Section I. Project Information	
Project Title: "Khao Laem: Tiger Conservation Project, Phase 3"	
Grantee Organisation: Freeland	
Location of project: Khao Laem National Park, Kanchanaburi Province, Thailand (15.059301 N, 98.608739 E) Park HQ at UTM 47P 456814 1661080 (WGS84)	
Size of project area Total area of PA: 1,497km^2 Total area of 2020/21 survey efforts: 905km^2 Approximately 140km^2 via ecological surveys 333km^2 during Phase 1.1 SECR grid survey with a further 432km^2 SECR survey site initiated during early 2022	**Number of tigers in project area, giving evidence & source:** Approximately 10-12 individuals. The focal site is part of a contiguous series of 17 PA's with a combined area of more than 20,000 km^2 that allows free movement of tigers throughout. Population estimate via (unpublished) camera trap data from the site over the previous 6 years.

Partners:

Khao Laem National Park (KLNP); Department of National Parks Wildlife and Plant Conservation (DNP): Starting in 2016 (at the request of the KLNP Park Superintendent) Freeland initiated low intensity tiger ecological monitoring activities, this remains on-going and supplements this year's two Spatially Explicit Capture, Recapture (SECR) surveys. Khao Laem directly shares all park-based data with the DNP's Protected Area Regional Office (PARO3) in Ban Pong and tiger data with the Wildlife Conservation Division's Tiger Research Centre in Huai Kha Kheng WS. This process ensures all tiger records are cross-referenced against a national database of identification images.

Freeland advisor field staff, Eric Ash completed a DPhil (Zoology) relating to large carnivores in Thailand with WildCRU, University of Oxford. He is currently conducting two years post-doctoral studies at the same university. He assisted this project by directing students cataloguing Khao Laem survey data. A collaboration with WildCRU facilitates sharing of technical expertise to ensure surveys are conducted to appropriate scientific standards. This partnership between WildCRU and Freeland was (until covid) starting to provide intern opportunities for young biologists interested in conducting tiger conservation.

Consultant senior biologist Saifon Sittimongkol PhD from Thailand's Prince of Songkhla University analysed survey data, oversaw the SECR surveys and joined survey teams during implementation.

Consultant senior biologist Jonathan Moore also helped analysing project survey data and joined surveys teams during SECR survey implementation

Freeland now collaborates with IUCN Thailand as recipient of a 2 year grant under their programme Accelerating Tiger Recovery along the Thailand-Myanmar Border. This increase of resources allows an expansion of Khao Laem tiger survey efforts, which now encompass almost all terrestrial area of the park. Freeland is a member of the IUCN Thailand National Committee, which helps synchronise conservation efforts with other domestic partner organisations, including the DNP (As the chair).

Further partnerships include FFI Myanmar and Wildlife Asia (Australia), the latter supports the Karen Wildlife Conservation Initiative working in neighbouring Myanmar. These partnerships bring specialist abilities to our projects, provide foundations for scientifically rigorous surveys and successive data analysis. We recently helped establish the Dawna Tenasserim Tiger Alliance (DTTA) to enhance transboundary cooperation and understanding of tiger dispersal across the international border with Myanmar. These broad partnerships are improving collaborative efforts on all fronts to protect and conserve tigers.

Project Contact Name: (main contact via email)
Tim Redford, Surviving Together Programme Director

Email: tim@freeland.org

Actual start date of project: 1st February 2021

Section II. Project Results

Long Term Impact:

The long-term impact sought by this project is to contribute towards doubling the Thai tiger population by the conclusion of the next Thai Tiger National Action Plan (likely to conclude in 2034). This impact will represent significant progress toward our vision of **'ensuring the persistence of Indochinese tigers'.** Evidence from key source sites within WEFCOM landscape indicate tiger conservation measures are succeeding and the tiger population is slowly increasing and dispersing into adjacent PA's where they were subject to numerous threats. Recovery and persistence of tigers within this landscape requires the bolstering of protection especially in edge and transboundary habitats, managing both prey and tigers as a contiguous meta-population and improved coordination between agencies to share best practices. This project has been implementing crucial activities towards all of these by increasing capacity of officials and rangers at one key tiger habitat called Khao Laem National Park.

Conservation Outcome:

This project has developed a more precise understanding of the tiger population within Khao Laem and its function facilitating tiger recovery across parts of WEFCOM. Information obtained over the last year has contributed considerably towards this better understanding. Tiger conservation measures have improved - augmented by increased capacity among officials now able to conduct tiger population surveys, implement adaptive protection measures and mitigate human-tiger conflict. Now a safer environment at Khao Laem NP allowing a tiger (and prey) population recovery. The outcome is validated by the continued persistence of tigers over several years. Now surveys are documenting increase in certain prey species which is creating a situation conducive for further tiger breeding and successful rearing of cubs.

Summary of activities and achievements:

Work at Khao Laem during 2021 was often hindered by covid 19, with travel restrictions and quarantines often impacting activities. Nevertheless the project was able to implement all proposed activities and time sensitive grid surveys occurred as planned.

Tiger monitoring at Khao Laem utilised two distinct formats. Regular long term ecological monitoring (LTM) was supplemented with two Spatially Explicit Capture, Recapture (SECR) surveys. The first SECR - Phase 1.2 ran in the west of Khao Laem from February 2021 to May 2021 and Phase 2.1 in the east occurred during November 2021 to January 2022. Therefore, most of Khao Laem's forested area was monitored for tigers and prey.

We were able to compare the status of tigers, prey and threats following the surveys. This confirmed four individual tigers were recorded during 2021 and a further two in early 2022. Although the survey level of effort remained approximately the same as previous years - a large increase in wild boar was recorded. This is very good news as a pandemic virus called African Swine Fever (ASF) is sweeping across much of Southeast Asia and reducing available tiger prey in other areas.

Records of the critically endangered Indochinese leopard were high too, at 58 independent captures, this likely represents 4 or 5 individuals which are mostly active during the day. Through data from the SECR surveys we were able to better understand temporal use of the landscape by the various carnivores.

During every patrol (and survey) SMART data was recorded. This fed back into the park's SMART database led adaptive management as patrol priorities and routes were planned.

In early 2022 a series of tiger related incidents including; poaching and human-tiger conflict occurred and these are discussed later in this report.

Details of activities and results:

Objective 1. Improving knowledge of tigers, prey and threats in KLNP and adjacent areas

This component has two approaches to estimate tiger abundance and evaluating changes. Firstly a continuation of the SECR surveys and secondly, using opportunistic long term monitoring prioritizing areas tigers regularly occupy.

In 2021 the opportunistic long term monitoring cameras were deployed over two six-month phases in eastern Khao Laem over fourteen 3km x 3km grids (126km^2) These cameras were checked approximately every 60-90 days, the period varied due to availability of park rangers, who were often quarantined due to covid. The LTM surveys occurred as follows; KL26 (Jan-March 2021), KL27 (March-June 2021), KL28 (June-Oct 2021) and KL29 (October 2021-Feb 2022). Combined this totalled 7,256 camera trap deployment days. Some cameras still remain unchecked in one area due to insufficient rangers to join a survey team (These four cameras have now been in place for 190 days and may be damaged).

In 2021-2022 we conducted two SECR grid surveys; during February 2021 to May 2021 SECR Phase 1.2 surveyed 432km^2 in West Khao Laem and between November 2021 to January 2022 SECR survey Phase 2.1 returned to East Khao Laem to re-survey the same 333km^2 in East Khao Laem. Data from this second east survey is still being analysed and will be compared with Phase 1.1 conducted during the same season in 2020. We were able to compare the status of tigers, prey and threats between East and West Khao Laem, which led to a greater understanding about the severity of problems in the west.

During February 2022 a further four grids (36km^2) in Southwest Khao Laem were surveyed in the area that experienced tiger poaching and HTC issues. No tigers were recorded, but armed poachers were.

Therefore at a combined total of 927km^2 surveyed, the target of 333km^2 was easily surpassed.

During these various surveys six different individual tigers were recorded (see table in appendix) on seven occasions, with one male tiger (M4) identified as a transient originating in . He is identified in the national tiger database as HKT276. The target was 10 tigers to be identified, as some are newly dispersals into Khao Laem this brings the number of identified individuals during the last 7 years to 10 with another 2 still to be identified.

We have reached the target # of potential prey species identified as we recorded Muntjac, Serow, Sambar, Gaur and Wild Boar. (5 species)

Each deployment taught a minimum of six rangers to set and effectively place the camera and to collect relevant data for SMART, increasing the park's existing dataset. The grid surveys sometimes had ten rangers participating in each of the six teams, so on some occasions we had 57 rangers per trip helping with the grid surveys led by six Freeland staff. All received training on use of technical equipment and advice on where to set cameras.

Investigating the Khao Chang Puek wildlife corridor

During 2021 we planned to ask permission from the Royal Forest Department (RFD) to survey an unprotected reserved forest north of Khao Laem which provides connecting habitat. With additional protection, the area could become a significant migration corridor from east to west WEFCOM north of Sangkhlaburi and the Vajiralongkorn dam.

No work was conducted this year on the Khao Chang Pheuk Forest Reserve corridor plan, as supporting staff were not available and all camera resources were fully utilised during the SECR and ecological surveys. Travel through this area has however identified that it is experiencing on-going threats with migrants (Karen, Mon and Burmese) settling and converting areas to agricultural land. Sites adjacent to the road are already encroached and further away some areas were observed to already contain large rubber plantations (of at least ten years of age). The mountains do still have intact forest and these may still provide migration corridors for wildlife.

Objective 2. Mentoring capacity in DNP staff to manage and analyse data to foster greater understanding of threats

This objective ran into issues during 2021 as the main official designated to manage the scientific monitoring of Khao Laem resigned. Much effort had been devoted to developing his capacity to manage camera data, ensuring information is easily retrievable and communicated with other relevant partners securely.

After each survey a complete set of images was left at KLNP so that information can be immediately integrated into the park's own database, reviewed and time sensitive threat data such as the locations of poachers can be rapidly relayed to enforcement teams. We were able to continue supporting patrolling over the last year and the mentoring of two technicians who manage SMART data to monitor trends, or long term changes. It should be mentioned that SMART is still not used to optimum levels at Khao Laem.

To gauge skill retention among participating officials we propose to conduct training validation activities, training recipients will be invited to participate in monitored patrols, tests, interviews and supervisor interviews. Analysis of responses will help highlight weaknesses and direct training needs for future activities.

Collaboration across divisions within the DNP helped identify the tigers detected during surveys and match these records from other parts of the complex. This has provided some insight into the dispersal and functional connectivity of tiger sub-populations within WEFCOM

Objective 3. Reducing specific threats to tigers including cattle grazing in the park

Preliminary assessments suggest up to 5,000 cattle may be present in certain sectors of Khao Laem. We originally proposed to collaborate with the park management to organise workshops that gain stakeholders acceptance that they are breaking the national park law and must remove their cattle. But due to unforeseen circumstances involving the illegal killing of two tigers in an adjacent park because they predated domestic cattle – this process received an order from the DNP HQ in Bangkok to be accelerated.

At the time of writing, the cattle within the park have already been reduced to 400, mostly in Southwest Khao Laem and an undetermined number in Northwest. This is a good start in resolving this issue, but much more needs to be done and this cattle phase out process may still take two to three more years. It will ultimately be beneficial to the conservation of the parks biodiversity, both from the ecological perspective and from an animal health viewpoint too, as these cattle carry many diseases including Lumpy Skin Disease (LSD) easily transmissible to wild ungulates especially bovines such as gaur and banteng. These are both tiger prey species.

During the year we started using GSM cameras in areas we recorded poaching during the surveys. These cameras upload to a server and send messages to the smart phones of relevant officials. They have been used to great success with several interdictions made. This aspect of the park protection is still on-going and we expect to learn of more arrests of professional poachers very soon. In images of evidence we can clearly see these poachers are not only using home-made muzzle loading rifles, they have expensive high powered sports rifles with telescopic sights too. This shows that they are not participating in subsistence poaching, but catering for the exotic meat trade which is substantial in Kanchanaburi province.

To support park protection we have been training a rapid response unit among the senior rangers. Training included, enforcement tactics, such as takedowns and arrest techniques and use of new technology such as the GSM cameras. More enforcement training is required and we will continue to search for additional support for this.

Key achievements of this project:

- Comparison of survey Level of effort - Long Term Monitoring (ecological surveys)
  LTM: 2021 - 7,256 Camera trap days
  SECR 2021 – two surveys – P1.2 = 3,634 days (no tigers) and P2.1 = 3,995 days = total 7,619 days (2 new tigers recorded)
  Combined LTM & SECR = 14,875 days of effort. 927km^2 surveyed

- Tiger images/identified;
  2021. Tigers identified: 4 individuals recorded from 7 independent captures over 24 images (LTM only) 2022 (to Feb) 3 further individuals recorded

- SMART support
  Two SMART data technicians mentored in data management
  Almost all patrol rangers (more than 75) mentored in SMART data collection

- In 2021 Khao Laem's nine patrol teams conducted 414 Patrols over of 1,494 days over a distance of 21,237.73 km. covering 1,273.95 km2, this accounts for 85.1% of the total terrestrial area of Khao Laem.

- Violations recorded into SMART during 2021 (Jan-Dec) include; 6 encroachment cases, 26 logging case, 15 illegal fishing cases, 64 illegal collection of forest products and 83 wildlife poaching cases**.**

- From the above 4 encroachment cases, 1 logging case and 5 wildlife poaching cases were sent to the police and the court for prosecution**.**

Obstacles to success:

Although much has been achieved in 2021, much more than previous years, many challenges have strained the projects limited resources;

1. Covid and related DNP budget reductions and staff changes
2. Insufficient resources (staff and funds)
3. Stolen and damaged cameras
4. Poaching and human tiger conflict

1. Due to covid the DNP's budget was downsized by the government looking to reallocate funds towards covid-relief operations. Due to this some contract rangers had their contracts terminated, this led to less rangers available for surveys and park protection. A further challenge of salaries being reduced also led to further rangers resigning and others being less enthusiastic about their work. This situation is improving at the time of writing as the government made emergency funding available and some rangers have been rehired. Covid travel restrictions were in place for some of the year and as rangers contracted covid their whole team was quarantined to avoid further spread of the disease. Initially this was fourteen days, but has now been reduced to 7 days. The resignation of the park's scientific officer who was being mentored in data management and a lack of interest among his replacement took that part of the project back to the start again.
2. As activities have grown it has put increased strain on available project resources, the park has been requesting further assistance to resolve staffing and human-tiger conflict issues. We have been able to help to a limited level, but further funds are required to support the outreach efforts in mitigating Human-Tiger Conflict (HTC) and to employ a junior staff member at Freeland to help with data management.
3. As is usual with surveys some equipment has been damaged and stolen by poachers, weather and elephants. We will replace the LTM cameras to ensure a sufficient number are in the field to reach the survey target.
4. Poaching and human tiger conflict emerged as a serious issue in early 2022 when two tigers were poached in adjoining Thong Pha Phum National Park. Further resources were required from this project and Khao Laem to mitigate the problems. The loss of two, possibly three tigers

is a catastrophe to the tiger population in this part of WEFCOM, especially as both were proven to be females. Interventions to prevent more poaching and HTC retaliation took up staff and financial resources that were not planned for. The only good outcome emerging from this poaching event is that it has accelerated the removal of cattle being illegally grazed in the forest of west Khao Laem.

In previous years fires have been a considerable problem at Khao Laem. However, an unexpected tropical depression lay over Southeast Asia for several weeks bringing early rain to the parched areas of Kanchanaburi. Consequently, there were very few fires during the period October 2021- February 2022. The same rains also ensured streams were running and water was abundant.

Monitoring and Evaluation:

The main outcome we are endeavouring to reach is 'Improved management and evidence-led protection strategies facilitating safer tiger dispersal within WEFCOM'.

Three main objectives are helping foster this above outcome, namely;
Objective 1. Improving knowledge of tigers, prey and threats in KLNP and adjacent areas,
Objective 2. Mentoring capacity in DNP staff to manage and analyse data to foster greater understanding of threats and forest connectivity *and;*
Objective 3. Reducing specific threats to tigers, including cattle grazing in the park.

To further improve tiger protection the project has sourced additional cost-share support that expands wildlife surveys, SMART patrolling and our input interpreting effectiveness of patrolling results.

Data analysis from surveys is enabling us to establish baseline figures for tigers and prey, as well as an insight into the threat situation. Threats at Khao Laem are a combination of natural and manmade issues including; fires, poaching, illegal and unmanaged NTFP collection, free roaming stock and feral animals (cattle and dogs), habitat loss though encroachment and land grabbing.

A work plan and logframe guides implementation and provides indicators for project evaluation (See appendix). As we have established targets including dates, as per the work plan, we are able to internally monitor if we remain on track. Regular meetings with park management and the regional protected area management office allow discussions that review if predicted targets have been met. During the last year the various challenges already discussed did pose some issues, but these were mitigated and being adaptive in our collaborations ensured work could still proceed. The previous park superintendent was very supportive of the project he ensured the ranger resources we required were available as we needed them.

A major tool for monitoring patrols and associated data is SMART. We participate in each SMART meeting and have a good cross flow of information from SMART and back to the park concerning the status of wildlife and the threats we have recorded.

Shared learning:

All information from this project is shared with the site custodians, the DNP. Thereby contributing to the enhanced understanding of tiger ecology across the WEFCOM landscape. We are still debating if we will write any scientific papers about the Khao Laem tigers and other carnivores. One scientist at the DNP was encouraging us to publish the information from the project. We have shared some information about ungulates with a Thai student. To date though, nothing formal has been published in the public arena.

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

TV News stories includes Khao Laem

Khao Laem was visited by the UK's ITV Channel 4 who were recording a news story about tiger conservation in Thailand. A Bangkok based TV news crew joined a survey to east Khao Laem and

interviewed rangers and project biologist Dr. Saifon Sittimongkol concerning tiger conservation. It was aired in UK in May 2021. A link to the video is here;

https://www.youtube.com/watch?v=Y7jmyp6pJps&t=1152s

The 24 minute current events story looks at tiger conservation in Thailand and the successes made to date while offsetting them against the continued challenge of tiger trafficking.



Mongabay Feb. 2021: For border-crossing Thai tigers, the forest on the other side isn't as green
https://news.mongabay.com/2021/02/for-border-crossing-thai-tigers-the-forest-on-the-other-side-isnt-as-green/

February 2021. City rich eyed over park land grab
https://www.bangkokpost.com/thailand/general/1858924/city-rich-eyed-over-park-land-grab

March 2021 Thai language encroachment case in Khao Laem concerning a coffee shop and fruit farm highlighted in DNP social media
https://www.facebook.com/1608062546175314/posts/2798702957111261/

2022. For the events concerning the tiger poaching in Thong Pha Phum, tiger attack on cattle grazer, the three legged tiger and Thong Pha Phum tiger skin trafficking case there are many media links. All are available on request.

Here are just four (one from each);
Tiger poaching
https://www.bangkokpost.com/thailand/general/2246431/bengal-tiger-pelts-weapons-seized-in-forest-5-suspects-escape
Attack on cattle grazer
https://www.bangkokpost.com/thailand/general/2255571/man-injured-two-dogs-killed-in-tiger-attack
Three legged tiger
https://www.bangkokpost.com/thailand/general/2260951/tiger-with-missing-leg-caught-by-camera-trap
Thong Pha Phum tiger skin trafficking case
https://www.bangkokpost.com/thailand/general/2265207/3-members-of-wildlife-trade-gang-caught-3-baby-leopard-cats-rescued

Section III. Appendix

Did you carry out camera trapping as part of this project? Yes

If yes: Total camera trap nights/days:	**Total area surveyed:**
LTM Grid Period 1. Twenty-eight (28) Camera traps deployed for 2,543 nights. LTM Grid Period 2. Thirty-six (36) Camera traps deployed for 3,923 nights. Total 6,466 days SECR Phase 1.2 – 90 days SECR Phase 1.2 – 90 days Additional grids at Pilok Kee – 90 days (results in next report) **Total 6,736 days**	LTM (East) - 126 km^2 SECR Phase 1.2 - 432 km^2 SECR Phase 1.2 – 333km^2 Additional 6 grids at Pilok Kee - 54 km^2 **Total 945km^2**
Numbers of tiger/leopard/prey recorded Six different individual tigers were recorded over the last year with seven independent captures over 24 images. Leopard (both colour morphs) underdetermined number of individuals over 58 independent captures with 206 images recorded. Five prey species were recorded over 1,007 independent captures	**Please include data on other species recorded** Totally 35 mammal species were recorded – see list in appendix

Are numbers of tigers/leopards/prey increasing or decreasing in your project area? Please show trends

Tigers (individuals recorded)

2018	2019	2020	2021	2022
2	5	4	4	3

See comparative tables/graphs in appendix for leopard and prey

Did you carry out other surveys? Yes.

If yes:
2 x SECR surveys, one in western Khao Laem and one in eastern Khao Laem – see details above in area surveyed.

Did you carry out patrolling as part of this project? Yes (as a cost share)

If yes:
Total distance patrolled: 21,237.73 km

Total area patrolled: 1,273.95 km^{2,}

Do you use Patrol Monitoring software such as SMART? Yes

If yes:
Total distance patrolled using patrol monitoring software? As above

How do you collect data? Handheld devices/paper/other? Please give details? Hand held Garmin GPS and paper reporting to SMART technician

Please provide comparison data on from your patrolling over time

Type of crime	2018	2019	2020	2021
Encroachment	1	3	8	6
Wildlife Poaching	25	215	65	83
Illegal fishing	0	54	38	15
Illegal logging	7	56	44	26
Illegal NTFP collection	0	61	41	64

Was the data you collected analysed by a SMART specialist?

Collated but not analysed

Please provide data on violations recorded/arrests/successful prosecutions

	2018	2019	2020	2021
Cases (combined all types)	33	389	196	194
Prosecutions (Court)	0	4	12	10

The judicial process in Thailand is very prolonged and cases may take up to 4 years to conclusion. We do not have any information about how many of the above successfully concluded with a judgement

Does your project work with local communities? Yes, but just started

If yes: (please be as specific as possible and include gender split) **Who? n/a**	**What did you do? Was it successful? n/a**	**How many people did you reach? n/a**

How do you measure the success of this activity?

Did you carry out educational activities with adults or children? No		
If yes: (please be as specific as possible and include gender and numbers) **Who? n/a**	**What did you do? n/a**	**How many people reached? n/a**
Have you seen behaviour change from these activities? (Please give details of your results and of how this is measured) n/a		
Did you carry out training activities for any staff/community member on the project? Y/N		
If yes: (please be as specific as possible and include gender split) **Who? n/a**	**What did you do? Was it effective? n/a**	**How many staff trained? How many others trained? n/a**
How do you measure the effectiveness of this training? n/a		
Did you carry out conflict mitigation activities with community members? Yes		
If yes: **Who?** During community meetings with village head person, and villagers from Pilok Kee where more than 20 cattle were predated, related retaliatory tiger poaching subsequently occurred and a villager was attacked by tigers.	**What?** The intervention Involved discussions about what transpired before the cattle predation, why this may have occurred, why villagers decided to break the law and kill the tigers, informing villagers about park regulations and helping mitigate further problems. We have upcoming plans to expand activities, especially in alternative livelihoods for villagers ceasing grazing cattle illegally inside the park.	**How many people did this include?** <30 in Pilok Kee
Have you seen behaviour change from these activities? (Please give details of your results and how this is measured) After our staff spent time in the community and conducted discussions the villagers seem more friendly towards the rangers and better understand the problems that they caused by illegally grazing cattle in the park. They are receptive to collaborative interactions and more open to discussions about the		

illegalities that previously occurred. They appear to want to cooperate and participate in conservation. Note, their continued occupation within the village is dependent on them not breaking park regulations and further criminality could see the guilty individuals being evicted from their houses which are in the park. As this was a short term immediate response based on the series of serious HTC events - no indicators for behaviour change resulting from the intervention were established. A temporary check point with two ranger teams has been established in the village and to date the villagers have been well behaved and cooperative.
Were any scientific papers/articles published because of your project? No
If so, please give details or provide copies. N/A

Work plan

Following the proposed work plan from the start of work in 2021 we can see that all activities were conducted with outputs as predicted. The main challenge of cattle grazing within the park is something that may take two to three years to totally resolve. During 2020-21 much time was lost due to covid and associated restrictions. However, by early 2022 the situation is improving and solid steps forward have been made in moving cattle out of the park. Work will continue on this and outreach during 2022. Targeted enforcement efforts will continue to further reduce poaching in 2022.

		2021											2022	Post
Objective	**Survey / Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
	Activity	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Objective 0. Planning, preparation and project management														
0	Preparing technical equipment, cameras, gps, field equipment	✓												
0	Park based training course to refresh ranger survey, reporting and safety skills	✓								✓				
0	Planning exercise to synchronise survey with park management	✓								✓				
0	Monthly or quarterly meetings with project steering group (frequency TBD)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Objective 1. Improving knowledge of tigers, prey and threats in KLNP and adjacent areas														
1a	SECR Grid Survey implementation. Installing/Checking cameras	✓ W	✓ W	✓ W	✓ W						✓ E	✓ E	✓ E	✓ E
1b	Permanent station long term monitoring - East	✓		✓		✓		✓		✓		✓		✓
1c	Investigating the Khao Chang Puek wildlife corridor.	*Corridor survey postponed due to covid and lack of resources*												
Objective 2. Mentoring capacity in DNP staff to manage and analyse data to foster greater understanding of threats and forest connectivity														
2a	Cataloguing survey data				✓		✓		✓		✓		✓	✓
2a	Analysing survey data				✓		✓		✓		✓		✓	✓
2b	On job training for rangers in data collection and other patrol skills (cost share)	✓		✓		✓		✓		✓		✓		
2b	Participating in monthly SMART meetings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Objective 3. Reducing specific threats to tigers including cattle grazing in the park														
3a	Surveying and introducing measures to remove the domestic cattle from the park	✓		✓			✓						✓	✓
Others.														
	Concluding report and debrief with PA (including midterm review)							✓						✓

✓ E	Second SECR Survey East Khao Laem (Finally 90 days operational period)
✓	Ecological monitoring (permanent station) activities with dates to be decided
✓	Activities with dates to be adapted as project progresses

2021 Logframe with updated data in final outputs and situation status column.

Impact; This project will help secure the future for tigers in one of the remaining known breeding populations of Indochinese Tigers.			
Project Summary	**Measurable Indicators**	**Means of Verification**	**Final outputs / situation status**
Outcome: **Improved management and evidence-led protection strategies facilitating safer tiger dispersal within WEFCOM, help maintain the site as one of mainland Southeast Asia's last tiger strongholds**	**1. Rigorous scientific methods are utilised to survey tigers at Khao Laem, indicators leading from this will include:** *A Tiger density figure (tigers per 100km2) will be re-affirmed during a second post activity workshop* *The formal tiger population size established for KLNP is re-affirmed* *Number of individual tigers identified during surveys that have been documented in other parts of WEFCOM obtained via sharing photographs with the Khao Nam Ram research station in Huai Kha Kheng WS* *Prey species richness figure is formalised and density of prey sufficient level to support the local tiger population is established and agreed.* **2. Comprehensive post SECR survey data analysis and associated workshop delivers an**	**1.** Camera-trap survey results demonstrate improved capture rate compared with previous years **2.** Analysis of SECR data using R suite Spacecap package during data analysis workshop, leading to confirmation of tiger abundance for Khao Laem NP **3.** Comparing tiger photos' recorded during SECR survey with National DNP tiger database will identify resident individuals and differentiate from dispersing individuals from the Thung Yai-Huai Kha Kheng source site **4.** Park SMART database will be utilised to compare 2018, 2019 and 2020 patrol coverage, violations and wildlife sign. As patrols become more efficient we *expect* to see a decline in violations and an increase in wildlife sign	1. Comparisons are based on the LTM surveys throughout 2021. During 2021-22 two further SECR surveys were conducted in Khao Laem. No tigers were recorded in West Khao Laem, however further tiger images were obtained in east Khao Laem as the forests in this area of the PA are in better condition (both ecologically and threat severity). Tiger images/identified individuals comparisons; 2021. Tigers identified: 4 individuals recorded from 7 independent captures over 24 images (LTM only) 2020. Tigers identified: 6 individuals from 122 images 2019. Tigers identified: 2 individuals from 4 images Comparison of Level of effort - Long Term Monitoring (ecological surveys) 2021. 7,256 Camera trap days 2020. 7,083 Camera trap days 2019. 8,285 Camera trap days 2. Data analysis from the western SECR grid has been completed, but due to the huge amount of data from the second SECR survey in cataloguing and analysis is not yet concluded. As there were no tiger records from the west SECR survey an abundance figure cannot be calculated for that area. The number of tiger records from

	accurate understanding of tiger density and produces standardised comparative baseline figure for tigers at the site **3. Cost share: KLNP demonstrates dedication to continuing park-based wildlife and violation monitoring, metrics recorded in SMART include:** *Number of potential threats, or disturbances, documented and compared for changes over previous years.*	recorded. However, there are many factors that may influence change either way. **5.** Post-project debrief questionnaire with DNP officials with key focal indicators discussed, including ranger efficiency, interdicted crimes, and news from confidential informants	the park remain quite low as we are still learning where the optimum tiger habitats are located. An abundance figure for tigers may be possible for in May 2022. 3. All tiger images shared with the DNP tiger center and one individual tiger was identified 4. SMART patrol crime interdictions (as previously mentioned) declined due to DNP patrol coverage policy. Interdiction figures are now improving due to our additional support for ranger training and focussed anti-poaching protection activities. 5. This project has not yet implemented our plans for project evaluation, as the park management has been fully engaged in responding to the tiger poaching, HTC and cattle issues in Pilok Kee village area. A priority is to discuss the previous falling poacher interdictions and the new information concerning poaching in some areas (as identified during the surveys). In the report narrative there are updated tables concerning the number of threats interdicted by rangers which provide a useful comparison. SMART reports are produced each month with patrol and wildlife data in a retrievable format useful for in-depth analysis. **During 2021 Khao Laem's nine patrol teams conducted 414 Patrols over of 1,494 days over a distance of 21,237.73 km. covering 1,273.95 km^2, this accounts for 85.1% of the total terrestrial area of Khao Laem.**
Objective 1. Improving knowledge of tigers, prey and threats in KLNP and adjacent areas			
Output 1a In October 2021 Freeland in conjunction with KLNP officials will deploy 72 camera-traps in a	At least 333km^2 of previously surveyed tiger habitat will be surveyed again utilising 3 x 3 km SECR grid. Baseline 333km^2 (surveyed in 2020) **Target: 333km^2 formally surveyed**	1. Camera-trap survey results will lead to an immediate identification of individual tigers and prey species and a basic	1. Three SECR surveys and two periods of LTM surveys were conducted during this project period as follows. - During October 2020 to December 2021 SECR survey (discussed in the 2020 report) Phase 1.1

second SECR survey, consisting of at least thirty-seven 3km x 3km grids (>333km^2). Based on 2020 results this will provide an immediate understanding of any recent population trends. This was achieved and described in the 2020 report Survey will correspond to an existing standard landscape grid design that encompasses the whole WEFCOM landscape and following analysis help understand abundance, distribution and dispersal of tigers at the site. **Output 1b** Between March 2021 and Feb 2022 opportunistic ecological monitoring utilising at least 20 cameras will occur. **Output 1c** Investigating the Khao Chang Puek wildlife corridor.	# tigers initially identified during survey Baseline 5 - **Target: >10** # of potential prey species identified during surveys. Baseline 4 - **Target: >5** # of key sites or corridors important for tiger dispersal identified Baseline 0 **- Target: >2** **Output 1b** Ecological monitoring shares similar targets as 1.a # tigers initially identified during survey Baseline 5 - **Target: >10** # of potential prey species identified during surveys. Baseline 4 - **Target: >5** **Output 1c** Meet with RFD and gain permission to visit the area Baseline 0 - **Target: >1** Plan low intensity wildlife surveys if initial investigation suggests these are warranted. Baseline 0 - **Target: >1** x 6 month survey	understanding of abundance 2. Following discussions and analysis during joint post activity Data Management and analysis workshop key dispersal sites for increased protection will be identified 3. Feedback from external advisors/partners (e.g. DNP, Panthera, WildCRU wildlife researchers) will help understand the situation and guide next steps 4. Permission is given in a letter from RFD to visit the site 5. Site assessment is conducted – short report 6. If wildlife survey is conducted – immediate camera trap results from the short survey	surveyed 333km2 in East Khao Laem using the standard 3x3km survey grids. - During February 2021 to May 2021 SECR Phase 1.2 surveyed 432km^2 in West Khao Laem using the standard 3x3km survey grids. - During November 2021 to January 2022 SECR survey Phase 2.1 returned to East Khao Laem to re-survey the same 333km2 in East Khao Laem - In February 2022 a further four grids in Southwest Khao Laem were surveyed in the area that experienced the poaching and HTC issues. Throughout the project operational period two phases of long term monitoring covered a further 14 grids (126km^2) was surveyed. Therefore, target of 333km^2 area within Khao Laem to be surveyed was easily surpassed. During these various surveys six different individual tigers were recorded (see table in appendix) on seven occasions, with one male tiger (M4) identified as a transient originating. He is identified in the national tiger database as HKT276. The target was 10 tigers to be identified, as some are newly dispersals into Khao Laem this brings the identified individuals to 10 with another 2 still to be identified. We have reached the target # of potential prey species identified as we recorded Muntjac, Serow, Sambar, Gaur and Wild Boar. (5 species) No further work was conducted on corridor identification (Khao Chang Pheuk Forest Reserve all resources were fully utilised during the SECR and ecological surveys.

Objective 2. Mentoring capacity in DNP staff to manage and analyse data to foster greater understanding of threats and forest connectivity			
Output 2a. Freeland will work with officials to continue collating camera-trap information. We will mentor them on standard practices of camera-trap database management and types of information required for summarizing results. Information will be concluded into a summary report on the tiger situation at the park. Results will be incorporated into the WEFCOM tiger survey database and provide guidance for discussion and included in the next Thailand Tiger Action Plan (due in 2022).	KLNP Officials mentored on standard practices of camera-trap database management and types of information required for summarizing results. *Baseline 0* - ***Target: 2*** Officials are also integrated into research and monitoring activities at Khao Chang Peuk wildlife corridor.	1. Camera trap data analysed during joint post survey activity. Officials ability during this activity to be verified through review of each by supervising biologists from project staff 2. Data analysis figures verified during same post activity data management and SECR analysis activity 3. Finally tiger and prey abundance figures are discussed and agreed with DNP at a national level 4. Information from the Khao Chang Peuk site is verified with RFD and DNP officials and an assessment made of the sites conservation value	Although field section experienced some challenges due to several reasons the mentoring plans are still in progress. Challenges included, covid travel restrictions, a downsizing of rangers, the resignation of the park's scientific officer and a lack of interest among his replacement and the loss of the park's wildlife databases (which we are replacing) Concerning the official who was mentored in cataloguing and the management of images throughout the project, his resignation for personal reasons caused considerable problems for the park. A replacement official who was ideal as a successor was also moved a few months later. It is impossible to guarantee such permanent officials will not be promoted or moved to another site. This situation is the same for all PA in Thailand. In the last quarter of this project the park Superintendent was also promoted and left Khao Laem to work as a Director in Eastern Thailand. Therefore, we had to brief the successor on project status and developments. As very few meetings have occurred over the last year plans for a data management (and landscape analysis workshop) are on hold. We are continuing to analyse data and arrange it in an orderly manner so we will be ready for national level discussions as the situation normalises. All Khao Chang Peuk wildlife corridor investigations remain suspended and so no officials were integrated into planning or implementing those activities. This activity remains paused until further notice.

Cost share activity: Supporting additional wildlife surveys, SMART patrolling and gauging effectiveness of results *(note as KLNP officials are already trained in use of SMART this last component is aimed more at supporting field based data collection and mentoring enhanced data entry and interpretation)*			
Output 2b. Number of DNP officials with increased capacity in survey, monitoring and patrolling skills trained during the project life	Capacity development during this component will be informal on-job-training and mentoring in decision making processes mostly involving best practices in tiger surveys. Current Baseline 0 **Target 8 team leaders trained** #rangers able to use trail cameras, know where to place them for best results Current baseline 30 **Target 40** #SMART Data entry officials mentored in higher level SMART software use Current baseline 2 **Target 4** #rangers receiving on-job-training in contemporary patrol procedures (dependent on further resources) Current baseline 0 **Target 8**	1. Assessment of officials' skill retention will be gauged during on-job-training and more formal evaluation activities, with results concluded in a validation report. 2. Feedback from park superintendent about staff performance will be canvassed during training validation and also included in this report 3. Freeland Law enforcement advisor will implement and report on validation exercise identifying individual officials trained and their increased ability 4. Park SMART database outputs demonstrate an increase in data entered (Over the last 4 years data has increased each year) 5. Post-project debrief with DNP officials	1. In all 12 team leaders were trained in wildlife survey techniques 2. More than 75 rangers participated in surveys and received on-job-training throughout the surveys, including where to place cameras, setting cameras, recording setting/site data, downloading data, and general survey best practices. Feedback from park superintendent not yet requested. To be requested within next 3 months. 3. Only one SMART data manager received additional mentoring. This is an aspect the project requires more resources and time to achieve results. 4. Enforcement patrol procedures, in all 15 team leaders received refresher and tactics training. Surpassing target 5. We were able to give additional training to 4 senior rangers on the use of GSM trail cameras that can immediately upload images to senior staff's phones. 6. Initial understanding shows SMART data entry and level of effort has increased but arrests and interdictions (compared with the level of effort) have declined. Therefore this indicator does actually represent an actual decline in violations. 7. No post-project debrief yet as activities continued over to this year.
Objective 3. Reducing specific threats to tigers including cattle grazing in the park			
Output 3a The main focus of this objective is to remove the domestic cattle from the park. This may take 2 to 3 years, with no certainty it can be	Areas cattle are being grazed are identified *Baseline 0 - **Target: entire protected area*** An approximate figure of cattle in the park is reached	1. Joint Freeland/Khao Laem monitoring team jointly review the sites 2. Grazers and owners cooperate and honestly say how many cattle they	1. Grid survey Phase 1.2 helped identify further areas being used for grazing cattle. We were able to define a cattle density using the same survey data analysis techniques as would be used for any wildlife species. 2. Due to workload and covid meeting restrictions in 2021 large scale census of

achieved except for a commitment from the park superintendent to make it happen. Activities will include, a survey to estimate the scale of the problem, researching ownership of the cattle, bringing in further stakeholders such as livestock department and university expertise. Then a series of workshops to obtain agreement with cattle owners to remove their cattle during an amnesty and phase-out period.	*Baseline 0 -* ***Target: 5,000*** *(best guess)* Further partnerships to solve this problem are forged *Baseline 0 -* ***Target: 4 agencies*** *(Livestock, DNP, 1 x university and Freeland)* A series of workshops are held to increase awareness of the laws restricting cattle from being grazed in the park are held. *Baseline 0 -* ***Target: 4*** During workshops owners are persuaded to sign contracts which agree with them removing the cattle over a 2 to 3 year period. *Baseline 0 -* ***Target: All owners***	have in the park (difficult to check and confirm) 3. Partnership between four agencies is reached – possible letter of agreement to certify this.	cattle numbers not yet conducted. However, in January 2022 with the tiger poaching incident it brought attention to this huge problem and we were able to get this topic into regional and national discussions. The DNP ordered all cattle to be removed from the Pilok Kee area and this reduced from several thousand (perhaps 4,000) to just 400. We will continue to work with the park and communities to reduce this further. 3. Khao Laem has discussed a partnership to remove the cattle with a university that previously assisted at another location. 4. No law awareness workshops conducted 5. Voluntary census participation has occurred with cattle owners. But is going slowly. 6. No next steps in place yet, but likely to involve rangers re-visiting the remote cattle grazing areas to count the cattle again.