



Monitoring population trends of tiger and their prey  
species in Kerinci Seblat National Park, Sumatra

Final Report to Report to 21<sup>st</sup> Century Tiger  
September 2006

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## Mid-term Report Summary

This report covers all activities completed during the first term of Project Year (PY) 3. The main aim of PY3 was to assess tiger populations in poorly known areas in the 13,300 km<sup>2</sup> Kerinci Seblat National Park (KSNP) and use this information to improve tiger conservation management. The project has achieved this by increasing the capacity amongst Indonesian scientists through training and research that has enabled all project staff to successfully conduct high quality camera trap surveys to estimate tiger density and to conduct detection/non-detection surveys, a new method developed by this project, to estimate tiger and prey occupancy. The detection/non-detection method is planned as part of WCS-Tiger Forever programme and Sumatra-wide medium-large bodied mammal surveys. The KSNP tiger and prey data were used as part of a global tiger assessment that subsequently identified KSNP as one of the two highest priority areas for the long-term survival of tigers in Sumatra. The tiger and prey data were also used by the Indonesian Department of Forestry to reclassify project study sites as core protection zones inside KSNP and to present a strong case to provincial government to veto the construction of a road that would have bisected KSNP. The project has continued to expand and now works with seven Indonesian universities. In fact, it was some of these students that were part of the project team that recently photographed the critically endangered and endemic Sumatran ground cuckoo, which has only been recorded once since 1916. This record gained wide exposure to the project and its donors being covered by over 26 media organizations, including The Sunday Times, The Independent, Channel 4 News, The Jakarta Post and Fox News. DICE and FFI are currently working with local government to establish the ground cuckoo study site as a new protected area. Overall, the tiger project is now well established in KSNP and has consequently been able to respond to other conservation needs, such as implementing the first formal KSNP human-elephant conflict mitigation programme. As this diversification continues the tiger programme is developing a community component that is anticipated to begin in PY3.

## Introduction

### Current Project Status

Kerinci Seblat National Park (KSNP), Sumatra, is an important protected area for tigers because it still contains large blocks of forest that continue outside the national park boundaries. Whilst these large forest blocks could support viable tiger populations, the pervasive threats of illegal logging and poaching of both tigers and their prey render the future of this species uncertain. In order to assess the impact of these different threats and the conservation strategies aimed at reducing them, information is needed on the population trends of tigers and their prey. This report highlights project activities completed in the first six months of Project Year (PY) 3, which aimed to collect baseline data on tigers and their prey in KSNP. More specifically the project objectives were:

Objective 1: Continue monitoring tiger and principal tiger prey populations for KSNP;

Objective 2: Disseminate project information to project partners and policy makers; and,

Objective 3: Monitor and evaluate project results and effectiveness.

The assessment programme in PY3 has been implemented and is being conducted under the following timescale (Table 1).

**Table 1: Year 3 programme activities scheduled from April to September 2006**

Activity	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
1.1 Steering committee meeting												
1.2 Workshop in Sumatra (KSNP HQ)												
1.3 New project personnel field survey training												
1.4 Continue data collection (detection/non-detection surveys)	RAI	NY							SE	AS	O	N
1.5 Continue data collection (camera trapping)												
2.1 Presentation to national universities												
2.2 Workshop in Jakarta (Dept. Forestry)												
Submit report to 21st Century Tiger												
3.1 Mid-term and end of Year 3 term M&E												
3.2 End of Year 3 term data transfer to KSNP												

## First term activities

This report covers all activities conducted between Months One and Six from April to September 2006.

### Activities 1.1 and 1.2. Steering committee workshop and workshop in Sumatra (KSNP HQ)

During Month 2, Mr M. S. Kaban (the Indonesian Minister for Forestry) visited Kerinci for a meeting. The project staff presented Mr Kaban with a tiger photo and a Sumatran ground cuckoo photo from our PY3 camera trapping site. Also during this month, the steering committee with representatives from Fauna and Flora International (FFI), DICE and the Directorate General of Forest Conservation (PHKA) met in Sumatra. During this time overall project progress and project expansion, including the identification and allocation of KSNP staff for Activities 1.3-1.5, was discussed and the implementation of the PY3 timetable. A separate meeting was then held with the head of KSNP to discuss project progress and its work plan

### Activity 1.3. Project personnel field training

As scheduled, during Months 1 and 2, project personnel comprising one KSNP forest rangers, four community scouts and two Indonesian national university graduates received four weeks training in field equipment use, including GPS and camera traps, and field survey methods. The tiger and prey monitoring programme, based on indirect sign (detection) surveys and camera trapping surveys, then continued for KSNP.

### Activity 1.4. Detection/non-detection surveys

From detection/non-detection data collected throughout PY2 in a patch of forest 1154.5 km<sup>2</sup> in the central-eastern side of KSNP (Block 4, Figure 1), tiger and principal prey species occupancy was investigated.

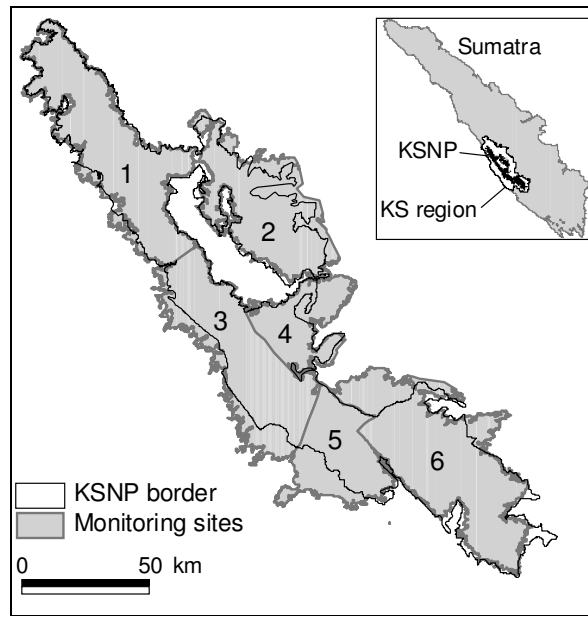


Fig. 1. Monitoring blocks for detection/non-detection surveys

Applying a constant occupancy model, i.e. one that assumes occupancy and detection probability to be constant across the four surveys and 80 sites, found a high occupancy of tiger and their prey in the study site (Table 2). Tigers had an occupancy estimate of 0.8052 or approximately 80% of the study area was occupied by tigers. These results highlight the importance of this block of forest for tiger survival and verify reports by the KSNP-FFI Tiger Protection and Conservation Units of the importance of this area. Further analyses are being conducted to investigate the influence of environmental covariates, such as distance to roads, on tiger and prey occupancy and detection probabilities.

Table 2. Preliminary occupancy estimates for tiger and key prey species in KSNP, using the constant model.

Species common name	Proportion of area occupied ( $\pm$ S.E.)
Tiger	0.8052 (0.0520)
Muntjac	0.9698 (0.0257)
Sambar	0.9212 (0.0320)
Wild pig <i>Sus</i> sp.	0.9635 (0.0213)
Tapir	0.9544 (0.0281)
Serow	0.7248 (0.2643)

### Activity 1.5. Camera trap surveys

Camera trapping was conducted, using 21 camera placements within a capture-recapture framework, between Months 2 and 6. A fully operation camera trapping campaign was conducted in Ulu Batang Ule, a mosaic habitat that covered primary forest in KSNP and adjacent forest in a commercial logging concession that had been degraded through selective logging activities (Fig. 2).

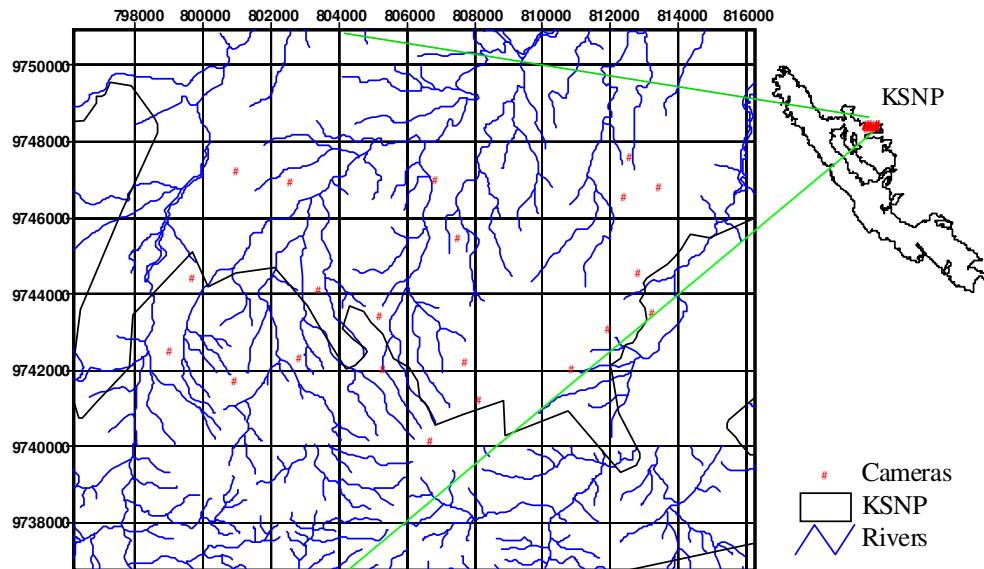


Fig. 2. Camera trap location in the hill forests of Ulu Batang Ule, bordering KSNP.

From a total of 1277 identified photographs, 20 species of wildlife were recorded from Ulu Batang Ule (Table 3). This included a substantial number of tiger records and all the main prey species. Capture history data will be analysed in the second term activities to estimates tiger density (individuals/100km<sup>2</sup>).

Table 3. Camera trap photographs from Ulu Batang Ule

No	Species	Records	No	Species	Records
1	Tiger	80	11	Clouded leopard	15
2	Bearded pig	22	12	Wild Boar	6
3	Pig-tailed macaque	134	13	Sambar	1
4	Great Argus pheasant	46	14	Asian wild dog	6
5	Porcupine	55	15	Sumatran ground pheasant	10
6	Muntjac	49	16	Marbled cat	4
7	Sunbear	52	17	Pangolin	4

8	Tapir	71	18	Squirrel	3
9	Golden cat	10	19	Sumatran ground cuckoo	1
10	Mouse deer	2	20	Unknown/blank	10

### Activity 2.1. Presentation – Padang State University

During Month 3, project staff gave a joint presentation to two local universities, Padang State University and the University of Andalas. During this time project progress and research opportunities were presented and discussed to maintain on-going collaboration between the project and these universities.

### Activity 2.2. Workshop in Jakarta (Dept. Forestry)

During Month 6, a meeting, originally planned for Jakarta, was held in Bogor by WCS. During this time an enhanced detection/non-detection protocol was discussed and developed. This enhanced method now uses grid cells of 288 km<sup>2</sup> (i.e. the size of a male tiger home range) and is currently being tested in several Sumatran national parks, including KSNP. After subsequent refinement, it is anticipated that this enhanced technique will become a standard tiger and prey field survey method.

### Activity 3.1. Mid-term monitoring and evaluation

The project was reviewed during Month 6 by FFI and DICE. The project manager and field team leader then discussed the second term timetable implementation, staff appraisals and future developments. The project has already made significant progress over the course of PY3 and has successfully adhered to the timetable and achieved all milestones. Numerous additional activities have been completed, such as the application of the detection/non-detection method to camera data to estimate species occupancy, and these have been important for KSNP management.

### Additional activities

#### Statistics and data analysis training

With a strong commitment to local capacity building, the project manager designed and produced a series of tiger specific data analysis tutorials in both English and *Bahasa* Indonesia. During Month 6, these tutorials were used by the project manager to train project personnel in univariate and multivariate analyses, as well as capture-



recapture analyses. A refresher course will be provided at the end of PY3. Similarly with the GIS tutorials produced by this project, the statistics tutorials will be distributed to other tiger projects throughout Asia.

### The Project in the community

During first project term, the new monitoring bus was unveiled. This bus, known as *Harimau Merantau* (the Roaming Tiger) will be further renovated (including the removal of the fake leopard skin seat covers!) and used for community outreach, which are planned for 2007 (Plate 1).



Plate 1. The new project vehicle: *Harimau Merantau* (the Roaming Tiger)

As part of the community awareness raising campaign, project staff met with the local government (*Bupati*) of Kerinci to discuss their conservation efforts. Besides seeing the tiger photographs, the *Bupati* Kerinci was especially interested in field photographs from Sipurak (PY2 study site) of the titan aroid (*Amorphophallus titanium*). This endemic aroid was recently discussed in a patch of community-owned forest near Lake Kerinci and has since been a source of local pride. The *Bupati* Kerinci subsequently decided to have a statue made of this flower, which is now on display in the centre of Sungai Penuh, the capital of Kerinci.



Plate 2. A replica of the endemic titan aroid (*Amorphophallus titanum*) copied by the Kerinci government from the KSNP tiger monitoring team's field photographs

### Plans for a new protected area after the rediscovery of the Sumatran Ground Cuckoo

During Month 2, the camera trapping team working in Ulu Batang Ule, Bungo District, photographed a Sumatran ground cuckoo *Carpococcyx viridis* in one of their camera traps (Plate 3). Until now, the endemic Sumatran ground cuckoo has only been recorded once since 1916, and then only from southern Sumatra in 1997. Re-finding this critically endangered species close to KSNP is especially exciting because it was photographed in disturbed forest that has been left to recover near KSNP, and because our project has built capacity among young Indonesian scientists to lead camera trapping teams that undertake routine monitoring. This finding also shows the important role of the tiger as a flagship and umbrella species that can be used to raise funds that also serve to conserve the biodiversity living with the tigers' distribution. A press release issued by the University of Kent received wide coverage including, Fox News, The Discovery Channel, The Sunday Times, The Independent, The Jakarta Post and 26 other websites and newspapers.



Plate 3. Sumatran ground cuckoo, *Carpococcyx viridis*, recorded on 18<sup>th</sup> May 2006.

The Ulu Batang Ule camera trap study showed the importance of degraded forest for tigers and the need to protect patches of this forest located outside KSNP. DICE and FFI are currently working with the local government from Bungo district, who are responsible for this location, to set up a new protected area based on this project's camera trap data. Whilst this will be a long process, the initial signs are promising as the local government is showing strong signs of commitment, especially as they are interested in promoting this location for nature tourism. DICE has already arranged for two international tourists to visit this area for birding and DICE is working with IPB (university in Bogor) to conduct amphibian surveys in this area.

### Non-tiger and prey tropical mammal studies

Two additional studies on poorly known tropical mammals have been conducted during PY2. Neneng Susanti, an M.Sc. student from University of Indonesia, conducted the first scientific serow study in Asia. Neneng successfully applied the detection/non-detection method developed by this project to estimate the occupancy of serow (*Nemorhaedus sumatraensis*) in a hill forest habitat. Serow occupancy was recorded at 0.7248 ( $\pm 0.2643$ , 1 S.E.) or 72.48% of the area surveyed was occupied by serow.

This project applied a mark-recapture method to assess the status of sun bear (*Helarctos malayanus*) populations in the KS region. We focused on the sun bear because it is categorized by the IUCN/SSC Red List as a being Data Deficient and the

highest priority for bear conservation research. Like most tropical mammals, sun bears are difficult to study because they are cryptic and difficult to detect. In this study, we applied a detection/non-detection sampling technique using camera trap data on sun bears to estimate site occupancy from three tropical forest study sites with different levels of degradation and protection status. To summarize, sun bear occupancy across the three study areas ranged from 0.4433 to 0.9303 (Table 4).

Table 4. Camera trap study site used for estimating sun bear occupancy in and around KSNP

Study area	Project year surveyed	Forest type	Protection status	Occupancy ( $\pm$ S.E.)
Renah Kayu Embun	Year 1	Primary submontane	Inside KSNP	0.4433 (0.1025)
Sipurak	Year 2	Primary hill	Inside KSNP	0.5704 (0.0981)
Ulu Batang Ule	Year 2	Degraded lowland - hill forest	Outside KSNP	0.9303 (0.0804)

### KSNP human-elephant conflict mitigation programme

Sumatran elephants live in fragmented populations across human-dominated landscapes where they compete with humans for space and resources. As human populations continue to convert forest to farmland, they reduce elephant habitat and increase the likelihood of crop-raiding. This represents one of the most severe forms of conflict as it threatens local livelihoods and can lead to loss of both human and elephant life, which impedes elephant and wildlife conservation. Through wide national and international collaboration, this project implemented the first human-elephant conflict mitigation programme in farmland outside of Kerinci Seblat National Park (KSNP) during tiger PY3. Thus, this project proposes to conserve the threatened elephant populations in and around the KSNP through six main objectives, which are:

- Increase capacity within KSNP staff, local communities and project staff to monitor and mitigate HEC outside of the KSNP;
- Increase capacity within KSNP staff and project staff to monitor elephant populations inside the KSNP [for which funding is pending];
- Raise local awareness of HEC mitigation methods;
- Disseminate project information to project partners and policy makers; and,

- Monitor and evaluate project results and effectiveness.

### Sumatran rhino assessments

In the 1980s, KSNP was considered as one of the most important protected areas for the long-term survival of the Sumatran rhinoceros, with a potential carrying capacity of 500-1000 individuals split between a Western and an Eastern forest block. However, poaching the KSNP rhino population was estimated at 64-77 individuals in 1993, which was further reduced to an estimated 28 individuals in 1995. In 2005, Rhino Protection Units (RPU), which had been patrolling in the Western Block for over 10 years, ceased their activities concluding that a maximum of only three rhinos remained. The decline was the result of heavy and sustained rhino poaching. In comparison, there have been no rhino surveys in the Eastern Block for over a decade, even though in February 2000 a one-off field survey by FFI-Indonesia, accompanied by RPU rangers found evidence of rhino presence (footprints, feeding) here. Unfortunately, this area has now come under renewed threat from cross-national park road building plans. Working with FFI and KSNP, DICE is leading a series of field surveys to verify reports that rhinos still are presence in the Eastern Block.

Finally, the project would very much like to acknowledge and offer a debt of gratitude for the support offered by the collaborators and donors listed below,

### Collaborating Institutions

PHKA

FFI-Indonesia programme

The Bureau of KSNP

University of Andalas, West Sumatra province, Sumatra

University of Bengkulu, Bengkulu province, Sumatra

University of Indonesia, Jakarta, Java

National University, Jakarta, Java

Institute of Agriculture in Bogor (IPB), Bogor, Java

University of Islam As-syafiah, Jakarta, Java

Jakarta State University, Jakarta, Java

## Donors

US Fish and Wildlife Service Tiger and Rhino Fund

21<sup>st</sup> Century Tiger

Rufford Small Grants for Nature Award

Peoples Trust for Endangered Species