

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, Hunchun County, Jilin Province, China, at approximately 42.41972 N, 129.86416 E	
Size of project area (if appropriate): About 5000 km ²	No of tigers and / or Amur leopards in project area, giving evidence & source: We have identified 23 Amur tigers (March - July 2019 in HNR), a number derived following a meeting of all camera trap partners.
Partners: <i>(Please give details of partners, including communities, academic institutions etc. for this project.</i> We worked closely with the Forestry Bureau of Jilin Province and senior management of Northeast China Tiger and Leopard National Park (TLNP). We collaborated with staff of the HNR and Hunchun Municipal Forestry Bureau (HMFB) substations of TLNP on monitoring, and rely on them to protect and manage the park. HNR agreed to share all monitoring data with us (collected in HNR), and HMFB agreed to share some of their monitoring data with us (collected outside HNR). Staff of HNR and HMFB also participated in snow tracking to better their own understanding of tiger and leopard behaviour in winter, as well as participated in our corridor analysis workshop.	
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Reporting period: August 1, 2019 - January 31, 2020	

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?)*

In 1998, the Wildlife Conservation Society (WCS) assisted the Jilin Wildlife Department in a survey that found tracks of single tiger (likely a dispersing male) in the Hunchun region, and no leopards. In 2019 and with our collaborators, we reported 23 tigers in the same general region and at least 13 leopards, including breeding females of both species. Thus, our monitoring program is providing the key metrics of change and success from our conservation efforts. By maintaining a long term database, we are collecting invaluable data for assessing past and current population statuses of Amur leopards and tigers, and guiding what conservation and management decisions should be made. Given the creation of the new Tiger and Leopard National Park (TLNP), this monitoring program becomes even more important as a baseline for understanding broader trends in tiger and leopard populations in China. These methods also provide a template for expanding monitoring across the new protected area.

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

Our team has: (1) demonstrated increases in the Amur leopard and tiger populations in and around HNR, and demonstrated that females of both species are rearing young within our study area; (2) gained a better understanding of leopard and tiger behaviour and habitat use, which will be used to improve effectiveness of camera trap monitoring; (3) developed a foundation for monitoring in the new TLNP; and (4) developed traction in linking the new TLNP with adjacent blocks of habitat by reducing habitat fragmentation within the park and making recommendations for corridors to link to the park to other habitat patches.

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

The WCS China Program has for years played an important role in the conservation of Amur leopards and tigers in northeast China, with most of our focus in Hunchun and surrounding areas. In 2019, with support from the WildCats Conservation Alliance (WCCA), we continued our monitoring program and conducted snow tracking and corridor research in Hunchun. We deployed 50 pairs of camera traps in Hunchun Nature Reserve (HNR) and identified 17 individual tigers and 13 individual leopards, including 2 tiger family units and 1 leopard family unit. We tracked 4 sets of tiger tracks and 2 sets of leopard tracks for a total distance of 121 km, and we learned more about local big cat movement patterns, habitat preferences, and hunting behaviour.

In particular, the tracks we followed in Dahuanggou revealed good locations for deploying camera traps to monitor tiger movement into this new area. Our team also carried out a preliminary ecological corridor analysis designed to engage park management in discussions on future corridor planning within TLNP and to link the park to other habitat patches.

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)*

Objective 1: Continue (and expand) camera trap monitoring of Amur leopards and tigers in and around HNR

Activity 1.1 Monitoring in HNR

In 2019, we continued to engage in camera trapping at four of the six subunits of HNR: Madida, Yangpao, Banshi, and Jingxin (Figure 1). We deployed camera traps at 50 sites in HNR, covering approximately 450 km² of key habitat for Amur tigers and leopards. We completed camera maintenance four times a year as planned, and collected all images from November 2018 – November 2019 and analysed all data. During a monitoring period that included 32,916 trap nights, we obtained 191,509 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 two memory cards were removed by persons unknown.

Common Name	Encounters	Sites Represented	Images/Videos	Individuals
Amur tiger	496	33	3,747	17
Amur leopard	75	28	650	13

Table 1. Information on tigers and leopards from camera trap monitoring by WCS from November 2018 - November 2019.



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

During the monitoring period, Amur tigers or leopards were captured at 44 of the 50 camera trap locations (88%; Figure 1). Tigers were seen at 33 sites (66%), leopards were photographed at 28 sites

(56%), and there were 17 sites where (34%) both species were captured. We identified 17 individual tigers (5 males, 5 females, and 7 of unknown sex) and 13 leopards (3 males, 3 females, and 7 of unknown sex) by comparing stripe and spot patterns, respectively. Of the 17 tigers identified by our team, 14 individuals had been seen in previous years (including a family with 4 cubs) and 3 were new individuals (including 2 cubs in a family). These two tiger families were all found in Madida. Of the 13 leopards photographed, 5 were recorded in the past and 8 were seen for the first time. We provide some sample images of these animals below (Figures 2 - 3).



Figure 2. Tigers captured by camera trap in HNR in 2019. Photos © WCS China



Figure 3. Leopards captured by camera trap in HNR in 2019. Photos © WCS China

In addition to the Amur leopards and tigers, we also recorded other mammals, including wild boar, roe deer, sika deer, Asian badger, Manchurian hare, Asiatic black bear, red fox, leopard cat, raccoon dog, yellow-throated marten, and Siberian weasel. We analysed our data in the spring and found that human activity accounted for 38% of captures, including major harvest of non-timber forest products (NTFP), foot traffic without clear purpose, a small amount of grazing, and a relatively large number of vehicles. Wild animals accounted for 62% of all captures, mostly ungulates (>50% of all animals; Figure 4).

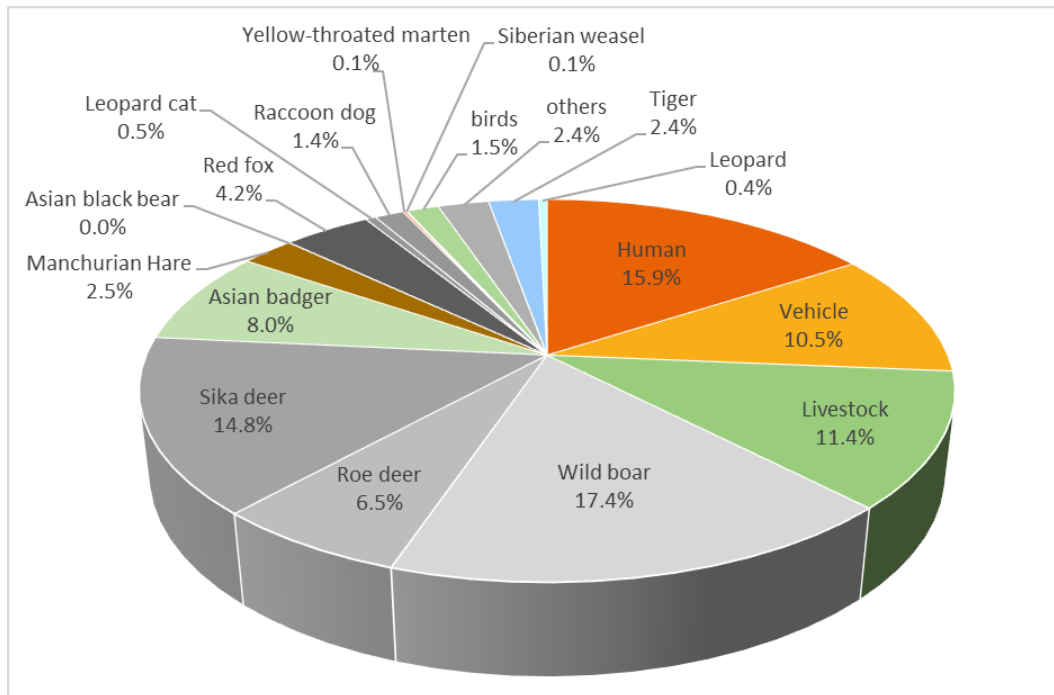


Figure 4. The proportion of human activities and other wild animals.

Activity 1.2 Monitoring in Dahuanggou

We set the groundwork for monitoring big cats in Dahuanggou (see Activity 2.1, below), and discussed monitoring with HMFb as the relevant law enforcement agency; however, the onset of the COVID-19 pandemic prevented us from setting out traps as early as we had hoped. We expect to deploy camera traps in Dahuanggou this spring, as soon as we are safely able to return to the field.

Objective 2: Snow track leopards and tigers to glean information about their movements and behaviour

Activity 2.1. Snow track in Dahuanggou and 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.

In January 2020, with the help of HMFb, we conducted Amur tiger and leopard snow tracking activities for 13 days, or 570 man-hours total, which was twice the output we projected in our proposal. Our efforts focused primarily on the Dahuanggou forestry farm, the Heshan forestry farm, Erdaogou, Sandaogou, and Sidaogou areas. Our team spent three days walking transects in the forest, looking for tracks. Then, we split into two groups of three people each to follow four sets of tiger tracks and two sets of leopard tracks for a total of 121 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.

For tigers, we recorded behaviours such as feeding, drinking, bedding, scent-marking trees, and ground scrapes (Figures 5 - 9). We recorded fewer events by leopards; only bedding, scent-marking trees, and ground scrapes.



Figure 5. Locations of survey routes. The Dahuanggou area includes the blue and red routes to the west.



Figure 6. A bedding site and set of tiger tracks. Photos © WCS China



Figure 7. Tiger scrapes on the ground and a scrape on the tree. Photos © WCS China



Figure 8. Tiger scat. Photo © WCS China

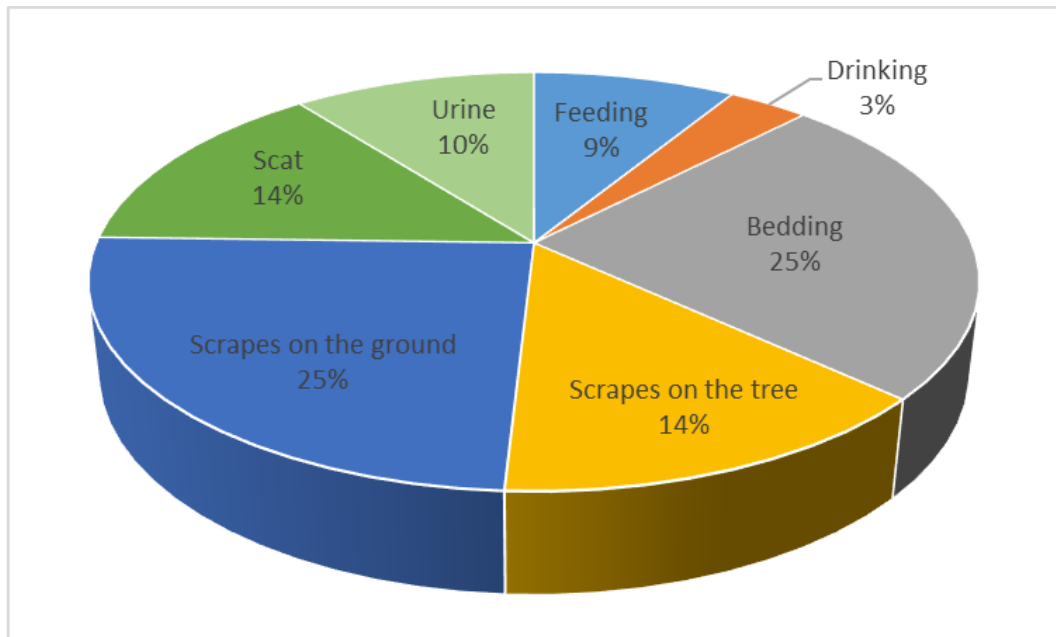


Figure 9. The proportion of tiger and leopard behaviours in all tracking.

Our team could not determine pad width for all tracks given substrate conditions, but we did conclude that there were at least two tigers and one leopard in the area we tracked: at least one male tiger in Heshan-Erdaogou-Sandaogou, and one female tiger and one female leopard in Dahuanggou (Table 2). Our first tracking efforts in Dahuanggou were quite fruitful, as information about tiger and leopard travel routes have provided us with ideas about where to set camera traps.

Track number	Date (YYY/MM/DD)	species	Location	Track length (km)	Pad width (cm)	Step distance (cm)
1	2020/01/04	tiger	Dahuanggou	5.1	-	120
2	2020/01/04-06	leopard	Dahuanggou	20.4	6.4	98
3	2020/01/07	leopard	Dahuanggou	5.8	-	105
4	2020/01/05-07,11-12	tiger	Heshan	47	11.3	134
5	2020/01/14,16-17	tiger	Erdaogao-Sandaogou	30.7	11.1	135
6	2020/01/17-18	tiger	Dahuanggou	12.1	9.5	122

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

Objective 3: Conduct ecological corridor analysis

Activity 3.1. Offer guidance to TLNP on corridor design

In December 2019, we worked with an ecological planning company to develop an analysis of ecological corridors for TLNP. Recommendations included habitat restoration options, creation of wildlife overpasses/underpasses, roads management, and more. We held a roundtable meeting with the TLNP Administration in Changchun in January 2020 to discuss these initial findings, with 14 people attending to review the methodology and results.



Figure 10. Delegates at the meeting of ecological corridor construction in Changchun. Photo © WCS China

From this meeting, we saw that there are many different decision makers in park management, with different levels of information, which has stalled efforts to definitively identify regions to target for habitat restoration and to prioritize action. Therefore, our next step is to convene a meeting of all relevant stakeholders—including key representatives from TLNP, WCS, WWF, Beijing Normal University, and more—to jointly agree on methodologies to define corridors. We will also seek to identify and rank prospective corridors based on their potential value to tigers and on the degree of difficulty in creating each corridor (e.g., financial, logistic, political).

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 km²)*

- 100 camera traps covering 450 km²
- 17 individual tigers and 13 individual leopards (including 2 tiger family units and 1 leopard family unit) detected by our monitoring in Hunchun Nature Reserve—up from a single tiger 20 years ago
- 6 people trained during 10 days of snow tracking
- Travel routes of tigers and leopards identified in Dahuanggou for future camera trap work
- 1 workshop on corridor analysis.

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)*

Most activities were completed on or ahead of schedule, and in some cases with results that exceeded our expectations. We were unable to complete camera trapping at Dahuanggou, which we hope to commence this spring should the threat of COVID-19 vastly diminish.

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

For camera trap monitoring, we monitor our yearly effort by our ability to successfully set up and recover camera traps with a minimum stolen. Thankfully, unlike in Russia, people in China who find our camera traps seem disinclined to actually steal them, at worst removing the memory cards. This results in some lost data, but not loss of expensive equipment.

For snow tracking, we evaluate our success by the number of tracks we find and follow, and the types of behaviour we are able to record, as well as the discovery of good locations to set camera traps. The number of trained staff is another indicator of success.

For ecological corridor analysis, our indicator of success was the number of people who attended the workshop, and our ability to influence TLNP management on corridor design.

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

We share output with our local partners and the Jilin Province Forestry Bureau through a bi-annual meeting. Jilin Province Forestry Bureau collects and analyses monitoring data from all teams camera trapping in the province, and the compiled results are shared out at this meeting. Results of our preliminary corridor analysis provides a foundation for serious discussion with park administrators and other stakeholders to generate actions needed to begin the creation of key corridors.

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)*

As in years past, WCS recognized WCCA in the 2019 Annual Report and will do the same for 2020.

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: 32,916 trap nights	Total area surveyed: 450 km ²
Numbers of tiger/leopard/prey recorded 17 tigers and 13 leopards	Have you included data on other species recorded? Yes, we have included data on other wildlife and human activities
Did you carry out patrolling as part of this project? Y/N No	
If yes: Total distance patrolled:	Total area patrolled:
Do you use Patrol Monitoring software such as SMART? Y/N No	
If yes: Total distance patrolled using patrol monitoring software?	How do you collect data? Handheld devices/paper/other? Please give details?

Does your project work with local communities? Y/N No		
If yes: (please be as specific as possible)		
Who?	What did you do?	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:		
Who?	What did you do?	How many people reached?
Have you seen behaviour change from these activities? (Please give details of how this is measured)		
Did you carry out training activities for any staff/community member on the project? Y/N Yes		
If yes: (please be as specific as possible)		
Who?	What did you do?	How many staff trained? How many others trained?
WCS staff, HMFB staff, and other volunteers	Snow tracking	8 staff trained and 2 volunteers trained
How do you measure the effectiveness of this training?		

By whether participants could identify track type, accurately measure a track, and judge the tiger's behaviour after completing training.		
Did you carry out conflict mitigation activities with community members? No		
If yes:		
Who?	What?	How main people did this include?
Have you seen behaviour change from these activities? (Please give details of 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.		