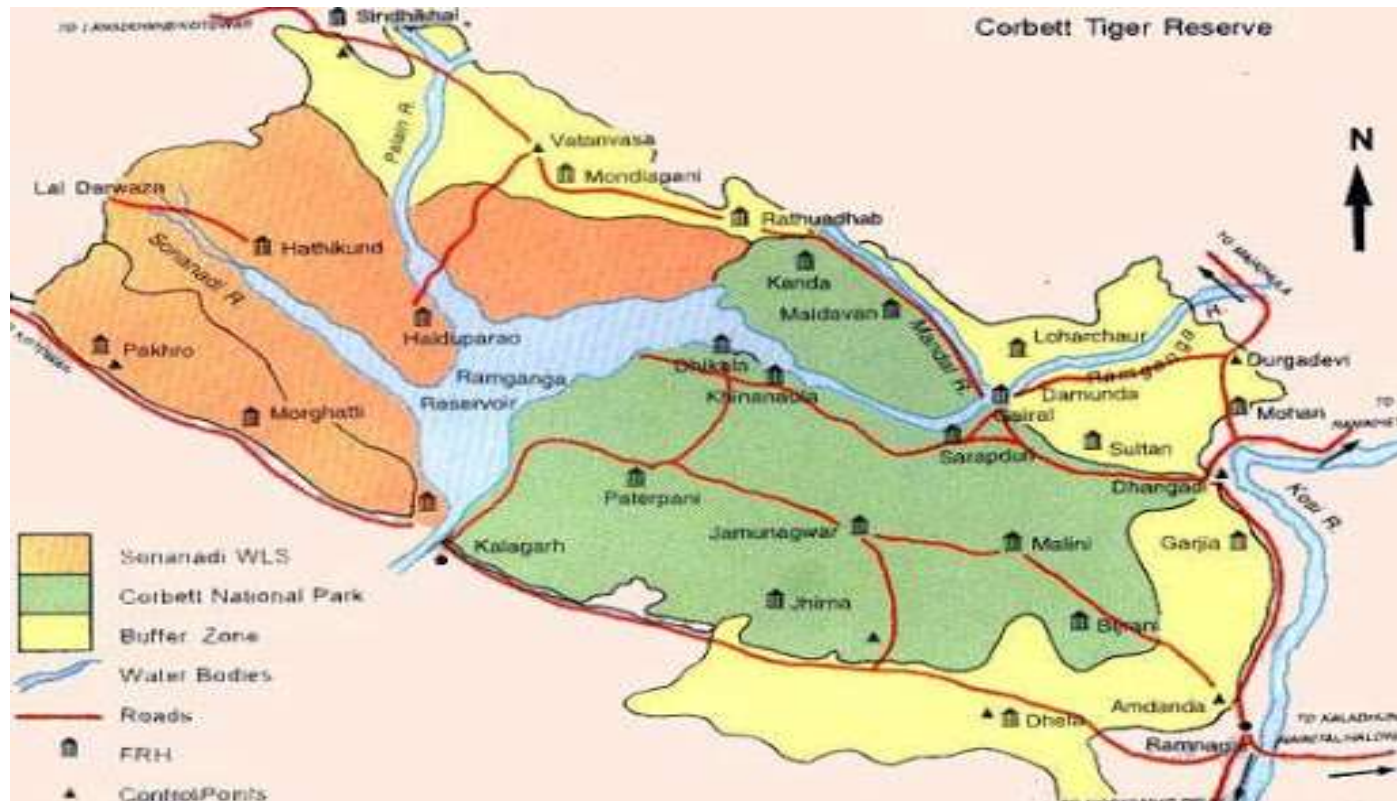


JIM CORBETT NATIONAL PARK

- Designated as **Hailey national park** on August 8,1936. Renamed as **Jim Corbett national park in 1957** in the honor of environmentalist, naturalist Edward James Corbett.
- **Area** : 1288 square km which includes **Tiger reserve, Reserve forest and Sonanadi wildlife sanctuary.**
- CNP was also the launching site of *Project Tiger from*
- where the Scheme was launched in 1973.
- It has **five divisions**
 1. Almora forest division
 2. Ramnagar forest division
 3. Terai forest division
 4. Lansdowne forest division
 5. Amangarh forest division

- 49 species of mammals
- 685 species of birds
- 39 reptilian species, 10 amphibians and
- 36 species of Pisces amongst vertebrates



FACTORS OF LOCALITY

- ❖ **Physiographic factors**- ridges, rolling grasslands, flat valleys. Spread across Nainital, Almora and Pauri districts.
- ❖ **Edaphic factors** e.g. Deer prefers fertile alluvium areas.
- ❖ **Climatic factors**- rainfall >140 cm and humid climate
- ❖ **Biotic factors**- inter and intra species competition.

TIGER (Panthera tigris)

- **Tiger census 2018** – 2967 tigers in India.
- Tigers in Corbett Tiger Reserve- 250 individuals (Phase 4)

• Distribution of tigers are mainly function of :

1. Forest type
2. Canopy density
3. Slope
4. Aspect
5. Elevation



These two decreases resource utilization conflict

- Tigers habitat association has chital (spotted deer), Sambhar, Barking deer and Nilgai which in turn has an association with tree species such as *Acacia catechu* (Khair), *Shorea robusta* (Sal), *Tectona grandis* (Teak).
- Two categories of canopy density is preferred by tigers
 - ❖ **>10%** canopy density for hunting.
 - ❖ **40-70%** canopy density for resting.

TIGER HABITAT GRASSES

Vanchari- *Sorghum hehela*

Kans – *Saccharum spontaneum*



Bhamar -*Eulaliopsis binnata*



Imperata cylindrica

CENSUS METHOD

- Camera trapping



- Drone survey

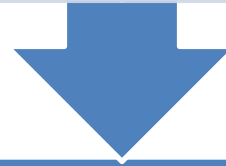


- Dung survey- can identify the diet, age, health etc.
- E-eye surveillance: electronic 24x7 live surveillance along southern boundary
- M-stripes

Challenges in CTR

High tiger density

Ideally should be 15 square km here it is 5 square km.



Diversion

Man-animal conflicts

High inbreeding leads to low genetic diversity



Grassland Mismanagement

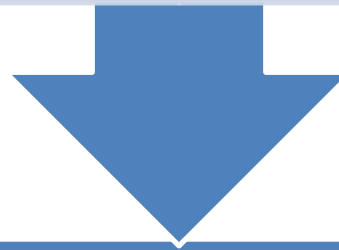
Trampling of soil

Low soil moisture

Lack of smart infrastructure

Corridors are blocked by human habitations.

Lack of eco bridges, underpasses



Invasive alien species affects grasses

Lantana camera

Parthenium, cassia

LEOPARD (*Panthera pardus*)



- Leopard is another large cat found.
- They are nocturnal.
- Compared to tiger, **leopards are smaller in size**, have **long agile body** that **has rosettes** instead of stripes.
- has ability to climb trees.
- adaptable to variety of terrains as well as to **broad range of prey** that includes everything from **insects and rodents** up to large ungulates.
- They also **ambush their prey** by jumping down from trees.
- The leopard's call is termed as '**SAW**'.
- **THREATS**: habitat destruction, poaching for their skins.

Ophiophagus hannah

- *“The lifting of the snake’s head had caught my eye and it was not until the head had been raised some two or three feet from the ground and the hood expanded that I realised it was a hamadryad. It was the most beautiful snake I had ever seen”* wrote Jim Corbett in his book *Man-Eaters of Kumaon (The Kanda Man-eater)* (1944).
- Different populations of this species occupy wide range of habitats, and the array of size, colour/pattern variations that exist, all are mind-boggling.
- Presence in the Himalayan foothills of Uttarakhand and its capacity to survive in the subtropical/temperate climate and elevation of the Kumaon and Garhwal Hills.
- On October 2012, a king cobra hatchling was found inside the Indian Veterinary Research Institute’s campus in Mukteshwar, Nainital District (2300 m).
- Highest verified elevation for a king cobra sighting in the world.



- Diet includes members of its own species! monitor lizards, rat snakes, pit vipers and banded kraits.
- Radio-telemetry studies can further shed more light on the hitherto elusive life.
- Threat faced by the species are forest fires, road kills, due to increased road-network, disrupting connectivity and fragmentation.
- Rising human population and the resulting increased proximity between king cobras and humans could exacerbate human-snake conflict, resulting in higher rates of persecution.
- Climate change threatens to alter its ecosystem.
- King cobras usually do not bite humans unlike vipers. Rather, they are afraid of humans.



- Conservation efforts can highlight the ecological significance.
- Protecting the king cobra will end up protecting a large area of its habitat and other species therein, as each king cobra demands a relatively large space (a male occupies 6-8 sq. km).
- Its regal uniqueness, unmatched intelligence, impressive ability to adapt, and sheer size never cease to impress all.
- king cobras adapted to high elevation in uttarakhand are in special need of conservation.

Python bivittatus

- Pythons are non-venomous, very large, slow-moving, nocturnal snakes that kill their prey by strangulating.
- A full-grown adult female can be as big as 19-20 feet long.
- There are pits located on its snout and



Canis aureus

- It is listed as least concern on the IUCN red list due to its widespread distribution and high density in areas with plenty of available food and optimum shelter.
- Genetic studies indicate that the golden jackal expanded from India around 20,000 years ago, towards the end of the last ice age.
- It is very adaptable, with the ability to exploit food ranging from fruit and insects to small ungulates.
- Jackal's competitors are the red fox, wolf, asiatic cat.
- The jackal scavenges off the kills made by the tiger, leopard, dhole.
- Jackals dominate foxes.



Vulpes vulpes

- Largest of the true foxes.
- Red fox is distinguished from other fox species by its ability to adapt quickly to new environment.
- Vulnerable to attack from large-sized felines like Leopards and tiger.



Riverine fauna

Rivers are the **lifeline** of the forest-

Main River:

Ramganga river

1. Without the Ramganga river there would be no Corbett.
2. It is the largest of the precious few perennial sources of water in the Park.
3. In fact, for a brief period (from 1954 to 1957) the Park was known as Ramganga National Park.
4. A rain-fed river originating near Gairsain in the Lesser Himalayan region,
5. In Park it flows roughly from east to west for 40 km till Kalagarh where it enters the plains.
6. Inside the Park it gathers waters from the Palain, Mandal and Sonanadi rivers
7. Kalagarh Dam on Ramganga built in 1970- 80 sq.km area.
8. Along with river many SOTS are found, 'Sot' is the local name for a seasonal stream. While traveling across the park you may cross several of these boulder dry streams. Though most of them appear dry and lifeless, they are very important for ecology.

Fauna in these Riverine land of Corbett.

1. The Ramganga is inhabited by key aquatic species like mahseer fish, the endangered Gharials, mugger crocodiles, otters and turtles.
2. Many species of birds, like kingfishers, fish-eagles, terns and storks depend on the Ramganga.
3. During winters the Ramganga reservoir attracts many migratory bird species, especially water birds from Europe and Central Asia.
4. Elephant presence around the river-Drink 100 to 160 lit. of water per day.
5. Five species of kingfisher can be seen along the streams namely Common kingfisher, white throated kingfisher, pied kingfisher, stork-billed and crested.

Dominant and unique Riverine fauna of CTR

1. Golden Mahseer-Tiger among the fishes.
2. Otters-smooth-coated otters, Eurasian otters, and Asian small clawed otters.
3. Gharials and mugger.

Golden mahseer



Golden mahseer

- Origin of word- Persian language word, Mahi is fish and sher –Tiger, hence it is called “Tiger among fish”.
- Scientific Name: *Tor putitora*
- Body colour of adult- golden on dorsal side and reddish yellow(fins).
- Endangered species- Distributed from Pakistan to Myanmar.
- In India- Throughout the south Himalayan drainage i.e. Indus, Ganges-Yamuna and Brahmaputra.

Conservation issues:

- *Dams create obstructions across rivers inhibiting (longitudinal connectivity')*
- *the migration of fish and other aquatic species leading to the isolation of habitats, which can affect the "genetic structure of populations".*
- Scientists have found close genetic relationships between populations of the golden mahseer, upper patches of Ramganga and sonanadi, Mandal river(40-50kg of weight and 200cm length, Avg rate of growth is 10cm per yr)
- while significant genetic differentiation was observed between lower patches of Ramganga and Ganga river and Yamuna populations.(15-20 kg of wt and 100-120cm L, Avg rate of growth is 4-6 cm)

Steps to be taken:

- Micro protected area /ESZ
- No go areas
- Fish passes in dam./Conventional pool-type passes, fish lifts, fish ladders, hydraulic fish locks, and slot passes
- Maintaining genetic connectivity by introducing best gene population.
- Urgent need of data gathering

□ Otters



- Smooth coated otters.
1. Vulnerable species and most commonly found.
 2. Predominantly fish eater, and supplements its diet with shrimp/cryfish, crab and insects, and other vertebrates like frog, mudskippers, birds and rats.
 3. Active during day

Eurasian otter

1. Near threatened species
2. Widest distribution range-From Europe through northern Africa to Asia
3. Fish is the major food.
4. nocturnal



Asian small clawed otter



1. Smallest of all other otters
2. Vulnerable
3. Distribution-mainly Indian and southern china.
4. Adapted to feeding on –hard shelled invertebrates like crabs, mollusk and insects, and some amphibians,rodents and snakes.

Gharials-Longest of all living crocodile.

1. The scientific name of Gharial is('Gavialis Gangeticus'). The Gharials is characterized by its extremely long, thin jaws and sharp teeth.
2. The name Gharial derived from male Gharials snout, a sublime part of its nostril which resembles the 'Ghara' (an Indian pot) and this part of Gharials helps in creating hiss by snorting which alerts its presence
3. They dwell in deep fresh flowing rivers. They survive on fish only.



4. Gharials nest eggs in sand banks.
5. Turned into Critically endangered species.
 - i. 1940- 4000-5000
 - ii. 1997-400
 - iii. 2008-200

Conservation issues

1. Dam, barrages, and water abstraction adversely affects gharial by turning suitable river habitats into marginal/unsuitable lakes, and by altering the quantity and quality of water available to downstream river sections.
2. Gharial, with its long, toothy rostrum is particularly vulnerable to entanglement in fishing nets, where it is frequently trapped underwater and drowns.
3. Entangled gharial are also commonly killed or have their rostrums chopped off to disentangle nets and perhaps, in retaliation for damaging nets.



4. River bed cultivation threatens gharial survival by alienating them from the terrestrial component of its habitat leading to desertion and migration. Removal of sand from riverbanks disrupts gharial behaviour and may even force local populations to desert the area.
5. Sustained mining activity may destroy vital basking and nesting sites and may also result in direct mortality of eggs during the nesting season.
6. Egg harvesting for subsistence food by riparian residents at some gharial locations directly increases egg mortality

DEERS and ANTELOPES

SAMBAR DEER

- Scientific Name - *Rusa unicolor*
- Family - Cervidae
- Status- Vulnerable as per IUCN Red Book
- In general, they can attain height upto 1.6 m and weigh upto 550 kgs.
- Its calling to state the presence of tiger is highly precise.
- They are favourite prey of tigers.
- Its population is estimated through transect survey.
- They communicate by scent marking and foot stamping.
- Their antlers which are shed are eaten by porcupines.



CHITAL(SPOTTED DEER)

- Their name is derived from Sanskrit word 'Chitral' which means spotted.
- Scientific name - *Axis axis*
- Family - *Cervidae*
- IUCN Status - *Least concern*
- *It is sexually dimorphic. Males are larger than females and males only have antlers.*
- *Mature males achieve height of 95 cm and can weigh upto 110 kg.*
- *Feed - Ficus species, Syzygium cumini and grasses*
- *Its call to spot tiger is less precise as compared to Sambar deer.*
- *The antlers are three-pronged and are shed annually and later eaten by porcupines.*
- *Predator - Tiger, Leopard*



BARKING DEER

- Also called Indian Muntjac.
- Scientific name - *Muntiacus muntjak*
- Family - Cervidae
- IUCN status - Least Concern
- It is an omnivore as it eats fruits, seeds, grasses, bird eggs, small animals and it also scavenges.
- Its call sounds like barking when it is frightened by predators.
- It is one of the smallest deer species.
- It uses scent gland to mark its territory.
- It is known for its fake calls .
- Predator - Tiger, Leopards.



HOG DEER

- Scientific name - *Hyelaphus porcinus*
- Family - Cervidae
- IUCN status- Endangered
- It runs like a hog with its head hung low. That is why it is called Hog deer.
- Adult males reach upto height of 70 cm and can weigh approximately 50 kgs.
- Males are aggressive and can become territorial at low population densities.
- Predator- Tiger, Leopard



NILGAI

- Scientific name - *Bosalephus tragocamelus*
- Family - Bovidae
- IUCN status- Least concern
- It is also called blue cow and it is the largest antelope of the Asian subcontinent.
- It shows sexual dimorphism. Males are bluish whereas females are greyish.
- Only male species have horns which are permanent.
- It can reach height of 1.5 m at shoulder and can weigh upto 300 kgs.
- It creates human-wildlife conflict by damaging agricultural fields.
- They feed on flowers of *Butea monosperma*, fruits of *zizyphus Mauritiana* and foliage of *Anogeissus pendula*
- Predator - Tigers



Avifauna of Corbett National Park



657 species (as of 19th September 2020) according to Avibase

> 50% of India's bird diversity

Recent Bird Census

- **By Uttarakhand Forest Department, after 13 years**
- **February 16th-18th 2021**
- **12 ranges of Kalagarh tiger reserve and Ramnagar forest division under CTR landscape.**
- **21 teams, 5 members each, count birds by sighting method**
- **To know the number of birds and species of birds**
- **Focus on Kosi river, Kosi barrage, Ramganga river and other ponds adjacent to CTR**
- **Due to climate change, birds not found before in Uttarakhand have been spotted in CTR**





Long-tailed Shrike
(Lanius schach)



Long-tailed Minivet (*Pericrocotus ethologus*)



Grey Bushchat
(Saxicola ferreus)

PASSERIFORMES



**Black-hooded Oriole
(*Oriolus xanthornus*)**

ACCIPITRIFORMES: Accipitridae

VULTURES

All 9 species of vultures in India are found in Corbett National Park



Himalayan Griffon (*Gyps himalayensis*)



Egyptian Vulture (*Neophron percnopterus*)

**Cinereous Vulture (*Aegypius monachus*) and
Himalayan Griffon (*Gyps himalayensis*) on a
Bombax ceiba tree**





ACCIPITRIFORMES: Accipitridae

EAGLES



Lesser Fish Eagle (*Ichthyophaga humilis*)



Crested Serpent Eagle (*Spilornis cheela*)



Mountain Hawk Eagle (*Nisaetus nipalensis*)

FALCONIFORMES: Falconidae

Fastest animal in the world

Most widespread raptor



Peregrine Falcon (*Falco peregrinus*)

GALLIFORMES: Phasianidae



Indian Peafowl (*Pavo cristatus*)



Kalij Pheasant (*Lophura leucomelanos*)



Red Jungle Fowl (*Gallus gallus*)

PSITTACIFORMES: Psittaculidae



Plum-headed Parakeet (*Psittacula cyanocephala*)

Elephant

- *Elephas maximus* (Family – Elephantidae)
- IUCN : endangered
- CTR – part of north west indian landscape



Characteristics

- Size
 - when fully-grown, males are about 9.0 ft tall at the shoulder and 4 t (4.4 short tons) in weight
 - while females are smaller at about 7.9 ft at the shoulder and 3.0 short tons in weight
- Trunk
 - an elongation of the nose and upper lip combined; the nostrils are at its tip
 - Hold water, protect tusk, play with others
- Tusk
 - dig for water, salt, and rocks,
 - to debark and uproot trees,
 - as levers for maneuvering fallen trees and branches, for work, for display, for [marking trees](#), as weapon for offence and defence, as trunk-rests, and as protection for the trunk.
- Skin
- Intelligence
 - very large and highly developed [neocortex](#)
- Soundless movement

Food and Ecology

- Grasslands, tropical evergreen to dry deciduous
- consume up to 150 kg of plant matter per day
- generalist feeders, and are both grazers and browsers
- feed on at least 112 different plant species belonging to e legume, palm, sedge and true grass families
- In CTR – Rohini, other grasses (saccharum, vetiveria, etc.)
- Good swimmers – kalagarh dam case
- Digestion – not optimum, many undigested grasses remain in dung



- As part of food chain, not a prey for any species
 - Tiger killing elephants – report of CTR study (2014-19)
 - Of the 21 deaths – 60% by tiger

Reproduction:

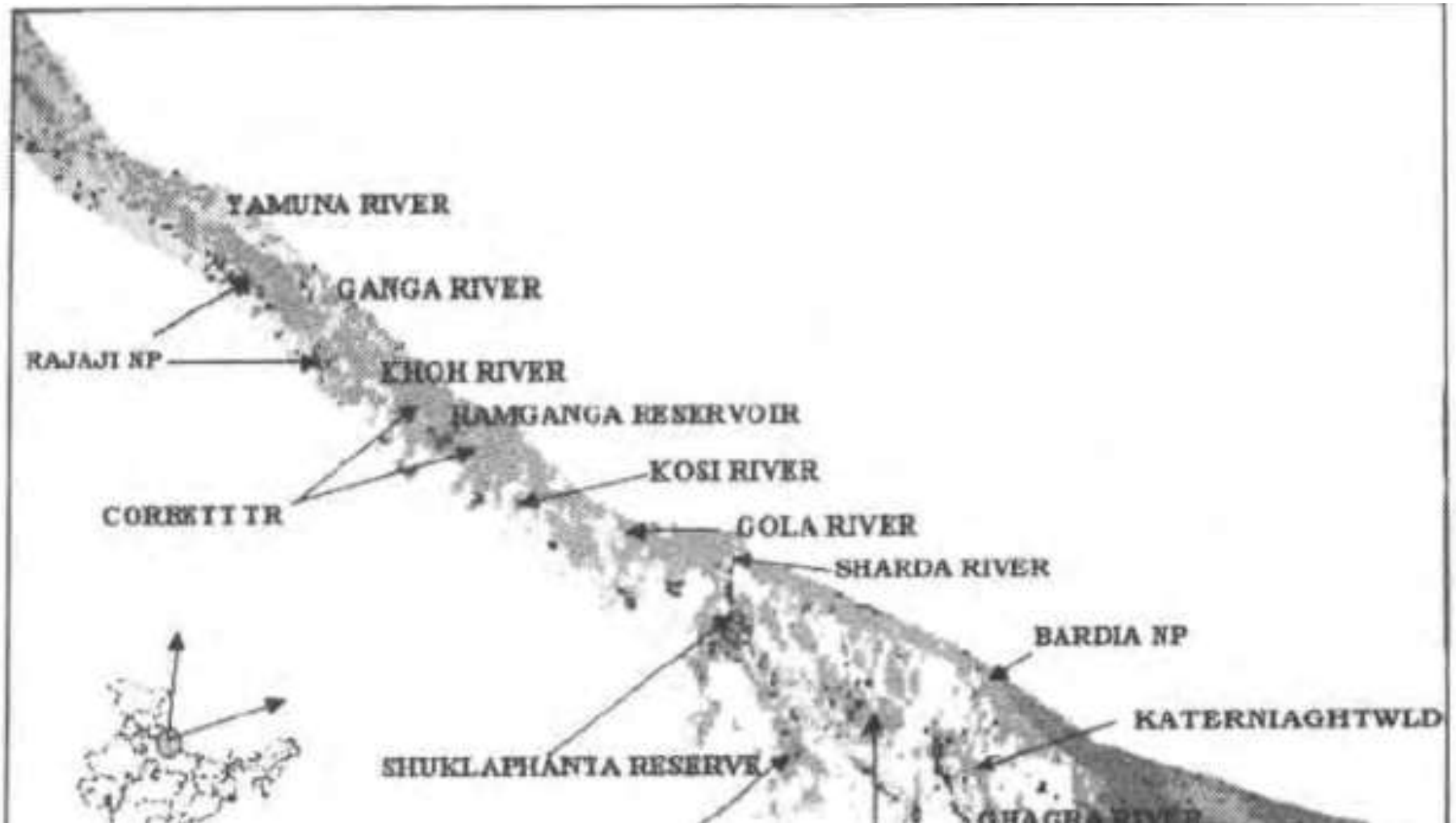
- Bulls – fight for access to female
- Between the age of 10 and 20 years, bulls undergo an annual phenomenon known as "musth". Testosterone level – up 100 times – become aggressive
- The gestation period is 18–22 months, and the female gives birth to one calf.

CTR – use of Elephant

- Patrolling
- To use in tiger monitoring and translocation
- To rescue those stranded in rains/ patrol in rains



Corridor – NW Landscape



Threats

- elephants – long ranging animals – elephant reserve much beyond protected areas
- india- only 27% ER under PA
- Food availability
 - Lopping of trees for gujjar buffaloes
 - Overgrazing
 - Lantana invasion
 - RBM mining – labour – threat to water source and trees (firewood)
- fragmentation of corridors
- infrastructure projects
 - road and rail – create new habitat edges –(Rajaji – 19km stretch)
 - alter hydrological dynamics
 - barrier to movement
 - collision deaths

Threats

- mining
- high tension power lines – electrocution
- diffused boundaries – HEC
- poaching/ ivory trade - demographics
- crop raiding
 - opportunistic raiding
 - obligate raiding
 - dispersing herds
- Corbett – an exception

Captive elephants

- forest camp (kalagarh visit)
- zoo
- temple elephants
- private
 - circus
 - tourist
- schedule 1 animal

Need:

- training and service condition of mahout – recruitment at forest guard level
- veterinary care and proper diet plan

Solutions

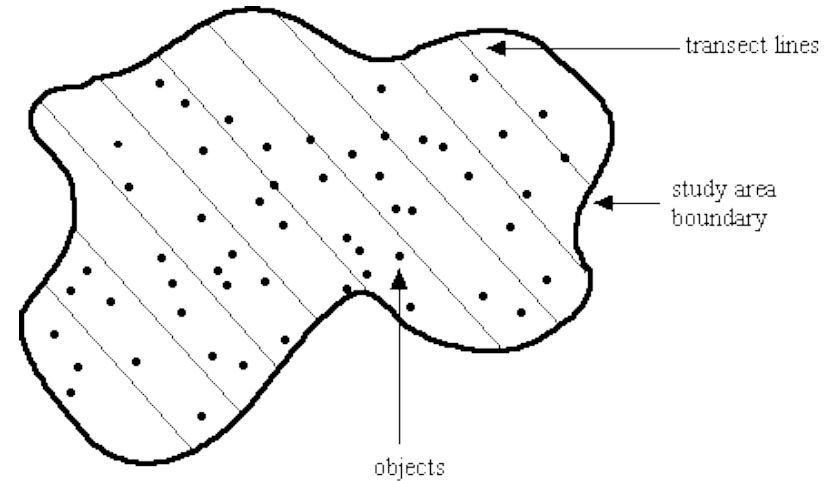
- Elephant Reserve
- Community reserves outside PA
- Managing hec
 - Regulatory mechanisms to stop habitat loss
 - Let go, slow go and no-go zones
- Elephant Landscapes

Issues to be considered:

- Elephant protection
- Habitat protection
- Corridor securement
- HEC mitigation and public cooperation
- Monitoring and research
- Captive elephant management and welfare
- Training and capacity building of frontline staff

Monitoring and Census

- Methods:
 - Total Count
 - Block Count
 - Line Transact
 - Direct
 - Indirect
- Uttarakhand census, 2015
 - 1797 elephants
 - Corbett – 1035
 - Dhikala – 242
 - Rajaji - 309



Why to care for Elephants

- Keystone species
- Landscape architects
- Seed dispersal
- Nutrition – elephant dung
- Water provider – digging holes
- Food chain – apex predator sometimes hunt young elephant
- Umbrella effect

CONCLUSION

- Faunal conservation – holistic perspective
 - Habitat, flora..
- Use of new technologies and specific animal oriented monitoring
 - E- Eye surveillance
 - African elephant monitoring by oxford – worldview3 (high resolution satellite imagery)
 - M- stripes, camera traps
 - GPS based patrolling
 - Radio collaring to check patterns
- Data gathering – census, surveys of herbivores (transact line, etc)
- Adaptation to climate change, flooding – contribute to changing faunal behaviour – need better ways to understand dynamics of fauna management

Perhaps you may not have seen me
but Please don't be disappointed
" I have seen you "

