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 48 Amur tigers and 51 Amur leopards in Hunchun.
Partners: *(Please give details of partners, including communities, academic institutions etc. for this project.* The NTLNP administration is our primary partner, especially the Hunchun branch (also called HNR Administration) and Hunchun municipal branch (also called Hunchun Municipal Forestry Bureau). For this project, we share monitoring data with each other and their staff participate in our camera data collection to better understand tiger and leopard population information.	
Project Contact Name: (*main contact via email)* Mr. Wang Aimin	
Email: awang@wcs.org	
Reporting period: February 1, 2021 - January 31, 2022	

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?)*

We envision a future in which subpopulations of tigers and leopards are dispersed across the major forested landscapes of northeast China, connected to each other and Russian populations by ecological corridors. Establishment of a monitoring system that can be integrated across this landscape and combined with data from Russia, provides a means of producing relevant metrics of progress towards this goal.

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

Our team has expanded our database by continuing to monitor tigers and leopards, and monitored tiger and leopard populations.

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 Hunchun and surrounding areas. In 2021, with support from the WildCats Conservation Alliance (WCCA), we continued to carry out camera trap monitoring in Hunchun. We deployed 48 pairs of camera traps in Hunchun Nature Reserve and 20 pairs of camera traps in Dahuanggou (Figure 1). We identified 16 individual tigers and 16 individual leopards in HNR, including 2 tiger family units, and identified 4 individual tigers and 3 individual leopards in Dahuanggou (Table 1).

Table 1. Information on tigers and leopards from camera trap monitoring by WCS in 2021.

	Common Name	Encounters	Sites Represented	Images/Videos	Individuals
HNR	Amur tiger	228	26	578	16
	Amur leopard	130	24	327	16
Dahuanggou	Amur tiger	41	10	100	4
	Amur leopard	8	7	37	3

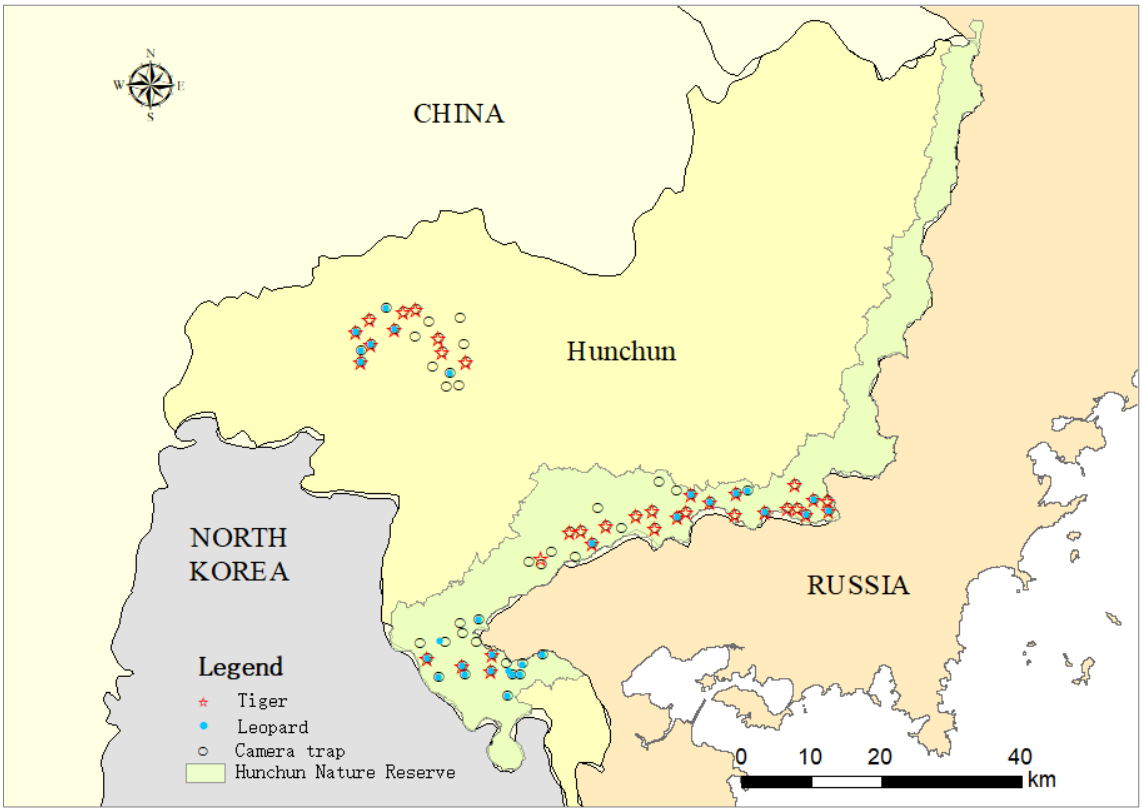

Figure 1. Locations of camera trap that showed Amur leopards and tigers.

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. Monitor populations of Amur leopards and tigers in Hunchun.

Activity 1.1. Continue camera trap monitoring in HNR.

In 2021, we continued to engage in camera trapping at four of the six subunits of HNR: Madida, Yangpao, Banshi, and Jingxin (Figure 1). In January, we deployed camera traps at 48 sites and covering approximately 430 km^2 of key habitat for Amur tigers and leopards. We completed camera maintenance three times a year, and collected all images from January to October 2021 and analysed all data. During the monitoring period that included 11,471 trap nights, we obtained 57,407 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, four cameras were stolen and six cameras malfunctioned.

During the monitoring period, Amur tigers or leopards were captured at 37 of the 48 camera trap locations (77%). Tigers were seen at 26 sites (54%), leopards were photographed at 24 sites (50%), and there were 13 sites where (27%) both species were captured. We identified 15 individual tigers (6 males, 4 females, and 5 of unknown sex) and 16 leopards (8 males, 4 females, and 4 of unknown sex) by comparing stripe and spot patterns, respectively. Of the 16 tigers identified by our team, 8 individuals had been seen in previous years and 8 were new individuals (including two family units).

The tiger family units were both found in Madida. Of the 16 leopards photographed, 9 were recorded in the past and 7 were seen for the first time. We provide some sample images of these animals below (Figures 2 - 3).

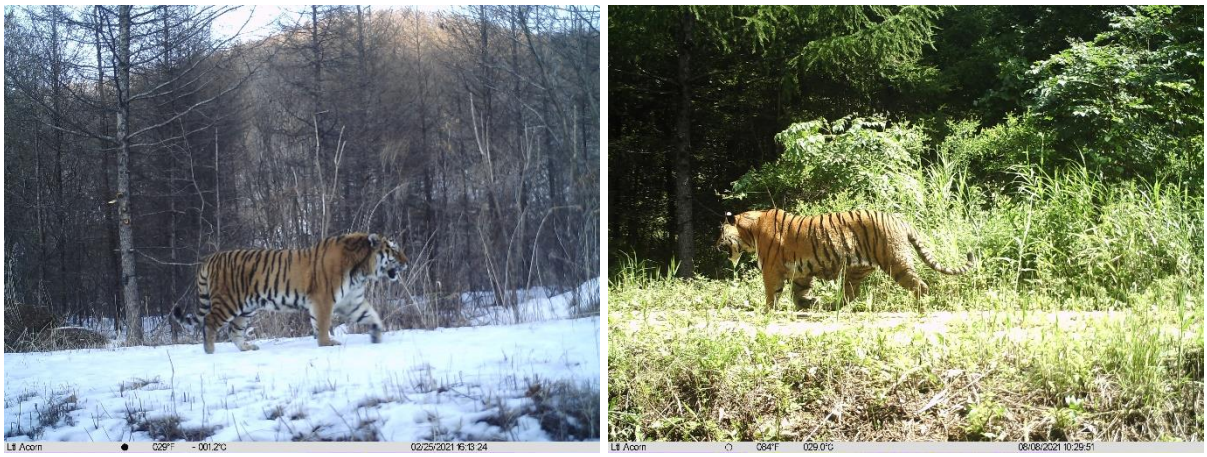

Figure 2. A tiger captured by camera trap in 2021. Photos © WCS China

Figure 3. Two leopards captured by camera trap in 2021. Photos © WCS China

We have carried out camera monitoring in HNR for nine consecutive years, and the statistics show that the number of tigers and leopards is increasing year by year (Figure 4). More tigers and leopards have been captured due to increased monitoring coverage. However, we believe there is a real increase in the actual numbers of tigers as with the establishment of the Northeast China Tiger and Leopard National Park, the government has invested more effort in protection and restoration, which has improved the quality of the habitat and created favorable conditions for tigers and leopards. During this monitoring period, we recorded a total of 20 tiger cubs and 5 leopard cubs—an unthinkably large number even a decade ago. This is a strong development, and we are looking forward to continued habitat improvements here to bolster local populations and source expansion further inland in China.

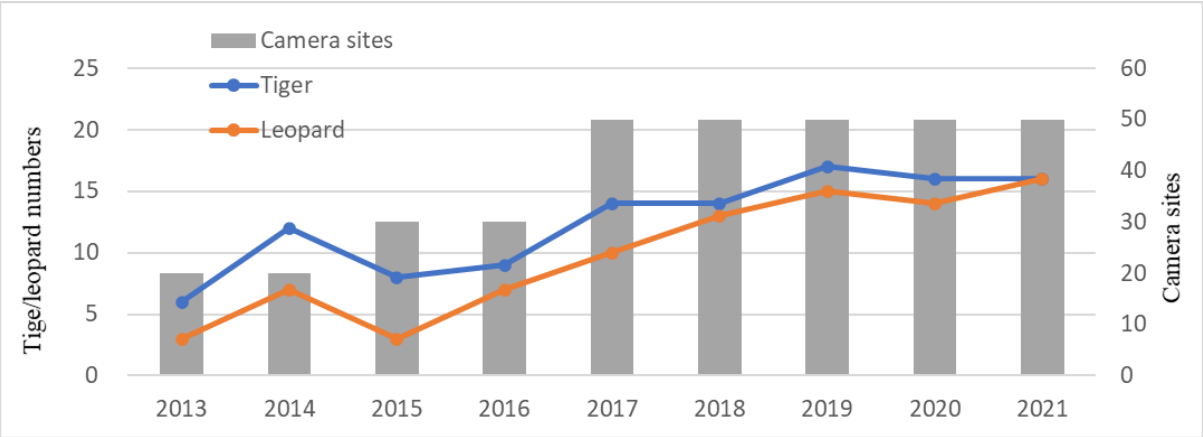

Figure 4. Population trends of Amur tigers and leopards in Hunchun Nature Reserve, northeast China, 2013-present

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 our annual data and found that human activity accounted for 49% of all captures (Figure 5), mainly of cattle, humans, and vehicles in about equal proportions. Wildlife accounted for 51% of all captures, mostly ungulates (>90% of all animals), with sika deer accounting for about 94% of all ungulates.

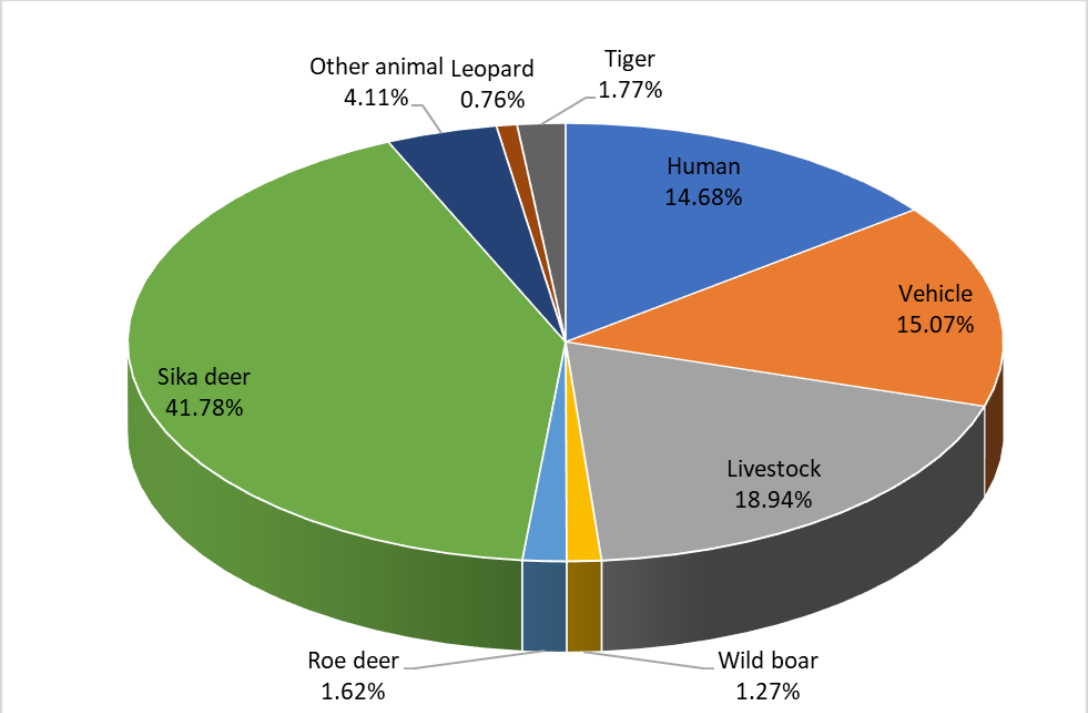

Figure 5. The proportion of human activities and wild animals in HNR.

Activity 1.2. Continue camera trap monitoring in Dahuanggou.

In 2021, we continued to engage in camera trapping in Dahuanggou (Figure 1). We deployed camera traps at 20 sites that covered approximately 180 km^2 of key habitat for Amur tigers and leopards.

We completed camera maintenance three times a year, and collected all images from January to October 2021 and analysed all data. During the monitoring period that included 5,795 trap nights, we obtained 30,667 images and videos of wildlife and human activity. The raw data of tigers and leopards received from these camera traps are presented above (Table 1). During the monitoring period, one camera was stolen and two memory cards were removed by persons unknown.

During the monitoring period, Amur tigers or leopards were captured at 13 of the 20 camera trap locations (65%). Tigers were seen at 10 sites (50%), leopards were photographed at 7 sites (35%), and there were 4 sites where (20%) both species were captured. We identified 4 individual tigers (2 males, 1 female, and 1 of unknown sex) and 3 leopards (2 males, and 1 of unknown sex) by comparing stripe and spot patterns, respectively. Of these tigers and leopards photographed, all individuals had been seen in previous years except one new tiger. We provide the sample images of a tiger and a leopard below (Figures 6).

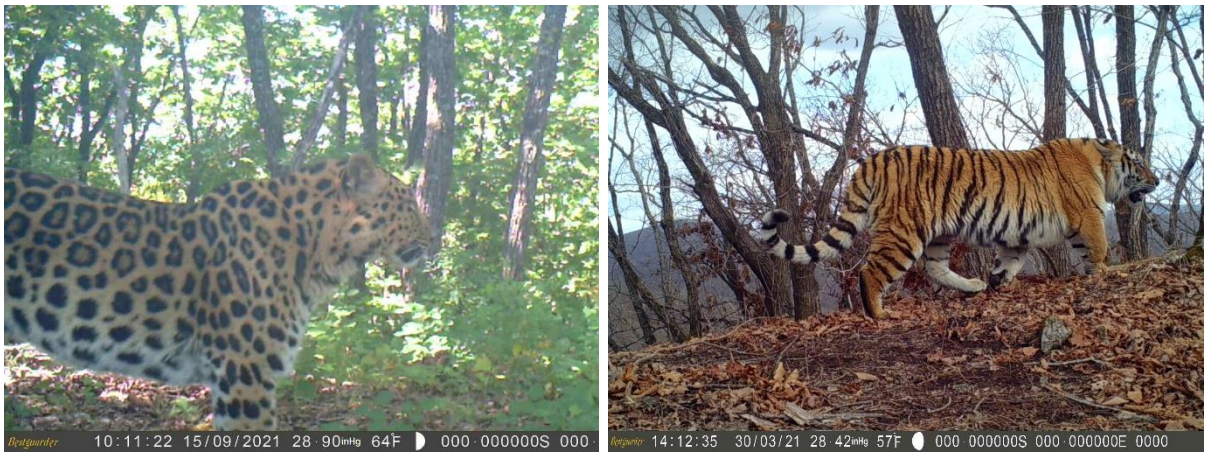

Figure 6. A leopard and a tiger captured by camera trap in Dahuanggou 2021. Photos © WCS China

Population monitoring in Dahuanggou has only been carried out for two years. There was no difference in the number of tigers and leopards captured over two years (Figure 7). Tigers detected in 2020 and 2021 were of different animals (suggesting dispersal or high turnover), while the leopards were the same individuals (suggesting residency).

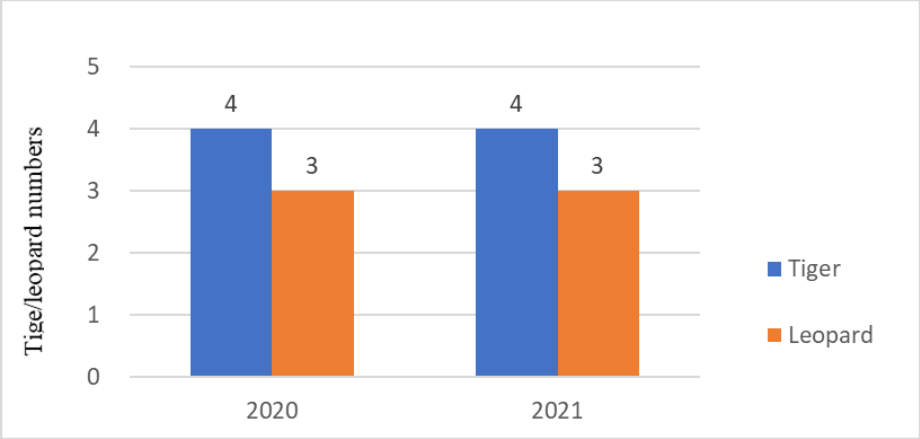

Figure 7. Comparison of tiger and leopard populations in Dahuanggou

We also recorded other mammals, and the species were the same as those in HNR, but the proportions were significantly different. We analysed our data of the whole year and found that human activity accounted for 87% of all captures (Figures 8), 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 13% of all captures, mostly ungulates (>65% of all animals), and roe deer accounted for about 69% of ungulates.

Comparing camera trap results between Dahuanggou and HNR clearly demonstrates the challenges of recovering big cats in the Northeast China Tiger and Leopard National Park (which includes both sites). In HNR, protection has been occurring since 2003, and livestock represent a much smaller percentage of the faunal complex, while sika deer, a key prey species for tigers, are more common. In Dahuanggou, where sika deer are rare and cattle are plentiful (similar levels in 2020 and 2021, Figure 8), officially there are very few cases of cattle depredation. However, the official number of depredations are based on carcasses recovered with clear signs of attack, and does not account for livestock that simply went missing. Therefore, we suspect that tigers rely predominately on livestock for much of the year here. Moving cattle out of the forests, and zoning forests so that some tracts are still available for foraging cattle, will be a key component of recovery of tigers across northeast China. Evidence from HNR indicates that as cattle presence is reduced, sika deer and other natural prey become more abundant, and consequently will represent a larger proportion of the diet of tigers and leopards.

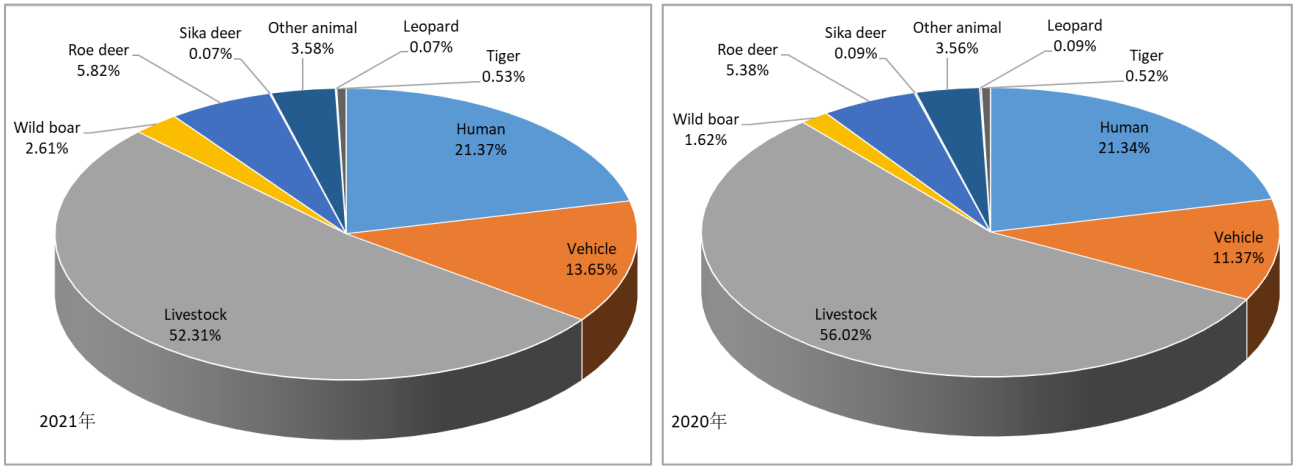

Figure 8. The proportion of human activities and wild animals in Dahuanggou.

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*)

<u>Output 1. By the end of 2021, we will have a dataset of tigers and leopards in and around HNR, which we can compare to our long-term dataset.</u>

- 138 camera traps covering 610 km^2
- 20 individual tigers and 19 individual leopards (including 2 tiger family units) detected by our monitoring in Hunchun—up from a single tiger 20 years ago

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)*

Although we did complete all the activities of the project as expected, we also encountered a few problems that required us to reallocate some funding. For example, with respect to Activity 1.1, COVID-19 prevented us from checking camera traps three times as stated in our proposal. Instead we went only twice. Consequently, we spent less on travel, and HNR also covered more of their share than expected.

In addition, while we expected to contract out some work to a Project Officer, we did not. As a result, we did the work ourselves and relied on our own staff (a project manager and project assistant) to complete it.

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. Our personal, achievable target was 50 sites in HNR and 20 sites in Dahuanggou. Our second indicator of success was the number of camera maintenance trips. We were able to check on nearly all of our camera traps during the reporting period (two in HNR were inaccessible due to roadblocks). We visited all of our cameras four times in Dahuanggou and two times in HNR over the course of the year. This frequency 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 communication, especially the Hunchun branch and Hunchun Municipal branch of NTLNP.

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?

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:** 17,266 trap nights	**Total area surveyed:** 610 km^2
Numbers of tiger/leopard/prey recorded 19 tigers and 19 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	
Did you carry out other surveys? Y/N No	
If yes:	
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 No		
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?		

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.		