RANTHAMBHORE NATIONAL PARK

The Ranthambhore National Park, which is a part of the much larger Ranthambhore Tiger Reserve, a Project Tiger reserve, lies in the Sawai Madhopur district of eastern Rajasthan. It is right now the only forest reserve in Rajasthan state and in the entire Aravali hill ranges where tigers exist.

The Chambal River forms a natural boundary of the Park towards the east, and on the eastern shore of Chambal lies the central Indian state of Madhya Pradesh. To the northeast of the Park, flows the river - Banas, a tributary of Chambal. Across the river Banas, lies the Keladevi sanctuary, while the Sawai Man Singh sanctuary lies to the south of the Park. Both these sanctuaries, along with the Ranthambhore National Park, are part of the Ranthambhore Tiger Reserve. Today, this Project tiger reserve spans over 1334 sq. km of area, of which 282 sq. km is the Ranthambhore National Park.

The entire Tiger Reserve stretches in a North-East to South-West direction for a distance of over 70 kilometers. To the extreme North-East lies the Kela Devi Sanctuary, south-west of which (and across the river Banas) lies the Ranthambore National Park. The Sawai Madhopur Sanctuary, followed by the Sawai Mansingh Sanctuary and the Qualji Closed Area lies further South-West of the park.

The project tiger reserve is where the Aravali and the Vindhyan hill ranges meet and this confluence is perhaps the reason for the rich bio-diversity of the Ranthambore. The geological formations of Vindhyan system are characterized by flat table tops locally known as 'Dang' , while the Aravallis are characterized by sharp ridges and conical hill tops. An important geological fault line - the Great Boundary Fault - lies at the confluence of the Aravali and the Vindhyan systems - and runs right across Ranthambore national park.

THE PARK: HISTORY

During the 19th century there was excellent forest cover almost all over India. The population density was very low and exploitation of forests to fulfill local needs was negligible. During that period the forests of Ranthambhore were the private and exclusive hunting reserves of the Jaipur and Karauli royal family. These forests were managed by the Shikar Khana Department (Hunting Department) of the state. The local villagers were allowed to take many kinds of forest produces in unlimited quantities for their private use, after payment of an annual tax (called Babs). In selected areas of the forests, which were used for hunting by the royalty, grazing and tree felling were strictly forbidden, but there were few restrictions, elsewhere. However, due to the low population density, there was hardly any damage to the forests.

By the end of the first quarter of the 20th century, the need for conservation of forests was being felt all over India. The population was growing rapidly and the forests were coming under pressure. In Ranthambhore, the system of “royalty permits” for commercial felling (mainly for firewood and charcoal) of entire blocks of forests was taking its toll. In 1925, the Jaipur state created a post of Superintendent of Forests and in 1939 the Jaipur Forest Act was enacted. The Rajasthan forest Act. was enacted in 1953, giving these forests some legal protection. In 1955, these forests were declared as “Sawai Madhopur sanctuary” and the practice of sale of forest produce through “royalty permits” came to an end. This was when the forests received their first “real” protection. However,

legal hunting continued unabated till 1973 and by then the tiger population was almost totally decimated.

In 1973 a part of this sanctuary came under Project Tiger Scheme. At that time there were 16 villages inside the sanctuary but between 1976 and 1979, 12 of these villages were shifted outside the sanctuary. In 1980, in order to give greater protection to the forests, an area of 282.03 sq. k.m. of the inner part of Sawai Madhopur sanctuary was declared as national park. Since then the state Govt. stopped collection of any forest produce from sanctuary and national parks. In the year 1983, 647 square k.m. of forests lying to the North of the National park were declared as the Kela Devi Sanctuary and included in the Tiger Project. Similarly, in 1984, 130 square k.m. of forests lying to the South of the National Park were declared as Sawai Mansingh Sanctuary and included in Tiger Project.

During the 1970s, tiger sightings were extremely rare in Ranthambhore but by the mid and late 1980s, as a result of the decade long protection given to the forests, Ranthambhore became the best place in the world to see wild tigers. Ranthambhore tiger reserve attained notoriety for illegal poaching of tigers in the year 1992.. Since then the forest authorities became very strict and now, generally speaking, poaching is not a serious threat in these forests. Since 1992, the tiger population has gradually recovered and in 2002 the Park boasted of nearly 40 tigers, a density of nearly 10 tigers per 100 square k.m. – which is one of the highest in the world.

In 2003 and 2004, disaster struck Ranthambhore's tigers once again. A census conducted by the high powered committee showed that there were only 26 tigers in entire reserve and all of them were with in the national park. The other areas of the reserve were totally devoid of tigers. To quote from the report of the Tiger Task Force - "in Ranthambhore, which is now known to have lost a large number of its tigers.....the threat of poaching remains...".

In 2005, the Rajasthan and the Indian government set up high powered committees to look into the state of Ranthambhore and to suggest measures to improve the situation. This put the spotlight back on Ranthambore and the tiger crisis in India and since then the forest and the police department intensified the protection around the the tiger reserve. Since then there have been no reports of poaching from around Ranthambore and a large number of tiger cubs were born between the summer of 2005 and the summer of 2006.

THE PARK: GEOGRAPHY

The Ranthambhore Tiger Reserve is the single largest expanse of Dry-Deciduous *Anogeissus pendula* Forest left intact in India. Such forests were found all along the North and Central Aravalis but in the last few decades they have been badly degraded and right now this Tiger Reserve is their last strong hold. In Ranthambore the bio-diversity is made even richer by the intrusion of the Vindhyan hill system.

The areas surrounding the Tiger reserve have been totally deforested and as a result, the Ranthambhore tiger reserve is now an "ecological island surrounded by farmlands and overgrazed pastures."

It is is home to over 40 species of mammals, 320 species of birds, over 35 species of reptiles and over 300 species of plants. (Ref: Dr. Dharmendra Khandal - Bio-diversity of Ranthambore 2004).

Panthera tigris tigris - the Indian or the Bengal Tiger is the flagship species of Ranthambhore and right now it is the only place in Rajasthan where tigers exist. In that sense it is on the westernmost extent of the tiger's distribution on the earth. If the tigers are to spread to the other surrounding forests of the Aravalis the Ranthambhore is the only "nursery" that can make it possible.

The Reserve is also a crucial link and wildlife corridor between a chain of Protected Areas from Dholpur district in the North-East to the Kota district in the South-West. In this chain of Protected areas, not only does Ranthambhore have the highest bio-diversity but it is the only Protected area that has large and viable populations of mega fauna.

This reserve is also an invaluable watershed for the surrounding areas, a fact that is made more significant considering that the surrounding areas have low annual rainfall. Ranthambhore is an important catchment area for the river Chambal, which in turn, is an important river in the Gangetic system. The reserve is also the most important catchment for a large number of reservoirs that surround it. It also plays a very important role in recharging the ground water of the area. These reservoirs and the ground water are the only source of water for entire surrounding area. The river Gambhir that flows out of the Reserve is the most important source of water for the wetlands of Bharatpur district.

Terrain

The terrain of Ranthambhore Tiger Reserve is mostly rugged and hilly. and is intimately related to the Great boundary fault.

The hills to the northwest of fault-line are the Aravalis and typically have ridges on one side and gentle slope on the other. This Aravali tract is highly undulating except for a few small plateaus and some small valleys. These valleys are teeming with wildlife and are the richest wildlife areas in the entire reserve. Most of Ranthambore national park's tigers are found in these valleys. The highest point of this tract is Gazella peak, 507 meters above M.S.L. The lowest altitude of this tract is 244 meters above M.S.L. at Bodal. Streams flowing in northern tract form the catchment of the river Banas and streams flowing in southern tract drain directly in the river Chambal. Most of the streams are very short lived but the streams facing sharp ridges maybe perennial, as the folded impervious rocky strata beneath, does not permit the water to percolate.

The hills south west of Great boundary fault are the Vindhyas. The sand stone beds of these hills are flat-topped and form extensive table lands known as "Dangs". These dangs rise abruptly from flat ground and have sandstone ridges running continuously along their edges. At places, small and short lived streams have eroded deep, long and narrow gorges that are locally known as "Khohs". The khohs are cool and retain moisture even in the hot summer and are main wild life areas in all

the parts of Project tiger reserve. The Kela Devi sanctuary has some of the longest and the widest khos.

The ravines are prominent feature of both the rivers, the Chambal and the Banas. These ravines are formed due to sandy nature of the soil along the banks of the rivers. Along the Chambal, the ravines are as deep as 50 mts and extend up to 8 kms in length. The ravines are very important for the lesser fauna.

Climate

The reserve, with its sub-tropical dry climate, has three very well defined seasons – summers, winters and monsoons. October and March are the time when the weather changes from monsoons to winters and from winters to summers, respectively.

Summers start during the end of March and last through the months of April, May and June. During this season the days are very hot and dry. During May and June the maximum day temperature crosses 40 degrees Centigrade and the minimum night temperature still hovers around 30 degrees Centigrade. During the day, hot and dry winds (loo) blow. In the summers the dangs are almost totally devoid of wildlife during the day. Most of the ungulates and the large predators spend the summer months in the valleys and the khos. The maximum day temperature often crosses 45 degrees C in May and June, when the relative humidity is at its lowest.

The monsoons or the rainy season lasts from July to September. This season is warm and humid, with one or two short thundershowers a week. Often there are long periods (10 to 15 days) with no rains. During such long breaks in the monsoon rains, the weather can get very hot and humid. Droughts are a common occurrence in and around Ranthambore. During monsoons the dangs have good cover grasses and herbs and as a result the ungulates tend to concentrate on the dangs and the larger predators follow them there. The average annual rainfall is 800 mm and there are an average of 38 rainy days per year and nearly 90% of them are in the monsoon months.

The winter season lasts from November to February. The night temperature stays below 10 degrees Centigrade, while the day temperature hovers around the 20 degree Centigrade mark. There is often some rain and fog during the mid winters. During December and January the lowest night time temperature goes down to 2 degrees C.

THE PARK: FLORA

Bio-geographic classification

According to the Bio-georaphic classification (Rodgers & Panwar ,1988) Ranthambhore Tiger Reserve falls in 4 B (Semi-arid zone and Gujrat,-Rajwara biotic province). The area forms a transition zone between the true desert and seasonally wet peninsular India.

Forest Types

The forests are mainly of edaphic climax and belong to the sub group 5B- Northern Tropical Dry Deciduous forests and subgroup 6B -DS1-*Zizyphus* scrub. The degradation stages found here are DS1-Dry deciduous scrub and SS4 -Dry Grass lands (Champion & Seth ,1968) according to the vegetation map prepared by French Institute, Pondicherry. The area is representative of dry deciduous *Anogeissus pendula* Forests sub type in association with *Acacia, Capparis, Zizyphus and Prosopis* species. (Ref: Project Tiger Management Plan 2002 - 2012).

The Reserve comprises of shallow perennial lakes, steep hills, gentle slopes, plateaus, narrow valleys, etc. and as such a variety of plant communities or associations are found. The main floral habitats of Ranthambore can be classified as follows :-

(a) Steep slopes and cliffs: The vegetation on the steep hills is very scanty and the plants like *Sterculia urens*, *Euphorbia neriifolia* etc. are found scattered without having any significant under growths due to absence of deep soil.

Out of all the different floral habitats of reserve, these are the least disturbed by human activity. This is because such habitats are the least accessible and and have the lowest “harvestable resources”. the annual biomass production is low in such habitats. However, they are crucial habitats for a large number of reptile and birds, particularly the endangered Long-billed vultures.

(b) Gentle slopes of hills: The gentle slopes maintain comparatively luxuriant vegetation due to better soil formation and water holding capacity. The typical dry deciduous elements found here are - *Anogeissus pendula, Sterculia urens, Boswellia serrata, Acacia catechu, Acacia leucophloea, Cassia fistula, Butea monosperma* etc. *Anogeissus pendula* is the most dominant species here. The shrubs and under shrubs (mainly *Grewia flavescens* (seyali) and *Caparice sepiaria*. (jal)) and some climbers further increase the density of flora. Various herbs form green carpets on the slopes, particularly during rainy season and just after the rains.

The biomass production in thee habitats is very high and these are very heavily used by almost all the wildlife. Outside the Ranthambhore national park, in all the parts of the Ranthambhore Tiger Reserve, it is in this habitat that the competition between wildlife and domesticated cattle is the highest.

(c) Plateaus: The open flat rocky areas maintain stunted and sparsely distributed trees and shrubs due to very thin layer of soil. However, the grasses, seasonal herbs and shrubs are abundant, except in the dry season.

The biomass production is the plateaus or the dangs is very low and highly seasonal. During the monsoon months, there are abundant grasses and herbs in the plateaus but soon after they dry out. These habitats are heavily used by wildlife and domesticated animals during the monsoons but sparingly after that.

(d) Valleys: The valleys are characterized with fertile soil, sufficient watercourses, maximum Humidity etc. As a result, it supports comparatively thick vegetation and some Evergreen elements also do exist. The common trees found here are *Anogeissus pendula (dhok), Syzygium cumini (jamun), Diospyros melanoxylon (tendu), Holoptelea integrifolia (chirail), Ficus benghalensis (bar), F. racemosa (gular), Launea coromandelica (gurjan), Butea monosperma (chila), Ziziphus mauritiana (ber), Bauhinia racemosa (sainta), Tamarindus indica (imli), Cassia fistula (amaltas), Mitragyna parvifolia (kadam)* , etc. The shrubs and under shrubs further make the vegetation dense and impenetrable at certain spots. The most common of these plants are *Adhatoda vasica (adusa), Caparice sepiaria. (jal) and Grewia flavescens (siyali)*. The valleys also have the greatest variety of climbers, herbs and grasses.

The valleys have the highest biomass production of all the habitats in the reserve and should be the prime wildlife areas. However, outside the Ranthambore national park, the valleys are inhabited by human settlements and are highly disturbed for the wildlife. Inside the Ranthambhore national park, they are have the highest density of wildlife that is found in the entire reserve.

(e) Lakes, reservoirs and its surroundings: These habitats provide variable plant communities controlled by the moisture content. The low-lying areas are also inhabited by certain trees like *Phoenix sylvestris (khajur), Ficus bengalensis (bar), Tamarindus indica (imli), Flacourtia indica (kakoon)* etc.

Most of the wetlands of the Ranthambhore, except those in the Ranthambore national park, are highly disturbed. Long periods of use by humans for cattle, irrigation, fishing etc have taken a big toll on these habitats.

(f) Sandy plain : The species like *Acacia nilotica (babul), A. leucophloea (ronjh), Capparis decidua (karil), . Prosopis juliflora (vilayati babul), Calotropis procera (ankra), Argemone mexicana (satyanashi)* etc. inhabit flat sandy localities - locally known as bhura - of the Reserve.

These habitats are highly disturbed in the reserve. Grazing by cattle and goats have destroyed most of the ground cover and *Argemone mexicana* has invaded this habitat in many areas.

(Ref: A study on the Ranthambore with reference to its existing flora - S.N.Das & V.Singh, Botanical Survey of India, Jodhpur)

Anogeissus pendula (Dhok):- It is dominant species and constitutes about 80% of the vegetation cover. It represents the edaphic climax. Generally found in the hilly areas and maintains luxuriant growth on the gentle slope of the hills due to better soil formation and water holding capacity. It is a slow growing species with generally varying girth and height ranging from 10-15 meters with crown cover more than 60% found on hill slopes and valleys. The growth of *Anogeissus pendula* is generally stunted on plateaus where the residual soil is poor and shallow. *Grewia flavescens* in under-story is a common associate of *Anogeissus pendula*. On the remote sensing imagery, *Anogiessus pendula* appears in shades of dull red depending on the density.

THE PARK: FAUNA

Ranthambhore's unique climatic and vegetational features have given rise to forests that are dry and open with little and stunted ground cover. This makes wildlife viewing relatively easier on the safari. There are over 320 species of birds, both resident and migratory, over 40 species of mammals and over 35 species of reptiles. Due to the dry climate there are not many species of amphibians in Ranthambore.

Besides tigers, the other wild cats found in Ranthambhore are Leopards, Caracals, Jungle cats, Rusty Spotted cats. Fishing Cats and Leopard cats have also been reported but their sightings are yet to be verified. The ungulates include Sambhar, Spotted deer (Chital), Blue bull (Nilgai), Chinkara (Indian gazelle) and Wild boar. The other large mammals that can be seen in Ranthambhore are the Sloth bear, Indian fox, Jackal, the extremely occasional Wolf, very few Indian wild dogs (Dhole), Small Indian Civet, Palm civet, Common Indian and Ruddy mongoose and Striped Hyena.

Human activity, such as, unplanned and illegal felling of trees, quarrying, farming and excessive grazing has greatly diminished wildlife outside the reserve.

Habitat wise distribution of wildlife of Ranthambhore.

Dangs: These are flat tabletop plateaus, surrounded by bold vertical cliffs. The soil depth is very shallow and there is hardly any water except in shallow constructed ponds and some moisture in depressions. In the summer season the dangs look deserted due to dry leafless *A. pendula (Dhok)* trees and lack of water. The main animals of the area are Chinkara, Nilgai, Hare, Fox, Jackal and Hyena. Avifauna is represented by Seed eating birds, Larks, Francolins, Quails, Sand grouse and Thicknees etc. During rainy season Dangs are lush green with small water pools every where and the ungulates like Chital, Sambar and Wild boar visit the areas to feed on the profuse green fodder. Carnivore like Leopards, Smaller cats and Tigers follow them.

Khohs: These are deep rocky nallahs (seasonal streams) cut up in the dangs. They are characterized by steep rocky slopes and cliffs, flat bottoms with deep and fertile soil. A number of water pools are found in the bottom and small perennial springs on slopes, even during the very hot and dry summers. Khohs are cool, moist and alive throughout the year.

The khohs are the main wild life areas of reserve, specially outside the national park. Nearly all the species of mammals are found in these, khohs. The avifauna is represented by Peafowl, Minivets, Flycatcher, Tits, Orioles and various other birds. All the species visit the upper plateau or dang area during night in search of food and specially during monsoons when khohs are wet and full of tormenting insects.

Streams: These are areas where water flows and remains for a longer period than other areas. These constitute the drainage of watersheds and are found in folds of hills. Most of these finally join Banas and /or Chambal. In these areas, even in the hot summer when other areas are dry and

hardly have any natural water, some small pools exist. The area around the pools are characterized by a belt of green trees in the summer. These networks of riparian belts are the life line of wild life in this dry deciduous area.

Such areas are home of all species of wild life, except Chinkara, which is essentially an animal of dry land. All animals are found within riparian area, except during rainy season when streams are fast flowing. From February till the onset of monsoon the riparian areas are extensively used by all the wild life.

Valleys: The terrain of reserve is hilly and there are large numbers of valleys in the area. These areas lie between two hills with flat bottom and rich soil and as a result the vegetation is good. Some water remains in the nallahs in small water pools and provide sustenance to wild life during hot dry summer.

Valleys are rich in wild life and almost all the species are found here. Tigers, Sambhar, Chital, Wild boar, smaller cats, Caracal, Chinkara, Nilgai etc. are present throughout the year. In the valleys some good grasslands are also available which provide ideal cover for tigers and other smaller cats, along with ground birds. The avifauna is represented by Peacock, Partridges, Green Pigeons, Parakeets, Sparrows, Prinias, Warblers etc.

Ravines: Both banks of the river Chambal and Banas are cut up by these ravines due to the sandy and easily erodable soil of these areas. These ravines are up to 50 meters deep with precipitous narrow gullies. Major portion of the ravine areas have been leveled and ploughed by the villagers, but some areas are still wild. There are a few water holes in the ravines but since the rivers are close by this is not a major limiting factor for the wildlife.

Since the area is flooded during monsoon and remains dry during summer with water available only in the river, the animal density of the area is generally lower. The main species are Chinkara, Nilgai, Wild boar, Hare, Hyena and many kinds of lesser mammals. The avifauna is represented by Peacock, River birds, Francolins, Sand grouse etc.

Wetlands: There are a few areas, with in the reserve, where water remains standing throughout the year. Due to the presence of water these areas become the centre of activity of animals both wild and domestic. These water bodies contain a variety of aquatic fauna and flora, according to the depth of the water bodies.

Along with aquatic fauna which includes turtle, crocodiles, fish, water birds, frogs, crabs and other small creatures, a lot of terrestrial fauna also use wetlands. The aquatic fauna constitutes an integral and important part of this ecosystem. After monsoons, the area of the water body is at its maximum and during winter the water line starts receding and fresh land comes out of water. During summer season when the surrounding areas are dry and there is no green fodder or grass the newly sprouted green grass in the area available due to receding of water attracts Sambhar, Cheetal and Wild boar. Sambhar and Wild boar also feed on aquatic vegetation. Invariably, the large predators follow them and these areas become main centre of activity of tigers.

Common species of Ranthambhore

	Name	Habitat
1.	Tiger	Dense cover in the valleys and riverine areas
2.	Leopard	Dense cover in the higher slopes and forest edge
3.	Jungle Cat	Scrub and grasslands and undergrowth in valleys
4.	Caracal	Streams, Open scrub and grasslands
5.	Rusty Spotted cat	Thorny trees, scrubland and cultivated areas
6.	Sambar deer	Thick cover in valleys, gentle slopes and dangs
7.	Chital or Spotted deer	Open spaces and riverine areas in forests
8.	Nilgai or Antelope	Open dry scrub land, grasslands and forest edge
9.	Chinkara or gazelle	Open scrub and grasslands in hilly areas
10.	Wild Boar	Open spaces and riverine areas in forests
11.	Sloth Bear	Dense riverine areas, khos and rocky areas
12.	Jackal	Open scrub and forest edges
13.	Hyena	Dense cover along streams, khos & riverine areas
14.	Indian Palm Civet	Large trees and undergrowth in moist areas
15.	Common Mongoose	Dense cover in moist areas and forest edges
16.	Ruddy Mongoose	Dense cover in moist areas and forest edges
17.	Indian Porcupine	Dense cover in riverine areas and rocky hillsides
18.	Indian Hare	Open scrub and grasslands
19.	Indian Flying Fox	Large trees in moist, low lying areas
20.	Marsh Crocodile	Wetlands
21.	Bengal Monitor Lizard	Dense undergrowth, large trees and rocky areas
22.	Indian Rock Python	Dense undergrowth in valleys and rocky areas
23.	Saw-scaled Viper	Open scrub and sandy soil
24.	Indian Rat Snake	Dense undergrowth and cultivated areas
25.	Indian Bull Frog	Wetlands
26.	Skittering Frog	Wetlands
27.	Common Indian Toad	Cool, moist and dark areas