

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	
<b>Project Title:</b> Monitoring Populations of Amur Leopards and Tigers in Northeast China	
<b>Grantee Organisation:</b> Wildlife Conservation Society (WCS)	
<b>Location of project:</b> Hunchun Nature Reserve (HNR) and adjacent lands within Northeast China Tiger and Leopard National Park (NCTLNP), Hunchun County, Jilin Province, China, at approximately 42.41972 N, 129.86416 E.	
<b>Size of project area (if appropriate):</b>  About 5,000 square kilometres	<b>No of tigers and / or Amur leopards in project area, giving evidence &amp; source:</b>  Hunchun Nature Reserve: 45 Amur tigers and 30 and leopards, based on our camera trap analysis of 2023.  Dahuanggou: 9 Amur tigers and 4 leopards, based on our camera trap analysis of 2023.
<b>Partners:</b> <i>(Please give details of partners, including communities, academic institutions etc. for this project.)</i>  The administration of NCTLNP is our primary partner, especially the Hunchun Bureau Branch (also called HNR Administration) and Hunchun Municipal Bureau Branch (also called Hunchun Municipal Forestry Bureau). We've been working on monitoring projects with them since before they became park branches, and we are trusted partners. For this project, we are working on camera trap monitoring together with their staff to better understand the current status of tiger and leopard populations within Hunchun county.	
<b>Project Contact Name:</b> <i>(main contact via email)</i>  Aimin Wang, Jonathan Slaght, Scott Waller	
<b>Email:</b> awang@wcs.org; jslaght@wcs.org; swaller@wcs.org	
<b>Reporting period:</b> February 1, 2023 - January 31, 2024	

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?)*

Our overall vision is to safeguard the global population of Amur leopards and recover a viable population of tigers in northeast China. Monitoring is the foundation of conservation intervention, and developing and sustaining an effective monitoring system is the first step. This year, we continued to carry out monitoring work in Hunchun Nature Reserve (HNR) and Dahuanggou to ensure the presence of a continuous monitoring system in the Northeast China Tiger and Leopard National Park (NCTLNP). It is only due to long-term monitoring efforts like this that we can demonstrate an increase in tiger and leopard numbers in northeast China over time and evaluate the success of conservation actions in the region. Long-term monitoring of tigers, leopards, their prey, and human use also allows us to compare conditions between sites and identify priority conservation actions to help us recover wild populations of Amur tigers and leopards.

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

Through this grant, we worked with NCTLNP, and expanded our database by continuing to monitor tigers and leopards. Our long-term monitoring has demonstrated significant increases in numbers of tigers and leopards in HNR, and especially this year, high productivity of females, demonstrating that HNR is becoming a “source site” for future expansion of tigers in northeast China. The increase in numbers of tigers in Dahuanggou demonstrates tigers continue to expand across NCTLNP. In addition, the high level of grazing in Dahuanggou suggests the importance of preventative actions to minimize future conflicts between tigers and humans. Our monitoring also demonstrated a decline in wild boar – a serious concern because boar are a key prey species for tigers.

**Summary of activities and achievements:** *(Please provide a narrative 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 HNR and surrounding areas. In 2023, with support from the WildCats Conservation Alliance, we continued our eleventh year of camera trap monitoring within HNR. Together with the Hunchun Bureau Branches of NCTLNP, we deployed 120 pairs of camera traps in HNR and 30 pairs of camera traps in Dahuanggou to the west. After analysing photographs taken by these cameras, we identified 45 individual tigers and 30 individual leopards in HNR, an increase from the 40 tigers and 28 leopards documented in 2022. We were pleased to record five female tigers with cubs, four of which had litters of 3-4 cubs, as well one leopard mother with cubs. This suggests that our study area has become a real, effective source site for tigers and leopards as they expand their range in China.

In Dahuanggou, we identified nine individual tigers and four individual leopards, (including one female tigress with cubs), which is up from four tigers and one leopard in 2022. Both roe deer and wild boar had been recovering at this site, but wild boar relative abundance dropped significantly from 2022 to 2023. This may be a result of a new outbreak of African Swine Fever. Finally, consistent with previous years, our cameras documented a high level of livestock and human use in

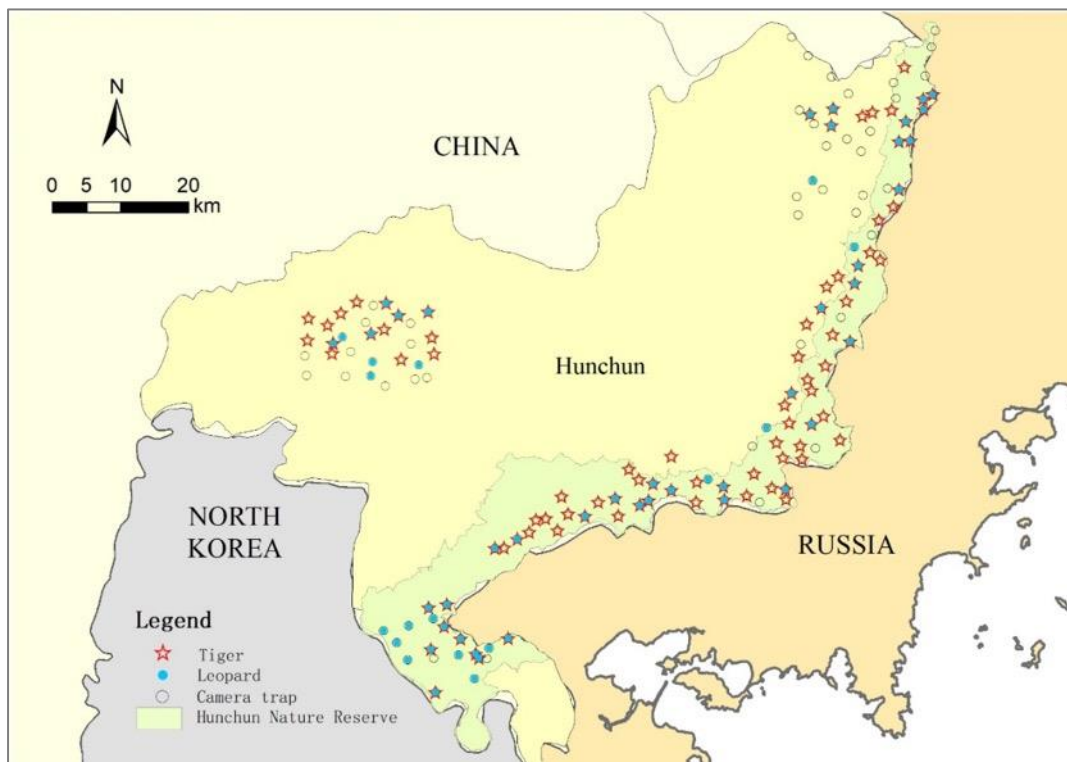
Dahuanggou. As tiger and leopard populations continue to recover and expand their range, proactive conservation efforts in regions like these are critical to minimize human-tiger/leopard conflicts and safeguard the recovery of these big cats – especially considering the recent decline in wild boar relative abundance and the importance of this species for tigers.

**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: Monitoring populations of Amur leopards and tigers in Hunchun.

*Activity 1.1 Continue camera trap monitoring in HNR.*

In 2023, we cooperated with the Hunchun Bureau Branch of NCTLNP to continue camera trap monitoring in HNR, covering approximately 1,080 km<sup>2</sup> of key habitat for Amur tigers and leopards (**Figure 1**). WCS had the responsibility of deploying camera traps in the southern half of HNR (50 sites), while Hunchun Bureau Branch takes responsibility for the northern half (70 sites). We carried out camera maintenance and data recovery three times – in May, August, and November. Together, these cameras produced 814,996 images and videos, and functioned for a total of 29,835 trap nights. The raw data of tigers and leopards received from these camera traps are presented below (**Table 1**). During the monitoring period, six cameras (out of a total of 240 cameras – 2.5%) and ten SD cards were stolen.



**Figure 1.** Map of camera trap locations across Hunchun County that are used to monitor populations of Amur tigers and Amur leopards. Red stars represent camera trap locations where tigers were

photographed, and blue dots represent camera trap locations where leopards were photographed. Empty circles represent locations where no big cats were photographed.

**Table 1.** Summary information on the detections of Amur tigers and leopards from camera trap monitoring by WCS in Northeast China in 2023.

	Common Name	Encounters	Sites Represented	Images/Videos	Individuals
HNR	Amur tiger	733	79	2538	45
	Amur leopard	187	48	410	30
Dahuanggou	Amur tiger	59	15	143	9
	Amur leopard	13	9	30	4

During the monitoring period, Amur tigers and leopards were captured at 91 of the 120 camera trap locations (76%). Tigers were seen at 79 sites (66%), while leopards were photographed at 48 sites (40%). Thirty-six sites (30%) detected both species. By analysing the unique stripe patterns of tigers and the spot patterns of leopards, we identified 45 individual tigers (13 males, 14 females, and 18 of unknown sex) and 30 leopards (8 males, 11 females, and 11 of unknown sex). Of the 45 tigers identified by our team, 30 individuals had been seen in previous years and 15 were new individuals. These tigers included five females with cubs: one in the northern part of HNR with four cubs; one in the southern part with four cubs; and three females in the middle region with four cubs, three cubs and one cub respectively. Of the 30 leopards photographed, 16 were recorded in the past and 14 were seen for the first time. These leopards included one family, in the southern with one cub. We provide some sample images of these animals below (**Figures 2-3**).



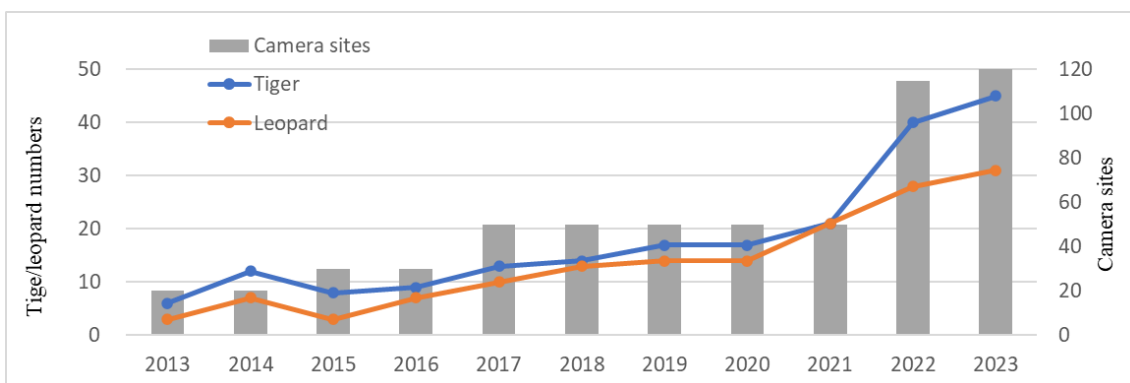
**Figure 2.** Two tiger families captured by our camera traps in HNR during the 2023 monitoring season. Photos © WCS China





**Figure 3.** Two Amur leopards captured by our camera traps in 2023. Photos © WCS China

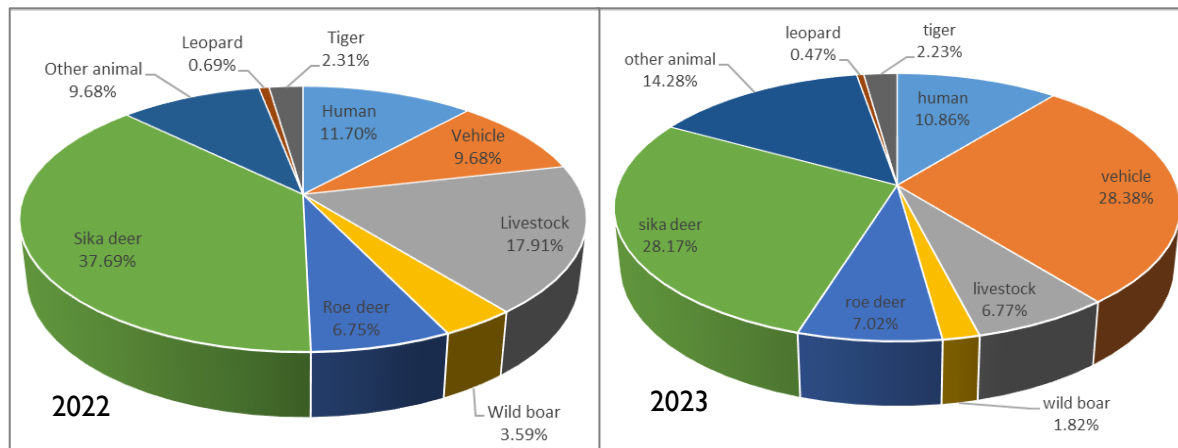
We have carried out camera monitoring in HNR for eleven consecutive years, and the number of individual tigers and leopards we have observed has been increasing year by year (**Figure 4**). Part of this is explained by the fact that we have increased the area in which we conduct monitoring, as well as the number of cameras we use. Even so, we believe the number of observed individuals also represents a true increase in Amur tiger and leopard abundance. With the establishment of NCTLNP, the government has also invested more efforts in protection and restoration work. For example, the park has strengthened their patrol and snare removal efforts, and the rate of snare encounters has consequently dropped by more than 95% compared to before the park was established. With the threat of poaching significantly reduced, tigers and leopards have been able to establish themselves and reproduce. Just in the last two years, eight female tigers and two female leopards were recorded with offspring in HNR, with a total of 24 tiger cubs and 3 leopard cubs. These are very encouraging findings, and we are looking forward to the further restoration and conservation of this area as a source site from which tigers and leopards can disperse into the interior of China.



**Figure 4.** Trend of tiger and leopard population over the years in HNR.

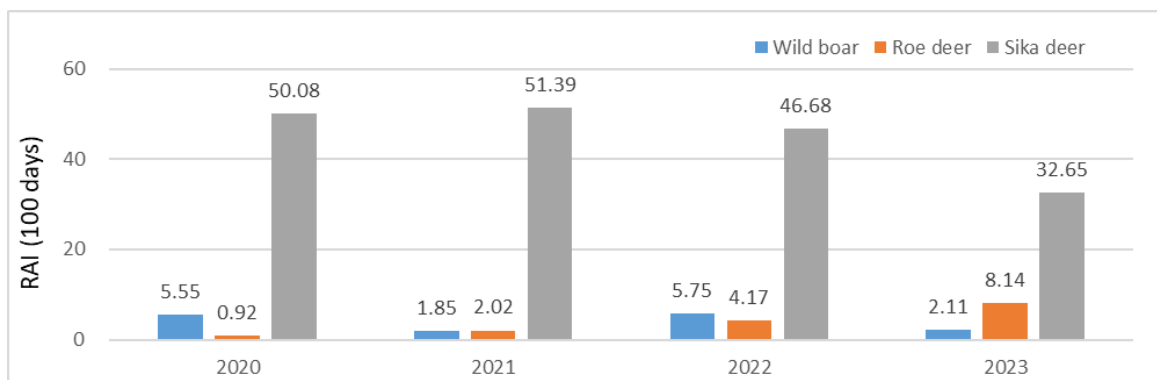
In addition to Amur leopards and tigers, we also recorded other mammals, including wild boar, roe deer, sika deer, Asian badger, Manchurian hare, Asiatic black bear, red fox, leopard cat, raccoon dog, and yellow-throated marten. We analysed the data from May to November and found that human activity accounted for 46% of all captures, mainly of vehicles, humans, and cattle. Wildlife accounted for 54% of all captures, mostly ungulates (>68% of all animals), with sika deer accounting for about

76% of all ungulates (**Figure 5**). Compared with last year (39%), there was an overall increase in human activities. In terms of composition, there were more vehicles than last year, fewer livestock than last year, and little change in human. The reason for this difference may be related to the statistical method, which is changed in 2023, of course, it may also be affected by the monitoring period (2022 data is from July to November).



**Figure 5.** The proportion of human activities and wild animals in HNR.

For ungulates, we analysed the data of the southern HNR from 2020 to 2023 (**Figure 6**). According to the relative abundance index (RAI), sika deer occupies the dominant position, while roe deer and wild boar only account for a small part. Their change trend over the years is not obvious except in 2023, when there is a decrease of wild boar and sika deer. The continuous growth of roe deer was consistent with the data of Dahuanggou, so it is possible that the population is recovering. The decrease of sika deer is mainly due to the influence of statistical methods.



**Figure 6.** The trend in prey populations over years in HNR.

#### *Activity 1.2. Continue and expand camera trap monitoring in Dahuanggou.*

In 2023, we continued camera trapping in Dahuanggou (**Figure 1**). We deployed camera traps at 30 sites covering approximately 270 km<sup>2</sup> of Amur tiger and leopard habitat. Though this is a small area

relative to the home range of an Amur tiger or leopard, this still gives us an indication of general patterns of tiger and leopard expansion west of Hunchun, and the amount of human use.

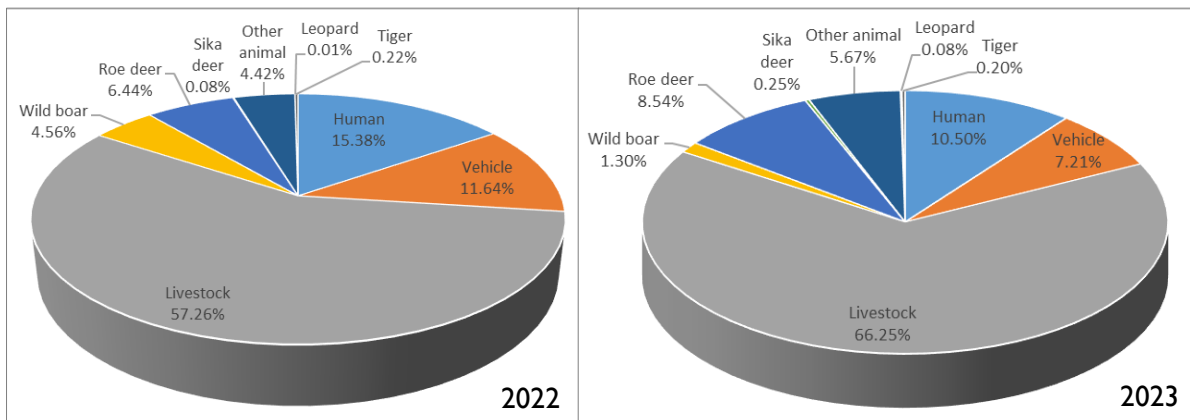
We completed camera maintenance three times throughout the year, and then combined all images for a complete dataset including detections from November 2022 to November 2023. This monitoring period included 8,390 trap nights from the cameras that took images in Dahuanggou, during which we obtained 68,249 images and videos of wildlife and human activity. The raw data for tigers and leopards from Dahuanggou are presented in Table 1.

During the monitoring period, tigers were captured at 15 sites (50% of sites), and leopards were captured at 9 sites (30% of sites). Five sites (17% of sites) had both tigers and leopards. We identified 9 individual tigers (2 male, 3 females and 4 of unknown sex) and 4 leopards (2 females and 2 of unknown sex). Of the 9 tigers identified by our team, 5 individuals were seen in previous years (including 2 that were previously captured at HNR). The other 4 tigers were new individuals we haven't seen before (including two cubs). All 4 leopards were new individuals. Example images of these animals captured by our camera traps are in Figures 7.



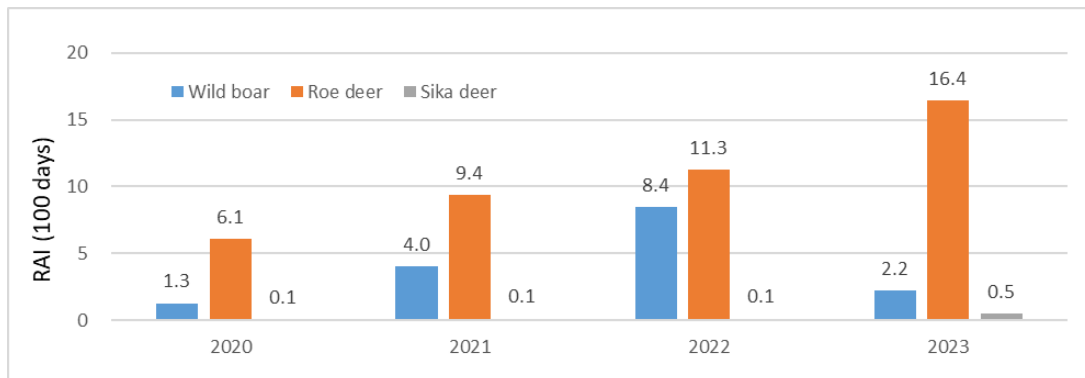
**Figure 7.** Photos of leopards captured in Dahuanggou, Northeast China.

Just as in HNR, we also recorded the number of detections of other mammals. While the species were the same as those in HNR, the proportions were different. We analysed the data from May to November and found that human activity accounted for 84% of all captures, including cattle, humans, and vehicles. Cattle accounted for a significant proportion of the non-wildlife captures, mainly due to grazing in the forest from May-October. Wild animals accounted for 16% of all captures, mostly ungulates (>62% of all animals), and roe deer accounted for about 85% of ungulates (Figures 8). These percentages are little changed from last year. There was a decrease in human and vehicle and an increase in livestock, but little overall change in human activity.



**Figure 8.** The proportion of human activities and wild animals in Dahuanggou.

In contrast to the eastern study area in HNR, sika deer were uncommon in Dahuanggou (**Figure 9**). Roe deer were the most common wild ungulate, with RAIs increasing from 2020 to 2023. Wild boar indices increased through 2022, then declined significantly in 2023 (**Figure 9**). The re-appearance of African Swine Fever may explain this decline, but so far we have not confirmed the presence of ASF in the region in 2023.



**Figure 9.** The trend in prey populations over years (May to November) in Dahuanggou, 2020-2023.

By comparing the monitoring results of different regions, we found that the percentages in Dahuanggou are in contrast to the same period in HNR, where there was a smaller human activity presence (mainly vehicles), greater amount of prey (mainly sika deer), and many more tigers and leopards. There is a higher level of human use in Dahuanggou, especially reflected in the high number livestock detections at our cameras. Cattle are a key component of the local economy. The government has technically banned livestock grazing in forest, but villagers still graze their cattle there due to the low costs. There are more tigers and leopards in the HNR, so grazing there faces a higher risk of predation by tigers and leopards. Furthermore, the government will not compensate for the loss of illegal livestock grazing in the state-owned forests. As such, many ranchers choose to graze in Dahuanggou where tigers and leopards are relatively rare. However, that situation is quickly changing: as tiger and leopard populations grow, there is the increasing risk cattle predation and



human conflict. Proactive conservation efforts in regions like these will be critical to minimize human-tiger/leopard conflicts and safeguard the recovery of these big cats.

**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<sup>2</sup>)*

Output 1. By the end of 2023, we will have a dataset of tigers and leopards in HNR, which we can compare to pre-2023 data.

- Second year of collaborative monitoring with Hunchun Bureau Branch across a 1,080 km<sup>2</sup> area in HNR, leading to an increase in the number of sites for monitoring from 50 to 120;
- 45 individual tigers and 30 individual leopards (including 5 tiger family units and 1 leopard family unit) detected by our monitoring in HNR;
- 9 individual tigers and 4 individual leopards (including 1 tiger family unit) detected by our monitoring in Dahuanggou;
- High number of livestock detections in Dahuanggou, highlighting the risk for human-tiger/leopard conflicts there as these big cats recover;
- Decline in wild boar detections detected in Dahuanggou, possibly indicating an outbreak of African Swine Fever

**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)*

During the project, all activities were carried out in accordance with the plan and successfully completed.

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

Our first indicator of success was the number of pairs of cameras we set up, and our second indicator of success was the number of camera maintenance trips. According to the original plan, we completed the camera monitoring of 120 sites in HNR and 30 sites in Dahuanggou. We visited all cameras three times in HNR and Dahuanggou as originally planned over the course of the year. This number of trips also ensured reliable battery operation, sufficient storage space on memory cards, and an unobstructed view of the target trail (especially in spring and summer, when vegetation can crowd the lens).

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

We shared camera monitoring results with local partners through communicating (including exchanging monitoring data), especially the Hunchun bureau branch and Hunchun Municipal bureau branch of NCTLNP.

**Budget Narrative:**

The grant funds were spent mostly according to the planned budget. There was some notable variance from the planned budget in the following categories:

1) Underspending on vehicle maintenance:

Within the project period we did not require as much vehicle maintenance as predicted, so the actual costs were lower than budgeted.

2) Zero budget for Camera Traps but actual expenditures incurred:

The WCS field office cooperated with a new local partner, Conservation Association, during the project period. WCS provides infrared cameras, and local partners share monitoring results with WCS. Per the budget, Infrared cameras were supposed to be supported by other funding sources. However, we had to use WCCA funding for these cameras, which we were able to do by reducing WCCA spending on personnel costs.

3) Underspending on batteries:

The budget unit price was calculated based on purchasing all Naishi batteries with a unit price of CNY5.5 per piece. However, during the actual implementation of the project period and considering the frequency of battery replacement (every three months) the capacity of the cheaper Nanfu battery (CNY2 per unit) was sufficient. So we purchased Nanfu batteries during the spring and autumn and Naishi batteries were purchased only in winter. Therefore, the actual costs of batteries were lower than the budgeted.

4) Underspending personnel costs for the Senior Scientific Officer position

The Senior Scientific Officer joined WCS in the later stage of the project period, so his personnel costs were mostly supported by other grant funds. Before he joined WCS, his tasks were assigned to the Project Manager and China Director accordingly, so the actual personnel costs were lower than budgeted.

5) Overspending on personnel costs for the China Director and Project Manager

Before the scientific officer was on boarded, the work he was responsible for was assigned to the Project Manager and China Director accordingly, so the actual costs were higher than budgeted.

**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)*

None.

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

Y (See the attachments)

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

Y (See the attachments)

<b>Section III. Appendix</b> (Please populate this section with details from section II) ;	
<b>Did you carry out camera trapping as part of this project? Y/N</b>	
Yes	
<b>If yes:</b>	
<b>Total camera trap nights/days:</b> 38,225 trap nights	<b>Total area surveyed:</b> 1350 km <sup>2</sup>
<b>Numbers of tiger/leopard/prey recorded</b>	<b>Please include data on other species recorded</b>
54 tigers and 34 leopards	Ungulates and other wildlife, and human activities.
<b>Are numbers of tigers/leopards/prey increasing or decreasing in your project area? Please show trends</b>	
The number of tigers and leopards has increased (see Figure 4).	
<b>Did you carry out other surveys? Y/N</b>	
No	
<b>If yes:</b>	
<b>Please give details</b>	

<b>Did you carry out patrolling as part of this project? Y/N</b>		
No		
<b>If yes:</b>		
<b>Total distance patrolled:</b>  (please give figures for different methods, vehicle/foot/boat etc)	<b>Total area patrolled:</b>	
<b>Do you use Patrol Monitoring software such as SMART? Y/N</b>		
<b>If yes:</b>		
<b>Total distance patrolled using patrol monitoring software?</b>	<b>How do you collect data? Handheld devices/paper/other? Please give details?</b>	
<b>Please provide comparison data on from your patrolling over time</b>		
<b>Please provide data on violations recorded/arrests/successful prosecutions</b>		
<b>Does your project work with local communities? Y/N</b>		
No		
<b>If yes: (please be as specific as possible and include gender split)</b>	<b>What did you do? Was it successful?</b>	<b>How many people did you reach?</b>

<b>Who?</b>		
<b>How do you measure the success of this activity?</b>		
<b>Did you carry out educational activities with adults or children? Y/N</b>		
No		
<b>If yes: (please be as specific as possible and include gender and numbers)</b>		
<b>Who?</b>	<b>What did you do?</b>	<b>How many people reached?</b>
<b>Have you seen behaviour change from these activities? (Please give details of your results and of how this is measured)</b>		
<b>Did you carry out training activities for any staff/community member on the project? Y/N</b>		
No		
<b>If yes: (please be as specific as possible and include gender split)</b>		
<b>Who?</b>	<b>What did you do? Was it effective?</b>	<b>How many staff trained? How many others trained?</b>
<b>How do you measure the effectiveness of this training?</b>		



<b>Did you carry out conflict mitigation activities with community members?</b>		
No		
<b>If yes:</b>		
<b>Who?</b>	<b>What?</b>	<b>How main people did this include?</b>
<b>Have you seen behaviour change from these activities? (Please give details of your results and how this is measured)</b>		
<b>Were any scientific papers/articles published because of your project? Y/N</b>		
No		
<b>If so, please give details or provide copies.</b>		