Section I. Project Information

Project Title:
"Khao Laem: Tiger Conservation Project, Phase 3''

Grantee Organisation:
Freeland Foundation

Location of project:
Khao Laem National Park, Western Thailand
Map in appendix
(15.059301 N, 98.608739 E)
Park HQ at UTM 47P 456814 1661080 (WGS84)

Size of project area (if appropriate): 1,497km^2	*No of tigers in project area, giving evidence & source:* Approximately 10 individuals – seven of which have been positively identified via camera surveys. Khao Laem is part of a contiguous 18,000km^2 transboundary landscape in western Thailand, comprising of 17 PA's that allows free movement of tigers throughout. Tiger population figures via (unpublished) camera trap data from the protected area over the previous 6 years.

Partners:
Khao Laem National Park (KLNP) management; Department of National Parks Wildlife and Plant Conservation (DNP): In 2016 at the request of the KLNP Park Superintendent Freeland initiated low intensity ecological tiger monitoring activities, this opportunistic survey approach remains on-going and supplements Spatially Explicit Capture, Recapture survey's (SECR) of which two have been conducted during 2020-21. KLNP directly shares wildlife data obtained from these surveys with the DNP's Protected Area Regional Office in Ban Pong and tiger data with the Wildlife Conservation Division's Tiger Research Centre in Huai Kha Kheng WS. This process ensures tiger records are rapidly cross-referenced against a national database of identification images. Panthera/ZSL Thailand assisted by loaning cameras to Freeland until midway through 2020 for surveys. This equipment was returned to use in adjoining protected areas where Panthera/ZSL are now conducting parallel SECR tiger surveys, except for 4 cameras which were donated to KLNP. Consultant senior biologist Saifon Sittimongkol PhD from Thailand's Prince of Songkhla University worked analysing project survey data and joined surveys teams overseeing SECR survey implementation. We are discussing ways to include Thai undergraduate students in the project. Although with the current covid-19 situation at several levels this initiative has been placed on hold. Consultant senior biologist Jonathan Moore also assisted analysing project survey data and joined teams deploying cameras during the 2020-21 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 has allowed 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 partners, including the DNP (As the chair).

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

Email: tim@freeland.org

Actual start date of project: (if different from 1st February) February 1st, 2021

Reporting period: February to July 2021

Section II. Project Progress

Summary of progress for the first 6 months: *(please provide a summary for use in our communication materials)*

Summary

Khao Laem Tiger monitoring continued in Khao Laem National Park throughout the first half of 2021. As with last year - two distinct types of surveys were simultaneously implemented; these were;
a) Regular opportunistic monitoring which gradually progressed across the park's landscape and b) one Spatially Explicit Capture, Recapture (SECR) survey. This represents the second phase of the planned SECR survey and started in February, concluding in May 2021. With the exception of two previous brief exploratory surveys in 2019/2020 this was the very first time any extensive wildlife monitoring has ever been conducted in this sector of the park.

Progress - Project Objectives with immediate results

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

Output 1a SECR Survey

A short note; the 2021 proposal and logframe were prepared before we had conducted Phase 1.1 survey, or Phase 1.2 which is discussed here.

The 2021 SECR grid survey ran over approximately 100 days during which 96 cameras in pairs were deployed by six teams involving 57 rangers and 7 project staff. Each team was assigned between 6 to 12 grids, each 9km^2 in size to survey. Cameras were checked midway through the survey at which point photos were downloaded and batteries changed. The area is very remote and accessing to place cameras involved boats, trail bikes, 4WD and foot. The minimum period each team spent in the forest was 5 days and the maximum was 8 days. Cameras, food, and provisions were carried by each of them during this time. For most teams there were no radio, or telephone communications, as the area is far from the park HQ and cell phone coverage. We utilised four satellite phones for added safety, but that was not enough for each team. Initially the survey area was extremely dry and drinking water hard to locate, luckily we had high volume water filters available for each team so they were able to filter water out of muddy pools in streams. Midway through the survey the rainy season started and by the end of the survey access was extremely dangerous as small streams became raging rivers. Totally the cameras surveyed over 3,625 days. Disappointingly despite this high level of effort no tigers were recorded, however leopards and clouded leopards were found. Threat levels are much higher than the east of Khao Laem and we recorded far more armed poachers and other people gathering forest products (223 images) than in the east. The amount of cattle being illegally grazed was also high (3,294 images), which is of considerable concern as there is a pandemic viral outbreak of cattle lumpy skin (LSD) disease which can easily jump to wild bovids, such as gaur which we recorded. It should be noted that no noticeable cases of lumpy skin we seen in the camera trap images of domestic or wild cattle, unfortunately the following month after the survey rangers saw a cow on one of the reservoir islands with obvious symptoms of lumpy skin disease. Although predominantly a domestic cattle disease it has already crossed into wild bovines in several protected area across Thailand. More work is required to fully understand the scope of this disease problem and how it impacts wild cattle.
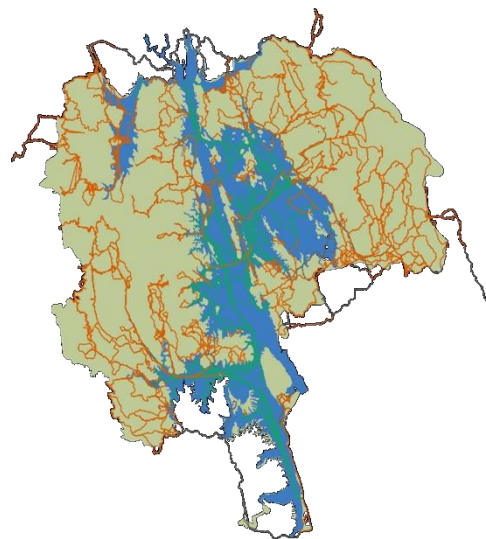
Data from the Phase 1.2 western survey was catalogued in July 2021 and is currently being analysed. We have some immediate comparisons of results from the two SECR surveys later in this report (including Phase 1.1 from last year).

Output 1b. Ecological monitoring and threats
During the first half of this year two ecological monitoring surveys were conducted in Khao Laem and a third will be completed by August 2021. During the first two we utilised 27 cameras over 7 grids for 2,543 days. As independent captures (more than 30 minutes between) we obtained 4 tiger records (1 individual) and 18 Indochinese leopards (at least three individuals). Indochinese leopards are now classified as IUCN Red data critically endangered and so these records are significant. The felid carnivore guild within Khao Laem therefore is very well represented with seven species in all inhabiting the same areas.

Threats and ecological disturbances continue to be major challenges in both sectors of the park, with the one sector being noticeably more heavily impacted. Identified threats include; illegal cattle grazing, fires, poaching, unregulated collection of forest products, feral dogs and the previously mentioned disease threat from cattle. This year we recorded two new threats, use of the area by off-road 4WD clubs and the passage of illegal migrants from Myanmar. All of the data we obtained from the surveys, both wildlife and threat, was given to Khao Laem with the advice that it could be entered into the park's SMART database. The threat data is particularly relevant as these can be considered further and adaptive management practices implemented. Based on poaching records obtained from one area of Khao Laem surveys we sourced several GSM trail cameras which send images directly to senior management at the park. A reactive ranger force is now on standby to interdict poachers as they are recorded. To prepare these rangers for rapid response we implemented a short enforcement ranger training course in June to refresh their anti-poaching skills. This response to threats is on-going situation and results leading from this adaptive management initiative should be known during by the next reporting period.

During this first half of the project the rangers continued regular patrolling and recording all their activities. These were reported each month during a patrol meeting during which the next month's patrol plan was explained and agreed on. There remains a concern about the reduction in poacher arrests compared with previous years and we are convinced the Department's policy of covering as much of the park area with patrols has led to a decline in the quality of these patrols. Distances patrolled are much higher, but interdictions (which take time) are measurably lower. Another aspect of concern is that all patrols start from the beginning of the month and once each team has reached its monthly quota of days patrolled they cease patrolling and work at the sub-stations. This generally means by the last 5 days of each month that no teams are out patrolling in the forest. Likely a fact that the local poachers know too, as the rangers mostly reside in the local communities. We are in discussions about these issues with the park management, however as the coverage policy is national and area covered is one of the indicators

Patrol routes Khao Laem January - March 2021

patrolling is evaluated by the department it may be challenging to change this, unless further evidence categorically proves to them there is a decline in patrol effectiveness. As the department considers its adoption and implementation of SMART is highly successful - highlighting any concerns is not an easy matter.

Interim results for both the ecological monitoring and the Phase 1.2 SECR survey can be seen in the appendix.

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

Output 2a.
Mentoring officials in standard practices of camera-trap database management.
During the early part of this year one of the Khao Laem officials undergoing mentoring in survey data management with us was promoted and moved to another protected area located in southern Thailand. This career move for her was extremely beneficial, unfortunately her exceptional computer skills are a huge loss for the project and Khao Laem. A second official remains in-situ and has now been trained in all the basic skills of implementing surveys, from the planning, preparation, implementation and initial raw data management. Consequently, site based data can now be retrieved in a logical manner. More work is needed for cataloguing data training so it may be easily imported into analytical programmes. The next phase of mentoring, which involves data cataloguing is on hold though, as physical meetings are not possible at this time due to covid restrictions. We hope in the second part of this year once

officials and our team are fully vaccinated that these meeting and travel restrictions may be eased and planned activities under this objective may resume.

Output 2b.
Cost share activity: **Supporting additional wildlife surveys, SMART patrolling and gauging effectiveness of results. Specific output is the number of DNP officials with increased capacity in survey, monitoring and patrolling skills trained during the project life.**

Safety, basic and survey training. October 2020
As a prelude to all SECR survey activities we conducted a series of activities to raise awareness among park staff about the scope and scale of the proposed surveys. We held an inception meeting with the park Superintendent and senior staff to explain what activities we planned to conduct and the outputs we were aiming for. Then we conducted a three day training course which contained topics relevant to conducting surveys which included, safety, first aid, navigation, reporting and how to use the cameras.

SECR survey Inception meeting with Khao Laem Superintendent and senior staff

This was highly productive and we were able to integrate many valuable resources into our survey planning processes, all of which would ease camera deployment and improve results. Being conscious of safety we implemented a short training course for 44 rangers during which they learnt about safety, first aid, navigation, data collection, and how to use the cameras and other technical equipment. The cameras we are using for the SECR survey utilise a smart phone application for setting and this too was demonstrated and taught to rangers.

Safety and basic training prior to start of survey

The cameras we are using for the SECR survey utilise a smart phone application via Bluetooth for setting and this too was demonstrated and taught to rangers. We were also able to teach them about a phone GPS system which allows input of shp files such as survey grids as well as the ability to record tracks and waypoints. This system called AlpineQuest is very useful as it allows every ranger who has

a smart phone to be able to practice navigation and record waypoints, even after this survey is concluded. We imported the survey grid for each team into their GPS and smart phones so they could check if they were in the correct location as cameras were deployed.

During the surveys capacity development was informal on-job-training and mentoring in decision making processes mostly involving best practices in tiger surveys. We were able to train 6 team leaders during Phase 1.1 and 6 during Phases 1.2. Two further team leaders were mentored during the ecological surveys and at least two now are highly proficient and able to self-implement all aspects of camera deployment. We were aiming 30 rangers knowing where to best place cameras during surveys and this was easily surpassed as in all we mentored more than 100 rangers who actively participated in the surveys. Many are highly enthusiastic and eager to practice further.

We were able to collaborate with the Khao Laem SMART Data entry officials and some interactions regarding data management and ways to improve their use of SMART was possible, but in a limited manner. We clearly saw an impediment in reporting as data was either not being fully captured, or not making it into the reports. Our internal reporting based on our interactions with rangers demonstrated a higher rate of poaching records than the park based version. We have discussed this with the park superintendent and we are collaborating to increase the efficiency of the parks reporting. Only one SMART official was engaged during any capacity development activities though, as the park is limited on available staff.

We would like to improve the parks reporting further but we are working with limited resources too. So, until we can find more funds this aspect will remain needing further attention.

In mid-June we were able to conduct a short enforcement refresher training course for 15 senior rangers who will form a rapid-response unit able to pursue poachers if they are recorded in GSM enabled trail cameras. More about this activity is explained in the appendix.

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

Counting and registering cattle for removal from Khao Laem NP – July 2021

Due to the crisis concerning Lumpy skin disease the phased removal of cattle from KLNP has been accelerated and owners have been requested to come into a park sub-station to register their cattle. They will then be given a deadline to remove them from the park.

Documenting ownership of cattle (left) and typical herd of cattle inside Khao Laem

This process maybe prolonged as word has not reached all the remote areas where cattle are kept and grazed. The plan is that we would assist by accompanying rangers charged with surveying the sites where cattle are kept and then helping design an agreement for a phased removal of these cattle. The rangers have been ordered to conduct this additional work, however no budget has been provided by the park for fuel for travel, food for prolonged stays in remote areas, or processes of guidance on how the objective may be achieved.

As mentioned earlier in this report, lumpy skin disease has already reached Khao Laem and was recorded affecting cattle on an island in the reservoir in June 2021. To date no wild cattle are been known to be afflicted. This however we fear will be short-lived and we expect to record gaur with this disease soon.

A vaccine is available for lumpy skin but as the cattle are roaming freely over a huge area it will be a difficult talk to administer the vaccine. It would be impossible to vaccinate wildlife.

Lumpy skin in Khao Laem

Details of activities and results to date first 6 months of 2021:

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**	**Interim outputs/situation**
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 accurate understanding of tiger density and produces**	1. Camera-trap survey results demonstration capture rate improvement compared with previous year 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 recorded. However, there are many factors	1. Comparisons are based on the surveys to date in 2021. A second proposed SECR survey for a region of Khao Laem has not yet been conducted. There are plans for this, starting in October 2021 during which time we expect to see an increase in tiger images, as we are certain this part of the park is in better condition (both ecologically and threat wise). Tiger images/identified individuals comparisons; 2021. Tigers identified: 1 individual from 20 images 2020. Tigers identified: 6 individuals from 122 images 2019. Tigers identified: 2 individuals from 4 images Comparison of Level of effort 2021. (first 6 months) Ecological surveys 2,543 days + SECR survey 3,624 days for a combined total 6,167 Camera trap days during the first six months 2020. 10,373 Camera trap days 2019. 8,302 Camera trap days 2. At this point data analysis from the western SECR grid has not yet commenced as cataloguing the date was only recently completed. As there were no tiger records from the west an abundance cannot be calculated. The number of tiger records from the park are quite low as we are still learning where are the optimum habitats within the park. So achieving an abundance figure for tigers may not be possible

	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 will include:** *Number of potential threats, or disturbances, documented and compared for changes (2019 baseline figures include 8 encroachment cases, 56 logging cases, 215 poaching offences). Number of patrol reports (SMART) generated independently by the park (Baseline 12 – remains at 12) Overall improvement in patrol effectiveness over the 2021 project period. Utilising SMART we will compare 2019/20 baseline coverage (754 Patrols over the course of 2,521 days covering distance of 24,978 km)*	*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	yet. We can undoubtedly obtain prey abundance figures, which are equally important and it is hoped within August 2021 these figures will have been achieved. 3. All tiger images shared with HKK Khao Nam Rum tiger center. We were planning a visit to review the status of the surveys and conform the identity of the tigers, but the current covid situation is currently preventing that. 4. SMART patrol crime interdictions as previously mentioned have declined and this is a matter to be discussed with the park superintendent. 5. As work remains on-going we have not implemented our evaluation plan. We are however in a position to discuss the falling poacher interdiction rate and the new information concerning the high level of poachers operating in some areas. In the report narrative are updated tables about the number of cases interdicted by rangers which can be compared. - SMART reports are being produced each month and so the data is in retrievable format useful in-depth analysis.
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 *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	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** # tigers initially identified during survey Baseline 5 - **Target: >10** # of potential prey species identified during surveys.	1. Camera-trap survey results will lead to an immediate identification of individual tigers and prey species and a basic understanding of abundance 2. Following discussions and analysis during joint post activity Data	1. During the first half of this year we surveyed 432km^2 using the standard 3x3km survey grids. Therefore, target of 333km^2 was surpassed by almost 100km^2 Only 1 Individual tiger was identified so far this year. There are now confirmed 7 individual tigers in Khao Laem and 3 more recorded by only one flank, these we record as unidentified. We have reached target # of prey species identified as we recorded Muntjac, Serow, Sambar, Gaur and Wild Boar. (5 species)

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.	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	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	No further work was conducted on corridor identification as all resources were fully utilised during the SECR and ecological surveys. 1b. Ecological monitoring outputs the same as 1a. 1c. As above no work on corridor identification and so did not yet meet with RFD. It should be noted that this corridor area lies next to the Myanmar border which is closed due to the military coup there and the covid situation. Illegal immigrants are being smuggled through this area by armed traffickers. Consequently, the area is also currently considered too risky to conduct activities. No site assessment and no plans yet for wildlife surveys there.
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	KLNP Officials mentored on standard practices of camera-trap database management and types of information required for summarizing results. *Baseline 0 - **Target: 2***	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	Although field section is on track – much of the mentoring plans are still on-going and even a little behind schedule due to the covid-19 related travel restrictions. As reported in the narrative above one official was mentored to date in cataloguing and data base management of images

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).	Officials are also integrated into research and monitoring activities at Khao Chang Peuk wildlife corrido*r*	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	As actual meetings are not possible at this time plans for a data management 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 travel and meeting situation normalises. All Khao Chang Peuk wildlife corridor investigations suspended and so no officials were integrated into planning or implementing those activities. This activity remains paused until the covid situation improves.
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)	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	1. In all 12 team leaders were trained in wildlife survey techniques 2. More than 100 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 ranger received any 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

	Current baseline 0 **Target 8**	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	images to senior staff's phones. See appendix. 6. Initial understanding shows SMART data entry and level of effort has increased but arrests and interdictions have declined, which we feel does not truly represent any 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 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.	Areas cattle are being grazed are identified *Baseline 0 -* **Target: entire protected area** An approximate figure of cattle in the park is reached *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**	1. Joint Freeland/Khao Laem monitoring team jointly review the sites 2. Grazers and owners cooperate and honestly say how many cattle they have in the park (difficult to check and confirm) 3. Partnership between four agencies is reached – possible letter of agreement to certify this.	1. Grid survey Phase 1.2 has helped identify further areas being used for grazing cattle. We are looking at if it is possible 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 large scale census of cattle numbers not yet conducted 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 started with cattle owners. 6. No next steps in place yet, but likely to involve rangers visiting the remote cattle areas to count the cattle.

WILDCATS CONSERVATION ALLIANCE

Status of 2021-22 work plan

Objective	Survey / Month	2021 1	2	3	4	5	6	7	8	9	10	2022 11	12	Post 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)	√	√	√	√	√	√	X	X	X	X	X	X	
Objective 1. Improving knowledge of tigers, prey and threats in KLNP and adjacent areas														
1a	SECR Grid Survey implementation. Installing/Checking cameras	√	√	√	√					E2	E2	E2	E2	
1b	Permanent station monitoring (Cost share)	√		√		√		X		X		X		
1c	Investigating the Khao Chang Puek wildlife corridor.					Corridor Survey postponed								
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				√		√		X		X		X	
2a	Analysing survey data				√		X →		X		X		X	
2b	On job training for rangers in data collection and other patrol skills (cost share)	√		√		√		X		X		X		
2b	Participating in monthly SMART meetings	√	√	√	√	√	√	X	X	X	X	X	X	
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)							√						X

E2	Second SECR Survey East Khao Laem (For minimum of 45 days operational period)
X	Ecological monitoring (permanent station) activities with dates to be decided
X	Activities with dates to be adapted as project progresses

Notes on above; Activity 1c. Remains postponed until covid situation permits a resumption of this activity and activity 2a. Data analysis, this was slightly delayed (about 2 weeks) due to the extensive quantity of data produced by the Phase 1.2 survey which took longer than anticipated to catalogue

Give details of any obstacles to success that the project has encountered over the last 6 months. *(Please provide detailed examples, explain what impact these will have on the project results and the changes to the budget and timetable of project activities)*

The largest single obstacle has been the effect of travel restrictions associated with covid-19. Luckily to date these have been minimal compared with the impact to other tiger survey projects we are conducting in Thailand and we have not missed any important survey implementation deadlines with this project. At the time of writing this situation is changing as Thailand undergoes a very serious spike in covid infections and travel restrictions are being more strictly enforced. This is preventing most of the meetings we were planning to have with partners. Virtual meetings do not offer the ability to discuss matters in depth and to easily compare plans. The projects next major deadline is the start of SECR Phase 2.1 which is a repeat grid survey in Khao Laem. The covid situation is not improving and could impact this date. We are hoping to start the survey at that time as it will run a minimum of 90 days which will take us into January 2022 for its conclusion. The weather around October to January is good for surveys as there is still water available and the temperature is not too hot. If a delay of 2 months or more is experienced it will make implementation harder due to lack of water and the risk of fires. We are monitoring the situation and we hope all will prove possible for an October start.

The inability to conduct face-to-face training and mentoring with officials is slowing institutionalising aspects of the project, such as data cataloguing and management down. We have postponed these activities during which our staff sit with officials and walk them through data management. Suspended until covid declines.

This project has dovetailed perfectly with the IUCN funded tiger project at Khao Laem and the two projects complement each other well. Both projects however are under-budgeted as the scale of the surveys requires many participating staff and officials. We have two private donors who covered additional staff time in 2021, but currently we are not certain if additional 2021-22 support will materialise. We will continue discussing this potential challenge with our donors, while looking for additional support to ensure the long term monitoring and enforcement responses to threats can continue. The more we learn about the Khao Laem site the more significant it becomes for tiger conservation in this complex transboundary landscape.

Due to the handling of the covid response by the Thai government e.g. the slow roll-out of vaccines some aspects of Thai society are becoming dissatisfied with the government and there have been demonstrations in Bangkok calling for the resignation of the Prime Minister. This is concerning as it could lead to increased political unrest and consequently further travel restrictions.

Reported in international media, the covid situation in Myanmar is becoming dire and with the continued civil unrest following the Myanmar military coup may lead to further economic or political migrants entering Thailand, which in turn may increase the incidents of covid infection. During SECR Phase 1.2 groups of Burmese illegally entering Thailand were recorded in survey camera traps. Apparently, the Vijiralongkorn dam reservoir is used as a way to circumvent police checkpoints along the road that passes through the park. The health and safety situation in and around the park is being monitored and security is discussed often with park based officials before each activity.

Budget: Is the spend on target? **If not, please give details and provide an updated budget sheet.**

Expenditures for the project are possibly a little ahead of where they should be. This means only salaries will remain in hand to pay field staff and a little for the ecological surveys. By survey Trip 28 collection we will be funding field costs from an additonal donor. Plans for assisting with cattle surveys or additional training will be reduced**.**

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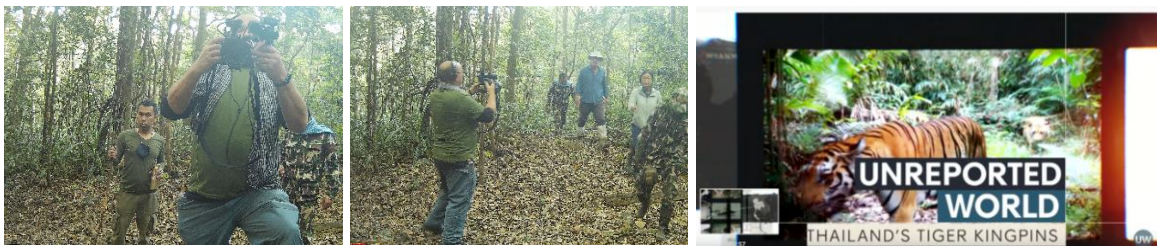
February 2021. City rich eyed over park land grab
https://www.bangkokpost.com/thailand/general/1858924/city-rich-eyed-over-park-land-grab

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/

Appendix

Khao Laem National Park enforcement ranger refresher training

June 2021

During 14th-19th June a short training activity for 15 senior rangers was conducted at Khao Laem National Park (supported by a cost share budget). The course was intended to refresh ranger's skills during poacher interdictions and was implemented in response to a noticeable increase in the use of snares. Previously, most poachers used guns to catch their quarry, but as patrols have become more effective - poachers have evolved their tactics to be stealthier to avoid giving away their locations.

Known poaching trails are now being monitored and if poachers are recorded the rangers will form two rapid response teams to interdict them. This is extremely hazardous as many poachers carry shotguns and home-made muzzle-loading rifles intended to kill large deer and wild boar, or even a ranger if the poacher wants to avoid arrest. So, to prepare the rangers for quick deployment they were taught a number of skills to improve reactions and teamwork which in turn will increase their efficiency and safety.

Training topics included; silent field signals as a way to communicate without giving away their positions, take-downs (ambushes and raids), arrest techniques, searches and weapons safety. Most of these tactics are standard military drills and a few rangers who were previously in the army know them. This training served as both a refresher for them and as a way to improve cooperation within the teams for others.

In conjunction with this training, further rangers were taught how to use GSM cellular trail cameras, including their camouflage and concealment, ways to test cell coverage strength and processes to call the rapid reaction force into use if poachers are recorded.

Snare detection and removal receives high priority now by the park management and high risk areas where the nylon and steel snares were previously found are repeatedly surveyed. It is possible to go back to the exact areas as such incidents are all recorded in park monitoring software and mapped.

The cameras are already recorded many armed poachers and we hope to soon see the results of this new training investment with an increase in poacher arrests and a decrease in snared wildlife.

Khao Laem National Park enforcement ranger refresher training

Khao Laem National Park enforcement ranger refresher training

Use of poacher cams and GSM enabled cameras

In conjunction with the above training we have started to use several types of trail cameras and GSM enabled cameras to monitor for poacher incursions. These will soon be incorporated into a larger operation to track down and catch poachers. Currently, these cameras are in the field and are sending back information.

Trusted Khao Laem rangers being taught how to set and place cameras to record poachers

The cameras have been deployed in several areas and some initial results can be seen here;

Part 1. Tiger monitoring: SECR Survey update

During Phase 1.2 between February to May 2021 we were able to plan and implement a large scale SECR grid survey. The actual implementation involved far more rangers and staff than was first envisaged and we were lucky to have matching funding to cover the additional costs. The area covered was 48 grids, utilizing 96 paired white flash cameras. These were deployed over a 5 to 7 day period by 6 teams, one of which divided into two sub-teams as their grid quota was considerable (Team 1 = 12 grids). The survey lasted approximately 100 days with a battery change and image download half way through, the location of the cameras was not changed. We achieved a combined total of 3,626 camera trap nights across the 48 grids. The area of the survey was designed by overlaying the grids on a map that included known patrol routes, encroached areas were omitted. There are at least two villages inside this sector of Khao Laem and although the villagers are allowed to farm they are not allowed to increase the size of their land, or introduce other types of business. We hoped this survey would conclude before the start of the rainy season in May, but the rains started early in April and so this survey straddles both dry and initial wet seasons. Even in the second 50 days the vegetation and access along streams changed considerably, trails were lost and small streams became strong flowing rivers.

Access to this area of Khao Laem involved using a combination of off-road motorbikes, trucks, boats and long walks. At least 4 teams needed to be ferried by boat to their drop off points. One also required further transportation deep into the area by 4WD owned by a village headman usually used for transporting fruit and vegetable produce. That truck had been transported into the area by boat many years ago. Some areas in Khao Laem have tracks that lead all the way to unofficial border crossings via Thong Pha Phum National Park. The cameras recorded considerable amounts of villagers of unknown provenance on motorbikes, border army and border police patrols and even illegal immigrants. There is a concerning threat to survey security in these areas due to criminal gangs smuggling illegal items and even people.
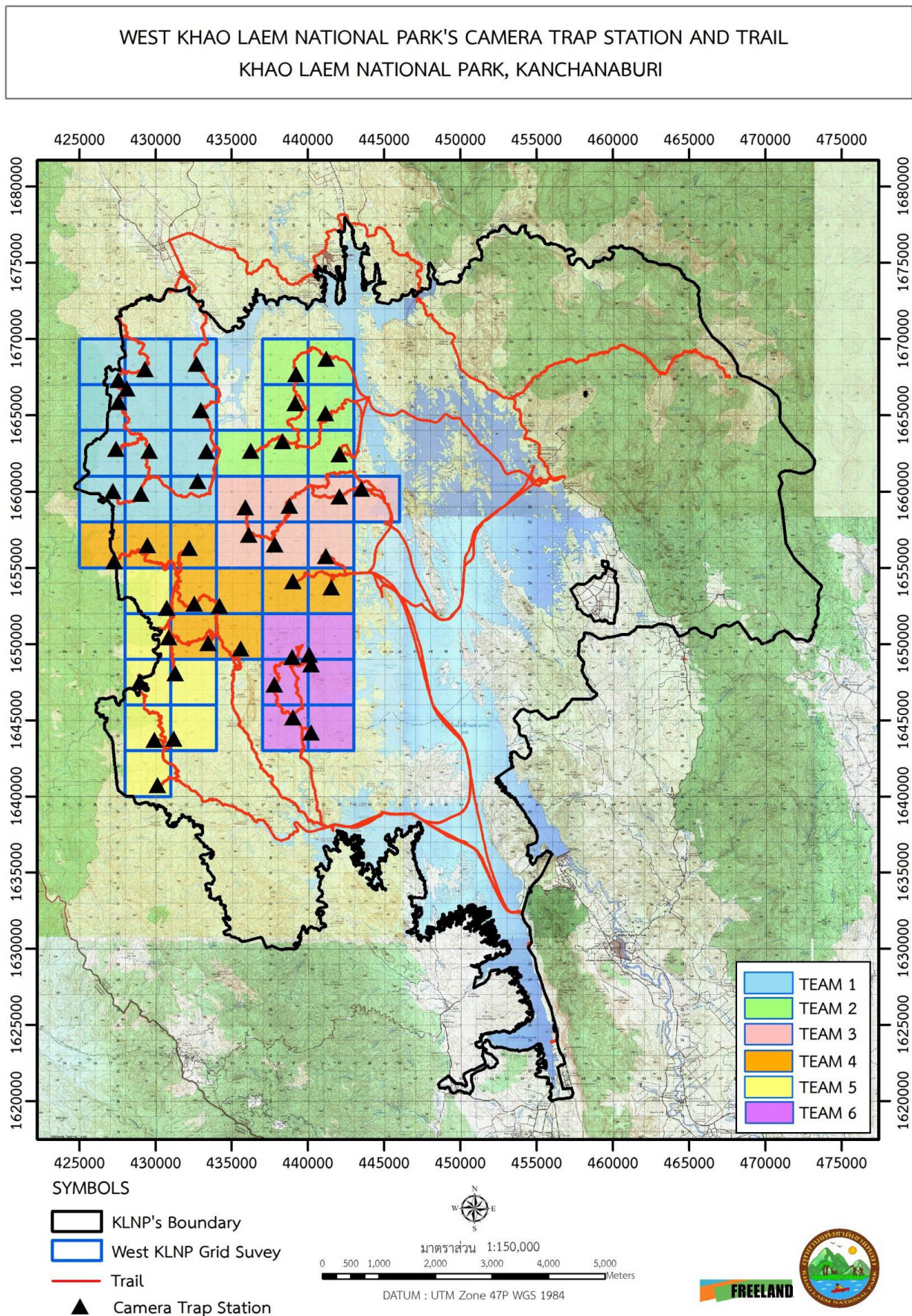
Anecdotally it appears species richness in this area is lower than the more mountainous sectors of the park. We will be able to confirm this during analysis. The forest type is the likely influence as it is mostly secondary and bamboo forest opposed to the primary forest in some areas. As the topography is more undulating and elevations lower, access is easier poachers and illegal collectors of NTFP's. Consequently, we recorded far more armed poachers and others wandering in the forest (223 images). The amount of cattle being illegally grazed was high too (3,294 images), which is of considerable concern with the current pandemic viral outbreak of cattle lumpy skin (LSD) disease. It should be noted that no noticeable cases of lumpy skin we seen in the cattle camera trap images.

The survey allowed us to look at the populations of tigers (0), prey (wild boar, sambar, gaur, serow, muntjak) and threats. We divided the threats into the following different categories; cattle, fire, domestic dogs, villagers (NTFP collectors), rangers and poachers. All cause varying levels of ecological disturbance, with dogs almost always present with poachers, or NTFP collectors. Poachers were defined as people carrying weapons, usually homemade muzzle loading rifles, but a few shotguns too.

Camera locations in SECR Phase 1.2 West Khao Laem National Park

WEST KHAO LAEM NATIONAL PARK'S CAMERA TRAP STATION AND TRAIL
KHAO LAEM NATIONAL PARK, KANCHANABURI

SYMBOLS

KLNP's Boundary

West KLNP Grid Suvey

Trail

Camera Trap Station

TEAM 1
TEAM 2
TEAM 3
TEAM 4
TEAM 5
TEAM 6

มาตราส่วน 1:150,000

0 500 1,000 2,000 3,000 4,000 5,000
Meters

DATUM : UTM Zone 47P WGS 1984

FREELAND

Threats

As previously mentioned the two investigated regions of Khao Laem are very different. Apart from the topography there are two villages inside the park and small farming homesteads scattered in both the southern section and to the north. The remote regions are less disturbed and yet still subject to poaching and ecological disturbance as the survey demonstrated. We learnt that there is a motorbike trail which is popular with enduro riders. A group of which were seen deep in the park during the survey. A search on youtube also revealed a route through the Khao Laem forest is popular with off-road groups too, who cause considerable noise and disturbance, as can be seen in their videos. I believe the park superintendent was unaware of this until we pointed the videos out to him.

By far the biggest single threat we consider is the illegal grazing of cattle. We have existing photographic evidence of grazers carrying homemade rifles while watching their cattle. Previously, we had initiated activities to survey the amount of cattle being grazed within the park boundary and this has been on-going. However, with the emergence of lumpy-skin disease the threat of cattle in the park has changed from being an ecological disturbance to one of a viral pandemic health issue as this disease can easily cross to wild bovines as examples in Huai Kha Kheng WS and Kuiburi NP clearly demonstrate. At the time of writing the park management has received notice from the DNP headquarters to remove all domestic cattle from within the park. We do not have any further details on how this may be achieved, but it will positively impact the park's eco-system if the cattle are taken out and it will further remove a second threat from the poaching cattle grazers (mostly illegal migrant labour).

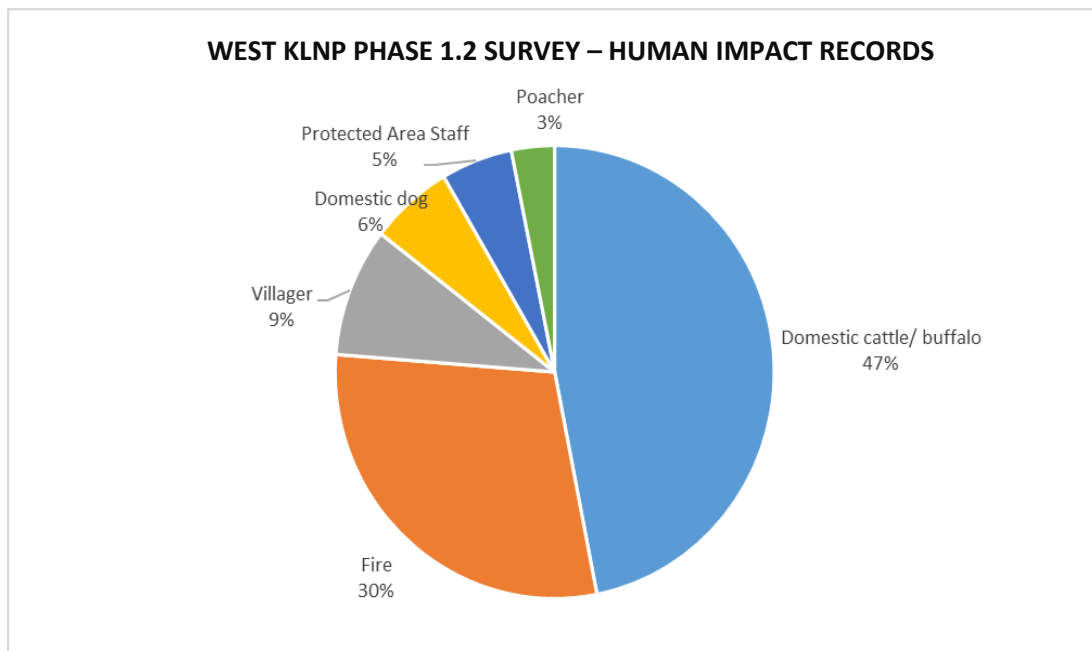**WEST KLNP PHASE 1.2 SURVEY - HUMAN IMPACT RECORDS**
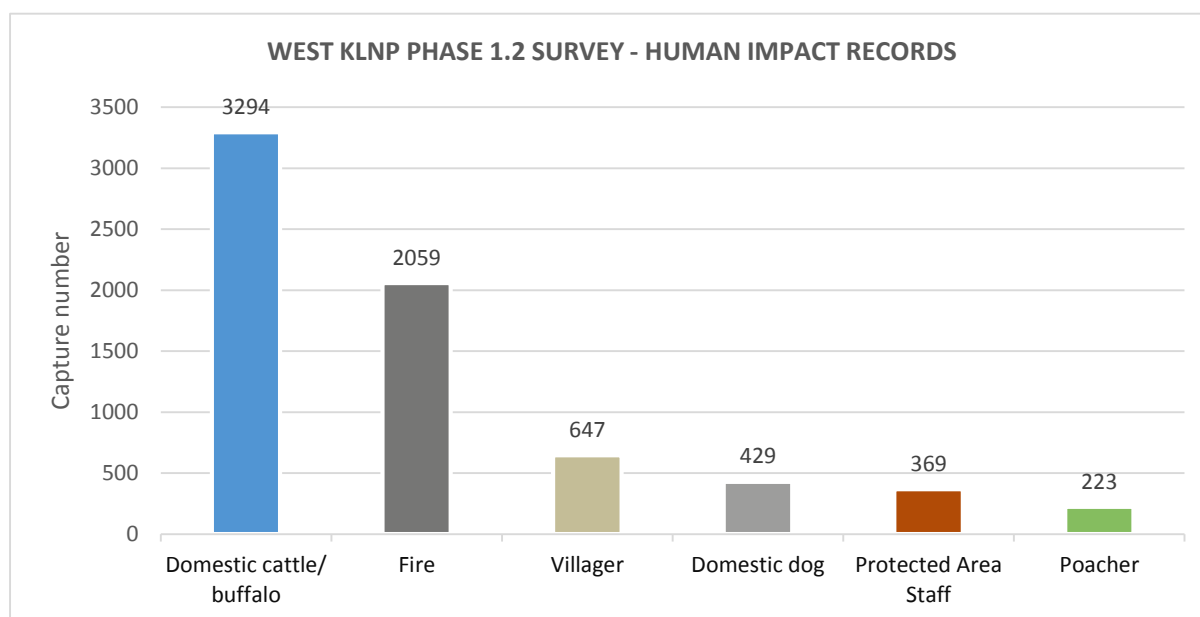
The next threat we encountered was fires, which are deliberately set to promote new grass growth for the cattle, clear the forest for mushroom and wild vegetable collectors and poachers. Each year the forest is being burnt and all the remaining large trees are all slowly being damaged by fire and eventually fall down, leaving only bamboo and invasive grasses. This burning is common throughout western and northern Thailand and seems beyond the ability of officials to get under control. Fires are simply left to burn out and preventative outreach seems non-existent. Some groups believe the burning by indigenous groups is less damaging and smaller in scale, but the fact is that once set forest (fires?) can travel for long distances, are huge in scale and cannot be extinguished due to the lack of roads and steep terrain. The bamboo quickly recovers, but each year there are less large trees which are vital components in the ecosystems, providing homes and food to a myriad of species including the ungulates which are tiger prey.

The level of poaching as demonstrated by the sheer number of photographic records from the SECR surveys is dramatically higher in certain regions of Khao Laem. During phase 1.1 we only recorded 3 images of poachers, whereas in the highest regions it was 223 images. Most poachers have shotguns, or homemade rifles. This intensity of poaching pressure would have a profound effect on the highly sought-after species such as wild boar and deer, which are also tiger prey species.

Uncontrolled collection of bamboo shoots, and other NTFP's is rampant across Khao Laem. Of particular concern are the domestic dogs that accompany villagers during their collection forays. Apart from the risk of bringing canine distemper virus into the park it is highly likely these dogs are trained to hunt wildlife too, especially pangolins. As the cattle are removed attention should be paid to removing the semi-feral dogs too, as it is illegal for anyone to have free roaming animals in protected areas. Awareness is required to develop an understanding among the rangers and villagers about the legality of having dogs inside a protected area and the diseases they carry. Perhaps the livestock department could assist by vaccinating dogs in communities adjacent or inside the park and the park could enforce laws that all dogs must be kept on leads if residents take them into the forest. This is an unclear aspect of the law, if people reside inside a protected areas – are they even allowed to have dogs?

One group of villagers recorded during the first part of this survey were searching for a relative who disappeared during a wild vegetable collecting trip. This person had been missing for 5 days and 2 days of searching still did not locate them. It is a remote and large area without phone signal and so someone having an accident while on their own is unlikely to be found.

WEST KLNP PHASE 1.2 SURVEY – HUMAN IMPACT RECORDS

Poacher 3%
Protected Area Staff 5%
Domestic dog 6%
Villager 9%
Domestic cattle/ buffalo 47%
Fire 30%

Tigers and other Carnivores

During the survey of the newly investigated region of Khao Laem we did not record any tigers. This does not necessarily mean they are not present, just during the survey we did not record them. As the size of the survey grids is designed to encompass and capture tigers at low abundances this does not look good for tigers. However, as this sector of Khao Laem adjoins Thong Pha Phum National Park and then it's just 7kms to the Myanmar border where the forest is a very large block of protected area (Thaninthari Nature Reserve) tigers may be present across a series of PAs in this contiguous landscape. There is only one small paved road through Thong Pa Phum NP to Pilok town on the Myanmar border and so wildlife has unhindered passage throughout the area and transboundary.

In all during Phase 1.2 survey we recorded 15 species of carnivores including; otters, civets, badgers, mongoose, martens, dhole. bears, and five felid species. Capture rate for the larger carnivores was lower than in the other survey area (see following table). A high capture rate of wild boar does however bode well for large carnivore recovery, provided the innumerable of identified threats can be mitigated.
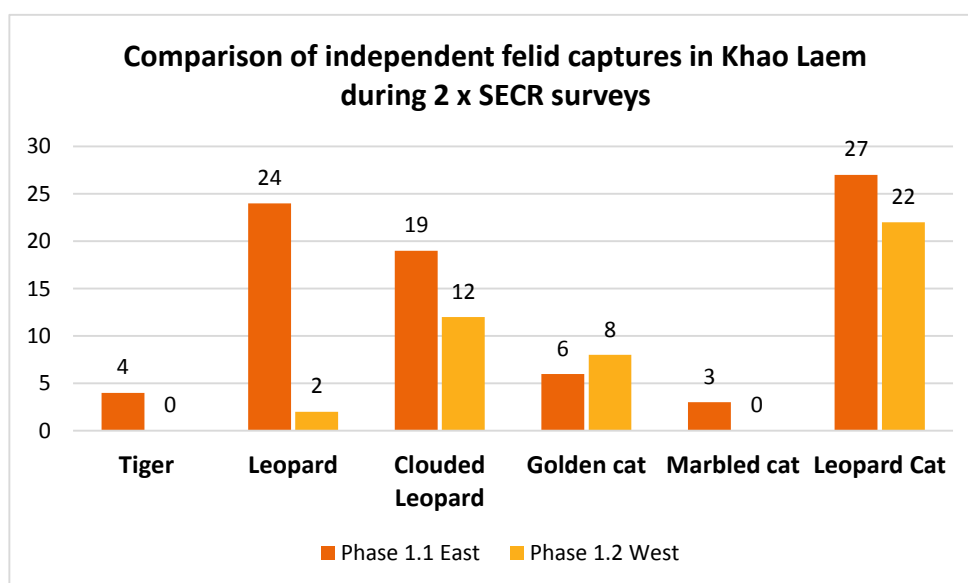

Recording Indochinese leopard was a good indication that demonstrates large carnivores can survive in the area, despite the poaching. Breeding was recorded by the presence of young carnivores including Asiatic black bears and clouded leopards. Note a Jungle cat was recorded last year, but not included in this above chart.

Mammal species recorded (and total image captures) during the 2 SECR surveys and ecological surveys T26/T27

Common Name	Scientific Name	Thai Name	Previously recorded at KLNP (pre-2021)	Ecological survey T26, T27 combined	SECR Grid survey East (Ave 90 days)	SECR Grid survey West (Ave 100 days)
Northern treeshrew	*Tupaia belangeri*	กระแตเหนือ	X			
Red-cheeked Squirrel	*Dremomys rufigenis*	กระรอกดินแก้มแดง	X			
Black Giant Squirrel	*Ratufa bicolor*	พญากระรอกดำ	X			
Greater Mousedeer	*Tragulus napu*	กระจงควาย	X			
Lesser Mousedeer	*Tragulus kanchil*	กระจงหนู	√		13	13
Red Muntjac	*Muntiacus muntjak*	เก้ง	√	84	469	154
Fea's Muntjac	*Muntiacus feae*	เก้งหม้อ	√	186	162	130
Mainland Serow	*Capricornis milneedwardsii*	เลียงผา	√	89	138	249
Gaur	*Bos gaurus*	กระทิง	√	40	87	0
Sambar Deer	*Rusa unicolor*	กวางป่า	√	0	6	13
Asian Elephant	*Elephas maximus*	ช้างเอเชีย	√	1	90	78
Wild Boar	*Sus scrofa*	หมูป่า	√	178	1,117	1,638
Stump-Tailed Macaque	*Macaca arctoides*	ลิงเสน	√	147	893	234
Northern pig-tailed macaque	*Macaca leonina*	ลิงกังเหนือ	√	49	430	1,199
Long-Tailed Macaque	*Macaca fascicularis*	ลิงแสม	√	0	2	3
Asiatic Brush-Tailed Porcupine	*Atherurus macrourus*	เม่นหางพวง	√	10	78	7
Malayan Porcupine	*Hystrix brachyura*	เม่นใหญ่แผงคอยาว	√	269	143	720
Hog Badger	*Arctonyx collaris*	หมูหริ่ง	√	10	12	6
Yellow-Throated Marten	*Martes flavigula*	หมาไม้	√	34	69	22
Crab-Eating Mongoose	*Herpestes urva*	พังพอนกินปู	√	18	46	51
Javan Mongoose	*Urva javanica*		√	0	0	0
Masked palm civet	*Paguma larvata*	อีเห็นเครือ	√	11	0	0
Common Palm Civet	*Paradoxurus hermaphroditus*	อีเห็นข้างลาย	√	1	7	11
Three-striped Palm Civet	*Arctogalidia trivirgata*	อีเห็นหน้าขาว	√	0	1	0
Small Indian Civet	*Viverricula indica*	ชะมดเช็ด	√	0	0	0
Banded Linsang	*Prionodon linsang*	ชะมดแปลงลายแถบ	√	0	1	0
Large Spotted Civet	*Viverra megaspila*	ชะมดแผงสันหางดำ	√	0	0	6
Large Indian Civet	*Viverra zibetha*	ชะมดแผงหางปล้อง	√	139	97	108
Large Toothed Ferret Badger	*Melogale personata*		√	0	1	0
Otter spp			√	0	1	0
Binturong	*Arctictis binturong*	หมีขอ,บินตุรง	√	4	1	3
Dhole	*Cuon alpinus*	หมาใน	√	25	134	65
Golden Jackal	*Canis aureus*	หมาจิ้งจอก	√	0	22	0
Malayan Sun Bear	*Helarctos malayanus*	หมีหมา	√	34	51	9
Asiatic Black Bear	*Ursus thibetanus*	หมีควาย	√	24	65	167
Leopard Cat	*Prionailurus bengalensis*	แมวดาว	√	26	27	28
Marbled Cat	*Pardofelis marmorata*	แมวลายหินอ่อน	√	1	7	0
Golden Cat	*Pardofelis temminckii*	เสือไฟ	√	0	15	24
Clouded Leopard	*Neofelis nebulosa*	เสือลายเมฆ	√	7	39	23
Indochinese Leopard	*Panthera pardus*	เสือดำ เสือดาว	√	49	96	2
Indochinese Tiger	*Panthera tigris*	เสือโคร่ง	√	7	6	0
Jungle cat	*Felis chaus*		√	0	0	0
Slow Loris	*Nycticebus bengalensis*		√	0	0	0
Lar Gibbon	*Hylobates lar*		√	1	0	0
Sunda pangolin	*Manis javanica*	ลิ่นชวา	√	0	0	1
Bamboo Rat	*Rhizomys pruinosus*	อันใหญ่	√	0	3	1

Tables with initial pre-analysis information

Initial Comparison of Photo Detections SECR Phase 1 (East) and Phase 2 (West)
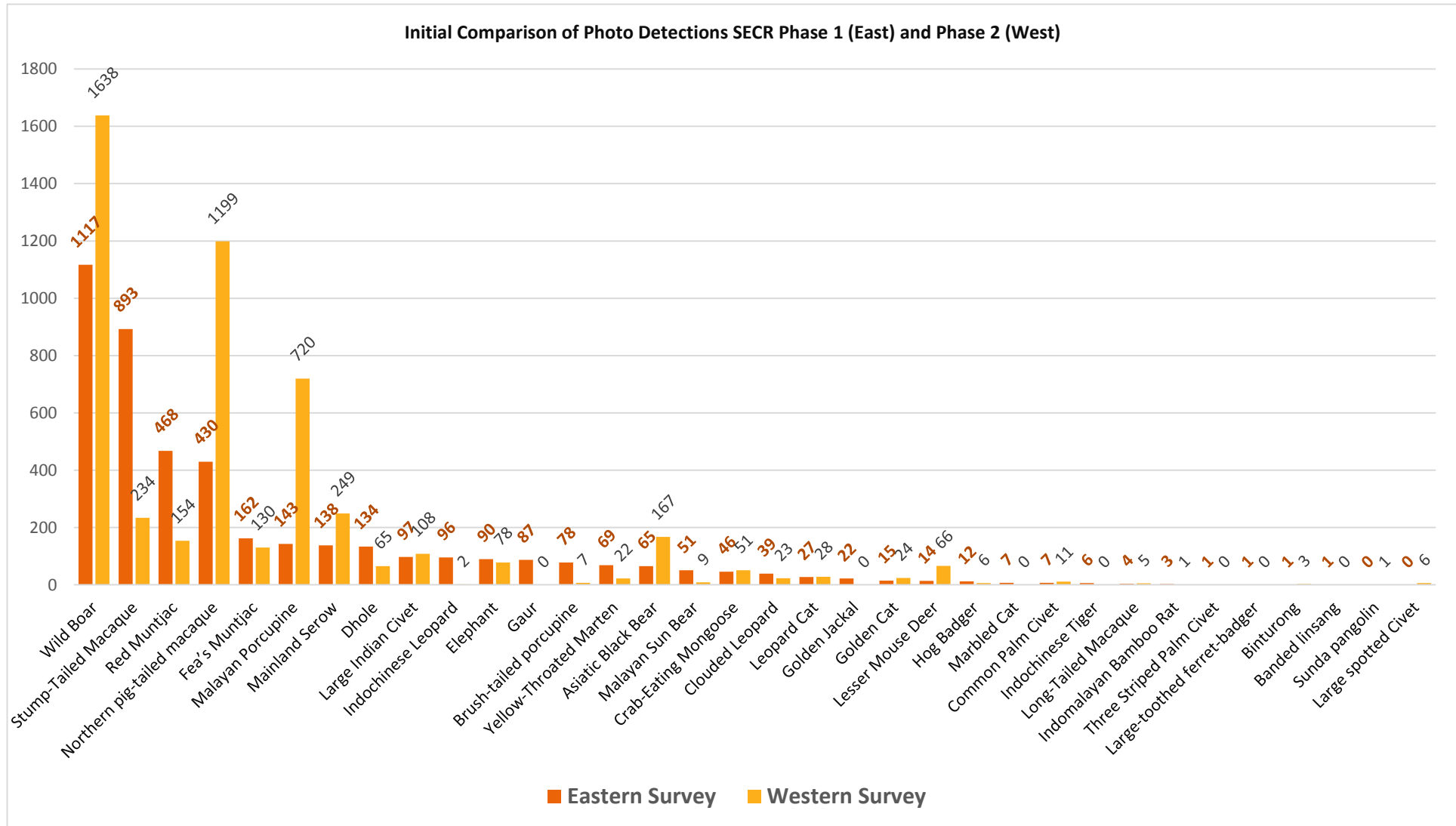
Part 2. Opportunistic/ecological survey results (as part of the long term monitoring)

Khao Laem survey grids and intensity of opportunistic/ecological long term monitoring surveys in 2020-21 (first half)

Map with tiger locations removed

This map is useful for Khao Laem to identify areas which require greater survey attention as we can clearly see which areas have or have not been surveyed. All of the grids were surveyed during the SECR surveys.

Throughout this project period opportunistic ecological tiger monitoring has continued across Khao Laem. Cameras are left for approximately 60 days between checks. Each time they are moved, data is downloaded and batteries changes.

Results January 2020 to June 2021 (July/August survey not yet complete)
Images obtained during this ecological survey recorded 24 species of mammals. From the family Felidae there were 86 independent detections with 262 images. Five species were recorded; Indochinese Tiger *(Panthera tigris),* Indochinese Leopard *(Panthera pardus),* Clouded leopard (*Neofelis nebulosa*), Marbled cat *(Pardofelis marmorata)* and Leopard Cat *(Prionailurus bengalensis).* During this period golden cats *(Pardofelis temminckii)* were not recorded during the ecological surveys, but were found during the SECR grid survey of the other investigated region.

Indochinese tiger records

Indochinese Tiger *(Panthera tigris corbetti)*

Other felid images

Top left. Golden Cat, Right. Clouded leopard
Second row. Clouded leopard, Right. Leopard cat
Third row. Golden Cat, Right. Clouded leopard with cub
Bottom row. Melanistic Indochinese leopard, right Clouded leopard
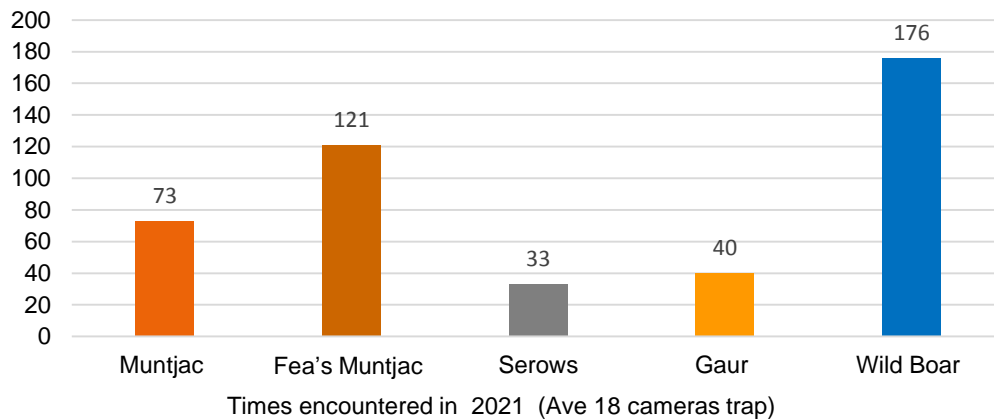
Other non-felid carnivores

Top left. Asiatic black bear, Right. Asiatic Black bear with cub,

Centre. Large spotted civet, large Indian civet,
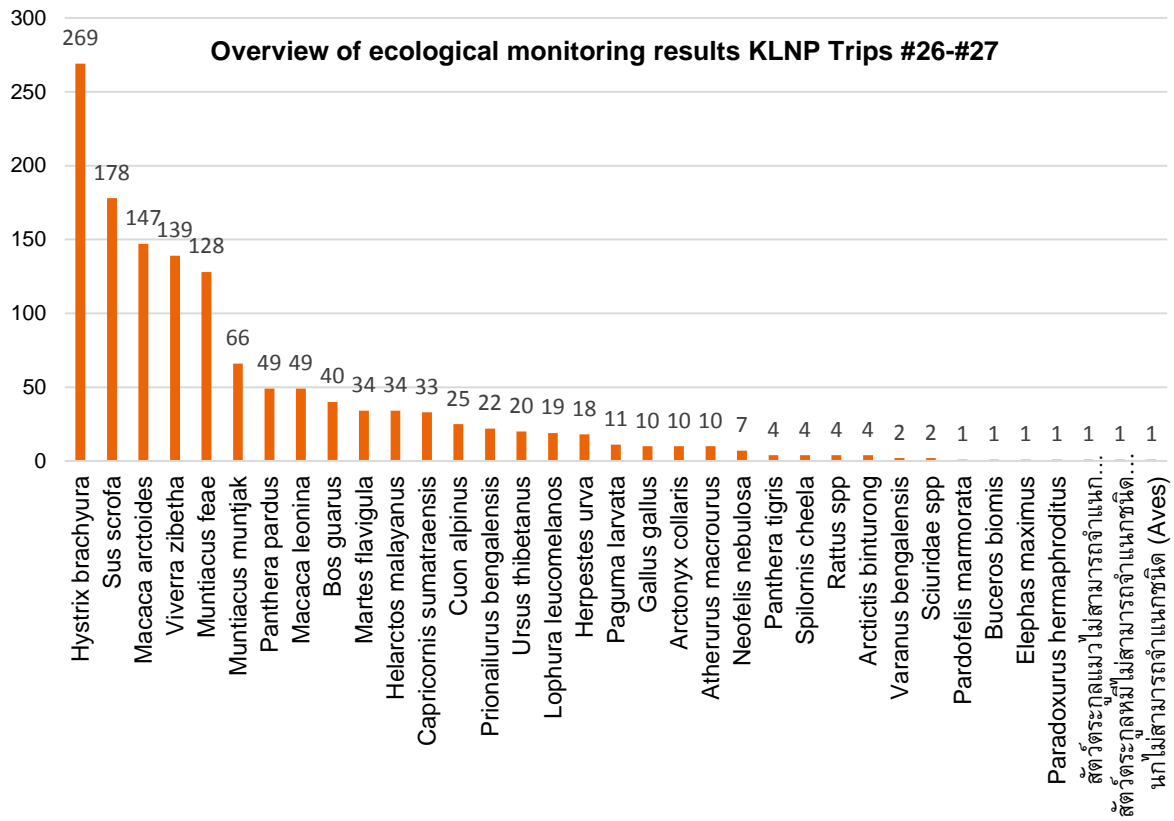
Bottom. Hog badger and Dhole

Prey

Five potential tiger prey species were recorded during this period; Red Muntjac *(Muntiacus muntjak),* Fea's Muntjac *(Muntiacus feae),* Serow *(Capricornis milneedwardsii),* Gaur *(Bos gaurus),* Wild Boar *(Sus scrofa).*

As surveys are gradually covering the entire investigated sector of Khao Laem we have been able to obtain a better understanding of where the tigers mostly reside. This will be of considerable use as long term monitoring plans are formulated. We have also learnt where the greatest threats are located.

Times encountered in 2021 (Ave 18 cameras trap)

Prey species Jan-June 2021

Overview of ecological monitoring results KLNP Trips #26-#27

Species	Count
Hystrix brachyura	269
Sus scrofa	178
Macaca arctoides	147
Viverra zibetha	139
Muntiacus feae	128
Muntiacus muntjak	66
Panthera pardus	49
Macaca leonina	49
Bos guarus	40
Martes flavigula	34
Helarctos malayanus	34
Capricornis sumatraensis	33
Cuon alpinus	25
Prionailurus bengalensis	22
Ursus thibetanus	20
Lophura leucomelanos	19
Herpestes urva	18
Paguma larvata	11
Gallus gallus	10
Arctonyx collaris	10
Atherurus macrourus	10
Neofelis nebulosa	7
Panthera tigris	4
Spilornis cheela	4
Rattus spp	4
Arctictis binturong	4
Varanus bengalensis	2
Sciuridae spp	2
Pardofelis marmorata	1
Buceros biomis	1
Elephas maximus	1
Paradoxurus hermaphroditus	1
สัตว์จระกูกหมู่ไม่ระบุชนิด (Aves)	1
สัตว์จระกูกหมู่ไม่ระบุชนิด	1

Threats and ecological disturbances

Threats included; poachers with dogs, cattle grazing, military patrols, illegal migrants and fires

SMART patrolling (cost share)

The projects aim is to increase the number of DNP officials with capacity to implement effective surveys, monitoring *and* patrolling. During every survey rangers accompanying the survey staff receive supplementary on-job-training in map, compass and GPS use aimed to increase their SMART reporting ability. They are encouraged to record every piece of relevant data, which is then entered into Khao Laem's growing violation and wildlife data base. This supplements the SMART patrol based reporting and has increased the amount of information in the database enormously.

Overall the level of effort from patrolling as displayed in the table below is on par with previous years. A significant number of teams have increased distance covered during patrols and have now almost reached the same distance covered in the entirety of 2020 e.g. team 1 and team 7. However, in a later chart that displays

Khao Laem patrol routes Jan-June 2021

threats using focal violations and the table with concluding data we can see the number of interdicted threats and the number of violators detained have both declined. This demonstrates the rangers are covering the area but their success rate has fallen. As discussed previously in this report, this effect has been recorded in several parks across Thailand and is cause for concern. It can be argued that the ranger's presence may be having a deterrent effect in these greater areas they patrol, however in reality this is unlikely, as rangers mostly patrol during the day and poachers spotlight and poach wildlife (at) night. It is hard to quantify deterrent effect of patrols as there are no baseline data of community attitudes towards laws, patrols and if their perception of the risk of being caught has increased. We would like to interview select communities to establish such baselines and have received in-kind advice on how to do this from a specialist company that conducts attitudinal surveys for large international aid agencies. Currently, we are lacking in resources to implement such a survey, however now we understand that such baselines of community feeling would be very beneficial it is on our list of actions to be conducted.

Data of patrolling efforts within the first six months of 2021; 9 patrol teams conducted 202 Patrols over the course of 872 days, covering distance of 10,957km. The number of violations interdicted by the patrol teams in the first half of 2021 include; 4 encroachment cases, two logging cases, 3 illegal collection of NTFP cases, and one case of poaching. During patrols wildlife sign was recorded from 473 locations, of which 4 were tiger tracks (although we are not 100% certain the ranger can differentiate between tiger and leopard tracks. Threats were reported at 78 sites.
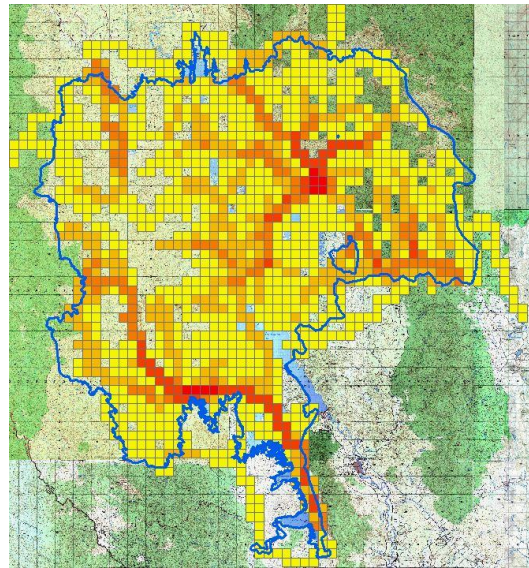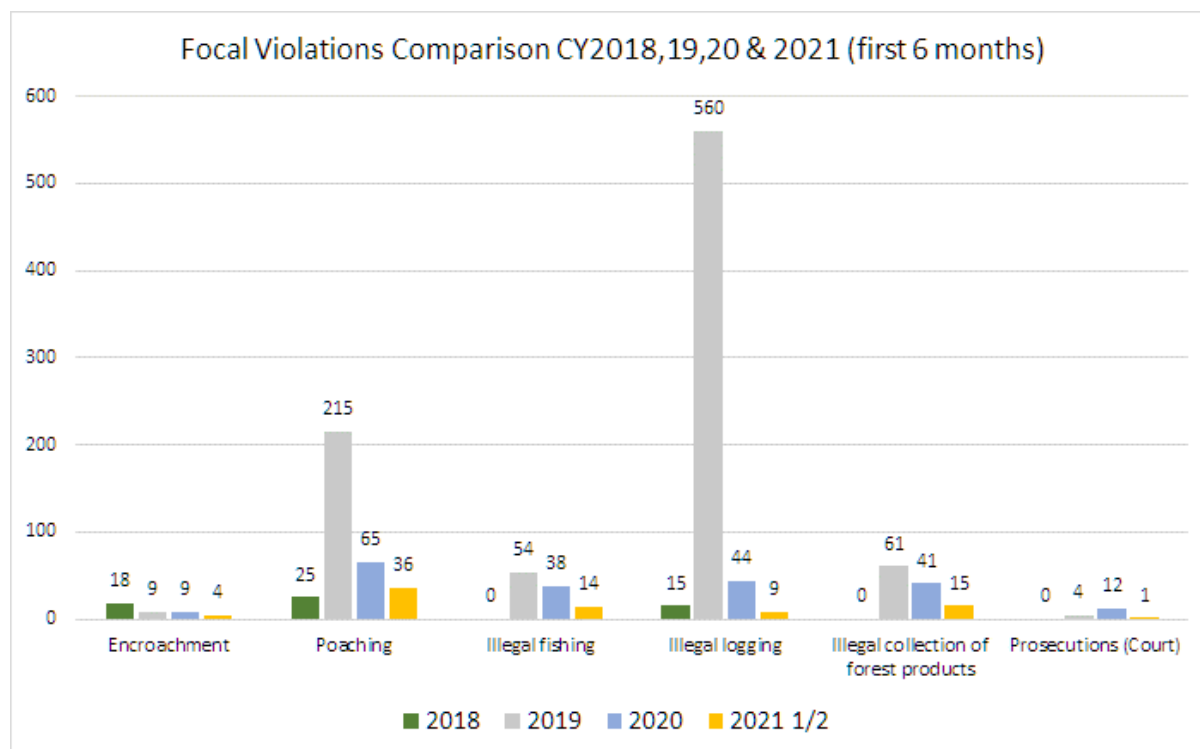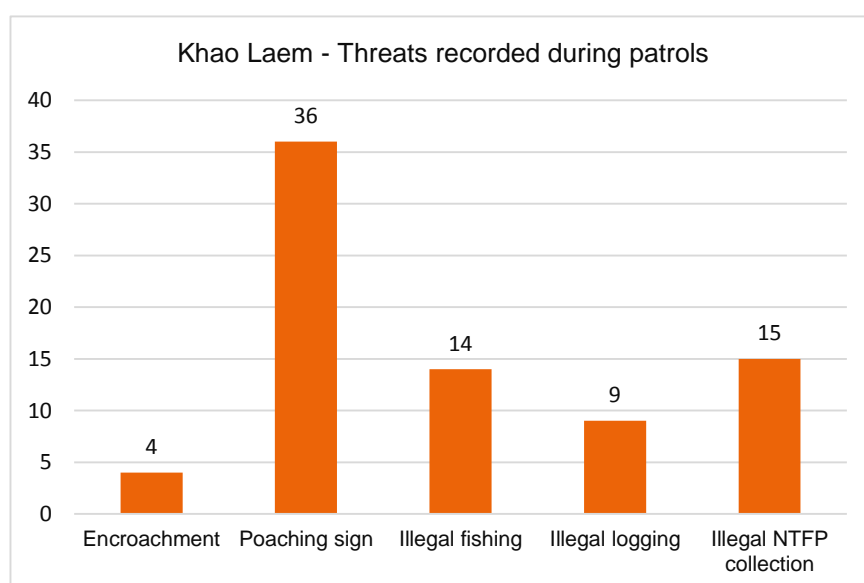
Khao Laem year by year comparison of focal violation crime cases - Jan-June 2021

Khao Laem recorded threats seen during patrols - Jan-June 2021

Next steps in project implementation
(Much is dependent on the covid situation)

August 2021.
Ecological survey cameras to be checked
Data analysis and comparison – both phases.
Threat monitoring – checking GSM cameras and responding
Coordinate and brief PARO Ban Pong about status of wildlife in Khao Laem

September 2021.
Data analysis and comparison – both phases.
Threat monitoring– checking GSM cameras and responding
If covid situation allows Coordinate and brief Khao Nam Rum Research station about status of wildlife in Khao Laem
Acquire and prepare equipment for next survey
Plan next SECR survey with Khao Laem management

October 2021.
Planning and acquiring supplies for next SECR survey
Briefing and training for SECR survey
Start of Phase 2.1 East SECR comparative survey
Ecological survey cameras to be checked
Threat monitoring – checking GSM cameras and responding

November 2021.
Continue Phase 2.1 East SECR comparative survey
Threat monitoring – checking GSM cameras and responding

December 2021.
Continue Phase 2.1 SECR comparative survey
Ecological survey cameras to be checked
Threat monitoring – checking GSM cameras and responding