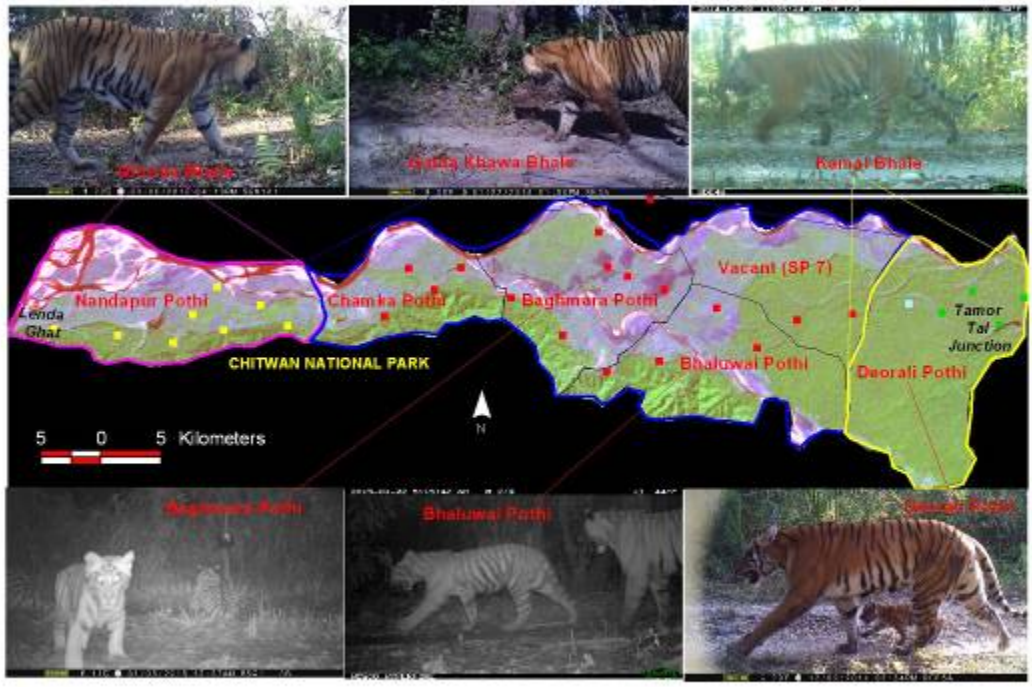
LONG TERM TIGER MONITORING AT CHITWAN NATIONAL PARK AND BUFFER ZONE, NEPAL

An Annual Report 2014-15



Submitted to
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Chitwan National Park, Kasara

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Contents

BACKGROUND, STUDY AREA, AND OBJECTIVES

The Long Term Tiger Monitoring (LTTM) encompasses, a 100 km^2 area bounded by Tamor Tal Junction, on the east, and Lenda Ghat, on the west; between the Rapti and Narayani Rivers, on the north, and the Reu River and the base of the Someswar Hills, on the south. By virtue of camera trapping in successive seasons, we have been able to identify the resident tigers photographed, as opposed to the sub-adults and transients, something that is not possible to do after a single season of camera trapping. At the end of the current season, 2014-15, we have completed a 20 year dataset.

It may be asked why we limit our research to such a small study area. The answer is simple: Unlike the Department we are not focusing on the total number of tigers in the national park and buffer zone. We want to monitor a manageable sample of resident tigers over a long period in order to increase our knowledge of tiger social structure and behavior. This can only be done in a relatively small study area where we can identify all the residents and follow their respective fortunes over time. Therefore, the government's camera trapping objectives and our camera trapping objectives are different, but complementary to each other.

METHODOLOGY

The study area in the Park was divided into four blocks which were successively camera trapped from December 4, 2014 until March 11, 2015 (Figure 1).

Sets of two digital cameras were set up opposite each other at intervals along roads, trails, and other expected tiger routes of travel. Camera trapping effort in each block was determined by the number of camera that were set up multiplied by the numbers of days they were deployed. A "day" was a 24 hour period. For example in Block One 17 cameras (8.5 sets) were put out for 27 days so the effort was calculated at 459. Camera trapping effort in Blocks 2, 3, and 4 was 306, 402, and 402 respectively. The total effort for the season was 1,569 (compared to 1,614 last season). The output was 1,283 tiger photographs, of which 299 were dependent cubs (compared with 540 last season). The summary of the tigers photographed and their reproductive history are presenting below:

Part I

RESULTS

Block 1

Resident Female: Deorali Pothi

Resident Male: Kamal Bhale

Subadult Female 1

Subadult Female 2

Subadult Female 3

Subadult 5 (Male/Female unknown)

Block 2

Resident Female: Bhaluwai Pothi

Resident Male: Gaida Kawa Bhale

Intrusive Male: Panch Pandu Bhale

Block 3

Resident Female: Bhaluwai Pothi

Resident Female: Baghmara Pothi

Resident Female: Chamka Pothi

Resident Male: Gaida Kawa Bhale

Subadult Male 8

Block 4

Resident Female: Nandapur Pothi

Resident Male: Dhurba Bhale

Subadult Male 8

In Total 14 Tigers (9 adults and 5 subadult tigers)

Resident Females	**5 (Figure 2)**
Resident Males	**3 (Figure 2)**
Intrusive Males	**1**
Subadult Females	3
Subadult Male	1
Subadults (sex unknown)	1

Reproductive History of Resident Females x 4

1. Deorali Pothi: Two cubs by Kamal Bhale, October 2014

   (One previous litter by Kamal Bhale, January 2013 (20 months previously)

2. Bhaluwai Pothi: 3 cubs by Gaida Kawa Bhale, July 2014

   (One previous litter by Gaida Kawa Bhale, January 2013 (17 months previously)

3. Baghmara Pothi: 3 cubs by Gaida Kawa Bhale, August 2014

   (Three previous litters all by Gaida Kawa Bhale, last March 2013 (18 months previously)

4. Nandapur Pothi: One cub by Dhurba Bhale, November 2014

   (Two previous litters by Khoria Bhale and Lenda Bhale, last April 2013 (20 months previously**)**

Total cubs recorded in 2014-15 season: 9 cubs belonging to 4 resident females. Compared with 12 cubs belonging to 5 resident females recorded in 2013-14

DISCUSSION

Resident Females

During the current season only 5 resident females were recorded, the first time the number of resident females has dropped so low since 1990-91 when we were monitoring the same study area by following known individuals. All 5 of this season's resident were the same ones as last season. The 6th resident from last season, Sukhibar Pothi (SP 7) was at least 16-17 years old, so it was not surprising that she had disappeared. But we camera-trapped 3 sub-adult females, 2 of them just inside the eastern boundary of the study area and one more on the edge, so it is a reasonable assumption that Sukhibar Pothi will soon be replaced, and that the number of resident females will return to 6.

Resident Males

Dhurba Bhale was the resident male in the east portion of the study area between 2008 and 2013. In October 2008 he sired Sukhibar Pothi's last litter of 3 cubs, all of which survived to dispersal age. Two of his daughters from this litter are currently resident females, Bhaluwai Pothi and Deorali Pothi, both of which have already had two litters of their own. In 2009 he sired cubs by two other females, Kasara Pothi, a litter of 3 cubs, and Chisopani Pothi, a litter of 2 cubs, all of which survived. Thus Dhurba Bhale sired at least 8 surviving offspring while he was the Resident Male in the east.

Last season Dhurba Bhale was only camera trapped once at Amaltari Ghat, at the extreme west of the study area on March 7, 2014. He was headed south and we assumed that having abandoned his territory in the east was leaving the study area and was dispersing away from it, possibly to Valmiki TR across the Indian border. However, during the current 2014-15 season Dhurba Bhale was photographed 91 times at 8 different locations between Jutke Khola and Lenda Ghat. It seems certain that he is in the process of establishing a new territory in the west, and he has already sired a litter with Nandapur Pothi the western most resident female in the study area. In all the cases so far recorded, once a tiger of either sex abandons its territory it has ceased to breed and become post-reproductive. So the case of Dhurba Bhale is unique.

The male that replaced Dhurba Bhale in the eastern part of the study area is Kamal Bhale: he sired two litters of cubs by Deorali Pothi, in January 2013 and October 2014. But Kamal Bhale, a large male, appears to be moving east and south, possibly creating space for an intrusive male, Panch Pandu Bhale, to start moving in.

Last season Kamal Pothi was only camera-trapped at one location, Tamor Tal, where 10 photos were taken. Kamal Bhale also was only captured 10 times at three locations in the study area. The majority were east and south of the study area. This season Panch Pandu Bhale was photographed 20 times, double last season, at Big Dip, Small Dip, and Deorali Chouk.

CONCLUSIONS

Since we started the project in 1995 there has been one remarkable result. The number of resident females recorded every season has remained the same, namely six. It has occasionally risen to seven or even eight, but quickly drops back to six. This indicates temporal stability. The population has reached the carrying capacity of the habitat; it is in a state of saturation.

Another finding is that reproduction is consistently high. Of the cubs born between July 1995 and June 2005 the number that survived to dispersal age was 42. In the latest 10 years, July 2005 to June 2015 the number of cubs born through 2013 that survived was 36. Of the nine additional cubs born in 2014 it is too early to know, but if we assume that 50% survive, which is the norm, this adds four or five to the 36, making 40-41, nearly the same as in the first 10 year period.

Given the stability that characterizes the CNP tiger population, one cannot expect any dramatic increase. More tigers require more prey and since the prey base in the Park is synch with the habitat, the only way to increase the prey is to increase the habitat. A big step in this direction has been the creation of the Buffer Zone. Improved

management of the BZ community forests has resulted in the creation of additional tiger habitat outside the park in the Buffer Zone. But the number of breeding females that can be accommodated in the BZ forests is limited. See below.

Elephants

There are presently four wild elephants resident in the Park, three of them in our study area. There is one adult male, the notorious Valentino, found between Sukhibar and Amaltari Ghat. There are two sub-adult males, one found near Kamal Tal, and another found from Tiger Tops Tented Camp and Amaltari Ghat. Outside of our study area, near Gangar GP, in the east there is another, an adult with a broken tusk.

Part II

CAMERA TRAPPING OUTSIDE OF LTTM AND IN BUFFER ZONE

Camera trapping in the buffer zone was divided into four blocks: 1) BZCF Parasi, 2) BZCF BanderJhula, 3) BZCF Meghauly and 4) BZCF Madi (Figure 1). Additional Block 5, along the Park boundary in Madi Valley outside of LTTM area was also camera trapped to support Park management camera trapping effort. Cameras were successfully set between 13 March 2015 and 23 June 2015. Trapping dates in each block were as follows: BZCF Parasi: 13 March to 6 April 2015; BZCF BandarJhula: 8 April to 8 May 2015; BZCF Madi: 22 May to 5 June 2015; Block 5: 19 May to 4 June 2015 and BZCF Meghauly: 7 June to 23 June 2015. In each block 8 to 9 camera locations were established with a set of 2 digital cameras in each location. However, in BZCF Madi, only 3 camera locations were established. Fewer camera locations were set because this area was already camera trapped at the same time by other organization. The cameras traps were placed for 24 hours and it was monitored by respective BZ forest guards and camera trapping technicians on a regular basis. Number of camera trap days varied from 14 to 30 days. The total effort was 1454 trap days. Of which 384 trap days in BZCF Parasi, 480 days in BZCF BandarJhula, 64 days in BZCF Madi, 308 days in Block 5, and 218 trap days in BZCF Meghauly.

RESULTS AND DISCUSSIONS

TIGERS

The output of the trapping effort was 160 tiger photographs. Out of which 114 were in the BZCF and 46 tiger photos in Block 5. These photographs included ten individual tigers: six in the BZCF and 4 in Block 5 (Figure 3). Block wise results are as below:

BZCF Parasi

Resident Male: Lamichour Bhale

Subadult Female 9

BZCF BandarJhula

Resident Female: Nangara Pothi

BZCF Madi

Resident Female: Mugai Pothi

Resident Male: Marlowe Bhale

BZCF Meghauly

Subadult Male 14

Block 5

Subadult Female 10

Subadult Male 11

Subadult Male 12

Subadult Female 13

PREY AND ASSOCIATED SPECIES

To understand the tiger's relative prey abundance and associated species, we counted the number of animals in the photographs obtained from the camera locations. Total number of animals photographed per block inside the Park including along the Park border in Madi is shown in Table 1. Likewise, Table 2 shows the number of animals photographed in the BZCF block. The animal number should not be consider as absolute number as many animals may have been counted multiple times as several photographs have been taken of the same individual animal.

Table 1. Number of animals photographed per block inside the Chitwan National Park.

Park	Leopard	Rhino	Wild Elephant	Sambar Deer	Spotted Deer	Hog Deer	Barking Deer	Wild Boar	Gaur
Block I	26	84		121	235		75	37	
Block II	11	456	118	5	2035	291	154	89	
Block III	85	878	173	165	3562		98	276	21
Block IV	33	758	63	152	2410	7	158	241	96
Block V (Madi)	7			124	121	28	35	77	25

Table 2. Number of animals photographed in the buffer zone community forest (BZCF), Chitwan National Park

Buffer Zone	Leopard	Rhino	Wild Elephant	Sambar Deer	Spotted Deer	Hog Deer	Barking Deer	Wild Boar	Gaur
BZCF Parasi	54	749		20	874	109	547	32	
BZCF BandarJhula		666			1532	4435		25	
BZCF Meghauly		375			514	451	147	191	
BZCF Madi				20				43	

Other species photographed are listed below:

Sloth Bear
Leopard Cat
Jungle Cat
Fishing Cat
Large Indian Civet
Palm Civet
Golden Jackal

Fox
Yellow Throated Marten
Common Mongoose
Crab-eating Mongoose

This season we obtained 114 photographs of six different tigers in the BZCF, compared to 34 photographs of four tigers last season. Of the four tigers photographed last season, three were photographed this season and are considered residents. These are Lamichour Bhale in BZCF Parasi, Nangara Pothi in BZCF BandarJhula and Marlowe Bhale in BZCF Madi (Figure 3). Lamichour Pothi photographed in Parasi last season was not photographed this season, however, another sub-adult Pothi has been photographed in her area. Additionally, in BZCF Madi, a Mugai Pothi, female tigress and sub-adult male in BZCF Meghauly was photographed this season (Figure 3).

At Parasi, Lamichour Bhale has been continuously photographed for the last three seasons now. Although, female tigress has been photographed these past two seasons, longer term residency has not been successful, despite of the presence of all the main prey species including sambar deer, spotted deer, barking deer, hog deer and wild boar. Disturbances may be the factor that needs further investigation.

In BZCF BandarJhula, Nangara Pothi has been reported since last three seasons. The area consists of several small islands created by channels of Narayani River, shows a very high number of hog deer and spotted dear abundance. Due to the mosaic of islands with dense riverine forests and good prey base, this area provides an ideal tiger habitat. It is interesting; however, male tigers are not regularly photographed in this area.

BZCF Madi covers approximately 126 km² forest and tiger residency status has been reported previously. During the short camera trapping efforts this season, one male and one female both residents were successfully photographed (Figure 3). Likewise, inside the Park Block 5 in Madi Valley four different sub-adults and Kamal Bhale, resident male occupying the eastern half of the LTTM area were photographed. Monitoring the status of tigers in Madi Valley is critical as it provide connectivity between Chitwan National Park and Valmiki Tiger Reserve in India. Additionally, shows the territory extension of male or female tigers occupying the eastern boarder of the LTTM area. The prey number indicates that there is an opportunity to improve the prey abundance in the BZCF Madi. Furthermore, camera trapping results of Park and other organization efforts should be combined together to better understand the overall tiger status in Madi Valley.

The buffer zone community forests around Chitwan National Park has been successfully contributing to accommodate additional tigers and increasing the overall tiger population in Chitwan.

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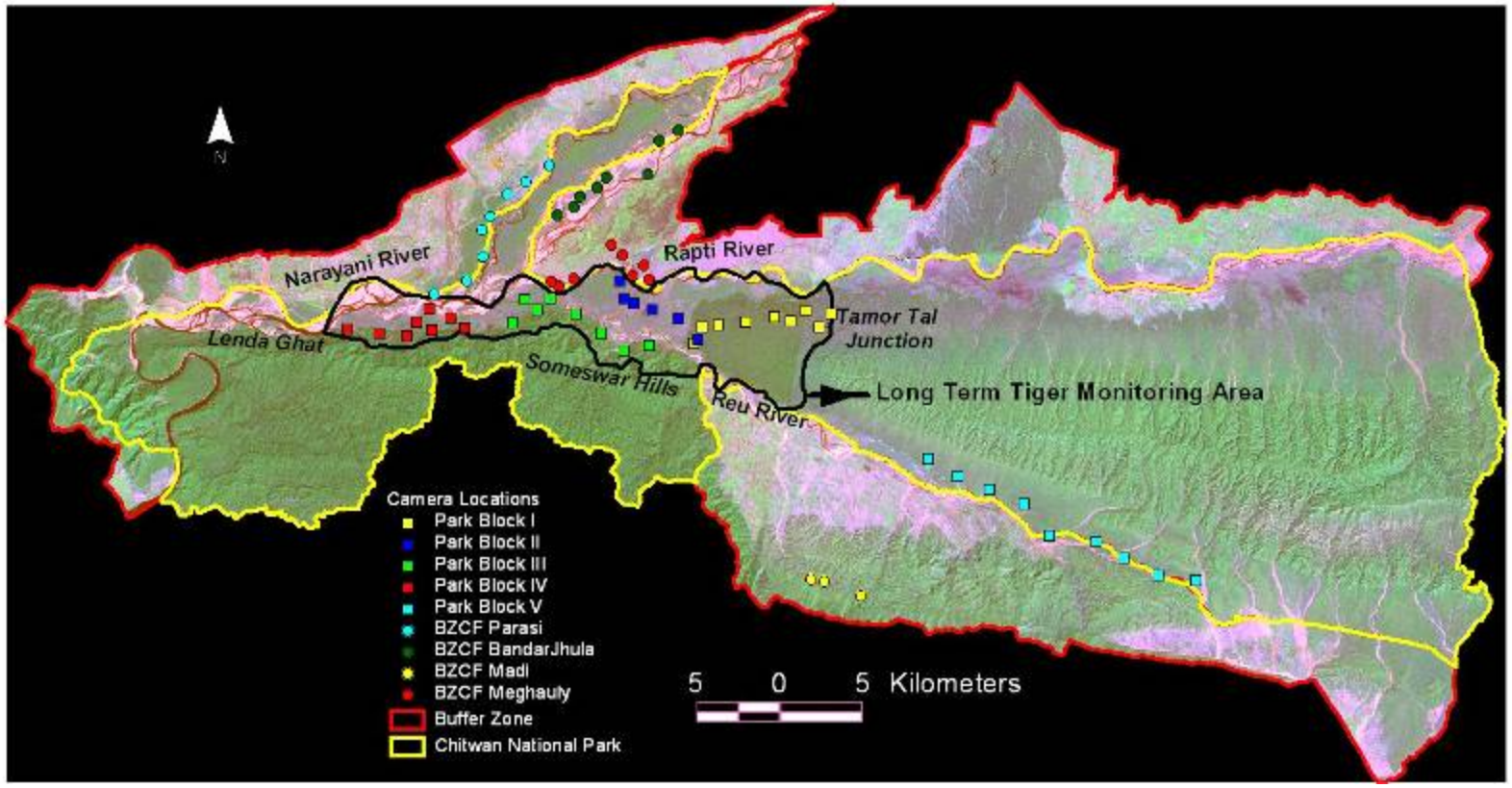

Figure 1: LTTM Area and locations of camera traps in 2014-15.

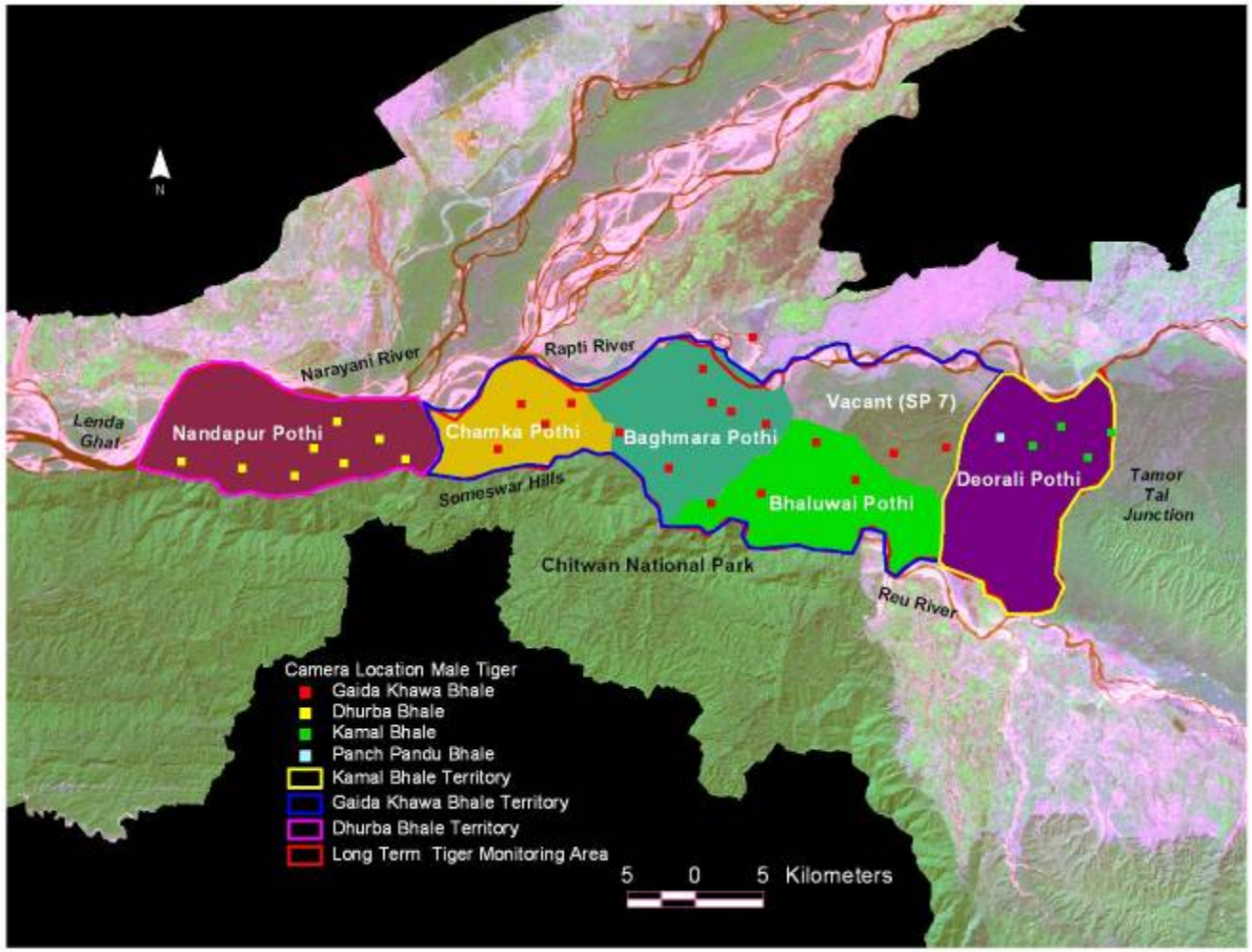

Figure 2: Name / territory of resident females in relation to resident males' camera trapped locations during 2014-15.

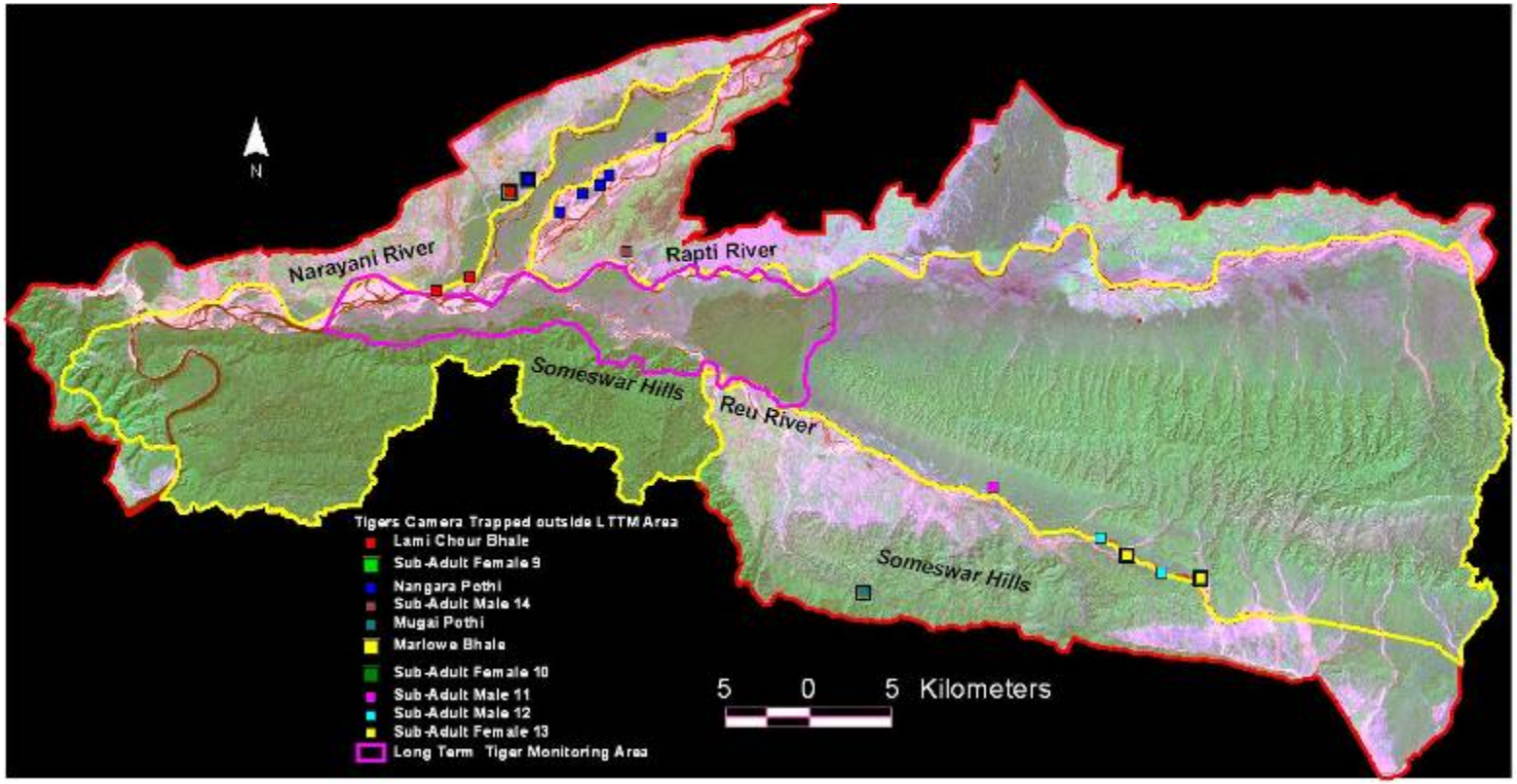

Figure 3: Tigers photographed outside of LTTM area and in the Chitwan National Park BZCF during the 2014-15.

RESIDENT FEMALE TIGERS IN LTTM AREA

Appendix 1 (a): NP 2 (Nandapur Pothi) photographed on 16-02-2015 and 20-02-2015

Appendix 1 (b): CP 2 (Chamka Pothi) photographed 05-02-2015 and 06-02-2015

Appendix 1 (c): BP 5 (Baghmara Pothi) photographed and 30-01-2015 and 04-01-2015

Appendix 1 (d): BP 6 (Bhaluwai Pothi) photographed on 29-01-2015 and 31-12-2014

Appendix 1 (f): DRP (Deorali Pothi) photographed on 12-10-2014 and 12-09-2014

RESIDENT MALE TIGERS IN LTTM AREA

Appendix 1 (g): Gaida Kawa Bhale photographed on 01-02-2015 and 08-02-2015

Appendix 1 (h): Kamal Bhale photographed on 18-12-2014 and 20-12-2014

Appendix 1 (i): Dhurba Bhale photographed on 06-03-2015 and 11-03-2015

TIGERS PHOTOGRAPHED IN BUFFER ZONE COMMUNITY FORESTS

Appendix 1 (j): Lamichaur Bhale in Parasi photographed on 02-04-2015 and 02-04-2015

Appendix 1 (k): Nangara Pothi in BandarJhula photographed on 24-04-2015 and 24-04-2015

Appendix 1 (l): Marlowe Bhale in Madi photographed on 27-05-2015 and 27-05-2015

Appendix 1 (m): Mugai Pothi in Madi photographed on 23-05-2015

Appendix 1 (n): Subadult female 9 in Parasi photographed on 01-04-2015 and 01-04-2015

Appendix 1 (o): Subadult male 14 in Meghauly photographed on 16-06-2015

PREY AND OTHER ASSOCIATED SPECIES

Appendix 1 (p): Some of the prey and other associated species photographed during 2014-15


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32C 12/27/2014 02:41PM HC3A


63F 11/29/2014 10:47AM DCE5A


8C 02/07/2015 11:18AM DK4B


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