Protecting tigers inside and outside of Kerinci Seblat National Park, Sumatra

Final-term Report, June 2008

A report to 21st Century Tiger

Organization Name:	Durrell Institute of Conservation and Ecology
Project Period:	1 June 2007 to 31 May 2008
Project Manager:	Dr Matthew Linkie
Field Manager:	Mr Yoan Dinata

Monitoring team

Matthew Linkie (Durrell Institute of Conservation and Ecology DICE/Fauna & Flora International FFI, Project Consultant)

Agung Nugroho (FFI, acting Field Manager)

Iding Ahmad Haidir (Department of Forestry, Camera Trap Coordinator)

Nevridedi Endri (Detection/non-detection Survey Coordinator)

Agung Nofrianto (Desk based officer)

Alex Turendi (Database Officer)

Doddy Yu Saputra (Field Researcher)

Erman Saputra (Field Researcher)

Sabirudin (Field Researcher)

Edy Asharli (Technician/Driver)

Sugarna (Community ranger)

Sutisna (Community ranger)

Asril (Community ranger)

Hambali (Community ranger)

Suhendar (Community ranger)

Memet (Community ranger)

Yahya (Community ranger)

Asep (Community ranger)

Yoan Dinata (FFI, Field Manager on study leave to conduct an MSc at DICE, October 2007-September 2008)

Undergraduates and postgraduates, who are conducting their field research in KSNP, and volunteers who joined the project during Year 3.

Karyanto	(Local NGO)
Beni Ramadhan	(Local NGO)
Oji Wulan Rahmino	(Kerinci Nature lovers)
Eka Susanti	(University of Lampung)
Joni Oktavian	(Solok Selatan)
Wawan Heriyanto	(Student, University of Bengkulu, Bengkulu)

Summary

From the 2007/08 21st Century Tiger activities, Project Year (PY) 4, the tiger and prey monitoring has continued to make strong progress. Firstly, camera trapping was conducted in primary/selectively logged lowland-hill forest that straddles the southern KSNP border. A tiger density estimate of 1.55 adult individuals/100km^2 (1.30-2.93, 95% CIs) was recorded. Camera trap data from the previous project year are currently being used by DICE/FFI/KSNP management to develop a new protected area that borders KSNP and within this PY a formal meeting was held with our regional government partners to discuss this initiative. Field survey training will be provided by DICE/FFI to Dept. Forestry and field survey activities will commence during the next PY. Secondly, detection/non-detection indirect sign surveys were completed with a total sampling effort of 1312 km in 37 out of 88 grid cells that cover KSNP and surrounding forests. So far, tigers have been detected in all grid cells, indicating a 100% occupancy. Whilst these surveys are taking longer to complete than anticipated due to the large size of KSNP and its rugged terrain, their completion remains a priority because these data will be used within the complementary Sumatra-wide surveys to produce the first rigorous Sumatran tiger population estimate. There were some notable staff achievements occurred during the first term of PY3: the Field Manager (Yoan Dinata) took up his place on the DICE MSc Conservation Biology course; the camera trap coordinator (Iding Haidir) won the best foreign trainee prize during a 3-month wildlife conservation course in India hosted by the Wildlife Institute of India; and, the detection/non-detection survey coordinator (Nevridedi Endri) joined the Department of Forestry as a Forest Technician for Siberut National Park, Sumatra. Finally, the project staff have been actively involved with the IUCN/SSC through leading the Cat Specialist Group's Red List assessment of the Sumatran Tiger and through four staff members being nominated and then accepted as Tapir Specialist Group members.

Introduction

The 13,300km^2 Kerinci Seblat National Park (KSNP) has been designated the highest priority for wild tiger conservation because its extensive forest habitat supports one of the largest tiger populations that is protected by strong law enforcement. The survival of these tigers depends on sound conservation management based on reliable information. The overarching aim of this project is to support KSNP management by conducting scientific tiger assessments in and around KSNP and to raise awareness and generate strong community support for tiger conservation through outreach activities outside KSNP. To continue tiger and prey assessments inside KSNP and establish community outreach outside KSNP, the proposed project activities for PY3 were completed within the following six objectives, of which 21st Century Tiger funded Objectives 1, 3, 5 and 6,

- Objective 1: Assess the conservation status of tigers, their prey and their forest habitat;
- *Objective 2: Develop the local capacity to statistically analyse field data;*
- Objective 3: Establish a new protected area at the KSNP border, Jambi province
- *Objective 4: Community outreach;*
- Objective 5: Disseminate project information to project partners and policy makers; and,
- Objective 6: Monitor and evaluate project results and effectiveness.

The monitoring programme for PY4 was conducted under the following timetable (Table 1). This report covers all project activities now completed from Month 1 to 12.

Table 1. Program activities scheduled for Project Year 4 [activities in italics are not being funded by 21st Century Tiger]

	Month											
Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1.1. Steering committee meeting												
1.2. Project personnel field training												
1.3. Detection/non-detection surveys												
1.4. Camera trap surveys												
1.5. Deforestation classification												
2.1. Design and produce a series of PRESENCE occupancy tutorials												
2.2. Project personnel statistics training												
3.1.Protected Area meeting												
3.2. Border demarcation and consultation												
3.3. Media campaign												
4.1. Project partner meeting to develop advisory committee												

4.2. Develop an environmental curriculum and train local religious leaders												
4.3. Deliver outreach programme in Islamic schools and farming communities												
5.1. Final project information dissemination												
5.2. Update project website												
6.1. Final project review												

Activity 1.1. Steering committee meeting

During Month 1, the Field Manager, Project Consultant and FFI-IP Country Representative (Dr Jito Sugardjito) met with the outgoing head of KSNP, Mr Soewartono (who will join the Dept. Forestry human resources division in Jakarta), and the incoming head of KSNP, Mr Suyatno Sukandar (from the Dept. Forestry Protected Area Planning division in Jakarta). The meeting was to formally introduce the project, its staff and give an overview of the project's past, present and future activities and the role of project partners. This meeting took place within the National Conservation Strategy Action Plan Workshop for Tigers and Elephants that was held in Padang, West Sumatra. Both Mr Soewartono and Sukandar expressed their commitment towards the project. Mr Sukandar was especially strong in offering his support in formalising the protection of our PY2 camera trap site in Bungo, which recorded a high abundance of tigers outside of the KSNP border.

Activity 1.2. Project personnel field survey training

During Month 1, project personnel consisting of eight community scouts (including three new personnel), one Indonesian university graduate and one local NGO volunteer received four weeks training in field equipment use, including GPS unit, compass and field survey methods. The field survey training focused on the practical data collection component, but also the statistical theory behind the newly developed detection/non-detection sampling protocol. This approach was useful for all staff (10 full-time staff) to increase their knowledge and understanding of the protocol and the need for each survey team to adhere to the standardized field methods. Training was provided by the more senior Indonesian field staff, which provides a clear demonstration that the local capacity-building objectives from the 21st Century Tiger-funded work in previous PYs are being realised and directly contributing to project sustainability.

Activity 1.3. Detection/non-detection field surveys

Field surveys continued from PY2 into PY3. Surveys are being conducted within 88 grid cells (17 x 17 km) that cover KSNP and adjacent forest. The sampling effort assigned to each grid cell is proportional to the amount of forest habitat contained within the cell. So, for example, a grid cell containing 100% habitat has a target effort of 40 km walked, whereas 50% has a target of 20 km walked, with a minimum effort of 5 km in cells with little habitat. Within each grid cell, the sampling effort is divided into 1 km segments (or sampling occasions) and the detection (1) and non-detection (0) of tiger is recorded for each occasion. So far, 37 grid cells have been surveyed with a sampling effort of 1312 km and a median cell survey effort of 36 km (min. = 13 km; max. = 68 km). Tiger has been detected in 332 of the 1312 x 1 km segments surveyed. Overall, tigers have been detected in 37 out of the 37 cells, indicating a 100% occupancy.

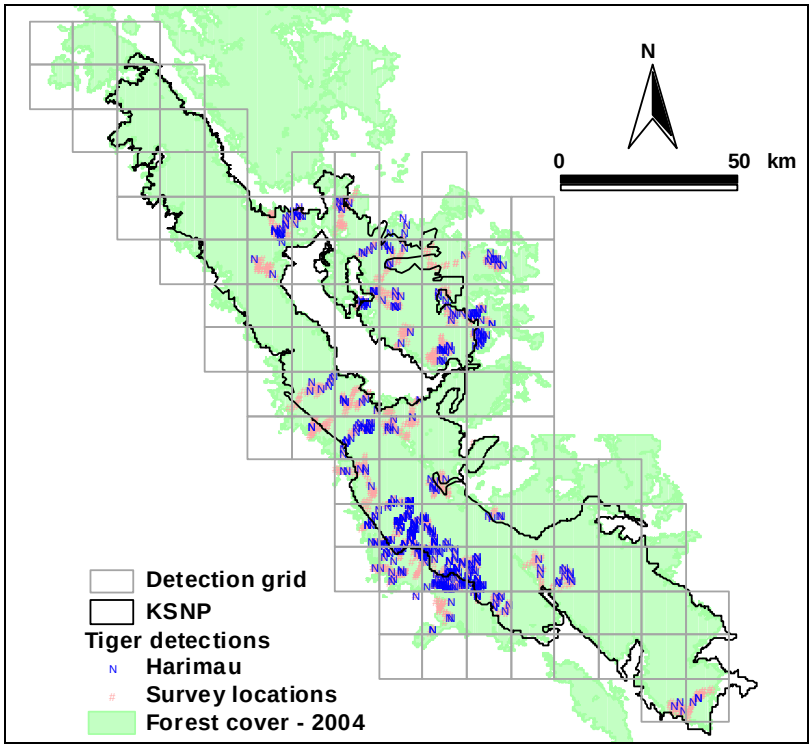

Figure 1. Tiger indirect sign locations and field survey locations from 37 out of 88 grid cells surveyed from Project Year 3 and 4.

These surveys are taking longer than anticipated due to the large size of KSNP and rugged terrain that is difficult to both access and to survey. It is desirable to complete the surveys within a short time span to as to avoid large changes in the state of the tiger

population (e.g. through births or deaths) during the total sampling period. As Sumatra-wide surveys are currently being conducted by collaborating organisations, making the KSNP dataset available as soon as possible will be important for the final analysis.

Activity 1.4. Camera trap surveys

Camera trapping was conducted in primary/selectively logged lowland-hill forest (Ipuh) that straddles the southern KSNP border. A total of 41 camera placements recorded 3255 camera trap nights in Ipuh (Figure 2). From the Ipuh study area, species relative abundance was calculated using species encounter rates (ER = number of species records/100 trap nights; Table 2).

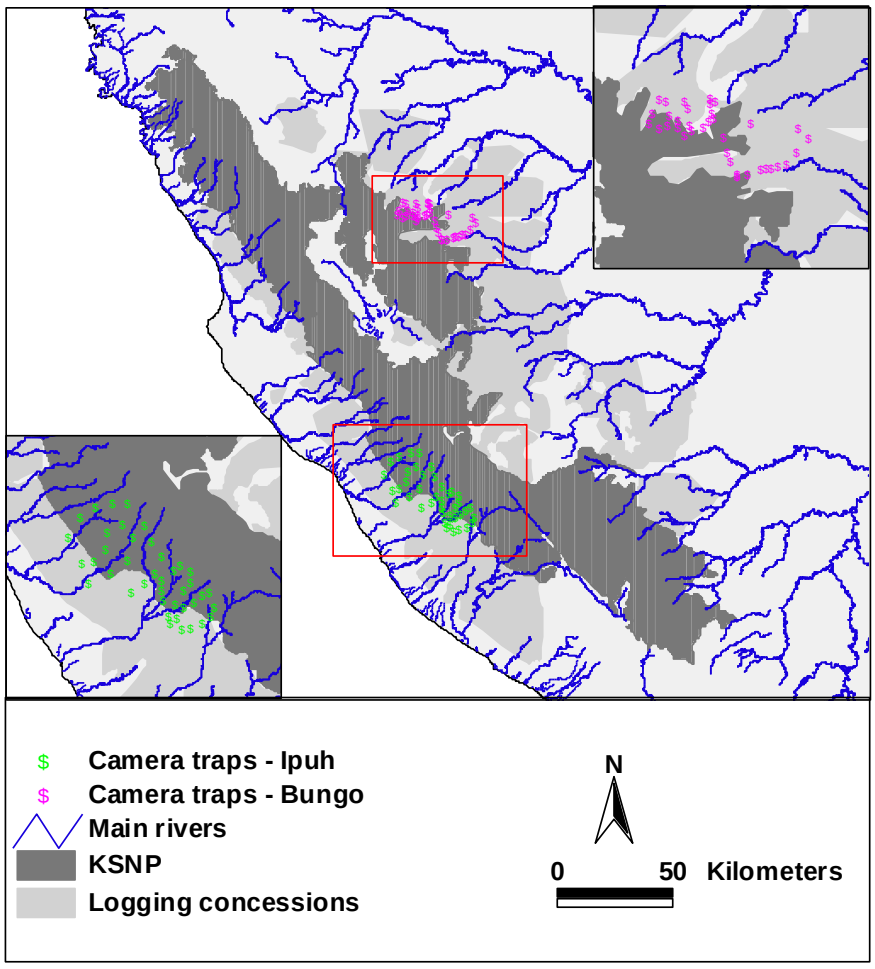

Figure 2. Camera surveys conducted in the primary-selectively logged hill-submontane forest of Bungo and primary-selectively logged lowland-hill forest of Ipuh in and around Kerinci Seblat National Park, showing inserts of camera trap locations

Table 2. Camera trap results from the primary-selectively logged hill-submontane forest of

Bungo and primary-selectively logged lowland-hill forest of Ipuh in and around Kerinci Seblat National Park

Common name	Scientific name	Bungo Trap nights = 2063		Ipuh Trap nights = 3255	
		Total records	ER	Total records	ER
Sumatran tiger	*Panthera tigris*	63	3.05	64	1.97
Asiatic golden cat	*Catopuma temminckii*	37	1.79	33	1.01
Clouded leopard	*Neofelis diardi*	18	0.87	47	1.44
Leopard cat	*Prionailurus bengalensis*	1	0.05	33	1.01
Marbled cat	*Padofelis marmorata*	2	0.10	1	0.03
Asian wild dog	*Cuon alpinus*	9	0.44	14	0.43
Malayan Sun Bear	*Helarctos malayanus*	76	3.68	112	3.44
Wild pig	*Sus scrofa*	6	0.29	23	0.71
Bearded Pig	*Sus barbatus*	26	1.26	134	4.12
Sumatran Elephant	*Elephas maximus*	0	0.00	3	0.09
Serow	*Capricornis sumatraensis*	1	0.05	1	0.03
Red muntjac	*Muntiacus muntjak*	64	3.10	33	1.01
Sambar deer	*Cervus unicolor*	13	0.63	5	0.15
Mouse deer	*Tragulus sp.*	16	0.78	13	0.40
Asian tapir	*Tapirus indicus*	66	3.20	119	3.66
Common porcupine	*Hystrix brachyura*	57	2.76	98	3.01
Masked-Palm Civet	*Paguma larvata*	1	0.05	2	0.06
Yellow-throated martin	*Martes flavigula*	1	0.05	4	0.12
Banded palm civet	*Hemigalus derbyanus*	0	0.00	1	0.03
Binturong	*Arctictis binturong*	0	0.00	2	0.06
Banded linsang	*Prionodon linsang*	0	0.00	1	0.03
Pangolin	*Manis javanica*	2	0.10	0	0.00
Great argus pheasant	*Argusianus argus*	63	3.05	76	2.33
Sumatran peacock pheasant	*Polyplectron chalcurum*	11	0.53	0	0.00
Salvadori's pheasant	*Lophura inornata*	10	0.48	3	0.09
Rufous-collared kingfisher	*Actenoides concretus*	1	0.05	0	0.00
Pig-tailed macaque	*Macaca nemestrina*	96	4.65	194	5.96
Banded Langur	*Presbytis femoralis*	0	0.00	1	0.03

Human	*Homo sapiens*	13	0.63	41	1.26
Total		**653**		**1058**	

Five of the seven KSNP felid species were recorded from both the Bungo and Ipuh study areas, with tiger and golden cat exhibiting a higher relative abundance in Bungo than Ipuh, but clouded leopard and leopard exhibiting a higher relative abundance in Ipuh than Bungo (Figure 3).

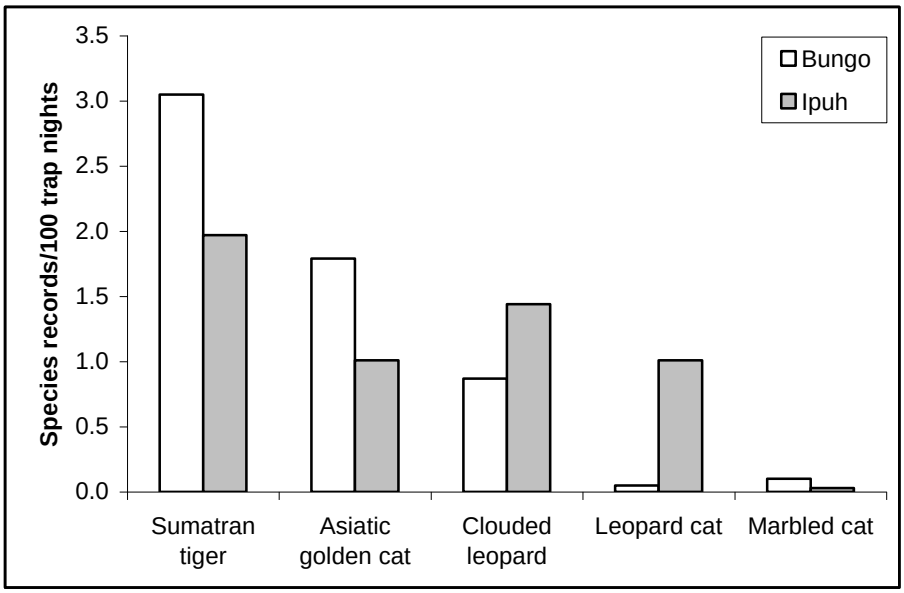

Figure 3. Relative abundance of felid species in primary-selectively logged hill-submontane forest of Bungo and primary-selectively logged lowland-hill forest of Ipuh in and around Kerinci Seblat National Park

Comparing the camera trap encounter rates of Bungo and Ipuh found a higher relative abundance of wild boar and bearded pig in Ipuh and a higher relative abundance of muntjac, sambar and mouse deer in Bungo (Figure 4).

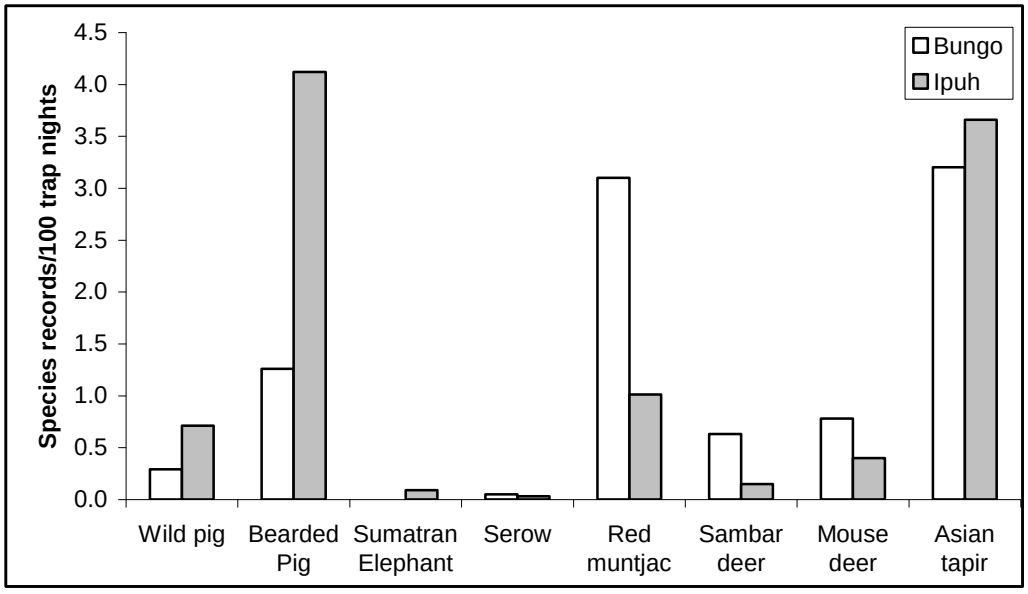

Figure 4. Relative abundance of ungulate species in primary-selectively logged hill-submontane forest of Bungo and primary-selectively logged lowland-hill forest of Ipuh in and around Kerinci Seblat National Park

Using the standard capture-mark-recapture protocol, a tiger density estimate of 1.55 adult individuals/100km^2 (1.30-2.93, 95% CIs) was recorded from Ipuh (Table 3). Although the mean density estimate was lower than that from Bungo, the CI overlap meant that there was no significant difference with the 2.95 adult individuals/100 km^2 (2.49-4.99) recorded from Bungo.

Table 3. Effective sampling area and estimated tiger density at the two study sites in Bungo and Ipuh

	Bungo	**Ipuh**
Camera trap polygon (km^2)	237.04	569.14
Buffer width (km)	2.74	5.28
Effective sampling area (km^2)	441.00	1227.18
Estimated tiger density and standard error (individuals/100km^2)	2.95±0.56	1.55±0.34
95% confidence interval	2.49-4.99	1.30-2.93

The Bungo camera trap results from the previous PY, highlighted the importance of this area for tigers and other endangered wildlife, which is located outside of the KSNP and without any formal conservation protection status. So, during Month 8, a new project was initiated in this area which aims to formally protect these tigers and their habitat

through working with local government to establish and then run a new protected area.

Activity 1.5. Deforestation classification

During PY3, four Landsat ETM+ images from the year 2004 were purchased for the KS region and then geo- and radio-metrically corrected, processed into a 2004 forest cover map and ground truthed to produce a final forest cover map. During PY4, this map was finalized in Month 2. The map was overlaid on a 2002 forest cover map for the same area to compare the location and rate of deforestation (complete forest conversion to non-forest, i.e. agriculture) in the KS region (Figure 2).

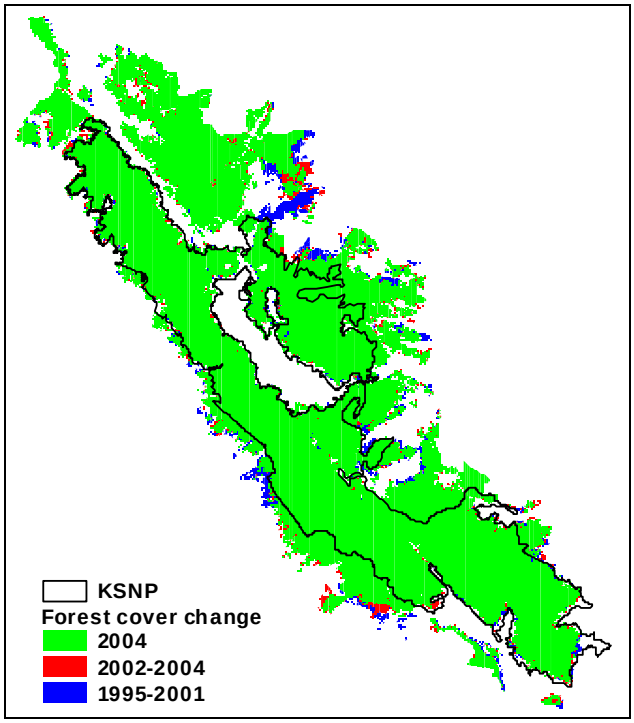

Figure 2. Forest cover in 2001 and forest loss between 1995 and 2001 in the KS region

In comparison with a previously estimated 1995-2002 period, deforestation rates across the KS region and inside KSNP were both found to have increased in the 2002-2004 period (Table 3).

Table 3. Change in forest cover for KSNP and the KS region from 2002-2004

	Forest cover (km^2)			Deforestation (km^2/yr)	
	1995	2002	2004	1995-2002	2002-2004
KSNP	11779.6	11552.5	11393.4	-32.4	-79.5
KS region	20921.3	19576.8	18839.9	-192.1	-368.4

A Landsat ETM+ image was purchased for the year 2005 for the central section of the KS region. This image was then processed into a forest cover map, using the method described above, and overlaid with the equivalent section for 2004. Comparing the 2004 forest cover with that of 2005 found that deforestation occurred at a rate of -44.1 km^2/yr. Deforestation was predominantly located outside of KSNP, but in places continued inside the NP (Figure 3).

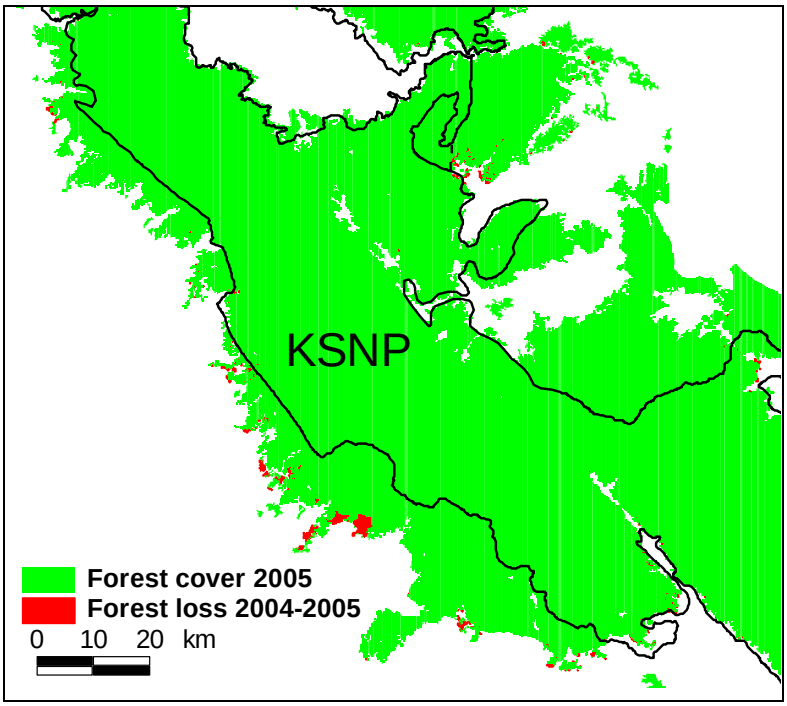

Figure 3. Forest cover in 2005 and forest loss between 2004 and 2005 in the central section of the Kerinci Seblat (KS) region and KS National Park (NP)

Activity 3.1.Protected Area meeting

This project component formally began in Month 8, after a new field leader was recruited. There was then a further delay in conducting the first meeting because high ranking government official partners were unable to rearrange their work schedules at short notice. The attendance of these key partners was important because the meeting aimed to introduce project partners to each other, as well as the aims, objectives and activities of the project and the meeting needed to follow official government protocol. The regional government partners expressed their interest in the project and then decided to invite a wider government audience, which was most welcomed but meant that the meeting was further delayed in order to accommodate this request. So, after two months of arranging a final date with the various project partners and then sending

out formal invites, the steering committee meeting was held over one day during Month 10. In total, there were 18 meeting participants, representing six different government sections, six different local NGOs, regional police, a traditional leader and a journalist, in addition to representatives from KSNP, DICE and FFI. The head of Bungo government, whilst unable to attended in person due to a last minute invitation by the national government in Jakarta, had prepared a statement, that was read out by his secretary and which announced the support of his government for the proposed work.

The meeting was hosted by our main partner, Bungo government forestry section (*Dinas Kehutanan*), and began with presentations by KSNP head office, the KS-Tiger Protection and Conservation Unit programme (which is partly funded by STF) and then the KS-Tiger Monitoring programme. These presentations introduced programme staff and their work being conducted within the Bungo section of KSNP. There then followed a questions and answer session followed by a presentation by the Bungo government representative. The main topic of discussion focused on the position of the KSNP border. From the meeting, the *Dinas Kehutanan* of Bungo offered their support for our planned activities. Other stakeholders from NGOs, such as ICRAF and Forum Konservasi Bungo Alam Raya, also took this opportunity to offer their support for the project and said that they looked forward to collaborating with us. Overall, this first meeting was considered a success and has created a working relationship to enable the implementation of the project's field activities.

Activities 3.2 and 3.3. Border demarcation and consultation and media campaign

A protected area meeting between DICE, FFI and the Government of Bungo is currently being arranged for the start of the next PY. The project must follow official government protocol and, so, this meeting is essential in order to develop the framework for field survey activities between DICE/FFI and *Dinas Kehutanan*, so that the border demarcation and consultation process can begin, accompanied by a media campaign.

Activity 5.1. Final project information dissemination

This activity held during Month 12 at KSNP Head Office. The head of KSNP and other

senior management personnel acknowledged the hard work and achievements made over the PY and expressed their ongoing commitment to the project. In recognition of the importance of KSNP for tiger conservation, the head of KSNP is currently discussing the creation of a new tiger coordinator post within KSNP to further boost the conservation work across the KS region. Also, as part of the project's focus on building local capacity to undertake enhanced scientific research, the project exposed its work and it donors to academics and undergraduate students through presentations given at the University of Bengkulu (UNIB) in Month 1 and Andalas University (UNAND), West Sumatra, in Month 2. This led to the recruitment of one UNIB student to the project.

Activity 6.1. Final term project review

The project was reviewed during Month 12 by DICE. The project manager and field team leader discussed the 2007/08 timetable implementation, staff appraisals and future activities. The project has made significant progress over the course of PY3 and has successfully adhered to the timetable and achieved all milestones, except completion of detection/non-detection surveys. Numerous additional activities have been completed, such as the initiation of a project that aims to obtain a formal protection status for a previous camera trap site in Bungo, which is important for KSNP management.

Additional activities in Project Year 3

Milestones in staff development – building conservation capacity

At the start of PY3, Yoan (Nata) Dinata, the project Field Manager from PY1-2, took up his place to study on the DICE MSc Conservation Biology Programme. Now over halfway through his studies, which are going extremely well, Nata is preparing for his dissertation research project. For this, Nata was recently awarded a BP Conservation Leadership grant, which he will use to purchase camera traps for a tiger study in the new DICE/FFI project in Batang Hari Protection Forest (BHPF), West Sumatra province. Nata will bring his wealth of KSNP experience to the new project site and train field staff in camera trapping and produce the first tiger density estimate for this data deficient area. This project is intended to establish an ongoing camera trap monitoring programme for BHPF and the data and results will be used to develop the first management plan for the protected area. Nata, along with three other

DICE/FFI/KSNP project staff were nominated and then accepted to become members of the IUCN/SSC Tapir Specialist Group during Month 7.

From Month 5-8, Iding Ahmad Haidir, the KSNP camera trap coordinator, was selected as the Department of Forestry representative to join a 3-month field training scheme hosted in India by the Wildlife Institute of India (November 2007–January 2008). This training, which was partially funded by USFWS, covered topics such as wildlife biology, wildlife management (policy and law) and nature interpretation and ecotourism. From the six foreign participants, selected from Asian government wildlife and/or forestry departments, Iding was awarded the best foreign trainee prize. In recognition of Iding's achievements and the government's commitment to tiger conservation in KSNP, the Department of Forestry is currently discussing the idea of establishing a KSNP-Tiger Coordinator position within the KSNP-head office and Iding had been identified as the most suitable candidate. If realised, this would unfortunately mean that Iding would have to leave the DICE/FFI project, but of course his promotion would provide much greater and wider benefits for tiger conservation.

Finally, in Month 11, Nevridedi (Dedet) Endri, the detection/non-detection survey coordinator, was successful in his application to join the Department of Forestry as a Forest Technician. Dedet epitomises the capacity building strengths of the DICE/FFI project. In PY2, he joined the project to conduct his undergraduate research on tiger abundance surveys in KSNP, where he received field and statistics training. In PY3, Dedet returned to the project to take up the newly created position of the detection/non-detection survey coordinator. Until now, Dedet has been training full-time personnel, students and volunteers in basic-intermediate statistical analysis techniques and has been overseeing the field survey work. Whilst it is a loss to the project that Dedet may be posted to Siberut National Park, West Sumatra, it reassuring to know that a well-trained scientist will be responsible for this important area of biodiversity. However, the head of KSNP and former head of KSNP (who is working with the human resources division of Department of Forestry) are currently lobbying for Dedet to be reassigned to KSNP, so that he can rejoin the DICE/FFI project.

Project in the community - Lake Kerinci Festival

During Month 9, the KSNP management asked the project to prepare an exhibition for the Lake Kerinci Festival. So, project staff produced posters for the KSNP stand, which was also represented by the KS-Tigers Protection and Conservation Units and NP management. The DICE/FFI monitoring project section included information from the forest camera trap surveys. The festival was attend by provincial and district level goverment representatives and therefore provided a good opprtunity for networking and for raising local awareness and support for the project, KSNP and tigers.

Comparative study to WCS Gunung Leuser Tiger Project

During Month 5, eight project personnel visited the WCS Gunung Leuser Tiger Project in northern Sumatra. The main purpose of this visit was to compare and share experiences and information on the detection/non-detection surveys, which the WCS project is also conducting as part of the Sumatra-wide tiger assessment. Other topics discussed were office activities and data management (datasheets, data entry and database operation). During this trip, the DICE/FFI/KSNP staff joined the WCS-Leuser Conflict Mitigation team in their visit to two forest-edge villages that had recently experienced conflicts with tiger. This raised KSNP staff awareness about the human-tiger conflict situation around Gunung Leuser National Park and the mitigation technique used, such as questionnaire surveys on local attitudes towards conflict.

Sumatran Tiger Forum Group Discussion

During Month 10, the Field Manager attended the tiger forum group discussion held in Lembah Harau Nature Reserve, West Sumatra. Other collaborators in attendance were BKSDA (regional Dept. Forestry)-West Sumatra, FFI, DICE, WCS, WWF, ZSL and UNAND. The Sumatran tiger forum group discussion elected the Chair (Hariyo T. Wibisono, WCS) and Co-chair (Wisnu Wardhana, PDHI), who will be responsible for maintaining good communication between forum members.

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

21st Century Tiger

Rufford Small Grants for Nature Award

Peoples Trust for Endangered Species