

ANIMAL DIVERSITY OF INDIA

9.1. THE RED DATA BOOK

Species judged as threatened are listed by various agencies as well as by some private organizations. The most cited of these lists is the Red Data Book.

It is a loose-leaf volume of information on the status of many kinds of species. This volume is continually updated and is issued by the International Union for Conservation of Nature (IUCN) located in Morges, Switzerland.

"Red" of course is symbolic of danger that the species both plants and animals presently experience throughout the globe.

The Red Data Book was first issued in 1966 by the IUCN's Special Survival Commission as a guide for formulation, preservation and management of species listed.

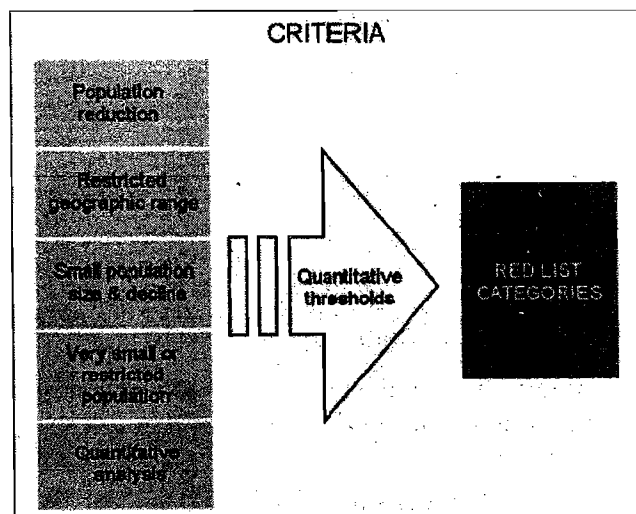
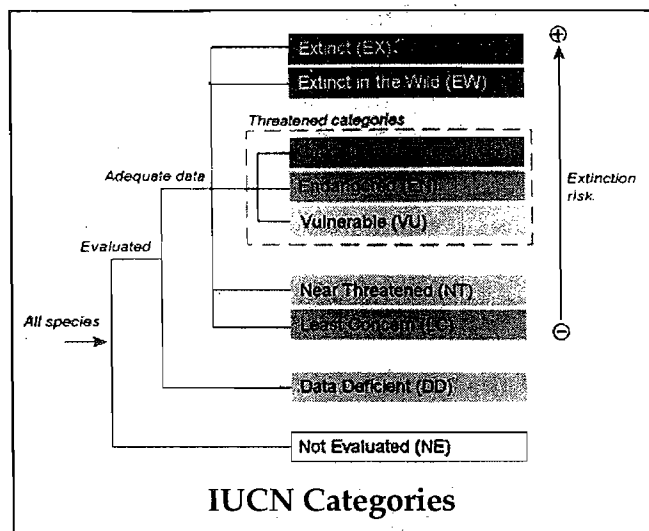
In this Book, information for endangered mammals and birds are more extensive than for other groups of animals and plants, coverage is also given to less prominent organisms facing extinction.

The pink pages in this publication include the critically endangered species. As the status of the species changes, new pages are sent to the subscribers.

Green pages are used for those species that were formerly endangered, but have now recovered to a point where they are no longer threatened. With passing time, the number of pink pages continue to increase. There are pitifully few green pages.

Do you know?

Two species of bear which have special feet are polar bear and the giant panda. The polar bear has partially webbed toes for swimming and walking on snow as well as furry bottoms to keep its feet warm on the ice. Giant pandas do not have a heel pad so they walk more on their toes.



9.2. IUCN CLASSIFICATION OF CONSERVATION PRIORITY

9.2.1. Extinct (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.

9.2.2. Extinct in the Wild (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.

9.2.3. Critically Endangered (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria for Critically Endangered.

criteria

- reduction in population (> 90% over the last 10 years),
- population size (number less than 50 mature individuals),
- quantitative analysis showing the probability of extinction in wild in at least 50% in their 10 years) and
- it is therefore considered to be facing an extremely high risk of extinction in the wild.

9.2.4. Endangered (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria for Endangered.

criteria

- reduction in population size (70% over the last 10 years),
- population size estimated to number fewer than 250 mature individuals,
- quantitative analysis showing the probability of extinction in wild in at least 20% within 20 years and
- it is therefore considered to be facing a very high risk of extinction in the wild.

9.2.5. Vulnerable (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable i.e.

criteria

- reduction in population (> 50% over the last 10 years)
- population size estimated to number fewer than 10,000 mature individuals,

- probability of extinction in wild is at least 10% within 100 years, and
- it is therefore considered to be facing a high risk of extinction in the wild.

9.2.6. Near Threatened (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

9.2.7. Least Concern (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

9.2.8. Data Deficient (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking.

Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

9.2.9. Not Evaluated (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

Do you know?

- India has been ranked as seventh most environmentally hazardous country in the world. The study is based on evaluation of "absolute" environment impact of 179 countries, done by researchers in Harvard, Princeton, Adelaide University and University of Singapore on January, 2011. Brazil was found to be worst on environmental indicators followed by united states and china whereas Singapore was the best.
- The National Clean Development Mechanism Authority of India evaluates and approves projects in accordance with guidelines issued by the Clean Development Mechanism Executive Board of the UNFCCC.

9.3. MAMMALS**- CRITICALLY ENDANGERED****9.3.1. Pygmy Hog (*Porcula salvania*)**

- Is the world's smallest wild pig, with adults weighing only 8 kgs. This species constructs a nest throughout the year.
- It is one of the most useful indicators of the management status of grassland habitats. The grasslands where the pygmy hog resides are crucial for the survival of other endangered species such as Indian Rhinoceros, Swamp Deer, Wild Buffalo, Hispid Hare, Bengal Florican and Swamp Francolin.
- In 1996, a captive-breeding programme of the species was initiated in Assam, and some hogs were reintroduced in Sonai Rupai area in 2009.
- Habitat: Relatively undisturbed, tall 'terai' grasslands.
- Distribution: Formerly, the species was more widely distributed along the southern Himalayan foothills but now is restricted to only a single remnant population in Manas Wildlife Sanctuary and its buffer reserves.
- Pygmy hog-sucking Louse (*Haematopinus oliveri*), a parasite that feeds only on Pygmy Hogs will also fall in the same risk category of critically endangered as its survival is linked to that of the host species.
- Threats: The main threats are loss and degradation of grasslands, dry-season burning, livestock grazing and afforestation of grasslands. Hunting is also a threat to the remnant populations.

9.3.2. Andaman White-toothed Shrew (*Crocidura andamanensis*), Jenkin's Andaman Spiny Shrew

- (*Crocidura jenkinsi*) and the Nicobar White-tailed Shrew (*Crocidura nicobarica*) Endemic to India.
- They are usually active by twilight or in the night and have specialized habitat requirements.
- Habitat: Leaf litter and rock crevices.
- Distribution:
 - The Andaman White-toothed Shrew is found on Mount Harriet in the South Andaman Islands.
 - The Jenkin's Andaman Spiny Shrew is found on Wright Myo and Mount Harriet in the South Andaman Islands.

- The Nicobar White-tailed Shrew (*Crocidura nicobarica*) is found in the southern tip of Greater Nicobar Island and is also recorded in the area extending from the Campbell Bay National Park to the Galathea River in the Andaman and Nicobar Islands.
- Threats: Habitat loss due to selective logging, natural disasters such as the tsunami and drastic weather changes.

9.3.3. Kondana Rat (*Millardia kondana*)

- It is a nocturnal burrowing rodent that is found only in India. It is sometimes known to build nests.
- Habitat: Tropical and subtropical dry deciduous forests and tropical scrub.
- Distribution: Known only from the small Sinhagarh Plateau (about one km²), near Pune in Maharashtra. Reported from an elevation of about 1,270 m above mean sea level.
- Threats: Major threats are habitat loss, overgrazing of vegetation and disturbance from tourism and recreational activities.

9.3.4. The Large Rock Rat or Elvira Rat (*Cremnomys elvira*)

- It is a medium sized, nocturnal and burrowing rodent. endemic to India.
- Habitat: Tropical dry deciduous shrubland forest, seen in rocky areas.
- Habitat / distribution: Known only from Eastern Ghats of Tamil Nadu. Recorded from an elevation of about 600 m above mean sea level.
- Threats: Major threats are habitat loss, conversion of forests and fuel wood collection.

Do you know?

India is endowed with vast inland and marine bio-resources. It is the third largest producer of fish in the world and the second largest producer of inland fish. The Western Ghats (the aquatic hotspot) has 192 endemic species of fishes

9.3.5. The Namdapha Flying Squirrel (*Biswamoyopterus biswasi*)

- It is a unique (the only one in its genus) flying squirrel that is restricted to a single valley in the Namdapha N.P. (or) W.L.S. in Arunachal Pradesh.
- Habitat: Tropical forest.
- Habitat / distribution: Found only in Namdapha Tiger Reserve in Arunachal Pradesh.
- Threats: Hunted for food.

9.3.6. The Malabar Civet (*Viverra civettina*)

- It is considered to be one of the world's rarest mammals.
- It is endemic to India and was first reported from Travancore, Kerala.
- It is nocturnal in nature and found exclusively in the Western Ghats.
- Habitat: Wooded plains and hill slopes of evergreen rainforests.
- Habitat / distribution: Western Ghats.
- Threats: Deforestation and commercial plantations are major threats.

Do you know?

The Spitting Cobra spits venom which can spray more than 1.8 meters, or 6 feet. It has near perfect aim, and will fire straight into the eyes of its prey.

9.3.7. The Sumatran Rhinoceros (*Dicerorhinus sumatrensis*)

- It is the smallest and most endangered of the five rhinoceros species.
- It is now thought to be regionally extinct in India, though it once occurred in the foothills of the Himalayas and north-east India.
- The Javan Rhinoceros (*Rhinoceros sondaicus*) is also believed to be extinct in India and only a small number survive in Java and Vietnam.

9.3.8. Kashmir stag/ hangul (*Cervus elaphus hanglu*)

- It subspecies of Red Deer which is native to India.
- Habitat / distribution - in dense riverine forests, high valleys, and mountains of the Kashmir valley and northern Chamba in Himachal Pradesh.
- State animal of J&k.
- Threat - habitat destruction, over-grazing by domestic livestock, and poaching.

Do you know?

Penguins don't live near freshwater. they drink salt water. They have a special gland in their bodies that takes the salt out of the water they drink and pushes it out of grooves in their bill. A handy in-house filtration system!

9.4. MAMMALS - ENDANGERED**9.4.1. Wild ass/ khur (*Equus hemionus khur*)**

- Once extended from western India, southern Pakistan, Afghanistan, and south-eastern Iran. Today, its last refuge lies in the Indian Wild Ass Sanctuary, Little Rann of Kutch.
- Threat -
 - Diseases- in 1958-1960, surra disease, caused by *Trypanosoma evansi* and transmitted by flies,
 - In 1961 outbreak of South African Horse Sickness.
 - other threats include habitat degradation due to salt activities, the invasion of the *Prosopis juliflora* shrub, and encroachment and grazing by the Maldhari.

9.4.2. Dhole/ Asiatic wild dog or Indian wild dog (*Cuon alpinus*)

- Threat - habitat loss, depletion of its prey base, competition from other predators, persecution and possibly diseases from domestic and feral dogs

9.4.3. Eld's deer/ thamin or brow-antlered deer (*Panolia eldii*)

- Status - endangered, deer indigenous to Southeast Asia
- Found in the Keibul Lamjao National Park (KLNP), Manipur.

9.4.4. Himalayan Brown/ red Bear (*Ursus arctos isabellinus*).

- Status - endangered.
- India's largest animals in the Himalayas, omnivores. Himalayan Brown Bears exhibit sexual dimorphism.
- Distribution - Nepal, Pakistan, and Northern India.

9.4.5. Golden langur (*Trachypithecus geei*)

- Primate, is an Old World monkey
- Distribution - small region of western Assam and in the neighboring foothills of the Black Mountains of Bhutan.
- Status- endangered.

Do you know?

Frog's tongues are attached to the front of their mouths rather than at the back like humans. When a frog catches an insect it throws its sticky tongue out of its mouth and wraps it around its prey. The frog's tongue then snaps back and throws the food down its throat.

9.4.6. Himalayan wolf

- Habitat / distribution - trans-Himalayan region of Himachal Pradesh, Jammu and Kashmir in northern India.
- Status – Endangered

9.4.7. Himalayan / White-bellied Musk Deer

- Habitat / distribution - Kashmir, Kumaon and Sikkim.
- Musk deer lack antlers, but they possess a pair of enlarged canines that grow continuously.
- Status – endangered
- Threat - poaching & illegal trade for its musk
- Deer musk is a substance with a persistent odor obtained from a gland of the male musk deer (Only males produce the musk). The substance has been used as a perfume fixative, incense material, and medicine.

9.4.8. Hispid hare/ Assam rabbit (*Caprolagus hispidus*)

- Habitat / distribution - southern foothills of the central Himalayas. Status – endangered.
- The habitat of hispid hares is highly fragmented due to increasing agriculture, flood control, and human development.

Do you know?

Cobras are cannibals, which mean that they will eat other snakes along birds, bird eggs and small mammals

9.4.9. Hog deer

- Status - endangered
- Habitat / distribution - northern india.
- Name - The hog deer runs through the forests with its head hung low (hog-like manner) so that it duck under obstacles instead of leaping over them like most other deer do.

9.4.10. Lion-tailed macaque/ wanderoo (*Macaca silenus*)

- Endemic to the Western Ghats.
- Status – endangered. Avoid human presence and they do not live, feed or travel through plantations.
- Habitat: Lion-tailed macaques live in southwest India in pockets of evergreen forests, called sholas, in the Western Ghats range. Today, they only live in mountain forests scattered across

three Indian states: Karnataka, Kerala, and Tamil Nadu.

- Threat - habitat fragmentation due to spread of agriculture and tea, coffee, teak and cinchona, construction of water reservoirs and human settlements to support such activities.
- Captive breeding – aringnar anna zoological park, Chennai and in Mysore Zoo.

9.4.10. Markhor (*Capra falconeri*)

- Exhibit sexual dimorphism national animal of Pakistan.
- Habitat / distribution – mountains of central Asia. In India - some parts of jammu and Kashmir .
- Status – endangered
- Threat – hunting (both for meat and for its twisted horns), armed conflict and habitat loss
- Conservation - listed on Appendix I of CITES

9.4.11 Nilgiri langur/ Nilgiri leaf monkey (*Trachypithecus johnii*)

- Status – endangered
- Threat – habitat degradation, development activities, introduction of exotic tree species.
- Habitat / distribution – hilly areas of western ghats in tamil nadu and kerala. tropical wet evergreen, semi-evergreen and riparian forests.

9.4.12. Nilgiri tahr

- The Nilgiri tahr is the largest of the three tahr species, inhabit montane grasslands of western ghats.
- It is the state animal of Tamil nadu. Status in the Wild: Endangered
- shoals forest (stunted evergreen forests) are typically avoided by tahr.
- Threats- habitat loss, overgrazing, illegal hunting.

9.4.13. Great Indian one horn Rhinoceros

- Habitat: Found only in the tall grasslands and forests in the foothills of the Himalayas.
- National Parks: Kaziranga National Park, pabitora wildlife sanctuary, Manas National Park, Assam
- Status in the Wild: Endangered
- Threat - Oriental belief that its horn, among other parts, has medicinal properties.

9.4.14. Wild Ass

- Habitat: Flat grassland covered expanse known as betis (islands where coarse grasses springs up during the monsoon).
- National Parks: Little Rann Of Kutch, Gujarat
- Status in the Wild: Endangered

9.5. VULNERABLE MAMMALS**9.5.1. Chiru / Tibetan Antelope**

- Status – Vulnerable
- Habitat : Tibet cold desert
- Threat : The chiru is threatened by hunting for its fine wool which is used to make the shahtoosh scarves, meat, magnificent horns.

9.5.2. Himalayan tahr

- Status – vulnerable
- habitat – Himalayas
- tahr have many characters in common with true goats, but lack a beard and have several other unique features.

9.5.3. Black buck

- Status – vulnerable
- Habitat – Grass land
- Threat - excessive hunting for meat and sporting trophies, as well as habitat loss. Black buck show sexual dimorphism.

Do you know?

Sharks have the most powerful jaws on the planet. Both the upper and lower jaws move. It tosses its head back and forth to tear loose a piece of meat which it swallows whole.

9.5.4. Gaur

- The gaur (*Bos gaurus*), also called Indian bison, is a large bovine native to South Asia and Southeast Asia. The species is listed as vulnerable on the IUCN Red List.
- Gaur are largely confined to evergreen forests or semi-evergreen and moist deciduous forests, but also occur in deciduous forest areas at the periphery of their range.
- The domesticated form of the gaur, *Bos frontalis*, is called gayal or mithun

9.5.5. Four-horned antelope, Chousingha

- Status - vulnerable
- The four-horned antelope must drink water regularly in order to survive

9.5.6. Takin

- Status - vulnerable
- Mountainous regions in the Himalayan Mountains and western China

9.5.7. Nilgiri marten

- Endemic to the Western Ghats. inhabits areas that are far from human disturbance
- Semi-arboreal lifestyle. Martens are Carnivorous animal.
- Only species of marten considered vulnerable to extinction.
- Threat - habitat loss and fragmentation, hunting for its fur.
- Only species of marten found in southern India

9.5.8. Red Panda

- Red panda is endemic to the temperate forests of the Himalayas,
- Diet - omnivorous (mainly on bamboo).
- Habitat / distribution – Sikkim and assam, northern arunachal Pradesh.
- Threat - habitat loss and fragmentation, poaching, and inbreeding depression.

9.5.9. Marbled cat (*Pardofelis marmorata*)

- Habitat / distribution - from northern India and Nepal, through south-eastern Asia to Borneo and Sumatra
- In india - Sikkim, Darjeeling, moist tropical forest.
- Arboreal in nature
- Threat – hunting, habitat destruction for marbled cat and its prey.

9.5.10. Barasingha or swamp deer (*Rucervus duvaucelii*)

- Habitat / distribution - isolated localities in northern and central India, and southwestern Nepal.
- Status - vulnerable.

9.5.11. Indian wolf

- Habitat / distribution - range extends from south of the Himalayas
- Status – vulnerable

9.5.12. Oriental small-clawed otter/ Asian small-clawed otter (*Aonyx cinerea*),

- Otter - any of 13 living species of semiaquatic mammals which feed on fish and shellfish, and also other invertebrates, amphibians, birds and small mammals.

- It is a smallest otter species in the world
- It lives in mangrove swamps and freshwater wetlands.
- Status – vulnerable. Threat - habitat loss, pollution and hunting.

9.5.13. Clouded leopard (*Neofelis nebulosa*)

- Habitat / distribution - Himalayan foothills through mainland Southeast Asia into China,
- They occur in northern West Bengal, Sikkim, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.
- status –vulnerable. Threat – deforestation and poaching.

9.5.14. Asian black bear/ moon bear or white-chested bear (*Ursus thibetanus*)

- medium-sized species of bear, largely adapted for arboreal life,
- Habitat / distribution - seen across much of the Himalayas, Korea, northeastern China, the Russian far east and the Honshū and Shikoku islands of Japan.
- Status -vulnerable species,
- Threat - deforestation and active hunting for its body parts.

Do you know?

- When male frogs are ready to mate they will 'call' out to the female frogs. Each different species of frog has their own special sound and that is the sound that the same species of female frog will answer to. Some frogs are so loud they can be heard a mile away!
- Frogs and toads are carnivores
- Some frogs are very good at camouflaging themselves so that they blend in with their environment, making it harder for their enemies to find them. A frog can change the colour of its skin depending on its surroundings.

9.6. MARINE MAMMALS

9.6.1. Freshwater / river dolphin

- Habitat / distribution - India, Bangladesh, Nepal and Pakistan which is split into two subspecies, the Ganges river dolphin and Indus river dolphin.

9.6.2. Ganges river dolphin

- Habitat / distribution - Ganges and Brahmaputra Rivers and their tributaries in Bangladesh, India and Nepal.

- The Ganges river dolphin has been recognized by the government of India as its National Aquatic Animal.

9.6.3. Indus river dolphin

- Habitat / distribution - Indus River in Pakistan and its Beas and Sutlej tributaries.

9.6.4. Herbivorous Marine Mammals

- include dugong and manatees and they inhabit swamps, rivers, estuaries, marine wetlands, and coastal marine waters.

9.6.5. Dugong

- (Dugong dugon) also called as sea cow.
- Status - vulnerable. Threat - hunting (meat and oil), habitat degradation, and fishing-related fatalities.

9.6.6. Manatees

- Habitat / distribution - Caribbean Sea, Gulf of Mexico, the Amazon Basin, and West Africa
- Threat - coastal development, red tide, hunting.

9.7. FEW EXCEPTIONS

9.7.1. Egg Laying Mammals

The unique feature of monotremes, a sub division of mammal, is that monotremes lay eggs rather than giving birth to their young. There are only five living Monotreme/ egg laying Mammals species: they are - the duck-billed platypus and four species of spiny anteaters (also known as echidna). All of them are found only in Australia and New Guinea.

Echidnas are also known as spiny ant eaters.

- Habitat / distribution - Australia and New Guinea
- In echidnas, the egg is carried in a pouch on the female's belly until the young hatches, at which point the barely-developed young must find a mammary gland and latch onto it for nourishment.

Platypus is a semi-aquatic mammal.

- Habitat / distribution - endemic to eastern Australia, including Tasmania.
- In the platypus, the female retires to a burrow in the bank of a river or pond. The burrow is lined with dry vegetation, and there the eggs are laid.
- The male platypus has venom strong enough to can kill a small dog, or cause excruciating pain among humans.

9.7.2. Marsupials

- Marsupials are the group of mammals commonly thought of as pouched mammals (like the wallaby and kangaroo).
- Marsupial mammals have placenta but it is very short-lived and does not make as much of a contribution to fetal nourishment.
- They give birth very early and the young animal, essentially a helpless embryo, climbs from the mother's birth canal to the nipples.
- There it grabs on with its mouth and continues to develop, often for weeks or months depending on the species.
- They do not have long gestation times like placental mammals. The short gestation time is due to having a yolk-type placenta in the mother marsupial.
- Extinct - Marsupial - quagga, the marsupial wolf.
- Placental mammals all bear live young, which are nourished before birth in the mother's uterus through a specialized embryonic organ attached to the uterus wall, the placenta.
- Placental mammals nourish the developing embryo using the mother's blood supply, allowing longer gestation times.

List of Marsupials

Phalangers	Opossum
Kola	Tasmanian devils
Kangaroo	Marsupial Mole (4 foot)
Wallaby	Bandi coot
Wombats	Tasmanian Wolf /Tiger
Dasyure	

9.7.3. Flying squirrel

- Flying squirrels are mammals too, but they don't really fly.
- They jump from high in a trees glide through the air like a kite.

Do you know?

Not all sharks are fierce carnivores. Some are quite harmless. Oddly enough, the most harmless sharks tend to be the largest! The basking shark, the whale shark and the Mega mouth sharks all fit this description. These huge sharks eat plankton.

9.8. BIRDS

- CRITICALLY ENDANGERED

9.8.1. The Jerdon's Courser (*Rhinoptilus bitorquatus*)

- It is a nocturnal bird found only in the northern part of the state of Andhra Pradesh in peninsular India.
- It is a flagship species for the extremely threatened scrub jungle.
- The species was considered to be extinct until it was rediscovered in 1986 and the area of rediscovery was subsequently declared as the Sri Lankamaleswara Wildlife Sanctuary.
- Habitat: Undisturbed scrub jungle with open areas.
- Distribution: Jerdon's Courser is endemic to Andhra Pradesh.
- Threats: Clearing of scrub jungle, creation of new pastures, growing of dry land crops, Illegal trapping of birds, plantations of exotic trees, quarrying and the construction of the River Canals.

9.8.2. The Forest Owlet (*Heteroglaux blewitti*)

- Had been lost for more than a century. After 113 long years, the owlet was rediscovered in 1997 and reappeared on the list of Indian birds.
- Habitat: Dry deciduous forest.
- Habitat / distribution: South Madhya Pradesh, in north-west Maharashtra and north-central Maharashtra.
- Threats: Logging operations, burning and cutting of trees damage roosting and nesting trees of the Forest Owlet.

9.8.3. The White-bellied Heron (*Ardea insignis*)

- extremely rare bird found in five or six sites in Assam and Arunachal Pradesh, one or two sites in Bhutan, and a few in Myanmar.
- Habitat: Rivers with sand or gravel bars or inland lakes.
- Distribution: Bhutan and north-east India to the hills of Bangladesh and north Myanmar.
- Threats: Loss and degradation of lowland forests and wetlands through direct exploitation and disturbance by humans.

9.8.4. The Bengal Florican (*Houbaropsis bengalensis*)

- A rare bustard species that is very well known for its mating dance. Among the tall grasslands, secretive males advertise their territories by springing from the ground and flitting to and fro in the air.
- Habitat: Grasslands occasionally interspersed with scrublands.
- Distribution: Native to only 3 countries in the world - Cambodia, India and Nepal. In India, it occurs in 3 states, namely Uttar Pradesh, Assam and Arunachal Pradesh.
- Threats: Ongoing conversion of the bird's grassland habitat for various purposes including agriculture is mainly responsible for its population decline.

9.8.5. The Himalayan Quail (*Ophrysia superciliosa*)

- It is presumed to be extinct since no reliable records of sightings of this species exist after 1876. Intensive surveys are required as this species is hard to detect due to its reluctance to fly and its preference for dense grass habitats. Possible sighting of this species was reported in Nainital in 2003.
- Habitat: Tall grass and scrub on steep hillsides.
- Distribution: Western Himalayas.
- Threats: Indiscriminate hunting during the colonial period along with habitat modification.

9.8.6. Pink-headed Duck (*Rhodonessa caryophyllacea*)

- It has not been conclusively recorded in India since 1949. Males have a deep pink head and neck from which the bird derives its name.
- Habitat: Overgrown still-water pools, marshes and swamps in lowland forests and tall grasslands.
- Distribution: Recorded in India, Bangladesh and Myanmar. Maximum records are from north-east India.
- Threats: Wetland degradation and loss of habitat, along with hunting are the main causes of its decline.

9.8.7. Sociable Lapwing (*Vanellus gregarious*)

- It is a winter migrant to India. This species has suffered a sudden and rapid population decline due to which it has been listed as critically endangered.

- Habitat: Fallow fields and scrub desert.
- Distribution: central Asia, Asia Minor, Russia, Egypt, India, Pakistan. In India, habitat / distribution is restricted to the north and north-west of the country.
- Threats: Conversion of habitat to arable land, illegal hunting and proximity to human settlements.

Do you know?

Some trees can "talk" to each other. When willows are attacked by webworms and caterpillars, they emit a chemical that alerts nearby willow of the danger. The neighboring trees then respond by pumping more tannin into their leaves making it difficult for the insects to digest the leaves.

9.8.8. Spoon Billed Sandpiper (*Eurynorhynchus pygmeus*)

- It requires highly specialized breeding habitat, a constraint that has always kept its population scarce. India is home to some of the last existing wintering grounds of this species.
- Habitat: Coastal areas with sparse vegetation. No breeding records further inland than 7 km from the seashore.
- Distribution: Has been recorded in West Bengal, Orissa, Kerala and Tamil Nadu.
- Threats: Habitat degradation and land reclamation. Human disturbance also leads to high incidence of nest desertion.

9.8.9. Siberian Crane (*Grus leucogeranus*)

- It is a large, strikingly majestic migratory bird that breeds and winters in wetlands. They are known to winter at Keoladeo National Park, Rajasthan. However the last documented sighting of the bird was in 2002.
- Habitat: Wetland areas.
- Located distribution: Keoladeo National Park in Rajasthan.
- Threats: Pesticide pollution, wetland drainage, development of prime habitat into agricultural fields, and to some extent, hunting.

Do you know?

Since April, 2011 the Ministry of Environment and Forests (MoEF) has tightened pollution monitoring norms for power projects with a generation capacity of 500 Mw and above, and integrated steel plants with a capacity of 1 million tonnes per annum and cement plants with a capacity of 3 million tonnes per annum.

9.9. REPTILES - CRITICALLY ENDANGERED

9.9.1. Gharial (*Gavialis gangeticus*)

- It is the most uniquely evolved crocodilian in the world, a specialized, river-dwelling, fisheater.
- The dire condition of the gharial reflects the tragedy of our rivers, where we stand to not only lose other endangered taxa such as the Ganges River Dolphin (*Platanista gangetica*) but also the use of their waters for human consumption and other needs.
- Habitat: Clean rivers with sand banks.
- Distribution: Only viable population in the National Chambal Sanctuary, spread across three states of Uttar Pradesh, Rajasthan and Madhya Pradesh in India.
- Small non-breeding populations exist in Son, Gandak, Hoogly and Ghagra rivers. Now extinct in Myanmar, Pakistan, Bhutan and Bangladesh.
- Threats: The combined effects of dams, barrages, artificial embankments, change in river course, pollution, sand-mining, riparian agriculture and ingress of domestic and feral livestock caused irreversible loss of riverine habitat and consequently of the gharial.

9.9.2. Hawksbill Turtle (*Eretmochelys imbricata*)

- It is a heavily exploited species. The species is migratory in nature and nesting occurs in about 70 countries across the world. Maturation is slow and is estimated between 25 – 40 years.
- Habitat: Nesting occurs on insular, sandy beaches.
- Distribution: In India they are found in the Andaman and Nicobar Islands, the coast of Tamil Nadu and Orissa.
- Threats: Turtle shell trade, egg collection, slaughter for meat, oil pollution and destruction of nesting and foraging habitats.

9.9.3. Leatherback Turtle (*Dermochelys coriacea*)

- It is the largest of the living sea turtles, weighing as much as 900 kg.
- Adult leatherback turtles are excellent swimmers. They swim an average of 45-65 km a day, travel upto 15,000 km per year and can dive as deep as 1200 m. Jellyfish is their primary food.
- The population spikes of leatherback coincide with abundance of jellyfish, making them important top-predators in marine environments.
- Habitat: Tropical and subtropical oceans.

- Distribution: Found in tropical and temperate waters of the Atlantic, Pacific, and into Indian Oceans.
- Threats: High sea fishing operations, harvesting of eggs, destruction of nests by wild predators and domesticated species such as cats, dogs and pigs. Artificial lighting disorients hatchlings and adults and causes them to migrate inland rather than towards the sea. Threats to habitat include construction, mining and plantation of exotics.

9.9.4. Four-toed River Terrapin or River Terrapin (*Batagur baska*)

- It is a critically endangered turtle. The omnivorous diet of the river terrapin and other terrapin species makes them an essential part of the efficient clean-up systems of aquatic habitats.
- Habitat: Freshwater rivers and lakes.
- Distribution: Bangladesh, Cambodia, India, Indonesia and Malaysia.
- Threats: Use of flesh for medicinal purposes, demand for eggs, which are considered a delicacy.

9.9.5. Red-crowned Roofed Turtle or the Bengal Roof Turtle (*Batagur kachuga*)

- It is a critically endangered turtle mainly restricted to the Ganga basin. Males have a bright red coloration during the breeding season.
- Habitat: Deep, flowing rivers but with terrestrial nest sites.
- Distribution: Found in India, Bangladesh and Nepal. In India it resides basically in the watershed of the Ganga.
- Threats: Water development projects, water pollution, human disturbance and poaching for the illegal wildlife market.

9.9.6. Sispara day gecko (*Cnemaspis sisparensis*)

- It is a large gecko which dwells usually in forests, it is largely insectivorous and nocturnal.
- Habitat / distribution: Endemic to Western Ghats, and found in Sispara, Nilgiris, Kavalai near Cochin.
- Threats: Habitat conversion and modification.

Do you know?

The Protection of Plant Varieties and Farmers' Rights Act, 2001 while seeking to protect the rights of plant breeders, as mandated under TRIPS, has in an innovative fashion, managed to provide 'rights' to the Indian farmer.

9.10. FISH**- CRITICALLY ENDANGERED****9.10.1. The Pondicherry Shark (*Carcharhinus hemiodon*)**

- It is a marine fish that occurs or occurred inshore on continental and insular shelves.
- This is a very rare and little-known species.
- Habitat / distribution: Indian Ocean – from Gulf of Oman to Pakistan, India and possibly Sri Lanka.
- In scattered localities spanning India to New Guinea. Also been recorded at the mouth of the Hooghly river.
- Threats: Large, expanding, and unregulated commercial fisheries in inshore localities and habitats. If still extant, it is probably caught as bycatch, although market surveys have failed to record it. Its populations are considered to have been severely depleted as a result of continued exploitation.

9.10.2. The Ganges Shark (*Glyphis gangeticus*)

- It is a uniquely adapted fish-eating shark that occurs in the turbid waters of the Ganga river and the Bay of Bengal. The small eyes suggest that it is adapted to living in turbid water, while the slender teeth of the species suggests that it is primarily a fish-eater.
- Habitat / distribution: It occurs in India and possibly in Pakistan. The Ganga river system and Hooghly river mouth are its known habitats.
- Threats: Major fisheries targeting sharks. Other probable threats include overfishing, pollution, increasing river use and construction of dams and barrages. A few jaws of the species were found to have been traded in the international market during recent years, which testifies that the species is not extinct.

9.10.3. The Knife-tooth Sawfish (*Anoxypristis cuspidata*)

- It has a long narrow snout with blade-like teeth and a shark-like body. It spends most of its time near the bottom of the sea, sometimes going down to almost 40 m. It can grow up to 2.8 m. in length and can withstand a range of salinity conditions. It is found in shallow coastal waters and estuaries.
- Habitat / distribution: Widespread in western part of the Indo-Pacific region, including Red Sea.
- Threats: The principal threat to all sawfish are fisheries (targeted, by Wcatch, commercial and subsistence). Their long tooth-studded saw, makes them extraordinarily vulnerable to

entanglement in any sort of net gear, including primitive fishing contraptions.

- When sawfish are caught in by catch, they often end up being traded because of the very high value of their products (meat is high quality and fins and saws extremely valuable in international trade).

9.10.4. Large-tooth Sawfish (*Pristis microdon*)

- They are heavy-bodied sawfish with a short but massive saw, and grow up to 3 m. in length. It is seen seasonally and very occasionally caught along with the Bull Sharks and the Green Sawfish.
- Habitat / distribution and habitat : Western part of the Indo-Pacific (East Africa to New Guinea, Philippines and Vietnam to Australia).
- In India, it is known to enter the Mahanadi river, up to 64 km inland, and also is very common in the estuaries of the Ganga and Brahmaputra.
- Threats: Same as that for the Knife-tooth Sawfish. There is also an increasing demand for sawfish in aquaria. Major habitat changes include construction of dams over rivers, siltation, pollution from industries and mining operations.

9.10.5. Long-comb Sawfish or Narrow-snout Sawfish (*Pristis zijsron*)

- It grow up to 4.3m in length and are heavily exploited by humans. This species was reported as frequently found in shallow water. It inhabits muddy bottoms and also enters estuaries. Its presence has been recorded in inshore marine waters, and it goes down to depths of at least 40 m.
- Habitat / distribution and habitat: Indo-Pacific region including Australia, Cambodia, China, India, Indonesia and Malaysia.
- Threats: This species has been damaged intensively, both as a target species and as incidental by catch in commercial, sport or shark-control net fisheries, as well as for aquarium display. As a result, it has become severely depleted in recent decades, and now appears to have been extirpated from many parts of its range.

Do you know?

Pugmark Census Technique In this method the imprints of the pugmark (foot print) of the tiger were recorded and used as a basis for identification of individuals. Now it is largely used as one of the indices of tiger occurrence and relative abundance.

9.11. SPIDERS

- CRITICALLY ENDANGERED

9.11.1. Rameshwaram Ornamental or Rameshwaram Parachute Spider (*Poecilotheria hanumavilasumica*)

- It was recently described in 2004, and is only found in India. It can give a nasty bite which usually is not fatal.
- The species is semi-social, which means they live partly in groups.
- Habitat: Arboreal and tend to live in hiding.
- Distribution: Endemic to India. Spread along the coastal savannah, tropical lowland rain forests and montane forests upto an altitude of 2000 m above mean sea level.
- Threats: Major threats causing the disappearance of this species is habitat alteration and degradation.

9.11.2. Gooty Tarantula, Metallic Tarantula or Peacock Tarantula (*Poecilotheria metallica*)

- Is steel blue in colour with patches of intense orange-yellow, black and white. It was first found in Gooty (Ooty/Udagamandalam) in south India in a burn pile during railway construction.
- Ever since the first picture of this spider was circulated globally, it has been in great demand in the illegal pet trade.
- A combination of small litter sizes and increased human pressures have made this species critically endangered.
- Habitat: Wooded mountain area.
- Distribution: Endemic to South India
- Threats: They are one of the most expensive spiders in the illegal pet trade. Large areas where the species occurs have been deforested, or subjected to habitat degradation due to local fuel wood collection, leading to decline in its population.

Do you know?

1. Roots store more starch than the trunk.
2. Roots do not have a central pith (soft central tissue) while the trunk does.
3. The majority of tree roots are non-woody. These non-woody roots only live for a few weeks.
4. The root hairs grow within days, when water, temperature, and nutrients are available to promote growth.

9.12. CORALS

9.12.1. Fire corals (*Millepora boschmai*)

- They are more closely related to jellyfish than corals. On contact, one usually feels a burning sensation similar to a sting from a jellyfish.
- The scientific name 'millepora' is derived from the several small pores on the surface of these corals. They are usually yellow green or brown in colour.
- Habitat: *Millepora* species are generally found in murky inshore waters and display a tolerance for siltation. They often are found in clear offshore sites.
- Distribution: Indonesia, Gulf of Chiriquí, Panama Pacific Province. Possibly extinct from Australia, India, Indonesia, Malaysia, Panama, Singapore and Thailand.
- Threats: Collected for decoration and jewellery trade. This group is also sensitive to temperature rise, and is thought to have completely disappeared from the majority of marine areas possibly because of growing global warming related bleaching effects.

9.13. BIRD'S MIGRATION

- Migration refers to the regular, recurrent and cyclical seasonal movement of birds from one place to other. The distance of migration ranged from short distance to thousands of kilometers. But at the end of period, birds will eventually return to the original place.

9.13.1. Reasons for migration

1. To avoid adverse factors (extreme climatic condition)
2. To manage food shortage
3. To manage shortage of water
4. To have a better breeding conditions
5. Less competition for safe nesting places

9.13.2. Migratory birds of India

Winter birds	Summer birds
Siberian Cranes, Greater Flamingo, Common Teal, Yellow Wagtail, White Wagtail, Northern Shoveler, Rosy Pelican, Wood Sandpiper, Spotted Sandpiper, Eurasian Pigeon, Black Tailed Godwit, Spotted Redshank, Starling, Bluethroat, Long Billed Pipit.	Asian Koel, Black Crowned Night Heron, Eurasian Golden Oriole, Comb Duck, Blue Cheeked Bee Eater, Blue-Tailed Bee-Eater, Cuckoos.

9.14. WILDLIFE DISEASES

Diseases	Casual organism	Animal susceptible
Tuberculosis	Mycobacterium spp	Deer, cat, primates, elephant
Anthrax	Bacillus anthrax	Gaur, chetal, wild pig, barking deer
Rabies	Rabies virus	Tiger, lion, bear, mongoose, squirrel
Foot and mouth disease	FMD virus	Gaur, nilgai, chetal, sambar, yak, mithun
Rinder pest	Microbilli virus	Deer, wild pig, wild buffalo
Trypanosomia	Trypanosomia virus	Tiger, elephant, sambar, macaque
Taxoplasmosis	Taxoplasma gondii	Rhesus macaque, civet cat

9.15. SPECIES EXTINCTION

- Extinction is caused through various processes:
 - Deterministic processes that have a cause and effect. E.g. glaciations, human interference such as deforestation.
 - Stochastic processes (chance and random events) that effect the survival and reproduction of individuals. E.g. unexpected changes of weather patterns, decreased food supply, disease, increase of competitors, predators or parasites, etc. that may act independently or add to deterministic effects.
- The impact of these processes will of course depend on the size and degree of genetic diversity and resilience of populations.
- Traits that adversely affect or increase a species vulnerability to extinction due to habitat fragmentation have been identified. These are:

- rarity or low abundance
- poor dispersal ability
- ecological specialization
- unstable populations
- high trophic status – as animals occupying a higher trophic level (i.e. the position of a species in a food chain) usually have smaller populations than those at lower levels (e.g. carnivores are fewer in number than herbivores)
- low adult survival rates
- low intrinsic rate population increase
- Body size, fecundity, dietary specialization.

9.15.1. Natural extinctions

- Have been caused due to several factors:
 - continent drifting,
 - climate change,
 - tectonic activity
 - increased volcanic activity
 - The late Ordovician global glaciations (439 Mya).
 - The late Cretaceous extinction assumed to be associated with an extra-terrestrial impact.
- Extinction in vascular plants has been more gradual compared with the loss of animals. It is believed that extinction among this group was due more to competitive displacement by more advanced plant forms, or due to a gradual climate change, than due to any sudden catastrophic event.

9.15.2. Artificial Extinction

- Even though species extinction is a natural process which can happen without the intervention of humans, extinctions caused by humans is now happening over and above the reasonable estimate of natural extinction rates.
- Species are threatened with extinction by the intervention of humans due to:
 - direct causes – such as hunting, collection or capture and persecution
 - Indirect causes – such as habitat loss, modification and fragmentation and the introduction of invasive species.

9.16. MAN - ANIMAL CONFLICT

- It refers to the interaction between wild animals and people and the resultant negative impact on people or their resources, or wild animals or their habitat. It occurs when wildlife needs overlap with those of human populations, creating costs to residents and wild animals.

Causes

- Human population growth
- Land use transformation
- Species habitat loss, degradation and fragmentation
- Increasing livestock populations and competitive exclusion of wild herbivores
- Growing interest in ecotourism and increasing access to nature reserves
- Abundance and distribution of wild prey
- Increasing wildlife population as a result of conservation programmes
- Climatic factors
- Stochastic events (e.g. fire)

Impacts

- Crop damage
- Livestock depredation
- Injuries to people
- Loss of human life

- Damage to property
- Injuries to wildlife
- Animal deaths
- Destruction of habitat

Preventive strategies

- Artificial and natural barriers (physical and biological)
- Guarding
- Alternative high-cost livestock husbandry practices
- Relocation: voluntary human population resettlement
- Waste management systems that restrict wildlife access to refuse

Mitigative strategies

- Compensation systems
- Insurance programmes
- Incentive programmes
- Community based natural resource management schemes (CBNRMS)
- Regulated harvest
- Increase alternate crops, preys or water points
- Wildlife translocation
- Conservation education for local populations
- Better sharing of information.

