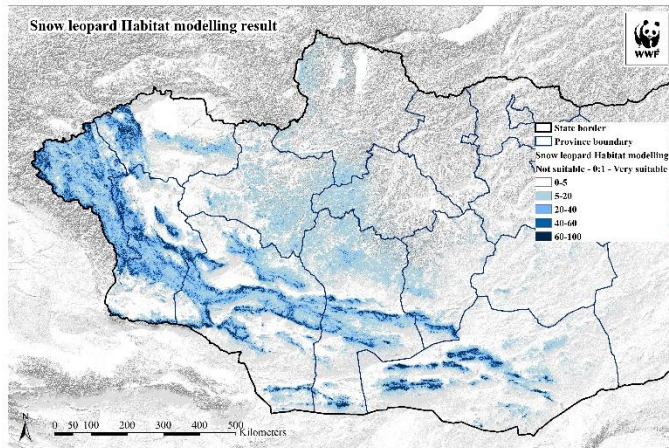
Snow leopard Occupancy survey results



Nationwide Snow leopard population assessment



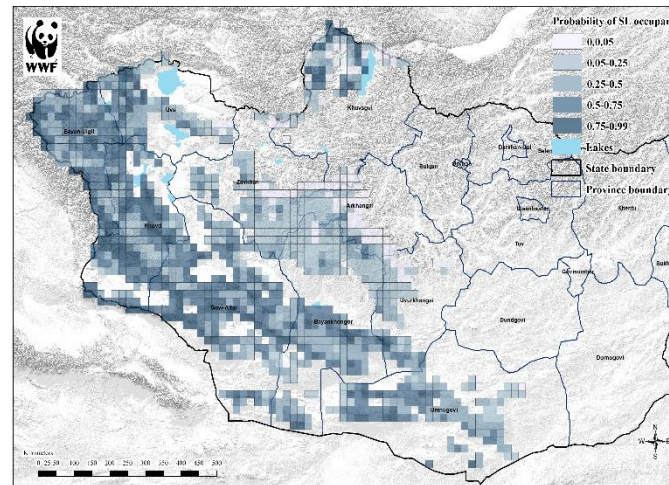
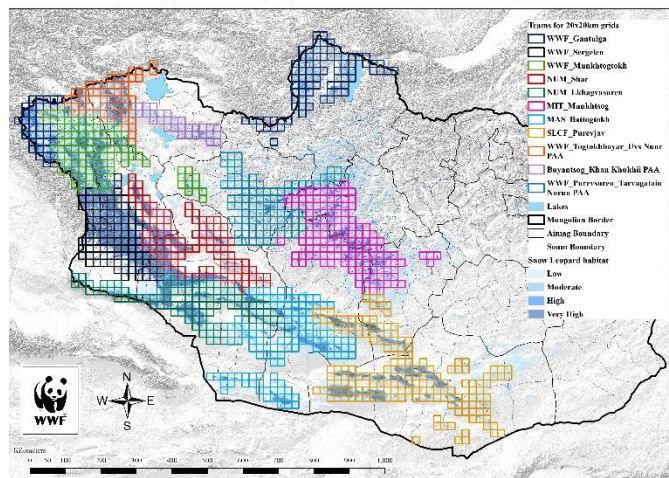
MINISTRY OF ENVIRONMENT AND TOURISM



Expected results:

- Detailed distribution map of Snow leopard in Mongolia by July 2019
- Mongolia Snow leopard population estimation by August 2019
- Nationwide Snow leopard population assessment report by end of 2019

Field team planning for the occupancy estimate for Nationwide SL population assessment





Research Programs: SLCF/SLT

TRAINING/RANGERS

- **Snow Leopard Population Assessment training**
 - 2010, 2013 (5 days) – National Park specialists
- **Snow Leopard Population Assessment training**
 - 2018 (5 days) – Biologists from multiple organizations
- **Ranger monitoring and patrolling training in Tost NR, communities** – yearly since 2012
- **Ranger monitoring training in TNC communities** – 2019
- **Ungulate survey training for specialists and rangers**
 - yearly since 2017





Conservation Programs: SLCF/SLT

- Livestock insurance since 2009 (direct compensation)



- Community managed insurance fund
- Runs in Tost, Tosonbumba Nature Reserve
- Involves 54 households
- Compensates annually (approx. \$1000)
- Insures approx. 11000 livestock
- Covers snow leopard and wolf livestock losses
- Conservation contract is made

- Predator Proof Corrals (prevent from night time losses)



- A total of 20 households have corrals securing at least 6800 livestock
- No livestock lost from predators since 2016
- No losses of livestock in the corrals since 2016





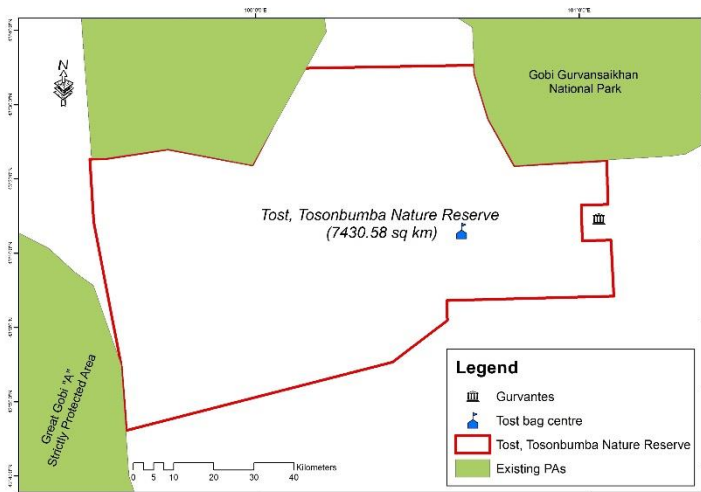
Conservation Programs: SLCF/SLT

- Snow Leopard Enterprises since 1997 (direct compensation)



- Income source handicrafts
- Runs through out western and southern Mongolia
- Involves 280+ households and 30+ communities
- Earns approx. \$35000 income
- Non poaching bonus is paid based on conservation contract

- Building capacity of Tost NR



- Have it declared as State PA in 2016
- Revoked all mining licenses
- Establishing management mechanism of NR
- Building capacity of rangers
- Creating management plan





Conservation Programs: SLCF/SLT

- Eco-camp – since 2013



40 school kids, 2 teachers participate every summer

- Interactive training for 12-13 year old children
- Runs in Tost NR



On-going large projects or Government Programs



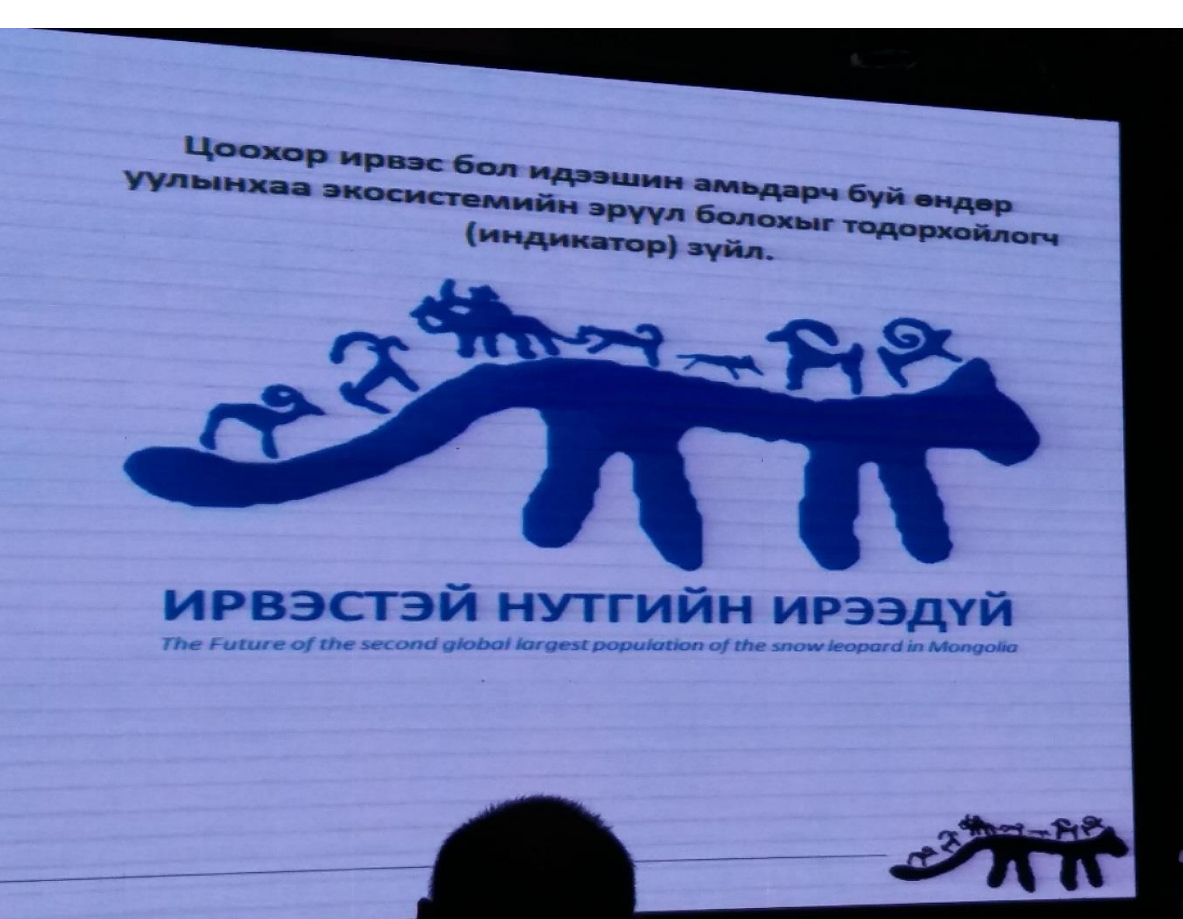
Broad goals:

- Capacity building in PAs of Mongolia
- Conservation of snow leopards and other endangered wildlife
 - improving livelihood of locals herders, citizens
 - offering ways for alternative income sources with pilot projects
 - Education awareness

Snow Leopard painting 70 x 100 cm by Sam Greenhill.



On June 26, 2019 Ch.Khurelbaatar, Minister of Finance, Stefan Duppel, Ambassador Extraordinary and Plenipotentiary of the Federal Republic of Germany to Mongolia and, Petar Gjorgjiev, Director of the Office of German Credit Institute for Reconstruction (KfW) in Ulaanbaatar signed intergovernmental and financial agreements on the **third phase of the ‘Biodiversity and Adaptation to Climate Change III’ project**. The project will be implemented with a non-refundable aid worth EUR 8 million from Germany



WWF Mon: USD 5 million for 5 years
 2018-2023

TNC Mongolia Program
 2016-2019; 2019-2021



“Ирвэстэй нутгийн ирээдүй” төслийн зорилго

Орос-Монгол болон Монгол дахь популяци хоорондын холбоос нутагт тогтвортой байгаль хамгааллын менежментийг нэвтрүүлэх, хууль бус агнуур, өширхөн хороох үйлдлийг бууруулах замаар Дэлхийн хоёрдогч том популяци болох Ирвэсийн ирээдүй бүрэн баталгаажсан байна.

- Ирвэс болон түүний идэш бологч зүйлийн хамгаалал,
- Бэлчээрийн менежмент,
- Хууль бус агнуур, худалдаа
- Ирвэс хүн хоорондын зөрчил,
- Нутгийн иргэдийн амьжиргаа,
- Мэдээлэл, сургалт, сурталчилгаа

Snow Leopard Landscape Level Conservation

- Management Plan for Southern Mongolia Snow leopard Landscape is developed and in the status of review
- Northern Altai SLL management plan development was initiated by WWF Mongolian Program Office



Trans-boundary Conservation

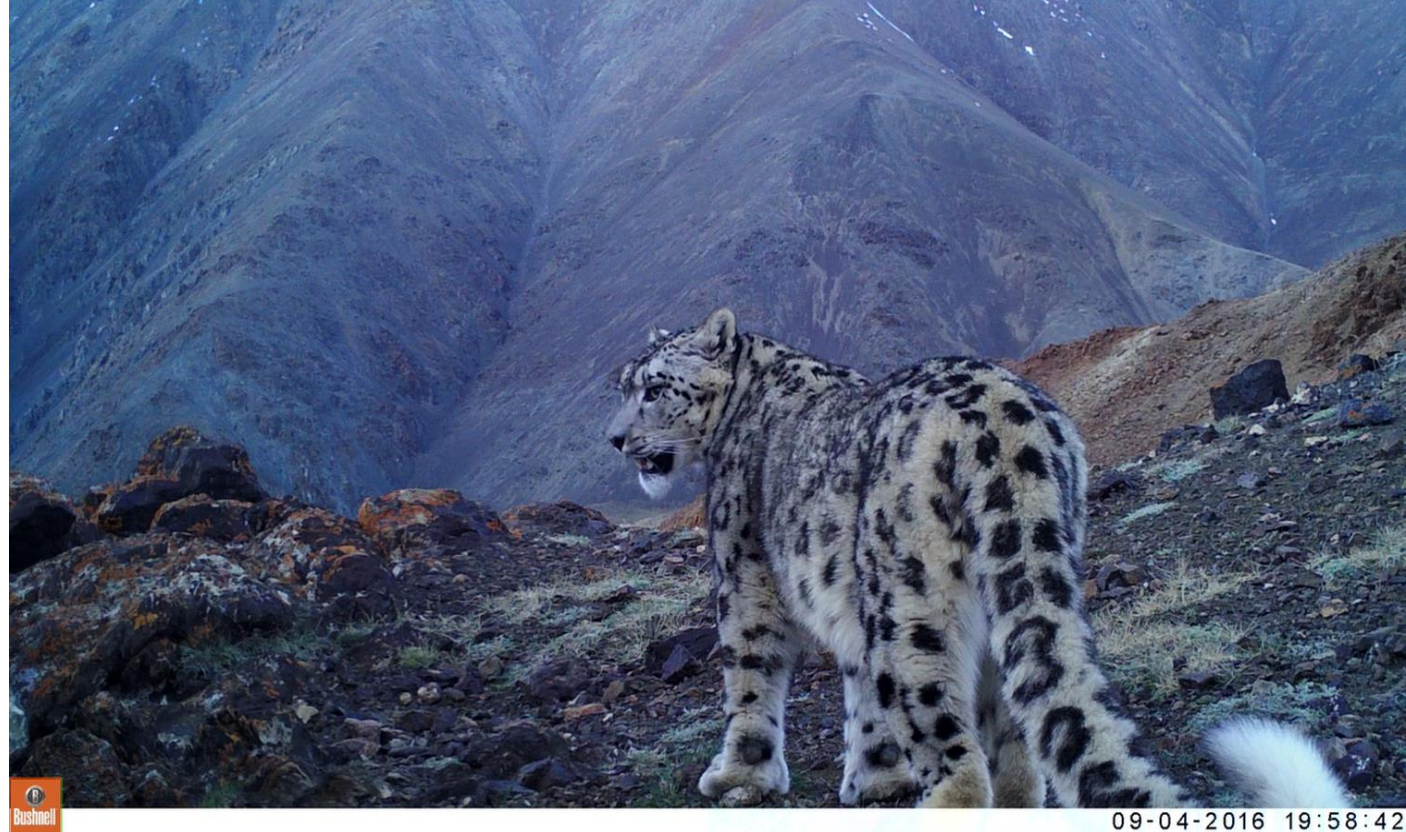
Russia:

Cooperation at all level

China:

Cooperation at Government, Ministry level

Cooperation at Academic institution's level



Trans-boundary Conservation Plans

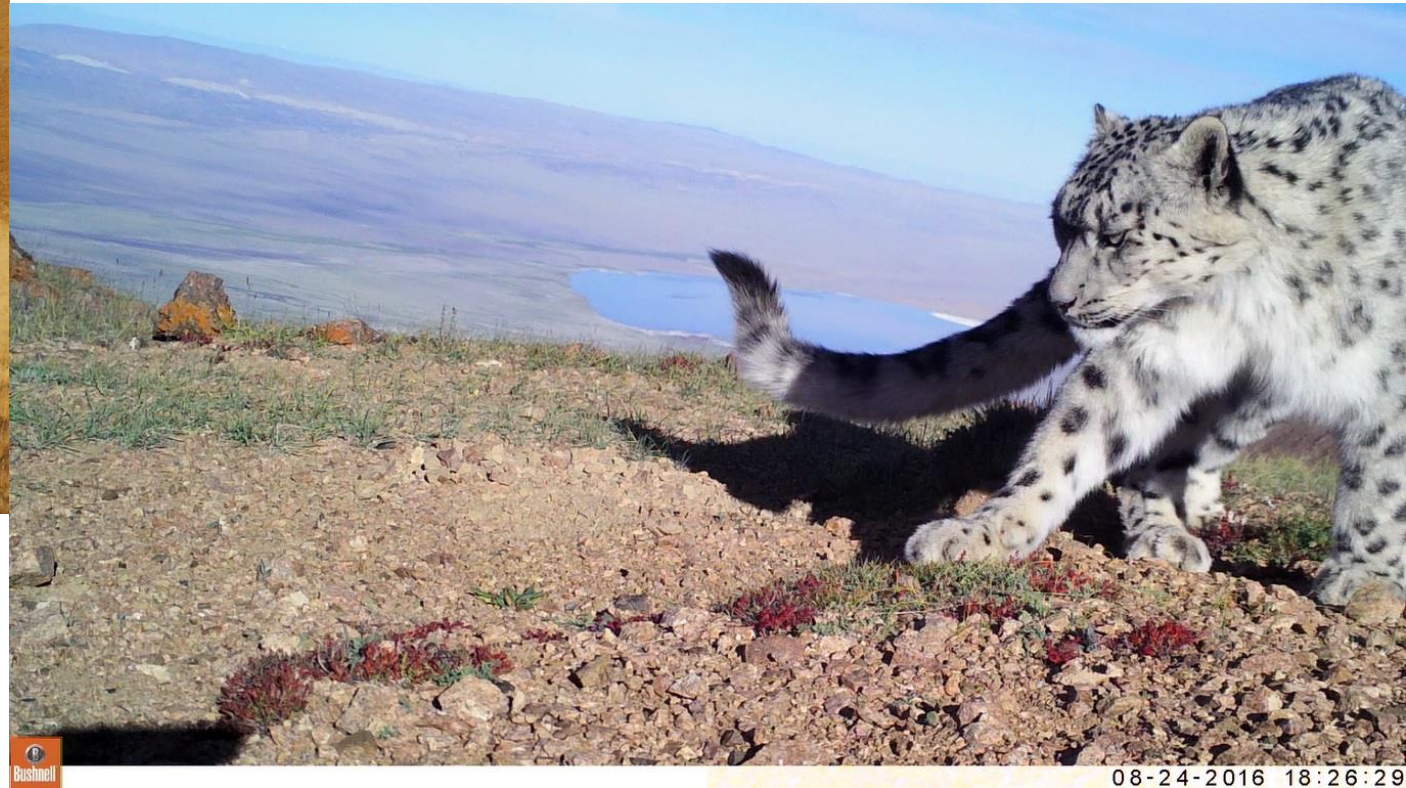
- 2nd management plan of Uvs lake basin international bio sphere reserve is approved
- Intergovernmental commission for implementation of management plan of Uvs lake basin international bio sphere reserve





for your attention

Thank you



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