

This report will be made public. If it contains confidential or sensitive information, please also provide a revised report for sharing with the public.

Section I. Project Information

Project Title:

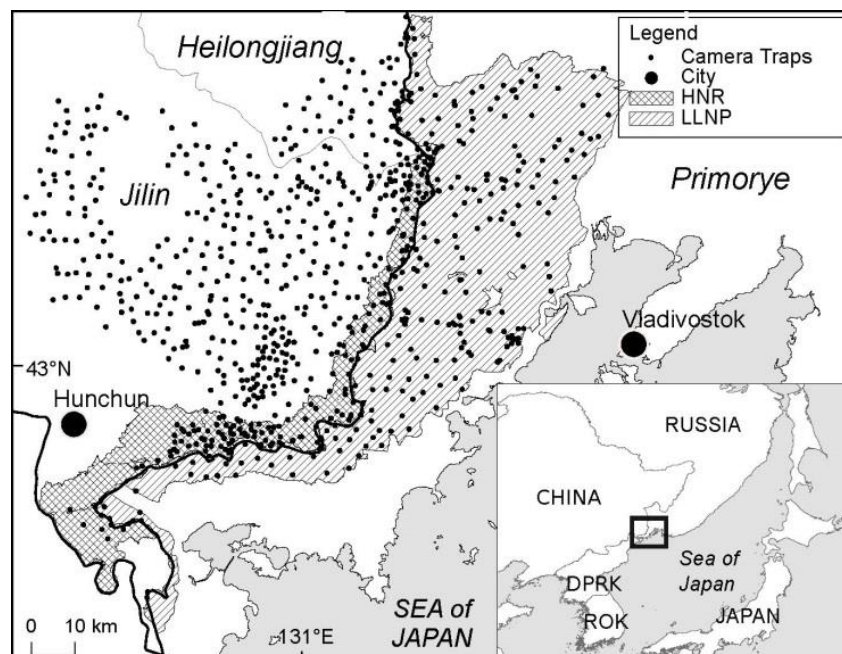
Safeguarding the recovery of Amur leopards in the Russian Far East

Grantee Organisation:

Wildlife Conservation Society (WCS)

Location of project:

Southwest Primorskii Krai, Russian Far East. Land of the Leopard National Park (LLNP) is approximately 43.100 N 131.200 E.



Map from: Vitkalova, AV, L. Feng, AN Rybin, BD Gerber, DG Miquelle, T Wang, H Yang, El Shevtsova, VV Aramilev, and J Ge. 2018. Transboundary cooperation improves endangered species monitoring and conservation actions: a case study of the global population of Amur leopards. Conservation Letters e12574. DOI: 10.1111/conl.12574s

Size of project area (if appropriate):

LLNP study area:

756 km²

No of tigers and / or Amur leopards in project area, giving evidence & source:

The Amur leopard (protected in the Red Books of Primorsky Krai and Russian Federation; listed as “Critically Endangered” by IUCN). Our 2018 publication estimated a stable global population of Amur leopards at 84 adults/subadults in 2014-2015. Surveys since then suggest the population has continued to increase to roughly 130 individuals in Russia alone.

Section II. Project Results

Ussurisk study area: 1,007 km ²	Over the course of our monitoring efforts in 2024, we estimated 41 ± 12 Amur leopards in our LLNP study area. We also recorded 2 Amur leopards in Ussurisk Reserve.
Partners: <i>(Please give details of partners, including communities, academic institutions etc. for this project.)</i> Since 2016, the Wildlife Conservation Society's work in Russia has been a collaboration between the WCS Global Conservation Program and the independent, Russian-registered NGO "ANO WCS". As this proposal was developed by staff of both WCS Global and ANO WCS, we hereafter use "we" to describe our joint efforts. For many years now, we have partnered with staff of Land of the Leopard National Park (LLNP) to work within its borders and collaborate on population monitoring of Amur leopards and now, the monitoring of reintroduced leopards in Ussurisk Reserve (which is under the management of LLNP). We also inform the Nezhinoe Naval Hunting Lease of our camera trapping activities on their land (adjacent to LLNP), although legally we do not require formal approval to work there.	
Project Contact Name: <i>(main contact via email)</i> Scott Waller, Dale Miquelle, Jonathan Slaght	
Email: swaller@wcs.org, dmiquelle@wcs.org, jslaght@wcs.org	
Reporting period: February 1, 2024 – January 31, 2025	

Please ensure that your report relates to the objectives and activities detailed in your proposal and logframe. Please include results data in Section II and Section III.

Long Term Impact: *(How has this work contributed to the vision and long-term impact that your project aims to achieve?)*

Our long-term goal is to help recover Amur leopards in the Russian Far East and support their expansion into former parts of their range. In recovering big cats, Hötte et al. (2016) proposed the following theory of change: improve law enforcement patrol quality, and poachers will be increasingly deterred and pressures on wildlife will decrease. Ungulate populations will increase first as a result, and leopard populations then grow thanks to both improved survival and more abundant prey. WCS has invested in this strategy to recover tigers at sites across the globe, with the notable example of recovery in Huai Kha Khaeng Wildlife Sanctuary in Thailand recently published (Duangchantrasiri et al., 2024).

Documenting the successes – or shortcomings – of our theory of change is only possible with long-term monitoring of the population responses of Amur leopards and their prey. This grant provided essential support for us to continue monitoring Amur leopard recovery in light of

continued, extraordinary investments in law enforcement by LLNP and their adoption of the SMART (Spatial Monitoring And Reporting Tool) adaptive management program in 2011.

Conservation Outcome: *(What are the actual changes that this project has achieved?)*

In this project, we made several landmark achievements to support the conservation and recovery of Amur leopards in the Russian Far East. In northern LLNP and adjacent hunting lease, we documented the highest densities of Amur leopards ever seen in Russia, a clear indicator that over a decade of improved law enforcement to reduce threats is working to enable leopard recovery. Our estimate of leopard population density serves as a new reference for what kind of recovery can be achieved for leopards in Northeast Asia. We also led the first year of camera trap monitoring of reintroduced Amur leopards in Ussurisk Reserve. This was essential work, as all GPS collars fixed to the three leopards failed shortly after their release in late 2023. Through our camera trap monitoring, we confirmed that the female leopard who was released in 2023 remained within the reserve, and the repeated photos we captured confirmed that she is healthy and in good condition. Excitingly, we also captured images of a wild male leopard who had been previously photographed in LLNP. This is the first documented evidence of a wild Amur leopard moving east across the Razdolnaya River development corridor, where a major highway, agriculture, and villages all act as a severe barrier to such movement. We are encouraged and energized by the successes of our program in 2024 and are eager to continue this vital work – with the steadfast support of WCCA – in 2025.

Summary of activities and achievements: *(Please provide a narrative summary for use in our communication materials Max 300 words)*

With the support of the WildCats Conservation Alliance (WCCA), the Wildlife Conservation Society (WCS) Global Conservation Program and its partner, the Russian-registered NGO “ANO WCS”, made great progress in 2024 in securing a future for Amur leopards in the Russian Far East. Using camera traps, we estimated the highest levels of Amur leopard densities in northern Land of the Leopard National Park and adjacent hunting leases. In fact, these are the highest densities of the big cats ever documented in Russia. To the east, we led a camera trap study to monitor the success of a leopard reintroduction project initiated in 2023 in Ussurisk Reserve. Thanks to our efforts, we confirmed that the released female, Narva, remains within the reserve and is in good condition. Excitingly, we documented the first evidence of a wild male leopard, named Kazanova, who arrived at Ussurisk Reserve from Land of the Leopard National Park after crossing the highways, villages, and farms of the Razdolnaya River development corridor. This is a thrilling development, especially given the potential for Kazanova and Narva to breed and establish a new population of leopards. These successes would not have been possible without the support of WCCA, and we look forward to our continued partnership in 2025 to safeguard the recovery of Amur leopards in Russia’s Far East.

Details of activities and results: *(Please give detailed narrative of the results of each objective & output. Please include measures for example patrol numbers and distances covered, #people trained or #people attending meetings/workshops or refer to figures in your tables below)*

Objective 1: Continue Amur leopard monitoring in Land of the Leopard National Park

Activity 1.1. Deploy and collect cameras in LLNP

Early in 2024, we deployed 130 camera traps across 66 locations across LLNP, covering an area of roughly 770 km². We have used many of the same camera sites over the years, which are selected to maximize the chances of detecting leopards. We travelled over 2,000 km by vehicle, 769 km by 4-wheeler, and 85 km on foot to deploy these cameras, all in just 16 days.

After the cameras were left in the forest for 90 days (to meet the assumptions of our statistical models used to estimate population size), our team returned to retrieve the cameras in May. Unfortunately, 8 camera traps (6% of total) were stolen despite our best efforts to camouflage them in dead trees and logs. The remaining camera traps captured 9,299 images, 137 of which contained human activity and 9,162 of which contained wildlife. Of these, 982 contained Amur leopards. *Logframe target*: 100% of cameras deployed by month 2 and 100% of cameras collected by months 5-6 [achieved].

Activity 1.2. Analyse data and develop report

We identified 28 individual Amur leopards, all of which were adults or independent subadults (**Table 1**). Using SCR analyses, we estimated a population density of 1.86 [95% CI: 1.25-2.77] leopards per 100 km². This is the highest density of leopards we have documented in 10 years of consistent, rigorous monitoring within the same study area (**Figure 2**), and 183% larger than our first estimates from 2015 (0.65 [95% CI: 0.45-0.85] leopards per 100 km²).

In last year's report, we wondered whether leopards would start to level off at something like a carrying capacity. Yet, this year indicates that the leopard population continues to grow, supporting by a continued increase in sika deer numbers (**Figure 4**). Given the high dependence of leopards on sika deer (Sugimoto et al., 2016), we are keen to continue our population monitoring. We are also curious what, if any, intra-guild competition begins between leopards and their larger neighbor, the Amur tiger.

Though there has been considerable inter-year variation, the rapid growth of Amur leopard population size in response to LLNP's improved law enforcement and recovering prey populations is nothing less than inspiring. This study remains a paragon of how our theory of change can successfully recover wild populations of leopards. *Logframe targets*: begin data analysis by Q3 (September 2024) [achieved]; complete data analysis by month 12 [achieved].

Table 1. Number of individual Amur leopards detected during each camera trapping season, 2015-2024. Detections are broken down by sex and age.

Age/sex	Number of leopards detected per year									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Males	6	6	10	9	12	8	11	11	12	10
Females	5	5	12	15	14	16	18	21	21	14
Unknown sex	2	1	4	2	0	0	2	0	2	4
Cubs	3	0	1	3	0	5	3	6	1	0
Total	16	13	27	29	26	31	34	38	36	28

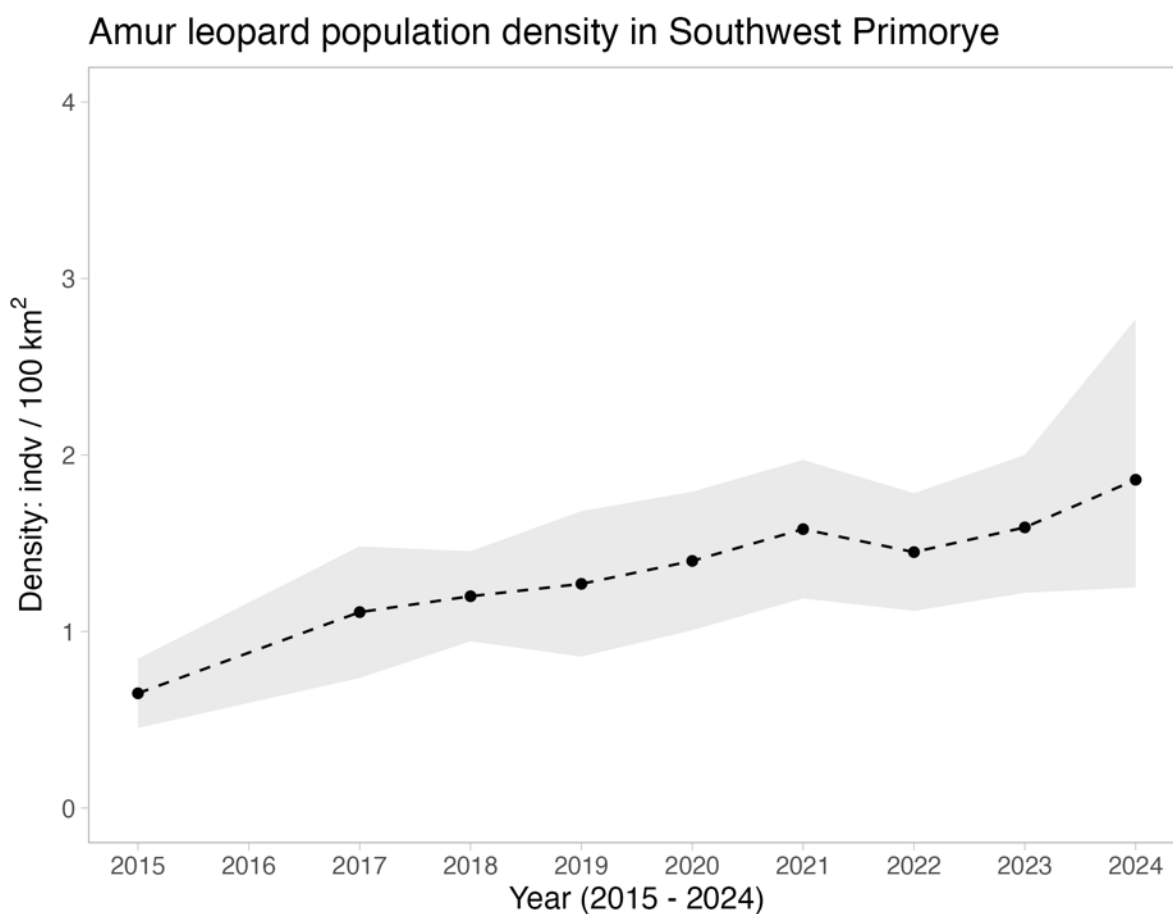


Figure 2. Amur leopard population density estimates in Southwest Primorye, Russian Far East, 2015-2024. Black dots represent the point estimate of density, and the shaded grey regions are the 95% confidence intervals.

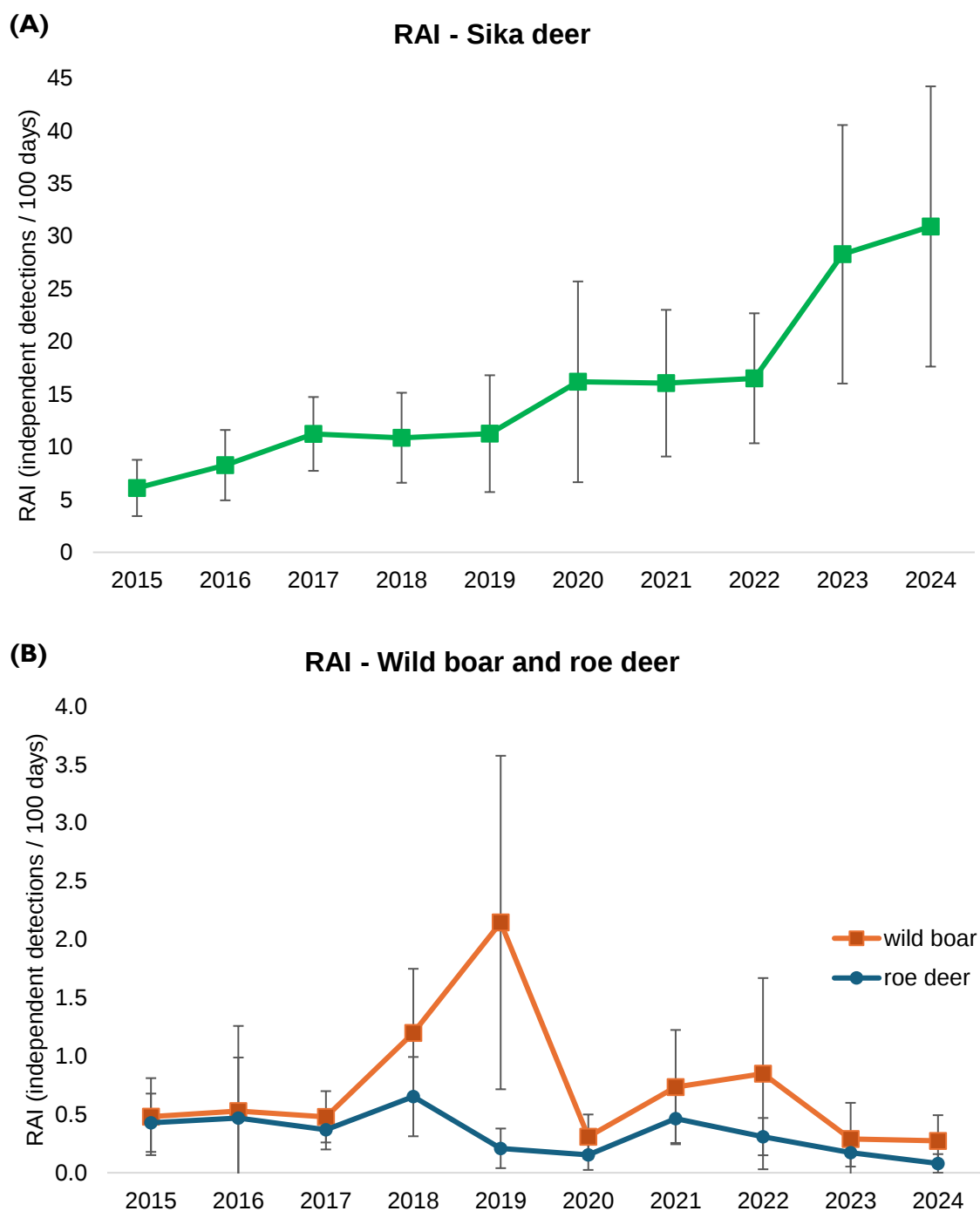


Figure 4. (A) Sika deer relative abundance index (RAI) estimates from 2015 – 2024 based on camera trapping data in Southwest Primorye, Russian Far East. (B) Roe deer and wild boar RAI Estimates during the same period and in the same study area.

Objective 2: Monitor individual Amur leopards recently released in Ussurisk Reserve

Activity 2.1 Deploy and collect cameras in and around Ussurisk Reserve

We deployed a total of 145 camera traps at 75 sites in Ussurisk Reserve and surrounding hunting leases. Unfortunately, we had to close 12 of these sites (24 cameras) in one hunting lease because lease manager rescinded permission for us to work there. This left us with 63 final locations. Our teams travelled roughly 2,400 km by truck and 4-wheeler and an additional 47 km on foot to deploy these cameras, covering an area of roughly 1007 km².

We returned to the field and collected these cameras in April-May of 2024. A total of 272,574 photographs were taken. After meticulously deleting empty images (typically of vegetation blown by wind or passing shadows), 5,748 photographs contained humans and/or vehicles, and 7,656 contained wildlife. Only 49 contained Amur leopards. 4 cameras were stolen in total, along with 2 memory cards, representing 4% of our total cameras. *Logframe target*: 100% of cameras deployed by month 2 and 100% of cameras collected by months 4-5 [achieved]

Activity 2.2. Track radio-collared individual leopards

As shared in our interim report, a few short days after the three Amur leopards were released into Ussurisk Reserve, their collars stopped functioning for reasons unknown and beyond our control. Now, we can only track the success of this reintroduction by monitoring the leopards with our camera traps. We cannot emphasize this enough: without the support WCCA provides us with to monitor these leopards, much less would be known about their fate.

Logframe target: Year-round record of leopard hunting behavior [not achieved; not possible].

Activity 2.3 Analyse Data and develop report

We identified the two leopards that were present during our camera trap monitoring: one female named Narva (who is still wearing her collar even though it no longer works) and a male, named Kazanova by LLNP staff, who was previously detected within LLNP. Amazingly, he traveled across the Razdolnaya River development corridor that separates LLNP and Ussurisk Reserve, an area of villages, farms, railways, and a large highway with thousands of vehicles passing per day. Kazanova crossed against all odds: this is the first documented case of an Amur leopard appearing east of the development corridor since leopards were extirpated there in the early 1970s. We are thrilled by the potential for Narva and Kazanova to start a new population of Amur leopards in Ussurisk Reserve where they have been absent for over 50 years. We caution that connectivity with leopards to the west will be critical to maintaining sufficient genetic diversity. We therefore are exploring all possibilities of protecting and improving a functional corridor for leopards to move across the development corridor. With the continued support of WCCA, we began a second year of monitoring in 2025. *Logframe targets*: begin data analysis by Q3 (September 2024) [achieved]; complete data analysis by month 12 [achieved].

Key achievements of this project: *(Please give a bullet point list of key measurable outputs)*

- Camera traps at 129 locations across our LLNP and Ussurisk Reserve study areas;
- 1.86 [95% CI: 1.25-2.77] leopards per 100 km² estimated in our LLNP study area, the highest density of leopards recorded in 10 years of rigorous monitoring;
- Record levels of sika deer relative abundance in our LLNP study area;
- Confirmation that the female leopard, “Narva”, who was released into Ussurisk Reserve in fall 2023 remains within the reserve and in good condition;

- First evidence of a wild male leopard dispersing from LLNP into habitat in Ussurisk Reserve, east of the Razdolnaya development corridor.

Obstacles to success: Give details of any obstacles/challenges to success that the project has encountered. *(Any changes to the project that have affected the budget and timetable of project activities should have been discussed prior to the end of the project)*

The fieldwork involved in this project is no “walk in the park”: for instance, winter temperatures can be freezing (near -40°C), and forest roads are almost always challenging and require expert drivers. Yet our organization has well over a decade of experience deploying camera traps to monitor leopard populations, and we faced no challenges out of the ordinary.

Monitoring and Evaluation: *(Describe the methods used to monitor and evaluate the progress of the project)*

First, we monitor our progress based on our ability to deploy the target number of camera traps for leopard population monitoring within the target deployment period, and the timely collection of units from the field. We have done this for many years now so that although there were the usual obstacles of vehicle breakdowns, deep snow and mud, and short days in winter, we were able to remain on schedule. Next, we evaluate our successes by the number of leopards we captured on camera, and in deriving population estimates for our study areas that we can compare to past years. This is only possible as the result of multi-year, sustained support from WCCA.

Shared learning: *(How will you share the outputs and learning from your project, in what format and with whom?)*

We produced annual reports summarizing our leopard monitoring efforts in both LLNP and Ussurisk Reserve which were shared with the Russian Ministry of Natural Resources. Special interest is being given to Ussurisk Reserve and the status of reintroduced leopards there. Thanks to the support of WCCA, we continue to monitor these leopards closely.

Budget Narrative:

Spending for this project was mostly in line with our proposed budget. Minor adjustments were made due to the fluctuating cost of some items and field conditions. No major revisions to our proposed budget were made during the project.

Media: *(Please provide a list of publications and media both local and national which mentions the work funded by this project and/or mentions WildCats Conservation Alliance)*

The dispersal of the wild male Amur leopard, Kazanova, from LLNP to Ussurisk Reserve would not have been discovered without our network of camera traps. LLNP shared this exciting news on their website and credited ANO WCS for the camera trap image of Kazanova.

<https://leopard-land.ru/about/news/1343>

Have you provided at least 2 blogs? Yes

Have you provided at least 10 high quality images with details of the relevant credit? Yes

Section III. Appendix (Please populate this section with details from section II)	
Did you carry out camera trapping as part of this project? Y/N Yes	
If yes: Total camera trap nights/days: LLNP & adjacent hunting lease: 7,269 Ussurisk Reserve: 7,395	Total area surveyed: LLNP & adjacent hunting lease: 756 km² Ussurisk Reserve: 1,007 km²
Numbers of tiger/leopard/prey recorded Southwest Primorye (LLNP & adjacent hunting lease): - Amur leopards: 28 adults/subadults , 0 cubs Relative Abundance Indices of three prey species (average number of independent detections per 100 days; see Figures 3 and 4): - Wild boar: 0.3 detections / 100 days - Sika deer: 30.9 detections / 100 days - Roe deer: 0.1 detections / 100 days Ussurisk Reserve - Amur leopards: 2 adults/subadults , 0 cubs - Wild boar: 3.5 detections / 100 days - Sika deer: 29.8 detections / 100 days	

- Roe deer: 3.8 detections / 100 days -	
Are numbers of tigers/leopards/prey increasing or decreasing in your project area? Please show trends The number of Amur leopards have been steadily increasing (Figure 1, Figure 2). Based on estimates of relative abundance, The number of sika deer also appear to be increasing (Figure 3). Wild boar abundance appears to be remaining at lower levels after a sharp decline in abundance due to African Swine Fever in 2020. Roe deer abundance appears to be fluctuating at low levels (Figure 4).	
Did you carry out other surveys? Y/N No	
If yes: Please give details	
Did you carry out patrolling as part of this project? Y/N N	
If yes:	Total area patrolled:

Do you use Patrol Monitoring software such as SMART? Y/N		
N		
If yes:	How do you collect data? Handheld devices/paper/other? Please give details?	
Please provide comparison data on from your patrolling over time		
Please provide data on violations recorded/arrests/successful prosecutions		
Does your project work with local communities? Y/N		
N		
If yes: (please be as specific as possible and include gender split)		
Who?	What did you do? Was it successful?	How many people did you reach?
How do you measure the success of this activity? N/A		
Did you carry out educational activities with adults or children? Y/N		

N		
If yes: (please be as specific as possible and include gender and numbers) Who?	What did you do?	How many people reached?
Have you seen behaviour change from these activities? (Please give details of your results and of how this is measured)		
Did you carry out training activities for any staff/community member on the project? Y/N N		
If yes: (please be as specific as possible and include gender split) Who?	What did you do? Was it effective?	How many staff trained? How many others trained?
How do you measure the effectiveness of this training?		
Did you carry out conflict mitigation activities with community members? N		
If yes:		

Who?	What?	How main people did this include?
Have you seen behaviour change from these activities? (Please give details of your results and how this is measured)		
Were any scientific papers/articles published because of your project? Y/N		
N		
If so, please give details or provide copies.		