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: Monitoring Populations of Amur Leopards and Tigers in Northeast China
Grantee Organisation: Wildlife Conservation Society (WCS) China
Location of project: Hunchun Nature Reserve (HNR) and adjacent lands within Northeast China Tiger Leopard National Park (TLNP), Hunchun County, Jilin Province, China, at approximately 42.41972 N, 129.86416 E.

Size of project area (if appropriate): About 5,000 square kilometres	**No of tigers and / or Amur leopards in project area, giving evidence & source:** To date, WCS has photographed a total of 40 Amur tigers and 40 Amur leopards in HNR.

Partners: *(Please give details of partners, including communities, academic institutions etc. for this project.*
WCS works closely with the Forestry Bureau of Jilin Province and senior management of TLNP. We also collaborate with staff of HNR (now a substation of TLNP) to continue camera trap monitoring of the Hunchun region. HNR shares all monitoring data with us (as collected by collaborators, which we then add to our own data), and their staff also participated in 1) snow tracking to better understand tiger and leopard behaviour in winter, and 2) an anti-poaching workshop. Finally, we also coordinate activities in Russia through WCS Russia.
Project Contact Name: (*main contact via email*) Mr. Wang Aimin
Email: awang@wcs.org
Reporting period: July 1, 2020 - January 31, 2021

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.

Section II. Project Results

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

Monitoring is the foundation of conservation intervention, and developing an effective transboundary monitoring system is the first step in transboundary collaboration. Ultimately, progress in this arena is dependent on the governments of both China and Russia, and the managers of both the Northeast China Tiger and Leopard National Park (China) and Land of the Leopard National Park (Russia). WCS has been working hard to push this process on both sides of the border.

Improved law enforcement is key to recovering tigers and leopards in TLNP. So far, it is unclear how the park management intends to manage a potentially huge number of field rangers. SMART (spatial monitoring and reporting tool) would provide an efficient and effective means of monitoring and managing rangers. At present, TLNP has incorporated SMART into the park patrol system and established a unified database. We believe that in our continuous training and evaluation feedback, SMART system will play a greater role in park law enforcement.

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

Our team has expanded our population dynamics database by continuing to monitor tigers and leopards populations. Our team also evaluated the use of SMART in TLNP to promote law enforcement in TLNP.

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

During the grant period, WCS China continued our monitoring program, conducted snow tracking in Hunchun, and carried out SMART assessment at 10 branches of TLNP. We deployed 50 pairs of camera traps in Hunchun and identified 13 individual tigers and 10 individual leopards, including 1 tiger family unit. We tracked 3 sets of tiger tracks for a total distance of 61 km, and we learned more about local big cat movement patterns, habitat preferences, and hunting behaviour. We also carried out a webinar on the use of SMART system and we evaluated its use in 10 branches and made suggestions for improvement.

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. Monitor populations of Amur leopards and tigers in Hunchun.

Activity 1.1. Continue camera trap monitoring in and around HNR.

In 2020, we continued to engage in camera trapping at four of the six subunits of HNR: Madida, Yangpao, Banshi, and Jingxin, and began camera monitoring in Dahuanggou in April (Figure 1). We

deployed camera traps at 50 sites in HNR and 20 sites in Dahuanggou, covering approximately 630 km² of key habitat for Amur tigers and leopards. We completed camera maintenance four times a year, and collected all images from April 2020 to January 2021 and analysed all data. During the monitoring period that included 29,826 trap nights, we obtained 116,022 images and videos of wildlife and human activity. The raw data of tigers and leopards received from these camera traps are presented below (Table 1). During the monitoring period, no cameras were stolen but three memory cards were removed by persons unknown.

Figure 1. Locations of camera trap that showed Amur leopards and tigers.

Table 1. Information on tigers and leopards from camera trap monitoring by WCS from April 2020 - January 2021.

Common Name	Encounters	Sites Represented	Images/Videos	Individuals
Amur tiger	222	34	559	17
Amur leopard	59	20	144	11

During the monitoring period, Amur tigers or leopards were captured at 42 of the70 camera trap locations (60%; Figure 1). Tigers were seen at 34 sites (49%), leopards were photographed at 20 sites (29%), and there were 12 sites where (17%) both species were captured. We identified 17 individual tigers (7 males, 4 females, and 6 of unknown sex) and 11 leopards (4 males, 2 females, and 5 of unknown sex) by comparing stripe and spot patterns, respectively. Of the 17 tigers identified by our team, 10 individuals had been seen in previous years (including a family with 4 cubs) and 7 were new individuals (including 2 cubs, whose mother was one of the quadruplets detected in Madida in 2018). This tiger family was found in Madida. Of the 11 leopards photographed, 4 were recorded in

the past and 7 were seen for the first time. We provide some sample images of these animals below (Figures 2 and 3).
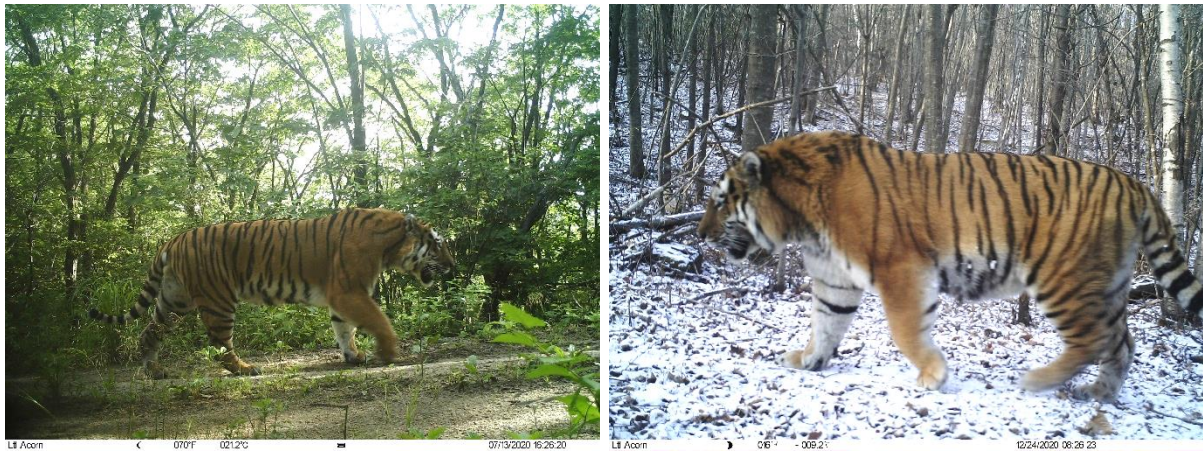

Figure 2. Tigers captured by camera trap in 2020. Photos © WCS China

Figure 3. Leopards captured by camera trap in 2020. Photos © WCS China

In addition to the Amur leopards and tigers, we also recorded wild boar, roe deer, sika deer, Asian badger, Manchurian hare, Asiatic black bear, red fox, leopard cat, raccoon dog, yellow-throated marten, and birds. We analysed our data of the whole year and found that human activity accounted for 59% of all captures (Figures 4), and cattle made up about half of that (most of which is captured in Dahuanggou), with the rest being humans and vehicles. Humans appeared to primarily be harvesting non-timber forest products (NTFP) and walking past without clear purpose. Wild animals accounted for 41% of all captures, mostly ungulates (>89% of all animals), and sika deer accounted for about 85% of ungulates and virtually all of them are captured in HNR.
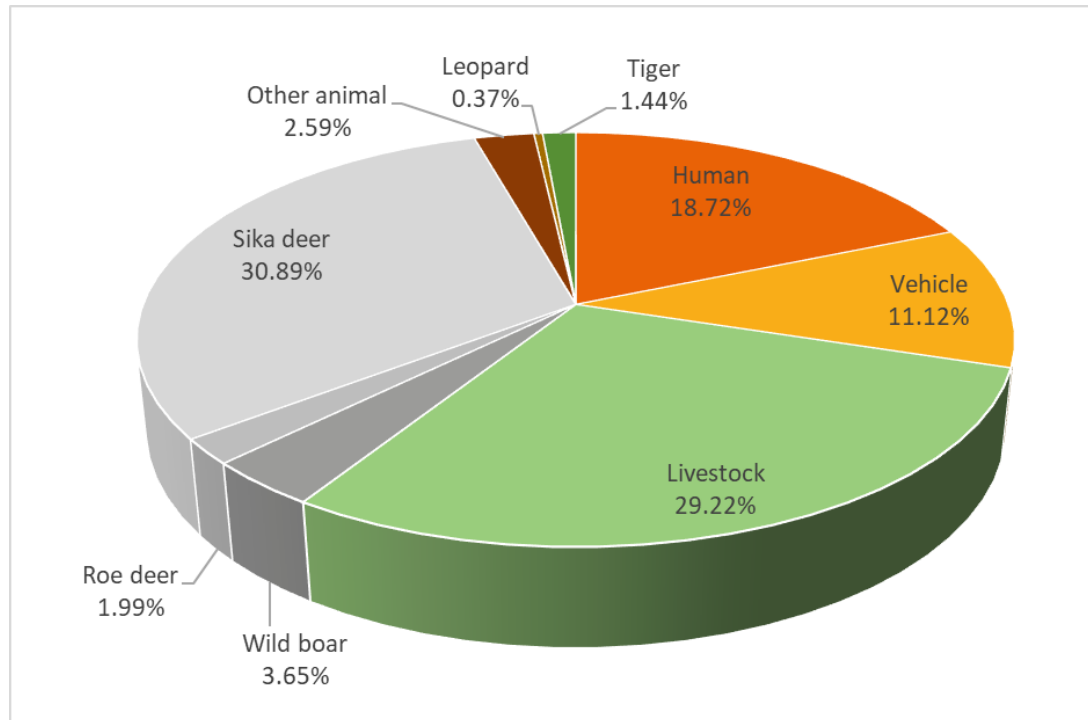
Figure 4. The proportion of human activities and wild animals.

Activity 1.2. Snow track Amur leopards and tigers in and around HNR.

Tracking big cats in the snow provides one of the best ways (without collaring animals) to learn about movement patterns, habitat preferences, and hunting behaviour, and can also help identify quality sites for placement of camera traps, often by detecting preferred travel corridors and scent-marking trees. In this season, we focused outside of HNR, specifically in Dahuanggou, to better understand big cat movements and to get a sense of where we might deploy future camera traps to track dispersal and recolonization.

In January 2021, with the help of HMFB, we conducted Amur tiger and leopard snow tracking activities for 5 days, or 240 man-hours total as planned (Figures 5 and 6). Our efforts focused primarily on the Dahuanggou forestry farm where we spent two days walking transects in the forest, looking for tracks. Then, we split into two groups of three people each to follow three sets of tiger tracks for a total of 61 km. We followed tracks and recorded behaviours until the end of the day or until the tracks were lost, usually due to snowmelt or obscured by wind.
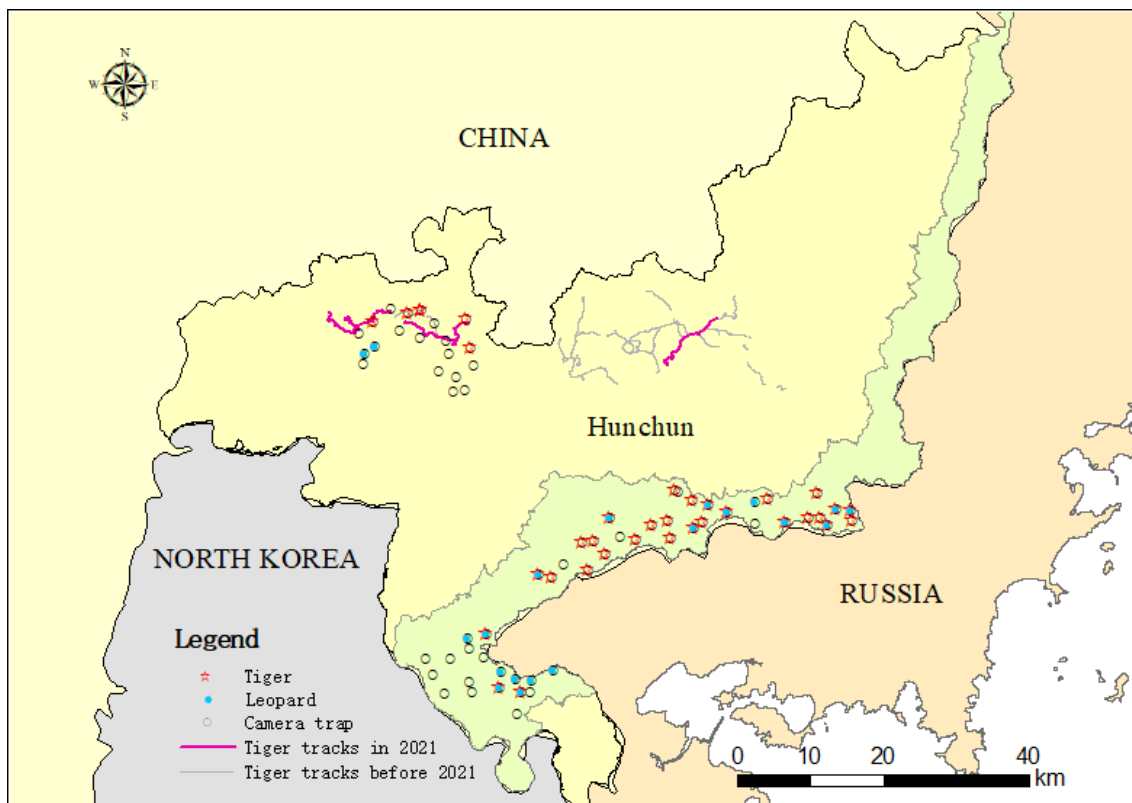
Figure 5. Working photos in snow tracking.

Figure 6. Locations of survey routes (pink line is the tiger tracks in 2021).

We only tracked 3 tiger tracks (Table 2) and identified 1 male and 2 female tigers. The two tracks of Dahuanggou belonged to a male tiger and a female tiger, possibly two of the four tigers captured by camera in Dahuanggou in 2020. We recorded the behaviours of these tigers, including drinking, bedding, scrapes on the trees, scrapes on the ground, scat, and urine (Figure 7).

Table 2. Parameters of the tiger and the leopard tracks.

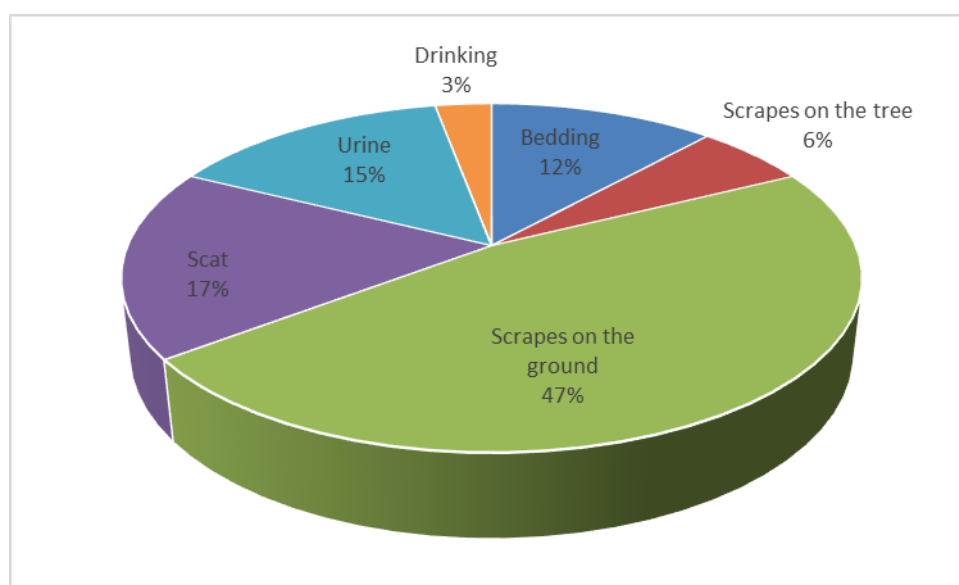| Track number	Date (YYY/MM/DD)	species	Location	Track length (km)	Pad width (cm)	Step distance (cm)
1	2021/01/20	tiger	Erdaogao	15.8	9.6	99
2	2021/01/21-22	tiger	Dahuanggou	22.1	9.0	102
3	2021/01/24-25	tiger	Dahuanggou	22.8	10.7	132

Figure 7. The proportion of tiger behaviours in all tracking.

Objective 2. Improve law enforcement in TLNP with SMART.

Activity 2.1. Conduct an assessment of previous efforts to implement SMART, and determine weak points and opportunities for improvement.

Our original plan was to invite an expert on SMART to come and review the SMART program in northeast China. However, due to the impact of the covid-19, we switched to domestic experts for review and evaluation.

In January 2021, we partnered with the TLNP administration to establish an expert team, mainly people in park branches who are proficient in SMART. We collected SMART databases from 10 branches, evaluated the SMART patrolling system of each branches by means of patrolling data analysis and network communication, and provided the evaluation report.

Activity 2.2. Work with HNR staff to correct deficiencies and improve law enforcement efforts.

In order to further strengthen the standardized management of patrolling, in 2020 TLNP established a unified SMART database and promoted its use in 10 branches. Our assessment was carried out for these 10 branches. According to the assessment report, each branch basically mastered the use of SMART system, but there were some problems in the process, such as incomplete patrolling

information records, inaccurate patrolling distance caused by irregular use of GPS, unrecorded storage of some surveys, etc. These issues will be followed up by the TLNP administration at a later stage to improve the use of SMART systems in each branch.

Activity 2.3. Conduct a workshop to explain SMART.

Due to the impact of the covid-19, the workshop was changed to a webinar. In January 2021, we partnered with the TLNP administration and invited the management personnel and SMART technical personnel of each branch to participate in the network meeting, and made a report on the SMART system evaluation of each branch. At the meeting, experts reported on the problems and deficiencies existing in each branch, and provided good suggestions to improve the use of SMART, so that the patrolling monitoring system can be better applied to anti-poaching law enforcement work.

Key achievements of this project: (*Please give a bullet point list of key measurable outputs- for example xxx of staff trained in SMART monitoring techniques, xxx camera traps covering xxx km^2*)

Output 1. By the end of 2020, we will have a dataset of tigers and leopards in and around HNR, which we can compare to pre-2020 data. We will also have expanded our understanding of tiger/leopard movements in northeast China via camera trapping in Dahuanggou.

- 140 camera traps covering 630 km^2
- 17 individual tigers and 11 individual leopards (including 1 tiger family units) detected by our monitoring in Hunchun—up from a single tiger 20 years ago
- 6 people trained during 5 days of snow tracking

Output 2. Improve the overall level of SMART patrol management in LTNP and delivery of SMART data recommendations to TLNP senior management.

- 1 webinar on the use of SMART system

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*)

All the activities have been completed. For the SMART assessment we were unable to invite foreign experts due to the impact of the covid-19, but we cooperated with the TLNP administration to conduct SMART assessment in 10 branches.

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

For camera trap monitoring, our first indicator of success is the number of pairs of cameras we set up. Our personal, achievable target is 50 sites in HNR and 20 sites in Dahuanggou.

For snow tracking, we evaluated our success by the number of tracks we found and followed, and the types of behaviour we were able to record, as well as the discovery of good locations to set camera traps. The number of trained staff was another indicator of success.

For SMART assessment, our indicators of success were the number of workshops and participating branches, and the assessment report.

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

At present, our camera data was shared with Hunchun Branch and Hunchun Municipal Branch of TLNP. We hope to promote data exchange and sharing among monitoring units in whole TLNP to understand the number of tigers and leopards. Our SMART seminar, which included representatives from 10 branches of TLNP to communicate their use of SMART, was also a very important form of shared learning where each branch demonstrated its strengths and found areas that still need improvement.

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)*

n/a

Have you provided at least 2 blogs? Y/N?

Yes

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

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:** 29,826 trap nights	**Total area surveyed:** 630 km^2
Numbers of tiger/leopard/prey recorded 17 tigers and 11 leopards	**Please include data on other species recorded** Yes, we have included data on other wildlife and human activities
Are numbers of tigers/leopards/prey increasing or decreasing in your project area? Please show trends. Based on camera trap evidence over a twenty year period, both tigers and leopard populations are clearly increasing in northeast China.	
Did you carry out other surveys? Y/N Yes	
If yes: We conducted 5 days snow tracking and tracked 1 male tiger and 2 female tigers with a total of 61 km.	
Did you carry out patrolling as part of this project? Y/N No	
If yes:	

Total distance patrolled: (please give figures for different methods, vehicle/foot/boat etc)	Total area patrolled:	
Do you use Patrol Monitoring software such as SMART? Y/N		
If yes: Total distance patrolled using patrol monitoring software?	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 No		
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?		
Did you carry out educational activities with adults or children? Y/N No		
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 No

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?   Y/N No

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 No

If so, please give details or provide copies.