

A STATUS REPORT ON NEPAL'S WILD ELEPHANT POPULATION

Petra Furaha ten Velde, 1997

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Cover Note

In an ongoing attempt to consolidate available information on Human-Elephant Conflict (HEC) in Nepal this document aims to make available the work of Velde, 1997, on the Status of Nepal's Wild Elephants. The original report has been digitally transcribed from a hard report with the minimum of alterations.

Michael Cordingley, 2011

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A Status Report of Nepal's Wild Elephant Population

A STATUS REPORT ON NEPAL'S WILD ELEPHANT POPULATION

It must be understood that the wild Asian elephant lives in a densely populated nation of Southeast Asia. Protection of its dwindling populations involves a wide range of conservation aspects, which need equal consideration, will their walk into the coming years be secured. One of the most challenging issues facing protection of their numbers is habitat fragmentation and increasing forest depletion. The elephant stands second to man in its need for land and has similar abilities of depleting its sources when insufficient to its needs. Therefore, continuing forest encroachment and destruction due to human activities, such as illegal settlement in reserve forests, or development projects, are obstructions which hinder their survival. Moreover with habitats shrinking, elephants are forced to wander long distances in order to meet their needs. This may even results in elephants crossing international boundaries, in their search for alternative suitable habitats. Inevitably the elephant comes to stand in increasing conflict with man over land use.

Taking this into consideration, one of the most important needs for the conservation of the Asian elephant is protection of remaining forest. Alternative strategies will need to be implemented will remaining elephant habitats be harboured. This may involve coming up with protected ranges, which serve as linkages between larger protected areas, or reserve forests.

The state of the wild elephant's of the Indo-Nepalese trans-boundary area can be considered doomed if appropriate action is not taken to understand their status and hence implement conservation schemes accordingly. The western and eastern Indo-Nepal elephants have been neglected in their needs for adequate habitats. With continuous movement taking place across borders, and consequently, the wild elephant number increasing in Nepal, conservation action will need to be implemented.

Habitat destruction today has become the prime cause for increasing elephant dispersal and migration patterns. Whether this is done internally or across country borders, both need to be considered. If elephants are of essence for life, it is our duty to protect remaining natural habitats, even if this means humbling man in his manipulation of the forest. Co-existence remains the leading issue in the safekeeping of the needs of both man and elephant, which has yet to challenge the role of conservation today.

I sincerely hope the following report will offer the Government of Nepal and related conservation organisations a better insight into the wild elephant population status of the country.

Petra Furaha ten Velde
August 15, 1997
Kathmandu, Nepal

Map. Elephant dispersal in Western, Central and Eastern regions

Table of Contents

<u>Title</u>	<u>Pages</u>
0. Introduction	[1-4] [*] 6-7
1. Western Region: Royal Sukla Phanta Wildlife Reserve and Reserve Forest	[5-19] 8-17
2. Kailali Reserve Forest: Elephant Walk	[20-25] 18-22
3. Royal Bardia National Park	[26-32] 23-27
4. Central Region: Royal Chitwan National Park and Parsa Wildlife Reserve	[33-42] 28-36
5. Eastern Region: Koshi Tappu Wildlife Reserve and Reserve Forest	[43-47] 37-42
6. Conclusion: Managed Elephant Ranges	[48-50] 43-44

Annex 1: Kailali Reserve Forest

Acknowledgements

Sources

Maps

0. Elephant dispersal in Western, Central and Eastern regions
1. Kanchanpur District: Elephant Dispersal route in and around the Royal Sukla Phanta Wildlife Reserve and areas of conflict
2. Kailali District: Elephant walk along Kailali reserve forest areas of conflict
3. Royal Bardia National Park: Elephant dispersal in the Park and areas of conflict
4. Royal Chitwan National Park and Parsa Wildlife Reserve: Elephant Dispersal and areas of conflict
5. Bara and Rauthahat Districts: Elephants dispersal in adjoining reserve forest of Parsa Wildlife Reserve and areas of conflict
6. a. Jhapa and Morang Districts: Elephant dispersal in to the Eastern region
b. Sunsari and Udayapur Districts

* Numbers in square brackets [1-4] denote original page numbers

The Wild Elephant Population of Nepal

Status study November-June 1996-1997;

An outcome of its findings

Introduction

In the wake of trans-border conservation, it is important that the Asian elephant is given priority when securing its rights to disperse and migrate country borders. Elephants can not recognize political boundaries set down by governments and policy makers, therefore it is necessary that those elephant population occurring near to borderline areas are acknowledged in their migration capacity beyond political boundaries. Though elephants may be protected in one country, these rights may not be perceived in the next. This is the situation for the elephant populations existing in North-west India, who disperse and migrate to Nepal annually. It has been seen that a percentage of these elephants are put at risk in their movement to Nepal, where they are subject to danger. As there are no protected corridors linking forested areas between India and Nepal, safety of their migration to and from Nepal is not ensured. Moreover since the status of the elephant population in Nepal is unclear, no conservation measures have been enacted to ensure their protection.

Although Nepal used to be home to a resident population of elephants, the eradication of malaria in the 1950's caused most of the forest inhabited by elephants to be destroyed. This led to the almost total annihilation of wild elephants in the country. However, with some of these forested areas still intact today, Nepal has the potential to support resident herds of elephants, making it an important area for present and future elephant conservation. If the long-term conservation of the Asian elephant is of importance, the needs of such migratory herds should be taken into consideration, especially when the preservation of suitable elephant habitats is crucial to the survival of such a large mammal. [1]

Since very little is known on the few existing resident herds of elephants or on the migration herds in Nepal, little attention has been given by wildlife managers to ensure their protection in the country. Therefore a preliminary study of the wild elephants in Nepal was carried out, so that a better understanding could be formulated of their status in the country.

With funding under World Wild Fund for Nature-International's, (WWF International) small grant package and with permission from His Majesty's Government of Nepal (HMG Nepal) and the Department of National Parks and Wildlife Conservation, a seven month survey was carried out in the eastern, central and far-western regions of Nepal. The objectives of the survey were to uncover the following:

1. the distribution of elephants throughout the country
2. an approximate population number of resident / migratory elephants per area
3. the intensity of human-elephant conflict per area and reason for conflict
4. the main migratory/dispersal routes used by elephants to enter and leave Nepal
5. the main conservation issues and threats facing the protection of wild elephants in the country

Methodology

The surveys were carried out in five protected areas of the terai belt and their surrounding reserve forests. These were:

1. Royal Sukla Phanta Wildlife Reserve
2. Royal Bardia National Park
3. Royal Chitwan National Park
4. Parsa Wildlife Reserve
5. Koshi Tappu Wildlife Reserve

The survey method included questionnaires with local communities, wildlife department staff, and naturalists, in order to find out:

1. the level of human elephant conflict
2. amount of damage done by elephants
3. a time line for human-elephant conflict
4. approximate number of elephants raiding crops [2]

Also migratory routes were stipulated along reserve forests, while interviews were carried out with bordering villages and habitat analysis of bordering forest were done as part the migratory route survey. Within each protected area surveys were carried out for habitat preference by elephants, and seasonal changes per area. This was done by foot print recordings, dung aging, and direct elephant observations in the national park or wildlife reserve.

The majority of time was spent in the Royal Sukla Phanta Wildlife Reserve and the Royal Bardia National Park, the monthly surveys carried out on movement patterns, conflict and preferred seasonal habitats (winter, summer, part of monsoon). The central and eastern regions were visited less frequently due to fewer numbers of elephants existing in these regions.

The data collected has been compiled into a status report on the existing elephant population per area. The study was carried out by the author out of interest, with the hope of attaining a deeper insight into the elephant situation in Nepal. All data collected was therefore based on personal effort and experience. [3]

The elephants of the north-Indian subcontinent extend into the terai region of Nepal. The terai region stretches across the Indo-Nepalese borders along the foothills of the lower hill range. In Nepal the terai belt extends from its eastern border to its western border along a 900km stretch. The area covers 17% of the total land area and consists of flat plains, wetland, and tropical forests. The Terai is mainly known for its large 'sal' trees, *Shorea robusta*, which can only be found here (APA Publications. 1987).

The terai belt is home to a rich variety of wildlife. Five protected areas have been established in order to preserve the remaining natural forests of the terai and its wildlife. Amongst such endangered species as the tiger and rhino, the wild Asian elephant also has its home in these regions. Where exactly does the wild elephant live in Nepal and what is its status in the country? [4]

Map. Kanchanpur District: Elephant Dispersal route in and around the Royal Sukla Phanta Wildlife Reserve and areas of conflict

1. Western Region

Royal Sukla Phanta Wildlife Reserve and Reserve Forest Area

Status of Wild Elephants

“It was as though an earthquake had taken place. Houses with gaping holes, cracked walls, lopsided posts and straw roofs, scattered tin cans, shredded clothes... but then there were also flattened wheat fields, crushed banana plants, and squashed tomato plants. And among the victimized houses, a woman lost her life by the power of the trunk. This was an earthquake effect caused by a herd of nine elephants that plundered the village of Tilakpur ward 3, Kanchanpur district, on February 6-7, 1997, for two consecutive nights. The elephants destroyed over nine houses, trampled and uprooted up to ten hectares of wheat, lentils, and chickpea plants, ate more than forty kilos of stored rice grain, salt, wheat flour, sesame seed, of which an extra weight is no accounted for. Also, clothes were ripped and thrown around, steel cutlery crushed, and cots destroyed. Was this the work of elephants or rather that of a rivalry group who carried out a looting expedition?” description from personal notes

Elephant Distribution, Number, and Human-Elephant Conflict

Background

The Kanchanpur district, located in the far-western region of the terai, is an area which has a continuous amount of elephant movement taking place in and around its border area. The district borders Indian state of Uttar Pradesh from which elephants disperse in from. These elephants are believed to be part of population of 500 individuals who are based around the Corbett National Park (Thouless 1993). [5]

Although the district has one Wildlife Reserve, the Royal Sukla Phanta, elephants were found to be occupying the Ghare ghas forest, occurring along the Chure foothills, 10km north of the reserve. The reserve covers an area of 155sqkm, but with an extension being demarcated, the area will cover 305sqkm. The Reserve proves to be too small to support a herd of elephants for longer periods of time. For this reason elephants spend a lot of their time moving between the Chure foothill forest and the Wildlife Reserve. Herd recordings within the reserve were therefore infrequent.

According to local reports elephants have been seen in this area since the early 1970's. During those times the number of elephants within the Sukla Phanta area was more than in the reserve forest. Formerly the Reserve was known to hold Asia's largest elephant named Tula Hatti, who roamed the reserve's area up to 1990. He was joined by a herd of 21 elephants who occupied the area for most of the monsoon months. Their home range used to extend into the Kailali district and on to Bardia National Park, Bardia district, where they were known to migrate to in the months of October and November. However, due to cutting of forests that lie along the Chure foothills of the Kanchanpur-Kailali forest tracts, elephants abandoned their usual migratory patterns as of 1985 (Byrne 1990).

Interestingly, this migratory route was for the last time used in November 1994, when elephants from both the Dudhawa National Park and Corbett National Park, made their way to the Bardia National Park. Since then these elephants have not returned to India, and have become residents of the Bardia National Park. During the study months the elephants recorded in and around the Royal Sukla Phanta Wildlife Reserve are therefore arrivals since 1994. [6]

Reserve Forest: Ghare ghas jungle and the villages of Barmadev, Motaina, Tilakpur, Haldukhal, Hirapur, Halapani, Arjuni.

From the months of December to March a herd of approximately 15-20 elephants were recorded in the forest belt of the Chure foothills. The elephants made their way to the Nepal side by crossing the Mahakali River and are believed to be coming from the Corbett National Park, situated 60km. west of Tanakpur. They walk along the Poonagiri valley, towards Khala Machetty forest area, and continue east along the narrow tract of the Chure foothills. The Khala Machetty area is yet the most intact forest of this range. It runs along the Mahakali River and connects to the Indian reserve forest at Poonagiri. Elephant footprints were recorded along the sandy banks of the Mahakali River, and further in the forest area. This is the primary point of crossing and also the main area where elephants obtain their water.

Continuing east along the foothill forest, the forest becomes more degraded as it suffers the effect of settlement along its boundary. Cattle grazing and firewood collection have cleared most of the forest undergrowth, and cleared many of the larger *Shorea robusta* species. The tract is 2 to 8 km wide, depending on the extent of forest cleared by the village. It consists of a deciduous forest with hard, rocky soil, yet differing in areas according to amount of annual rainfall and presence of natural water springs and rivers. Such tree species as *Schleichera trijuga*, *Shorea robusta*, *Adina cordifolia*, *Semecarpus anacardium*, *Mallotus philippinensis*, *Cassia fistula*, and as the elevation increases *Angoëssus latifolia*, and *Ficus religiosa* are found. The main water source in this area is the Mahakali River, although there is a seasonal river, Haldikhal, which flows only during the monsoon months. A naturally occurring lake also exists at 10 km from Barmadev. Elephants are known to visit this area, especially for water during the dry months. [7]

Elephants crossed the Mahakali River on December 9, and created conflict in the village of Barmadev. This village of about 200 houses is situated on the banks of the Mahakali River and is the first village elephants pass when entering Nepal. Newly planted wheat in its fluorescence stage, of 15 cm in length was trampled and eaten in 3 fields. This occurred for 2 consecutive nights. From footprints recorded in damaged fields, a herd of 9 elephants was raiding crops. Amongst the herd a large tusker was observed in the degraded forest tract during the afternoon. Elephants spent the day at 2-3 km from the village, and came down to the village area by 19:00. Crop-raiding was also observed in the nearby village of Motaina, located within 2 km from Barmadev. [8]

The herd consisted of 2 calves with footprint sizes 46cm, 65cm, aging them to be under 1 year old. There were 3 juveniles with footprints sizes 93cm, 99cm and 101cm aging them to be between 10 and 15 years. There was 1 sub-adult with a footprint size of 113cm, which aged it to be around 20 years. Finally, there were 3 adults, including a larger tusker with footprint size 141cm, aging him at over 45 years. The two other sub-adults had footprints of 121cm and 131cm.

According to interviews carried out with locally affected farmers, elephants have been coming to the Ghare ghas jungle area of Kanchanpur district for over 25 years. Although the number of elephants coming hasn't increased the amount of damage carried out by their herds has. The reasons being that formerly, the Ghare ghas jungle was used by elephant only as a route by which to migrate through between the forested areas in India to the Sukla Phanta and Bardia areas. During their journey to Bardia, elephants could be seen moving along the fringe areas of the forest and villages, but rarely stopped to feed on cultivated crops. However, this has changed in the last 3 years. Elephants have now been remaining in the forested areas during the winter season, and as a result of habitat degradation, have become habitual crop-raiders. One person was also killed in

Barmadev in September 1995, while bathing in the canal which runs along the fringe of the forest. No other incidents of human deaths by elephants have taken place in this area. [9]

The Ghare ghas forest of Kanchanpur has been degraded extensively. The impact of people and cattle on the forest was extreme in some areas, with the forest extending only 3-4km, before reaching the slopes of the Chure range. The forest was found to become more degraded going further east from Barmadev. The area is dry and rugged with a dominating species of *Shorea robusta* intermixed with *Adina cordifolia* and *Mallotus philippinensis* species. There exists virtually no undergrowth and no perennial water source. With elephants confined to the degraded forest tract, as they disperse further east, they are subject to raiding crops in order to obtain of their nutritional needs.

As a result of habitat degradation, the village of Thilakpur, located further east along the Ghare ghas jungle edge, suffered from extensive property damage. Elephants had made their way from Barmadev to Tilakpur by February 9, and spent two days in this area. With the forest tract in this area being severely degraded elephants destroyed 12 houses in 2 consecutive days, damaged wheat and lentil plants, and one woman was also killed by a bull elephant in the neighbouring village of Haldukul, when collecting firewood in the morning hours. The activities carried out by elephants in Tilakpur (as described in beginning quote) were clearly a result of a highly strung herd of elephants with insufficient habitat available for them. Although footprint recordings could not be clearly measured due to sandy soil, interviews determined that a herd of 7-9 elephants had come. From damage done to houses, the tusk indentation revealed the herd also included tuskers. Trampling of wheat and chickpea plants as well as damage to banana plants were extensive throughout the village.

Hirapur

By mid-February the elephants had made their way to the village of Hirapur, Kalapani and Arjuni, located further east from the village of Tilakpur. These villages are officially located within the northern extension boundary of the Sukla Phanta Wildlife Reserve. In the early 1970's with the proposing of the northern extension, these villages were to be relocated elsewhere. By 1990 the government had officially granted permission for the land in the Baghphanta area, however due to political reasons no immediate action was taken for relocation. Finally in 1997 the villages of Hirapur and Arjuni were partially relocated. The issue of 'sukumbasi' or landless people continues to be a major problem in the relocation of families from Sukla Phanta area. [10]

The most amount of damage took place in the Hirapur village from mid February to mid March. Hirapur has 188 houses, and is surrounded by both reserve forest and Wildlife reserve forest. It has witnessed elephants for the last 20 years, however the amount of damage caused yearly by elephants has increase in the last 3 years. According to interview prior to 1990 many elephants were passing along the fringes of the reserve forest. Since 1994 however, a herd of 6 elephants had been coming annually to the cultivated fields, damaging the wheat crop during its harvest stage. The season of 1996-1997, elephants came earlier than other years and spent more time in the area.

The state of the jungle in the Hirapur area improves as one nears the Chure foothill slopes. The forest suffers most from illegal tree felling, with the large Sal trees (*Shorea robusta*) undergoing most destruction. Also hunting of deer and wild boar was extensively carried out, and as a result the presence of wildlife was low in the area surveyed.

The main tree species recorded were *Aegle marmelos*, *Mallotus phillipinensis*, and *Shorea robusta*. During this time the Bel tree (*Aegle marmelos*) was fruiting and well liked by elephants. From dung piles examined, the Bel fruit was mainly fed on by elephants. Water is a problem in the area, as the only water source occurs near the hillside, at 12 km from Hirapur.

The elephants visited Hirapur for 3 consecutive nights. They were found to be entering the village either from the northern section of the forest or from the southern section. Interestingly, since most of the cultivated fields situated on the northern boundary of the forest suffer most from direct damage, people were found to be lighting fires and making noise throughout the night, in order to prevent elephants from coming. In the southern section however, this is occurring less. Therefore on two occasions elephants made their way via the degraded reserve forest extending south via the former cultivated fields of Arjuni village and back towards Hirapur. In this way elephants raided crops in the southern fields of Hirapur, while watch was being kept in the northern part of the village, the farmers not knowing elephants had already entered their fields from the south! [11]

Footprint recordings revealed a herd of 6 elephants, which included an adult male who was observed raiding wheat at 02:00 on February 13 and 14. The herd included 1 calf with a foot print size of 47cm, under 6 months old, 2 juveniles with 78cm and 91cm footprints, aged 6 and 8-9 years, 1 sub-adult with 106cm footprint size, aged 18 years and 2 adults with footprint sized 119cm and 138cm, aged 30 and 40-45 years.

From footprint sizes recorded in Barmadev and Hirapur, these were comparatively two different herds. This was evident since during the month of February there was still elephant movement taking place along the Khala Machetty and Barmadev areas. Therefore, elephants possibly enter Nepal together, as a joined herd of some 15-20 animals, and then split into 2 groups. Taking the surrounding habitat into account elephants are forced to disperse along the forest tract in order to obtain a sufficient food intake. This year elephants went as far east as Kalapani and the neighbouring forests of the Kailali district, before returning to the Mahakali area.

By March most elephants had returned to the Mahakali River and by the beginning of April there was no trace of elephants anymore in the Ghare ghas jungle. During this time most rivers have dried and water had become difficult to obtain. Moreover, the cultivated fields lie fallow and therefore there is nothing to attract elephants to the area anymore. During this time elephants either return to the adjoining forested areas in India, or enter the Royal Sukla Phanta Wildlife Reserve for a few weeks at a time. [12]

The Royal Sukla Phanta Wildlife Reserve

The Royal Sukla Phanta Wildlife Reserve lies in the western most region of the country and covers a total of 305 sqkm, which includes the area of the northern extension, still in the process of being officially established. The reserve used to be a famous area for hunting, before it was declared a Wildlife Reserve in 1976. The area extends from the flatlands in the south to the Chure hill range in the north and contains a variety of different habitat types. The reserve is mainly known for its grasslands which are interspersed throughout the southern section of the Reserve. Also the largest existing herds of 'barasingha' or swamp deer are found only in the Sukla Phanta Wildlife Reserve.

There are 5 major habitat types found in the Reserve. Along the Mahakali River, which marks the southern boundary of the Reserve, a *Dalbergia sissoo* and *Acacia Catechu* forest are found. The flatlands are made up of grass and wetlands, intermixed with a Riverine deciduous forest of the main tree species *Trewia nudiflora*, *Ficus glomerata*, and *Mallotus philippinensis*. The main shrub found growing here is *Murraya keonigii*. This forest follows the perennial Bahuni River, which is rich in fish and frog species, and also is home to the Gharial crocodile and numerous bird species. The Bahuni River is an important component of the reserve as it winds its way through the area, turning into a wetland, swamp area in some places, to a deep flowing river in other areas. The wetlands are composed of tall grasses with the main species of *Imperata cylindrical* growing extensively along the wetland area. The Rani Tal and Shikari Tal are the two naturally occurring lakes in the reserve, and make up most of the wetland areas. The grasslands or 'phantas' cover a large area of the reserve, with Sukla Phanta, the biggest continuous grassland, covering a total area of 55 sqkm. Both the *Bombax malabaricum* and *Butea frondosa* tree species are found growing along the periphery of the phantas. The remaining habitat consists of a dry deciduous or Sal forest type, which was found to occur mostly at higher elevations from the grassland area. The main tree species is *Shorea robusta* intermixed with *Terminalia tomentosa*, *Buchanania latifolia*, *Schleichera trijuga*, and *Syzygium cumini*. The main vines are *Bauhinia vahlii* and *Vilis latifolia*. [13]

Elephants

The presence of wild elephants in the Reserve did not follow any set pattern. Although 3 bulls were continuously recorded within the Reserve, during the study months of December to June, herds were recorded in the Reserve only in March, April, and June. The length of stay by herds within the Reserve was sporadic and their actual number was not accounted for. A herd of 14 elephants were seen along the banks of the Mahakali River by army staff on March 19. From footprint recordings a herd of 6 elephants had passed through the Keptan ghat forest area, and made their way along the Bahuni River towards Sukla Phanta. Efforts were made to locate the herd, however after 4 consecutive days only fresh signs of elephant footprints and movement were followed, but direct observations of the herd could not be made.

In the month of May a herd of 4 elephant footprints were recorded in the Jhilmila area. In Keptan ghat forest area recent elephant movement was also recorded. In June again a large herd was met by army staff while patrolling the Mahakali River area. According to reports this herd had 12 animals; however with survey of the area, 6-9 elephants were accounted for. According to local reports herds are more frequently seen during the monsoon months beginning in July.

Direct observations of bulls were made. The 3 males, with footprint sizes 116cm, 128cm, and 163cm were recorded to be resident in the Reserve. The bull with the footprint size of 116cm was met in the Sinnhpur area. He was a large adult bull of between 20-25 years, with tusks of about 1ft. long, a cut tail, and the right ear had a hole on its base. His double-domed head was particularly predominant, similar to the bulls recorded in the Royal Bardia National Park. The oldest bull of 50+ years (163cm) was met several times in the Bhauraya Phanta area. His old age was well visible, as dung samples showed that mastication was poor. This bull was well-recognizable by his foot prints, not only because of their size, but also because the left rear foot had one very elongated nail. This nail protruded about 19cm in length and was 14cm wide.

The preferred elephant habitats were found to be primarily in the riverine forests and wetland areas occurring along the Bahuni River. These areas offer shade and water and plenty of grasses to feed on. The main tree found to be browsed on in the forested areas was *Mallotus philippinensis*.

The following areas were identified as elephant-preferred habitats: [14]

1. Rani tal-Sinhpur: used mostly by 1-2 bulls
2. Sinhpur jungle, Kuluwa-phanta, Bhaurata Jari/Phanta- Bahuni River-Shikari tal jari-Kharaiya phanta
3. Mahakali River-Dekhanaghat-Sira jari-Keptam ghat-Barkaula Sinduri phanta

These areas were most used by elephants during the study, with the Keptan ghat riverine forest area, along the Bahuni River, especially preferred by herds.

Elephants used to enter the Reserve from 2 primary entry points. One was by crossing the Mahakali River at 'pillar 23', near to the village of Laghabagha. While another was from entering the Reserve in the southeast section, near the village of Jhilmila. Elephants come from the Thatargunja jungle, Haxarthana, in India, which connects to the Sukla Phanta Reserve forest. In the last 5 years, however, the forest on the Indian side of the Mahakali River has been depleted and settlement have come up. Similarly, in the southeast section, although the forest across the Indo-Nepal borders is continuous, the Thatargunja jungle has become more degraded. Another hindrance for the elephants in this area is the construction of the Mahakali Irrigation Project, which has disturbed wildlife of the Sukla Phanta Reserve. With both these ways becoming more difficult for elephants to enter the Reserve by, it is not clear as to where exactly elephants are entering the reserve at now.

A third way has been partially stipulated. This sees elephants coming via the Ghare ghas jungle of the Chure foothills, passing the village of Hirapur, and making their way south towards the main highway, and crossing here at a point near to the Champapur post. From here elephants continue south through the degraded Sal forest (*Shorea robusta*), towards Beldandi, and enter the Reserve. Although elephants were seen crossing the highway by Champapur staff in February of 1996, whether or not this way was used this year (1997) is unclear. It is likely that elephants are still crossing the Mahakali River, but are now entering at a different point, in need of further verification. [15]

Human-Elephant Conflict

"If elephants can cross the Mahakali River during the rains, what will stop them from coming to our fields?" farmer in Jhilmila, Sukla Phanta Wildlife Reserve

A human-elephant conflict has been existing in villages bordering the reserves southern and northern boundaries.

The following villages had conflict:

Southern boundary

1. Radhapur
2. Jhilmila
3. Imliya

Northern boundary

1. Bankatti

2. Palliya
3. Pipriya

Prior to 1994, conflict in the villages of Radhapur, Jhilmila and Imliya was intense. A total of 8 people have been killed in the area since 1984, with the latest death occurring in 1995. 10-15 elephants used to come in the months from August to November, during the harvesting times of corn and paddy. These elephants were coming from the reserve area, as well as from the Thatargunju forest in India, located at 1.5km from Jhilmila.

Since 1995 the number of elephants decreased, and in 1996-1997 no elephants were seen in the village area. The main reason is believed to be due to the completion of the Mahakali Irrigation Project, which runs through and along 3 villages. The canal was first started in 1971, and after undergoing various management problems, the project in Jhilmila area is only due for completion this year. The construction of the canal has created a lot of disturbance along the forests of the Sukla Phanta area. Continuous activity along the forests of the Reserve's border from trucks, jeeps and tractors, is the main cause of disturbance, also, a new road had been made which links up to India, by cutting through the wildlife reserves forests, along the Beldandi camp. The road has brought an increase of human activity and a depletion of the forest cover in this area. For these reasons elephant numbers have sharply decline in this area. A thorough impact assessment of the Mahakali Irrigation Project on the reserve was not effectively carried out, which has now led to steady degradation of the Reserves southern boundary area. [16]

The conflict in the northern area, near the Reserve's headquarters at Majhgaon, has increase in the last 2 years. According to interviews carried out with affected farmers up to 13 elephants come during the harvesting times of corn and paddy. They come from the Barkaula side in the Reserve and spend 3-4 months in the area, raiding crops almost daily. Although elephants have been seen in these areas for over 20 years, crop-raiding incidents have become common only since 1994.

According to details that were collected by the Reserve's staff the amount of damage recorded in 1995 by elephants was:

<u>Crop</u>	<u>Area Destroyed (hectares)</u>	<u>kg</u>
Paddy	5.731	20,061.51
Maize	0.944	2,454.66
Millet	0.0067	5.36
Lentils	0.0163	

Conservation Issues

Although the Sukla Phanta Wildlife Reserve covers a small area, and is therefore unable to support a resident population of elephants, its locality is of major importance for the wild elephants of the Western trans-boundary area. Together with the Chure foothill forests, the wildlife reserve and reserve forests of Kanchanpur district have a significant role to play in the present and future protection of the Indo-Nepalese elephant populations. There are, however, prominent conservation issues facing the conservation of elephants in the area.

With the Mahakali Irrigation Project developing along the fringes of the wildlife reserve, as well as village development taking place along and within the Ghare ghas reserve forests, the natural habitats of these areas are undergoing steady

degradation. Similarly, the border area at Dhodara-Chandani village areas, border pillar number 23, situated along the Mahakali River, has also suffered from impact on its forested areas. Although formerly the forest across the Indo-Nepalese borders was continuous, nowadays this continuation has been fragmented by settlements. Elephants now face human obstruction and development activities, when moving into the reserve. [17]

Although the Mahakali Irrigation Project, which is in its final stages of completion, has had major impact on the neighbouring protected forests of the wildlife reserve, no proper impact assessment of the Project on the Wildlife Reserve has been made. For these reasons, the forests neighbouring the canal construction sites are suffering the impact, and as a result elephants are rarely seen in these areas anymore. One of the impacts observed on the forest, was the new establishment of a gravel highway. The highway runs from the Indian border of Hazarhathana, to the east-west highway at Daidji, through the reserve forests, and along the border area of the reserve. The road has depleted much of the fringe area forest cover, as trees are cut and used by local construction companies. Protection of the forest by the Wildlife Staff is evidently not secured in this area. Moreover, the Sal forest of this area is used by elephants when dispersing from the Hirapur area, north of the east-west highway, to the preferred areas in the Wildlife Reserve. With increasing human activities taking place in this southern boundary area, the Royal Sukla Phanta Wildlife Reserve, therefore lacks boundary security from the encroaching developments.

Although it can be argued that where formerly a human-elephant conflict was severe, has now been diminished due to the construction of the canal, which has solved the conflict, it can not be reasoned as a positive influence on the reserves wildlife area. Disturbance from the main canal construction camp at Beldandi can be heard in the Rani thal wetland area, as well as along the Khariya grassland and forest areas, located along the Chaudhary River. This disturbance, together with local village impact on the forest, makes the southern boundary area of the Sukla Phanta Wildlife Reserve a fragile area. Since two years elephant numbers have decrease in these areas, as are they rarely seen dispersing in from the Thatargunja jungle in India, or from the Barkaula side within the reserve.

The western boundary of the reserve, which borders India across the Mahakali river, is another insecure area. Not only is poaching more severe here, since international borders are easy get-a-ways for poachers, but also human population pressures have affected the state of the forest here. The well-known bull elephant, Tula Hatti, was killed in this area, when he stepped on a [18] home-made bomb while passing through Dhodara-Chandani villages. This does convey the general negative feelings people have towards elephants in these villages. With human settlements having fragmented much of the formerly intact forest, when elephants move from adjoining Indian forests to Sukla Phanta Wildlife Reserve, contact with human settlements is inevitable. An increasing human-elephant conflict in this area could make the way fatal for elephants when entering the Reserve via this way.

The Ghare ghas jungle of the Chure hill range is also an important area for elephants conservation and therefore in need of effective protection. Since the forest is protected under the Kanchanpur local Forest Division office, the forests are not secured for the purpose of conserving wildlife. Therefore no serious efforts have been made to well-protect this forest tract. The forest has been affected by advancing fringe area settlements, as firewood needs as well as cattle grazing needs are common to all.

This steady degradation of the Ghare ghas forest has consequently resulted in a human-elephant conflict, since the remaining forest tract to which elephants are confined is unsuitable to their needs.

The only possible action recommended for Sukla Phanta Wildlife Reserve and Reserve forest areas is better protection of the Ghare ghas forest tract. This forest tract should be linked to the neighbouring forests of the Kailali district, which also make up an important component of the elephant dispersal area. With the forest tract still intact, this area could be established as a corridor linking up elephant areas across the Kanchanpur-Kailali- and Bardia areas. The establishment of the corridor would ensure elephants with sufficient forest area to disperse by, as they make their way via the Chure foothill forests to the Bardia National Park, located 160 km east. Also, further study is needed on elephant movement inside the Reserve and efforts are needed to find out where exactly elephants are entering the reserve from. This information would supply the link for further action taken on corridor protection.

The Sukla Phanta Wildlife Reserve, Kanchanpur reserve forests, as well as the continuing forests of the Kailali district and the Bardia National Park, Bardia-Banke districts, together make up an area most suitable for the protection of wild elephants occurring in the Western trans-boundary area. (See conclusion). [19]

Map. Kailali District: Elephant Walk along Kailali Reserve Forest and areas of conflict

2. Kailali Reserve Forest

Elephant Walk

Kanchanpur-Kailali-Bardia

“We saw a line of elephants, there must have been over 20, passing along the border edge of the forest, very quietly. They came 3 years ago around paddy harvesting time. We haven't seen them again since then.” Ranikunta village, Kailali

Introduction

The elephant walk is a migratory route which has been used by elephants for decades. Since elephants do not recognize country borders, their migration takes them from the forests of Uttar Pradesh in India, to connecting forests in Kanchanpur, Kailali and Bardia districts of Nepal. The migratory route exists outside of any wildlife protected areas, and therefore these elephants are not assured protection as they journey between India and Nepal.

For years elephants migrated between 4 protected areas of Corbett National Park and Dudhawa National Park in India and Royal Sukla Phanta Wildlife Reserve and Royal Bardia National Park in Nepal. These areas were connected across continuous forest tract, which allowed easy movement across borders by elephants.

However, with an increasing human population occurring along this forest tract and little control by the government over the forests' natural wealth, the forest suffered extensive destruction. As settlements developed, so did the need for firewood increase, as was the forest useful for cattle to graze in. Furthermore, with the construction of the east-west highway in Nepal this forest tract was further developed. By the late 1980's therefore this forest through which elephants migrated was turned into a degraded area. Along the Indo-Nepalese boarder as well, large tracts of the forest were converted into settlements, hindering the way of the giants as their journey to and from the protected areas became increasingly difficult, and fatal as well. [20]

This route was used for the last time used by the elephants in October-November of 1994 (2049-2050). According to interviews carried out with villages located along the elephant walk, elephants did not spend much time in the area. Interviews revealed that elephants used to be seen twice a year. During the months of June/August elephants could be seen journeying west towards Bardia. Then by the months of October- November these elephants were seen returning towards the Ghare ghas jungle of Kanchanpur district. Elephants have been seen in these areas since 15-20 years, when large herds of elephants used to pass along the fringes of the forest. During their migration to and from the Royal Bardia National Park elephants rarely stopped to raid crops. Instead elephants were known to walk non-stop, making their way from Sukla Phanta Wildlife Reserve to Bardia National park within two days. This saw elephants walking a total of 130 km. When elephants for the last time journeyed to the Bardia National Park their way was not easy. This could be a reason why elephants have not returned to their related areas in India, and have remained in the Park since their last migration in 1994.

The Kailali forest is protected as a reserve forest under the control of the local forest department as well as by local community groups or the VDC (Village Development Committee). A total of 100,000 hectares of forest have been identified as private lands. These lands are privately owned and are usually located near to the village site. The owner of this land is given permission by the forest department to cut

down trees, under certain rules. Trees are not allowed to be cut down if they are situated near to a hillside, water, or temple. Other than this the owner can cut down any number of trees needed as long as permission is first obtained from the department. Any other tree felling is considered illegal unless permission has been given. The department protects the forest by establishing guard posts located at various points along the forest area and the east-west highway. [21]

The Migratory Route

There are two main routes used by elephants to migrate to and from Bardia National Park and back. One route comes from the southern jungle tract of Kailali district, known as the Massuriya or Basantha jungle, which connects south to the Dudhawa National Park and north to the Chure foothill forest. The foothill forest here is known as Baraban jungle. Together the Massuriya jungle and the Baraban jungle make up the most intact forest tracts in Kailali district. Elephants make their way via the Massuriya jungle to the foothill forest, where they then head east towards Bardia National Park.

The second migratory route comes from the west, with elephants migrating from Corbett National Park to the Ghare ghas jungle of Kanchanpur and on to the connecting foothill forests of Kailali. Once elephants reach the environs of the Karnali River, they cross the east-west highway at a point some 5 km from the settlement of Lamkhi. They cross the highway heading south, towards the Chatiwan reserve forest located along the Kauriala River. From here elephants enter into the Bardia National Park by crossing the Karnali River and her two distributaries, the Kauriala and Geruwa.

At one point also, elephants used to migrate from Dudhawa National Park to Sukla Phanta Wildlife Reserve across the Laljari jungle. The Laljari jungle, located in Kanchanpur, connected south to the forest of India and onto Dudhawa National Park. This saw elephants directly moving into Sukla Phanta from there. However the Laljari jungle no longer exists since it has been cleared for settlement; therefore elephants are no longer able to make their way to Sukla Phanta from Dudhawa. There is a possibility however, that elephants make their way to Sukla Phanta via the foothills forest of the Chure range. Once they have made their way through the Massuriya jungle, they can head west. This would only be done by males, however, who tend to venture out into unknown areas more than herds do. [22]

After extensive surveys were carried out in Kailali's forested areas and villages located along the forest the following routes were stipulated:

1. Coming from Corbett National Park:

Corbett National Park > Haldwani Reserve Forest > Manhara > Tanakpur hills > Poonagiri > Sukhidakh > MAHAKALI River > Kanchanpur district > Kala Machetty > Barmadev > Motaina > Musepani > Hanuman nagar > Haldukhal > Tilakpur > Daidji > Hirapur > Kalapani > Arjuni (and elephants go into Sukla Phanta, cross the highway near to Chamapapur guard post) > Daumla ghat > Sisniya ghat > MOHANA River > Kailali district > Malbella > Olleni > Kolmoda > Thegadi > GODAVARI highway > Banskotha > Gauri (Lalpur) > Harriya > Khatauthi > Kuchaini > Jhil (Chaumala) > Lattaya > Andaya > Gauri Ganga River > Rampur > Ramshikarjala[†] > Bassuriya > Budkuwa > Ranikunta > Malmanga > KANDRA River

[†] Ramshikarjala is the point where migratory routes 1 and 2 join at the Chure foothill forest

> Kumbia > Bachella > Chainpur > Bahunpur > Baghmara > Kovhapur > Taglipur (Lamkhi) > Choudary Simal Tree > EAST-WEST highway > Dhorajyari jungle > Japatpur Nursery > Kauriala River > Bardia National Park

2. Coming from Dudhawa National Park:

Dudhawa National Park > Chandanchowki > Lalboji > MOHANA River > MASSURIYA jungle > Himathi > Jamunella > Pahalvan > Gangaluwa > Rajmudiya > Shivpur Kompha > Naphorwa > Kontha > Tappa > Murgawuha > Ambasa > Sissays > Lattaya > Balhawanpur > East-west highway > Ramshikarjala > Bara ban jungle > and then elephants head east towards Bardia National Park along the same route as described above. [23]

Status of Migratory Route

The elephant walk saw elephants walking along the forest fringes, near the vicinity of the villages. Rather than make their way along the more rugged terrain, along the Chure slopes, elephants migrated along the flat forest plains. With the terrain becoming more rugged north of the east-west highway, elephants would face more difficulty crossing these areas. The way the route followed saw elephants covering less distance in order to reach the Bardia National Park. Elephants had not altered their walk due to the developments of villages and a major highway along their route.

The forest tract through which the migratory route passes was found to still be continuous and relatively intact. The forest was degraded in all areas surveyed with the impact of cattle grazing having the most influence on the state of the forest. Cattle grazing results in a low forest undercover, since it dries and hardens the soil making it infertile for new plants to grow. In most areas the forest extended between 8 and 15 km before reaching the slopes of the Chure hills. This depended on the extent of village development each specific area surveyed.

The forest is of a mixed dry deciduous type, with the main tree species of *Shorea robusta*, *Mallotus philippinensis*, *Adina Cordifolia*, *Terminalia tomentosa*, *Semecarpus anacardium*, *Acacia catechu*, *Dalbergia sissoo*, *Phyllanthus emblica*, *Syzigium cumini*, and few species of *Terminalia bellerica* occurring (see appendix 1 for details).

The best forest tracts were found to be occurring along the major water systems of the Shiv Ganga, Gauri Ganga, Manhara, and Kotiya Rivers. Elephants were not found to be migrating along the forests of the Goda Godi wetland area, but instead made their way further north, nearer to the slopes of the Chure range.

The most problematic areas for elephants to cross were: [24]

1. The Malbella > Olleni > Kowapur > Thegadi > Banskotha up to Harriya areas, which have highly degraded forest areas. After crossing the Mohana river elephants enter the Kailali District, where the first 10-15 km of forests have been depleted due to human activities. Elephants also need to cross the Godavari highway to pass the Banskotha, another highly degraded area. The army has also set up a permanent base in the Godavari-Bhanskotha forest area which has further depleted the forest cover and caused disturbance in the area from shooting squads. In the Harriya forest area the construction of a canal has destroyed much of the forest cover, and could be problematic for elephants to pass through.

2. going further east along the Bara ban jungle, another area of difficulty was the Muda and Lamkhi areas. Here increasing settlement has encroached on the forests area as well, which has depleted the forest. The forest in this area was found to be only 4-5 km wide, before reaching the Chure hills.

3. The third problematic area was in the Dhorajyari area. Elephants cross the east-west highway and enter the degraded Dhorsjyari forest. This forest used to extend south to Tikkapur, but has now, for the most part been cleared by settlements. Elephants encounter a difficult situation when crossing this tract of forest and settlements to reach the banks of the Karnali River. A *Dalbergia sissoo* plantation occurs near to the village of Jagatpur, through which elephants were seen moving. According to fishermen, who were fishing on the Kauriala River early in the morning, the elephants seemed confused as to where to go, when they reached the banks of the river. According to them the elephants turned back again, and then were seen later on crossing the river.

Although herds of elephants have not been seen in these areas since 1994, the southern Massuriya jungle does receive single bulls visiting its fringe area with India. This forest connects to the Indian side, but has been highly degraded, which could be why herds have not been passing through this area after the 1994 migration. The forest area near to the Rampur village, situated 10 km north of the Kandra river bridge, also witnessed 3 bulls passing along the forest in November 1996.

It can therefore be concluded that although the forest tracts through which elephants migrate are continuous, due to increasing human activities in the forested areas, herds have ceased to use the corridor on an annual basis, as was formerly done.
[25]

Map. Royal Bardia National Park: Elephant dispersal in the Park and areas of conflict

3. Royal Bardia National Park

Status of Elephants.

“These elephants used to come and go from Sukla Phanta Wildlife reserve and spend few months here before returning back again. Now because the forest there is less, elephants have decided to stay here.” Farmer in Bakuwas, Bardia National Park

Elephant Distribution, Number and Human-Elephant Conflict

Background

The status of elephants in the Royal Bardia National Park has undergone an interesting change in the last 3 years. The park has witnessed an increasing number of elephants entering its area since 1994, which have now come to reside permanently in the Park. Formerly these elephants were temporary migrants to the Park, spending 3-4 months in the area, before returning to adjoining areas in India. The only known resident elephants prior to 1994 were two very large bulls. These bulls were first seen in the Park in 1987, and later were named Raja gaj and Kancha gaj, after speculation was made that one of these bulls could be one of the biggest Asian bulls in South-east Asia. Raja gaj has a shoulder height of over 11 feet and a massive body size. His particular high-domed forehead also gives him an outstanding appearance.

In November of 1994 a group of 31 elephants were first witnessed crossing the Kauriala River near to the village of Jagatpur. According to local reports first a group of 17 were witnessed along the banks of the Kauriala, by fishermen early in the morning. Later on in the day a group of 14 were seen crossing the river at the same place. Since then, the total number of elephants residing in the park has increased to 46-50 animals (Spring 1997). These elephants migrated in from the Dudhawa and Corbett National Parks in India, making their way along the described elephant walk of the Chure foothill forests (section 2). [26]

Royal Bardia National Park

The Royal Bardia National Park lies in the Bardia and Banke districts of the south-western Terai region. The Park covers a total area of 968 sqkm which makes it the largest protected area in the Terai. Due to its topography which ranges from the slopes of the Chure hill range to the river banks of the Karnali River, the area consists of numerous ecosystems, equally rich in flora and fauna. There are six main types of vegetation found in these ecosystems, which include a riverine forest, ‘Sal’ (*Shorea robusta*) forest, *Dalbergia Sissoo* and *Acacia catechu* forest, Savannah grassland, mixed hardwood forest, and tall grass floodplains (Upreti, 1994).

The northern boundary of the park is marked by the Chure hills, followed by the foothills of the Bhabar area, then by the alluvial flat land, and the riverine flood plain in its southern boundary. The Karnali and its two distributaries, the Kauriala and Geruwa, along with the Babai River are the main river systems of the park.

The Royal Bardia National Park is one of the best wildlife areas in the Terai and is therefore a prime area for elephant conservation.

Elephants

In the last three years the number of elephants entering the Park has increased from 2 resident bulls to 46-50 animals. These elephants were formally driven from

Nepal to adjoining forested areas in India, during the eradication of malaria in the 1950's when large tracts of forest were clear-felled. A group of some 25 animals were known to have spent 10 years in the Dudhawa National Park, while still making seasonal migrations to Bardia National Park. These animals along with a herd of 21 elephants migrated for the last time to the Royal Bardia National Park in November, 1994. From surveys carried out in the adjoining reserve forest areas of Katarnian ghat as well as in the neighbouring Kailali reserve forest elephants have not passed through these areas again since then.

There are at present two herds occupying the eastern and northern regions of the park. These herds are operating independent of each other, with one herd consisting of 9 members, and the other of 13 members. They reside mostly in the Gothi area along the Babai River, while making occasional visits to the Karnali flood plains. [27]

During the study elephants were observed in the Karnali flood plain area. Bull elephants were seen more frequently in this area, then herds were. Herds were however found to be using the area for 2 weeks at a time during the month of November, February, and March-April. A herd of 17 joined by independent bulls to form a group of 21 was recorded near to the Parks headquarters in March. The bulls were identified as Kancha gaj, Deep gaj and Babai bull. Babai bull usually visited the Karnali area jointly with the herds.

Apart from the bulls, the herd observed in the Kauraha phanta / Bakaura areas, consisted of 2 calves, 2 juveniles calves, 2 sub-adult males, and 7 females. Amongst the herd one old female was identified, who was often seen on her own, walking slowly behind the family members. This female was seen numerous times joined by 2 juvenile male calves, and has now become resident to the Kauraha phanta area.

Bull elephants were found to be occupying the Karnali floodplain area for longer periods of time. Although six bull elephants have so far been identified by local naturalist. Raja gaj, Kancha gaj and Deep gaj were mostly seen in the Karnali flood plain area, while three other bulls including Babai bull resided in the Babai valley area.

Elephants made their way from the Karnali flood plains to the Babai valley via Dhanaauwa thal. From there, they crossed the east-west highway to Khair vatti – Kuhavar – and on to the Babai valley. During the harvesting time of paddy elephants diverted their way in order to raid crops in the villages of Balhate and Karmala, situated along the Ambasa forest.

The most preferred habitats in the park were Savannah grasslands, *Dalbergia Sissoo* and *Acacia catechu* forest, and tall grass flood plains (Fjellstad and Gersteinham 1996). Elephants were mostly observed in the tall grasslands of the Karnalu, as well as in the riverine forest. These areas were mainly the Kauraha and Bakaura grasslands and riverine forest, JB's camp, and the Lalmate area. The main tree species preferred by elephants were *Acacia catechu*, *Dalbergia sissoo*, *Ficus golmerata*, *Mallotus philippinensis*, and *Bombax ceiba*. The main grass species fed on were *Saccharum spontaneum*, *Phragmites karka*, and *Arundo donax*. [28]

Human-Elephant Conflict

As a result of an increase in the wild elephant numbers a human-elephant conflict has developed. According to interviews carried out in the Park's bordering villages, for many years' only 2-3 bulls visited the village areas. Reports of

herds visiting the cultivated field was rare, however a herd of seven was know to use the park on a temporary basis. With the arrival of herds in 1994 however, groups of elephants now visit the villages of the eastern boundary, near to the Park's headquarters at Thakurdwara. Raiding in this area is more severe, compared to the villages north of the highway. In the western boundary, across from the Karnali River, bulls were only operating with herds rarely seen here.

The areas of conflict are:

	Eastern Boundary	Western Boundary
1	Chitkeya	Bindragau
2	Gabriella	Sunaiphanta
3	Mohanpur	Gupthipur
4	Bhanket	Banjeri
5	Bakuwa	Khonpur
6		Khalagau
7		Tingarua
8		Dhakinpurwa
9		Uttar
10		Dhangpur
11		Gola
12		Janaknagar
13		Jyotipur
14		Shantipur Dhukuniya
15		Madhavpur

[29]

The villages occurring in the western boundary, are situated along the banks of the Karnali river. This formerly connecting forest from the Kauriala river banks to the Kailali district has mostly been cleared, due to increasing settlement. The only remaining forest of this area, occurs as a 7,000 hectares strip known as the Chatiwan jungle. It consists of a dense thorny shrub layer intermixed with *Acacia catechu* and *Dalbergai sissoo*. During the crop-raiding season, elephants were not found to be venturing into the Chatiwan jungle except for an occasional bull elephants who was seen by the Balchaur forest check post, near to the Chatiwan jungle.

The human elephant conflict in the western flood plain area is carried out primarily by 2-3 bulls. These bulls, mainly Raja gaj and Kancha gaj, operate extensively in this area. With 10-15 years of raiding experience apart from raiding crops, these bull raid stored grains from houses, destroy vegetable gardens and fruit trees, as well as barrels of home-made alcohol. On average Raja gaj and Kancha gaj only visited the villages of this region, but were sometimes accompanied by 2-3 other bulls. House damages in these villages were more, compared to the eastern section. One person was killed in November 1996, which is the only record of human death in this area so far.

The conflict in the eastern section is carried out by herds of between 7-15 animals. All villages in this area received elephants during the paddy harvesting time, in the months of October and November, while the village of Chitkeya, which lies near to the Parks headquarters, received elephants in the month of March as well. The

old female accompanied by the 2 sub-adult calves and Kancha gaj visited the village for 3 consecutive days, destroying harvested wheat.

The human elephant conflict in the northern section, mainly in the villages of Balhate and Karmala, do receive herds and an occasional single bull, during the harvesting time of paddy. The bulls Raja gaj and Kancha gaj do not operate in these areas, but raiding is done by herds and single bulls residing mostly in the Babai valley.

Conservation Issues

The Royal Bardia National Park with its abundance of water and diverse number of ecosystems, offers its wild elephant population of between 45-50 animals the most suitable habitats in the country. It is also home to some of south-east Asia's most magnificent bulls and therefore Park management should provide secured protection of these giants. Due to the Park's large area, and with the possible expansion of another 900sqkm, there are at present few conservation issues hindering elephant protection on the Park. In-depth study will, however, be needed on population dynamics as well as elephant impact on the Parks vegetation. In the Thakurdwara area, for example, the impact of the herds was considerably noticed in the month of March. Although the elephant herds spend most of their time in the Gothi area, during their visit to the eastern section of the Karnali flood plains, their impact was recorded to be severe. The Thakurdwara area with its riverine forest and tall grass flood plains is a well-preferred area by elephants, however, its area is too small to support herds of elephants for longer periods of time. For these reasons, elephant herds are not seen in the area frequently for longer than 2-3 weeks at a time, and are known to spend most of their time in the Babai valley.

The impact of wild elephants in the Thakurdwara area was especially noticed due to other activities already affecting the natural state of the area. Not only is tourism concentrated in the eastern section of the Park, but the domestic elephants stable is located here as well. Both tourism and the used of domestic elephants have increased the amount of activity taking place, causing disturbance for wildlife as well as on the vegetation. Therefore, with a herd of 21 wild elephants also temporarily residing in the area, the vegetation suffers double impact. Mainly the tree species of *Mallotus phillipinensis* and *Bombax ceiba* underwent major destruction during these months. Many of the *Mallotus* trees were pushed over, and the bark stripped off the *Bombax* species. [31]

From a management aspect, should the number of elephants increase either due to an influx of migrating elephants from India, or due to a good reproduction rate, elaborate research will be needed to understand the carrying capacity of the Park. Possibly, should elephant numbers sharply increase in the coming ten years, elephants may seek to disperse/migrate to India again. As of now, however, it is unlikely for elephants to attempt to journey along the Chure foothill forests again, as was done in 1994. Recommended action would prefer joining the Park via a Managed Elephant Range to the Kailali and Kanchanpur reserve forest and on to adjoining areas in India. This would allow elephants to freely disperse between suitable areas and be ensured protection in their journey (see conclusion). [32]

Map. Royal Chitwan National Park and Parsa Wildlife Reserve: Elephant Dispersal and areas of conflict

Map. Bara and Rautahat Districts (Nepal): Elephants dispersal in adjoining reserve forest of Parsa Wildlife Reserve and areas of conflict

4. Central Region

Royal Chitwan National Park, Parsa Wildlife Reserve and Reserve Forest

Status of Wild Elephants

“We shouldn't try chasing elephants when they come to our fields. They are also living creatures like us, but we just speak a different language! In my experience with elephants, if we try to chase them by making noise and throwing fire, they'll just get angry back at us. If we don't do anything, usually they don't cause so much damage.

After all, the elephant is Ganeshjee, you know”. Farmer in Amelkhganja, Parsa district

Elephant Distribution, Number and Human-Elephant Conflict

Background

The central region formally held the only existing resident elephant population in the country. A group of about 25 elephants were known to reside in Parsa Wildlife Reserve area. Until recently, however, elephants have started to disperse into the Royal Chitwan National Park seasonally. Since the Parsa Wildlife Reserve is a very dry area, during the months of April to June elephants can mostly be seen along the slopes of the Chure range of the Royal Chitwan National Park. With the onset of the rains in July elephants return to the Parsa Wildlife Reserve, although movement by bulls between the two areas is constant throughout the year. This is especially so during the harvesting time of paddy. An exact population number is not accounted for, however according to wildlife specialists and local reports their number comes to between 20 to 25 individuals. [33]

Royal Chitwan National Park

The Royal Chitwan National Park covers a total area of 932 sqkm. It is situated in the terai lowlands of the south central region, and has become a world heritage site due to the successful conservation of the Asian rhino. The Park consists of the small Chure range, which rise towards the east, ranging from 150m to over 800m. 70% of the vegetation here is *Shorea robusta* species, intermixed with *Syzigium cumini*, while the vegetation cover changes nearer to the hill slopes of the Chure range. Here such species as *Buchanania latifolia*, *Dalbergia latifolia*, *Semecarpus anacardium*, *Phyllanthus emblica*, *Dillenia pentagyna*, *Bauhinia vahlii*, and *Bauhinia purpura* can be found. Bamboo also grows along the foothills of the Chure range, while at the top of the range *Shorea robusta* mixed with *Pinus roxburghii* grows. The other vegetation include riverine forests and grassland of the flood plains of the Rapti, Reu and Naryani rivers, which carve the natural boundaries of the north, west and south-west boundaries. The Someshwor hills are a very rugged hill range, occupying most of the western portion of the Park and are the natural boundary with India (Bihar). The reserve forest of the Someshwor hills joins with Indian forest, and the Valmiki Wildlife Reserve in the state of Bihar. There exists no movement across this trans-boundary area.

The number of elephants dispersing into the Park varies. Although bulls have been seen in the Park since 1990, herds of 10-13 animals have only been seen in the last 2 years. Herds spend most of their time along the Chure foothills during the summer months from April to June. The Amuwa and Dhabuwa regions of the western boundary had a herd of 5 elephants using the area during the month of May. This area provides elephants with more suitable habitats, since natural springs occur which are

the only source of water during the dry months. As a result the area is moister and therefore more diverse in vegetation types. Grasses such as *Phargmites karka* are found, and Bamboo is also plentiful. The bamboo shoots are especially preferred by elephants when the shoots ripen in May-June. [34]

Human-Elephant Conflict

With elephants dispersing into the Royal Chitwan National Park from the Parsa Wildlife Reserve, which are joined at their southern borders, a human-elephant conflict has also resulted. Although raiding of crops is carried out only by bulls, the extent of damage done stretches along the Parks south-western and northern boundary village areas. The Padampur Gabisa, which lies within the Parks northern boundary, has received 1-2 bulls raiding crops mainly in the month of May-June, during corn season, and October-November during paddy harvesting.

The affected villages are:

1. Amriti
2. Sawpur
3. Jitpur
4. Bhimpur

These bulls have started coming to this area since May of 1996, and make sporadic visits in accordance to crop harvesting time. The last time the bulls were seen was March 1997, when few banana plants were damaged. In the village of Meghauri, west from there, bull elephants have been coming to the cultivated fields since 1994-1995. In Meghauri the extent of damage being carried out by one bull, led to his capture and unfortunate death in January-February of 1997. According to local reports, conflict has now increased in the Padampur area, as well as in the Thori Gabisa of the south-western boundary.

Damage of crops and banana plants in all areas with a stated elephant problem was found to be carried out by 2-3 bulls. Interviews carried out with locally affected farmers revealed that there were a "male and a female" carrying out damage, with the "female" being more dangerous. This male was found to be a larger Makhna (tuskless male), who was considered female because he was tuskless. Both these bull elephants were found to be operating in the Padampur, Ayodyapuri and Thori Gabisas. Similar information was collected from interviews collected in these areas, with all responses revealing that the "larger female" was very dangerous and impossible to be chased. [35]

The Ayodyapuri and Thori Gabisas lie on the Southern fringe area of the park. These bulls were found to be operating in the following villages:

Ayodyapuri

1. Krishnagar
2. Bhagai
3. Pyauli

In these areas paddy is planted twice. With the harvesting of the first crop in June, the bulls start coming, and remain in the area until the end of the second harvested paddy crop in October-November.

In the drier area of Thori / Parsa Gabisa, which borders the Parsa Wildlife Reserve the main affected villages were:

1. Rosienagar
2. Saraswatinagar
3. Deepaknagar
4. Gautamnagar
5. Icchanagar
6. Sikaribas

These areas were very dry, with their cultivated plots extending south to the foothills of the Someshwor range. With no perennial water source available, water is transported via pipeline from the Amuwa River, near the Chure range. Rainfall during the winter and summer seasons is very rare, therefore cultivation in this area is poor. Finger millet is grown by some, with paddy being the main crop sown with the onset of the monsoon in July.

Conflict in this area began in 1994, with first only one bull raiding crops occasionally, who was later on joined by Makhana in 1995-1996. According to interview, these bulls destroy up to 25 quintals of rice per night, depending on how hungry they are. Salt and home made alcohol have also been removed from houses located right on the border with the forest. No house damages have been reported, and no death has occurred. [36]

Since the villages border the Parsa Wildlife Reserve, they are located along the main route used by elephants to enter the Royal Chitwan National Park. From Parsa districts elephants move either:

1. Via Sikaribas, towards Thori and Ayodyapuri Gabisa and along the Chure range, crossing the Raptiriver near to the Tiger top resort, towards Meghauli and back via Kasara, crossing the Chure hills, towards Thori and Parsa region.
2. or as elephants come from Parsa they pass Sikaribas/ Nirmalbasti and make their way towards the Padampur Gabisa by directly crossing the Chure hills.

The Chure range in this area is not very steep, and therefore able to be traversed by elephants. Between 7 and 13 elephants have been sighted by local department staff as well as by the army in both the Amuwa and Dhabuwa hillside areas, and the Kasara area.

Conservation Issue

Although the Royal Chitwan National Park covers 932 sqkm, suitable elephant habitat is limited mostly to the slopes of the Chure hill range. Habitat preference by recent herds revealed that due to water availability near the hillside, these areas were preferred. Especially since the main season elephants arrived in the Park coincided with the driest months from April/May, elephants would naturally seek out areas with plenty of water. So far, no raiding by herds has been reported in the parks vicinity, as all crop damages were perpetrated by bulls.

From the surveys carried out, no major conservation issues are facing the protection of elephants in the Park. Although the number of elephants dispersing into the Park is low, an inevitable conflict has already developed which is likely to increase in the coming years. Efforts have been made by the Park's management to help affected farmers chase away raiding bulls, with the use of domestic bulls and firing gunshots. This has proven to be temporarily effective. [37]

Together with the Parsa Wildlife Reserve, the Park offers elephants over 1400 sqkm of protected area. However due to the Chure range cutting through both the

Chitwan and Parsa protected areas, suitable habitat is limited. With elephants having only recently dispersed into the Chitwan area establishing of home ranges will develop as herds become more familiar with the area. If populations increase the number of elephants entering the park may also increase, which then may result in more intensive conflict.

Recommended action would encourage further research on dispersal patterns and number by the Parsa-Chitwan elephant population.

Parsa Wildlife Reserve

The Parsa Wildlife Reserve lies in the Parsa and Bara districts of the south-central terai belt and covers a total area of 499 sqkm. The area is very dry with no perennial water sources. A predominating *Shorea robusta* forest exists in the low lands of the Reserve, with vegetation varying as one reaches the slopes of the Chure hill range. The Chure hills occur along the Reserve's northern boundary, extending east and west. The Chitwan National Park bordering on its south-western boundary. The reserve forest, located north of the main highway as well as to the east of the Reserve's boundary, directly borders the Reserve's protected area and acts as a buffer area for the reserve. The Reserve forest of the Bara district is relatively intact and proposals have been made to include this area within the boundary of the Wildlife Reserve.

According to local reports there have always been a resident number of elephants in the area, who use the reserve and reserve forest areas to the north, on a permanent basis. Only recently have these elephants started dispersing into the Chitwan National Park, where they formerly were not known to have gone to. The main reason behind this is thought to be due to the fact that the main water source located in the Bara reserve forest has dried up, as settlements and cultivation, cattle grazing, have encroached on the former elephants' home. For these reasons, elephants are dispersing into Chitwan in search of water and more suitable habitat during the dry months. [38]

The preferred elephant habitat is in the Bhatta Dhara area of the Bhatta river. Along the hillside follows the elephant path or 'hatti dundi' which makes its way west to Nirmalbasti/Sikaribas and onto Chitwan National Park. The walk along the hills is about 35-40km. The habitat alongside the Bhatta river is suitable to the elephant's needs, with its tall grasses, wild banana plants, and bamboo. Other vegetation types includes a variety of tree and shrub species. Some of the predominant tree species recorded were *adina cordifolia*, *Anogeissus latifolia*, *Dalbergia latifolia*, *Albizia lebek*, *Bombax malabaricum*, *Mallotus philippensis*, *Ficus glomerata*, *Ficus semicordata*, *Syzygium cumini*, *Lagerstroemia parviflora*, *Dillenia pentagyna*, and *Lannea coromandelica*. Amongst the shrubs *Clerodendron viscosum* was common.

Compared to other areas of the reserve, which are very dry and mostly covered with *Shorea robusta* species, this area is preferred by elephants. There are also two villages located in this area, which have not yet been removed. The Rambodhi and Bhatta villages are situated at 6km from the hillside, along the Bhatta river. The villages are small, together having 55 houses, and are visited by herds occasionally, but mostly by bull elephants. In Bhatta village a herd of 15 visited the fringe area of the cultivated field, not causing much destruction. According to interview, herds are easy to be chased and do not usually come back once they've been chased. Elephants have been seen in this area even before the Reserve was established in 1985.

However, during those times the number of elephants coming to raid crops was much less. Since 1994, however, the amount of damage being caused by elephants has increased as have they become more difficult to chase.

Human-Elephant Conflict

According to the farmers of both Rambodhi and Bhatta villages the most amount of damage is caused by 2-3 bulls. Here also, it was found that a Makhna and one other bull came regularly, while a third bull was known to come alone. The raiding times coincided with harvesting of paddy in October-November, which was preferred to the wheat crop, harvested in March-April. [39]

The bulls have become more notorious, as they venture into the village area, searching for stored grains and salt. On average it was found there is a 50% destruction of crops caused by elephants, wild boar, monkeys, and peacocks.

The interviews in these areas evidently showed that the same bull elephants were raiding crops in both the Parsa and Chitwan areas. Also, surveys carried out in the reserve forests, revealed the same bulls raiding crops in the villages neighbouring the Bara and Rauthahat reserve forest, east of Parsa Reserve.

Another area of conflict existing near to the Parsa Wildlife Reserve was in the village of Amlekhganja, located 6km west from the Reserves headquarters. The village is located near the foothills of the Chure range, and is situated near the elephant route which sees elephants either walking west along the Chure foothills to Bhatta river and on to Thori, Chitwan, or east towards Aadhabar and on to the Bagmati river area. Here also damage was caused by 2-3 bulls and very seldom by a herd of 5-7 animals. As this area is very dry, no paddy is grown. The main crops grown are corn and mustard, although finger millet is grown by some. Crop-raiding coincides with the harvesting of corn in June.

Reserve Forest

"...his tusks were bigger and whiter than the Himalaya itself!" Farmer in Mahendranagar, Bara district

The Bara reserve forest occupies 30% of Bara district. The forest is relatively intact, and is continuous to the Bagmati district. There are 4 VDC (Village Development Committee) located inside the reserve forest. Elephants were found to be journeying all the way to the Bagmati River, to a place called Chandranagihapur. The main route which they travel along is described below: [40]

By crossing the main highway at Aadhabar (Reserve's HQ) elephants make their way east towards Pathlaya. Within the reserve forest there's a naturally occurring wetland with a pond of about 3 sqkm known as Halkhariya. The pond was regularly visited by elephants, especially during the dry season, when water inside the Reserve was scarce. During the rains also, when water level of the pond was high, elephants were often seen bathing there. For the last 2-3 years however the pond and surrounding wetland have dried up. The primary reason behind this is that the area was converted into a fish farming area, which drained the pond of water. Then, with the impact of cattle grazing in and along the fringes of the wetland, the area was turned into eroded grassland, unable to retain water. It was around this time as well that elephants were first reported to be seen in Royal Chitwan National Park.

The surrounding forest of the wetland extends up to 10km before reaching the foothills of the Chure range. Only one village, Ratanpur, occurs at the base of the

foothill, which is the only settlement in this area. As one continues further east, however, the number of settlements increase, which has diminished a lot of the former elephant range habitat. Therefore, elephants cross the highway again, near to the villages of Pillua and Mahendranagar, making their way towards the southern portion of the reserve forest.

The villages of Mahendrangar and Pillua together have 900 houses. They are closely situated within a degraded proportion of the southern reserve forest. According to interviews, elephants have been coming to the area for 25 years when up to 10 animals could be spotted at a time. Nowadays, herds come seldomly, but were last seen in September, 1996. Bull elephants have been seen yearly for the last 10 years.

All occurrences of crop-raiding were carried out by 2-3 bull elephants. Here also, elephants were described as one with long tusks, one without tusks and very dangerous, and another bull who comes alone who has shorter tusks. They come in the month of June-July with the harvesting of corn. According to locally affected people farmers in one night usually have 200-300kg of paddy eaten by a bull elephant. This is equal to about 20% of the output of 1.5 acres of land. [41]

From here the elephants continue along the southern situated forest passing the villages of Dakaha, Kushmari, Bodhgau, and Kakaudi. From here they go up to Changranigahpur, near to the Bagmati river before returning west, towards the Parsa Wildlife Reserve.

This was the main area used by elephants outside of the Parsa Wildlife Reserve. It was found that the reserve forest occurring south of the highway is more degraded than the forest surrounding the Halkhariya area. However with the large settlement of Nizgaud developing in the north portion of the reserve forest, which has cut out a major portion of the forest, elephants have no choice but to head south in their journey to the Bagmati area.

Conservation Issues

The Parsa Wildlife Reserve has benefited from a relatively intact reserve forest surrounding its protected area, which acts as a suitable buffer zone. Since the number of settlements directly occurring on the fringes of the Reserve's boundary is less, the impact of human activities is low.

The Reserve offers limited suitable habitat for elephants due to the dryness of the area. Therefore elephants are subject to spending most of their time along the foothill forests, where water is available, as well as a wider variety of browse.

Recommended action for the area would be to include the reserve forest located north of the highway with the Wildlife area. Seeing that the reserve forest is regularly used by elephants, efforts should be made to protect the forest, whilst it is still relatively intact. The reserve forest south of the highway which is also part of the elephant range area could be maintained as a corridor. Since the forest extends between 2-10km south of the Mahendranagar and Pillua villages and suffers the effects of a growing population, total protection is impossible. However, as a corridor this area could be maintained. It is highly likely however that elephants will cease dispersing up to the Chandranigahapur area, as the human population is rapidly encroaching on the existing forest through which elephants move.

If the Bara district reserve forest was to be included with the Parsa Wildlife reserve, together the Chitwan-Parsa-Bara areas would offer ample area for a reproducing herd of elephants. [42]

Map. Jhapa and Morang District (Nepal): Elephant dispersal in to the Eastern region

Map. Sunsari and Udaypur Districts (Nepal)

5. Eastern Region

Koshi Tappu Wildlife Reserve and Reserve Forest

Status of Wild Elephants

Story of Ganesh Hatti: as narrated by elephant camp 'subbha' Mr Amar Bahadur Magar

“The Koshi Tappu Wildlife Reserve used to be known for its single elephant named Ganesh. He was a large bull elephant belonging to a private landowner living near to Kusaha, a village near the Reserve’s head quarters. The story of the elephant is known by almost every body in this region. Ganesh, being a domestic elephant, and therefore used to people, was set free to roam after his owner dies. The owner’s wife having insufficient money to take care of him, untied Ganesh’s chains, and told him to roam the village and forests for food and water. So Ganesh took to roaming the villages, going up to the village of Pattyapur where the former domestic elephants were kept, and also spending time in the grasslands of the Koshi Tappu Wildlife Reserve. He returned daily to his owner’s house, however, where his owner’s wife fed him mostly bananas and rice. Then one day the wife also died. When Ganesh became aware of this he refused to go anywhere. According to villages Ganesh spent 12 days in front of the house, refusing to go anywhere or eat anything. After that, Ganesh spent most of his time harassing the villages and started becoming more and more dangerous. He is known to have killed eight people and destroyed a lot of crops and property. He also frequently visited the domestic elephant stables and became one of Nepal’s most successful fathers of many domestic elephant calves. Although Ganesh was honoured as a symbol of Ganesh, he was also disliked by many villages for killing people and destroying their crops.

Ganesh died in 1991 of a disease and has become a legend since in the villages he used to roam. His head has been kept in the Koshi Tappu Wildlife Reserve’s headquarters.” [43]

Elephant Distribution, Number and Human-Elephant Conflict

Background

The elephants of the eastern region are temporary residents occurring in the 5 districts of Jhapa, Morang, Sunsari, Saptari, and Udayapur. The Sunsari and Saptari districts contain the Koshi Tappu Wildlife Reserve, which covers an area of 150 sqkm. The reserve lies on the Saptakoshi river floodplains and is mostly known for its wild buffalo herds, found nowhere else in Nepal. Although elephants were once seen using reserve’s area, they have not been seen there since 1990. Formerly groups were rarely seen, however, 3-4 bulls, joined by legendary Ganesh, frequently visited during the months of June to November. These males also frequented the elephant stables at Pattyapur village, to mate with the female. According to local reports, after much complaint was made by the people of Pattyapur, the Reserve agreed to move the elephant stable to Kusaha (Reserves HQ). After this, elephants stopped coming to this area altogether.

The primary elephant areas were found to be in the Jhapa and Sunsari districts of the eastern region. Formerly herds of up to 30 elephants used to visit the Jhapa areas to raid rice crops (Santiapillai and Jackson, 1990). The elephants of the eastern

region are believed to be part of a population of about 80 individual, who spend most of their time in India (Thouless, 1993).

Reserve Forest: Jhapa, Morang, Saptari, Sunsari and Udayapur districts

The main elephant areas were found to be along the highly degraded forests of the Jhapa and Sunsari districts. Elephants enter Nepal from Assam/West Bengal by crossing the Mechi River. Their first point of entry on the Nepal side is the village of Bahundangi, located 10km north of Kakarvita. Elephants have been coming to this area for at least 15-20 years. According to reports up to 15 elephants come during the months of June and July and October to November, when corn and paddy are harvested. Although elephants have been [44] coming to these areas for a long time, the intensity of conflict has increased in the last 3-4 years. When surveying the surrounding reserve forests, it was found that the forest cover could scarcely offer elephant's sufficient food intake. For this reason, the elephants of these areas are almost forced to raid crops, as they spend their days sheltering in the degraded forest tracts, and entering the cultivated fields by nightfall to fill their stomachs.

The reserve forest, occurring along the Chure hill range, which was once continuous, has now been fragmented by villages and cultivation. Due to the availability of water from various river systems, this area is attractive to Farmers from the upper hill area. Most of the forested areas have therefore been converted into farm lands. The main tree species found are *Dalbergia sissoo*, *Shorea robusta*, *Acacia catechu*, and *Bombax malabaricum*. There are numerous *Dalbergia sissoo* plantations in the Jhapa district, through which elephants cross to entre into other jungle tracts. Elephants do browse on all the above mentioned tree species, however, these are insufficient to meet the nutritional needs of elephants. The rivers elephants obtain their water from are the Mechi, Kankai, Ratuwa, Lohandar, and Budhi River systems.

Human-Elephant Conflict

The human-elephant conflict in these areas is comparatively high. Although there are few elephants, the intensity of conflict has increased. Elephants have been coming to the Mechi River region since the last 20 years. In areas west of here, however, in the Udayapur and Sunsari districts, herds of elephants have only been seen coming for the last 5-6 years. The amount of damage being carried out by elephants has increased in the last 3 years, with more houses undergoing direct damage by elephants. In the village of Bahundangi, for example, in 1996 a total of 4 families move to the Bazaar side of the village, after elephants destroyed their houses. Stored corn usually kept in a loft of the house was most sought by elephants. Coconut trees and banana plants also suffer extensive damage. Also, a more recent temptation, during Dashain and Tihar festivals in October and November, elephants seek out barrels of locally brewed alcohol and seem to readily enjoy the sweetness of fermented rice! [45]

The extent of conflict took place in 7 out of 9 wards along the Mechi River region. The Jhapa district suffers most from herds of between 7-15 elephants coming seasonally. The footprint sizes recorded in damaged fields in the Bahundangi village, revealed a herd of 4, with the largest foot print recorded of 298 cm and the smallest of 51 cm. According to interviews taken with affected farmers, an average of 4 acres of paddy was destroyed per raid in October-November 1996. In 1995-1996 two people lost their lives in the villages of Thurgari and Devi ganja, Jhapa district. In the most

recent incident, a man was gored by a male elephant in the chest, on the veranda of house, where he was sleeping.

Going further west, the number of elephants visiting villages decreased. In the Sunsari and Udayapur districts the number of elephants rarely exceeded 5. This year elephants went as far as the Tarahara village of Sunsari district where a 3-4 herd visited in the May to November months. This sees elephants travelling 100-120km west, from the Mechi River to the Tarahara region, and back from there. Elephants spend about 3-4 months on the Nepal side, before returning to India by the end of November-December.

From India to Nepal: route walked by elephants

1. Raidag > Jainthi (Western Bengal) > Hasimara / Thirsakhola > Thistha > Khola / Salugora jungle > Panighatta > Naxalbari, Lauwghat jungle > MECHI KHOLA > Bahundangi (Nepal) > Deviganja > Thokla > Thimai > Kujanabari > Dhajjora jungle > Thugari (village bordering Ilam district) > Sossaou plantation > Parajungi > Dhukurpani > Beldangi (refugee camp) > Marongijilal > Barne jungle > Shathijora > Baukajora > Tarahara >Nayatole >Chatara jungle > Bhavanipur > Kumbarkote > Panchayan Narda > Chakaghate
2. Mahabharat jungle > Sissua > Rampur > Belkaha jungle > Bagalpur > Belaha > Kariyaha > Purandaha > Balahi > Balmanthi > Ambasi > Pattayapur > Gai ghat > Jogidaha. [46]

Route 1 was used during the months of June to November, 1996. Route 2 was used in 1994-1995, and there after elephants have been seen in the route areas. This year elephants have not gone as far as Pattayapur, in Udayapur district, where previously 3-4 elephants used to frequently.

Conservation Issues

There is little scope for providing protection for the small number of elephants present in the eastern region. The forest cover of the eastern region has for the most part been cleared and converted into agricultural plots and is therefore highly unsuitable for elephants, even on a temporary basis. With a high density human population continuing to deplete the little forest cover that is left, the elephants of this region can be considered doomed.

It can be concluded that the only attraction for elephants to be venturing into Nepal during the months from May to November, is due to the availability of domestic crops and water. Elephants remain in the Nepal side until after the harvesting of paddy in November, when they make their way back towards West Bengal. The small groups of 3, 5 and 7-15 animals spend their days sheltering in the forest tracts of the Chure foothills, which have been fragmented due to village development, and enter the cultivated fields by night to fill their stomachs. They spend 2-3 months travelling towards the Koshi river, and begin their return to India in August.

Although the Mechi river area has had elephants dispersing into its region for over 15 years, the Sunsari district claims to only be witnessing elephants for the last 5 years. Could this be because elephants are now venturing farther in their search for sufficient food and have as a result, become bolder as they entre the main village areas?

This all can be questioned, however, the only suitable alternative to managing a doomed population of elephants in this region, are either through domestication or translocation (Jackson and Santiapillai, 1990). Scope for domesticating elephants in this area should be considered. The Koshi Tappu Wildlife Reserve could increase its domestic elephant number which at present stands at only 1 elephant as 3 have been sent to the Royal Chitwan National Park. Investigation should be made into the cost-benefit of domesticating elephants and their use in the reserve. Translocation will need thorough study of available habitats to which elephants can be moved to. This can be done under the Nepal –India trans-border conservation efforts. [47]

6. Conclusion

Managed Elephant Ranges

Proposed Action for Elephant Conservation in Western Region

With the 7-month preliminary survey of the elephant population distribution in the western, central, and eastern regions completed a review of possible conservation strategies need to be considered. It can be concluded that the most scope for elephant conservation is in the western region. With eastern populations considered doomed, due to the shrinking of suitable habitats in the area, action for their protection would only recommend translocation. In the central Chitwan-Parsa region, a relatively stable population of elephants reveals that suitable habitats are sufficient for sustaining the low population number. Seeing that the two protected areas are joined by continuous forests, elephants are able to expand their home ranges, should populations increase. Conservation action would, however, recommend the joining of the Bara reserve forest to the Parsa Wildlife Reserve. This would then include those forested areas used by elephants located outside the Wildlife Reserve.

With the most amount of elephant movement taking place in the western region of the Kanchanpur-Kailali-Bardia districts, a conservation strategy needs to be planned for the long-term protection of their herds. In the process of understanding the movement of elephants across the trans-boundary area, attempts should be made to create a more suitable area for the elephants of this region. Since these elephants are thought to be part of a population of 500 individuals based around the Corbett National Park in Uttar Pradesh, their dispersal habits, which extend into the Kanchanpur – Kailali districts of Nepal, should be maintained (Thouless 1993). Although the two protected areas, the Royal Sukla Phanta Wildlife Reserve and the Royal Bardia National Park, fall under the elephants' range, a majority of the elephants of this region [48] reside in the degraded reserve forests of the Chure foothills. At one time these two areas were connected across the Chure foothill forest tract, which allowed for easy movement by elephants between these areas. However, with the foothill forest suffering the affects of increasing human activities along and in its area, the linking Kailali forest area has not been used for migratory purposes since 1994. Whether this is due to the degraded state of the forest, or because of the unfamiliarity with the migratory route by the present elephant herds, is questionable. Elephants of the trans-boundary region are now confined to the forest of the Kanchanpur district, as they have ceased migrating to the Royal Bardia National Park.

As of now the elephant populations of the Tanakpur – Sukla Phanta – Kailali areas are not recognized, since very little is known about them. With their populations occurring on a sporadic basis, no efforts have been made to ensure their protection. One could say these herds are of a "refugee" status. Moreover, although conflict continues to be severe in the reserve forest areas. Neither the Wildlife Department or the Forest Department is claiming responsibility. This has led to a confusing situation for locally affected farmers. Farmers do not know who to approach for help when their crops are destroyed and houses are damaged, or even when a family member is killed. Although these elephants occur in the reserve forest belonging to the Forest Department, according to its officials, they are not responsible for managing wildlife present in the forest. Similarly the Wildlife Department staff claims that since these elephants occur outside of the Wildlife reserve, they do not fall under the reserves responsibility. These elephants are therefore of and unrecognised status, which creates a vague situation for both affected farmers as well as for the elephants. In such

circumstances the elephant status becomes dilemmic, as elephants are confined to undesirable areas, where encroaching human settlement has inevitably lead them to raid crops and consequently become stressed due to the lack of suitable habitats to move into. For these reason conservation action recommend the creating of a Managed Elephant Range (MER) which will provide elephants with alternative areas to disperse or migrate in to. [49]

The Managed Elephant Range

Corbett National Park > Haldwini Reserve forest > Tanakpur > Mahakali > Kanchanpur Reserve Forest > Sulkla Phanta Wildlife Reserve > Kailali Reserve forest > Dudhawa National Park > Royal Bardia National Park

The Managed Elephant Range as described in the “Action Plan for the Asian Elephant” is established to provide sufficient space for elephant movements, and are complementary to protected areas (Jackson and Santiapillai 1990). For elephant conservation in Nepal the need of linking the Royal Sukla Phanta Wildlife Reserve and the Bardia National Park along the foothill forest of the Chure Range is essential. Since the forest occurring along the foothill forests of the Kanchanpur-Kailali-Bardia districts is continuous and is the main forest tract through which elephants disperse, establishment of an MER could effectively be implemented. Moreover, the Corbett National Park from which most of the western region elephants are dispersing in from, is also located along the Chure foothill forest, and could therefore be included in the MER. Similarly, the Dudhawa National Park located south of the Kailali district, can be linked to the Royal Bardia National Park, via the connecting forest of Kailali district. In this way a protected area system could be created involving the linking of 4 protected areas across the reserve forests of India and Nepal. Since suitable elephant habitat in Nepal is limited, the ability to disperse between habitats is essential for their ensured conservation. Since the minimum number of elephants needed for a viable population is 500, the elephants of the western region fall under this number. The creating of a Managed Elephant Range (MER) is therefore consequential should the conservation of this population be rendered.

The formation of the elephant range in the western region of Nepal and adjoining areas in India should seriously be considered, before further depletion of the Chure Hill reserve forest occurs. Its establishment should be carried out under the joined efforts of the Forest Department and the Wildlife Department of both India and Nepal, which will encourage trans-boundary conservation. The creating of a Managed Elephant range is only alternative for elephant conservation in Nepal, will their walk into coming years be secured and the conservation of their populations be granted?

[50]

Annexure 1.

Kailali Reserve Forest

A brief description on the State of the forest

Introduction

A 10-day survey was carried out in the Massuriya, Baraban and Dhorajyaru reserve forest of the Kailali district. The purpose of the survey was to find out the state of the forest, presence of wildlife in its area, number of villages bordering the forest, extent of human disturbance, and to find out the route used by elephants to migrate along this forest tract. Was the elephant route still intact, and if so, had elephants recently been seen by local people?

The following report is a description of what was found.

Baraban Reserve Forest

The Baraban reserve forest occurs along the foothills of the Chure range. It occurs north of Chaumala to the Kotiya River and is considered to be one of the best forest tracts in Kailali. After the Kotiya River further west, the forest cover along the foothills decreases, as settlement increase. Here the forest is limited to 4-5km width, along the foothills.

The Baraban forest consists mostly of a dominating Sal or *Shorea robusta*, forest type, with its known associates of *Terminalia tomentosa*, *Adina cordifolia*, *Mallotus philippinensis*, *Lagerstroemia parviflora*, *Semecarpus anacardium*, and few *Terminalia bellerica* and *Chebula* species. Along the Rivers the main species of *Acacia catechu* and *Dalbergia sissoo* are found, as well as *Syzigium cumini* and *Ficus glomerata* are found near the river banks, and are inter-mixed with Sal forest in some places further along the forest.

The forest is relatively intact and exists as a continuous strip all along the Chure foothills. The number of villages bordering the Reserve forest is extensive all along with the most amount of impact resulting from cattle grazing. Cattle's grazing has cleared most of the forest's natural undergrowth and therefore also decreases the chance of seedlings to grow. The forest covers an average of 10-15 km width in the Baraban forest section, decreasing as it nears the Kanchanpur district where settlement increases and the extent of forest depletion as well. The forest understory does however, improve as the forest nears the hillside at 2-3km. The forest has been thoroughly infiltrated by people and cattle. The winter months [51] especially suffer more impact, as they receive people and cattle coming down from the hills to spend the cold months along the hill slope forest, where grass and water are more readily available for their cattle. According to interviews carried out with local people and cow herders no elephants have been seen in the forest since 1993-1994. The elephant walk passes alongside the fingers of the forest within 1km of cultivated fields.

Massuriya Reserve Forest

The Massuriya Reserve Forest occurs south of the highway and connects to the Indian jungle at the Mohana River. The forest starts from the Kandra River and continues west to Chaumala. The forest has been fragmented by villages and cultivation, which divide the forest into three major fingers, all running south to the Indian forest. At one point the forest was continuous all along the Indo-Nepalese border. However, much of this forest has been cleared now. The forest in the Lalbojhi

and Chandanchowki areas is still continuous, although highly degraded. It connects to the forest of the Dudhawa National Park, and still witnesses elephants passing through the degraded corridor to the Massuriya jungle and on to Bardia National Park.

The forest is more degraded than the Baraban forest, as it is fragmented by settlement on either side of its three fingers. The dominant forest type is the mixed 'Sal forest' which suffers the impact of village development and cattle grazing.

According to the village reports a group of 35 elephants used to pass through this jungle yearly during the months of October and November. Prior to 1990 this herd was seen yearly, passing along the fingers of the forest, towards Ramshikarjala, north of the highway, and then diverted east towards Bardia National Park. The last time elephants were seen was in November 1994 when a large group of elephants were seen near to the villages situated along the first forest finger, at Lalbojhi. Some crops were raided during this time, as elephants made their way across cultivated fields towards the highway. Single bulls still venture into the Massuriya jungle, during corn season, but are not known to make their way further north towards Ramshikarjala.

The forest north of the highway, known as 5-course jungle, has less impact from settlements, but is still degraded. The forest stretches 10km from the nearest village, north to reach the foothills. An *Acacia catechu* and *Dalbergia sissoo* Forest was found occurring along the Kandra River, mixed with a Sal forest along the gradual slopes of the hills. According to interviews carried out here, [52] elephants used to be seen twice a year. In the months of April-May elephants would be seen making their way east to Bardia National Park, and then were seen making their way back again in October-November. In 1996 3 bull elephants were seen in this forest, however herds have not been seen since 1994.

Dhorajyari Reserve Forest

The Dhorajyari jungle occurs from the Balchaur forest checkpoint, north and south of the highway, extending west towards Lamkhi bazaar. The topography in this area is more rugged, and the forests relatively dry. Along the highway a degraded sal forest is found, while at 2-3km distance the terrain becomes hilly, with sal associated found in more variety. The area is dry, with no major water systems flowing through the area. The main water sources come from natural springs occurring near to the Chure hillside.

The elephant route takes elephants along the fringes of the forest, near to the east-west highway. They make their way along the Thagalipur village, where according to reports elephants used to be seen passing along this area annually. Elephants were for the last time seen in November of 1994, in their migration to the Bardia National Park. Elephants continue east for 2-3km before crossing the east-west highway. Elephants are known to cross a point near to a large *Bombax ceiba* tree, where according to local report one male elephant was known to perform 'puja' yearly. From this point, elephants cross into the south portion of the Dhorajyari jungle, which has been fragmented by settlement. Formerly the forest south of the highway was continuous to India and elephants had no difficulty moving through this area. This has been altered, however, with the settlements of Katassi, Jagatpur, and Tikkapur having depleted much of the forest cover.

Overview

In all forest areas surveyed no direct sightings of wildlife were made. The survey carried out along the riverine forests of the Kothiya, Gauri ganga, Shiv ganga,

and Kandra river systems were found to be the most intact forested areas. Since the survey was carried out during the dry season, these rivers were dry, which could be a reason for a low animal sighting in the forest. Footprints of wild boar, barking deer, jackal, leopard, monkey, Indian civet, peacock, rabbit, and Mongoose were found in the dry river beds, as well as nearer to the foothill sal forest. Leopard footprints were found most in the Shiv ganga and Gauri ganga areas. [53]

The Kailali reserve forest makes up an important forest linkage between the Kanchanpur and Bardia districts. With human settlement growing along the forest fringes, however, the impact of human activities will further degrade the forest. Although the forest still exists as a continuous forest tract, if stricter measures aren't imposed for better protection of its natural habitat the Kailali forest may be turned into a fragmented forest patch. The importance of this forest tract should not be disregarded, since it directly links up 3 National parks, and Bardia National Park. For elephant conservation in the western region, the Kailali reserve forest has an important role to play. By directly linking up the protected areas, the Kailali reserve forest can create a protected area system, established across the linking of reserve forests to protected areas. Although elephants have not used the forest as part of their migration habits since 1994, should elephant populations in the Indo-Nepalese western trans-boundary area increase, dispersal will be necessary for their survival into the near future. Since the forest corridor does still exist, elephants may decide to return to adjoining areas in India. This possibility should not be disregarded, when considering better protection of the western trans-boundary elephants and of the Kailali reserve forest. [54]

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