



# TARGET PRELIMS 2024

## BOOKLET-17; EB&CC-7

### BIODIVERSITY-BASICS; IMPORTANT MAMMALS

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## 2. BIODIVERSITY-BASICS

### 1) DEFINITION

- Biodiversity is the term popularized by the socio-biologist **Edward Wilson** to describe the **combined diversity at all levels of biological organization**.
- Biodiversity is defined as '**the variability among living organisms from all sources**, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; **this include diversity within species, between species and of ecosystems**'. (UN Earth Summit).

### 2) HOW IS BIODIVERSITY DISTRIBUTED ON EARTH?

- The **vast majority** of all species are found in the **tropics, and subtropics**, where most of the developing countries are also located. Infact, **50-75%** of all species are found in **tropical rainforests** that account for just **6% of the land areas**.
  - The **genetic diversity needed to maintain the world's agricultural system** is found **mainly in tropics, and sub-tropics**. These areas also contain **most of the important medicinal plants from which new pharmaceutical products are extracted**.
  - In the **northern regions, the recurrent ice ages did not permit the flowering of many life forms**.
- **Variation with altitude:** In general biodiversity **increases with altitude until a certain threshold** and **then decreases**. This is due to environmental factors such as temperature, air pressure, and precipitation.
  - **Many mountain ecosystems show greater biodiversity and higher levels of endemism than adjacent lowlands.**
  - **Mountain at lower altitudes can support exceptional biodiversity, due to compression of a wide range of ecosystems into a relatively short distance.** Mountains also often provide **islands of suitable habitat**, isolated from unfavourable surrounding lowlands.
- **Humboldt's Enigma:**
  - » **Background:** Conventionally, it was understood that **biodiversity will be highest around the equator, in tropics, as this region has higher primary productivity as it receives the highest sunlight (energy)**. As one moves away from equator biodiversity decreases. **Tropical rainforests** thus hold the crown for species richness.
- **Humboldt's Observation:** Alexander von Humboldt, a German naturalist, during his extensive travels through South America in the early 19th century, noticed something intriguing. **Mountain ranges**, despite occupying relatively small areas compared to vast tropical forests, displayed exceptionally diverse plants and animal life. This stood in stark **contrast to the predicted decrease in higher latitudes**.
  - » Two centuries later, **group of bio-geographers** - scientists who explore the relationship of diversity with geography - used modern tools to take another look at the drivers of

biodiversity. Based on their findings, they proposed their own version of the link between biodiversity and mountains and called it **Humboldt's enigma**.

» **Examples of Humboldt's enigma in India:**

- **Eastern Himalayas:** These are the second-most diverse area of perching birds in the world. For river birds, the eastern Himalayas may be the most diverse.

▫ **Reasons for the Enigma:**

- » **Compression of a wide range of ecosystem into relative short distance:** Mountains boast diverse landscapes with varied terrain, elevation, and microclimates. This creates a mosaic of distinct habitats, fostering speciation and niche adaptation among organisms.
- » **Geological Process like Uplifts,** result in new habitats where new species arise, so the habitats are 'cradles'.
- » **Climatic Stability:** Some climatologically stable mountains persist there for a long time, so these spots are 'museum' that accumulate many such species over time.
  - This provides refuge and protection to species during changing environment and thus aids biodiversity.
- » **Unique Resources:** Mountains have resources like nutrient rich volcanic soils and unique water regimes which gives sustenance for specialized species.

▫ **E.g.:**

- » **Coastal Tropical Sky Islands** (mountain surrounded by lowlands), like the Shola Sky Islands in the Western Ghats, are good examples of 'museum'. Here old lineage has persisted on the mountains tops as climates and habitats fluctuated around them in lower elevations. This is the reason, some of the oldest bird species in the western ghats, such as the **Sholicola**, and the **Montecincla**, are housed on the Shola Skey Islands.
- » The **Northern Andes Range** - including **Chimborazo** - is considered the most biodiverse place in the world. If we start from the foothills of the Andes and climb, we're going to counter different temperature and rainfall levels that support everything from **tropical evergreen biomes in the lower elevation to the alpine and tundra biomes near the top**. Such a large variation over short distances supports the immense biodiversity found in mountain regions - and worldwide.

### 3) MEGA DIVERSE COUNTRIES

- The megadiverse country is a term used to refer to the world's top biodiversity-rich countries. These were identified in 1988 by **Conservation International (CI)**, to promote the awareness for biodiversity conservation among world nations. According to CI, there are 17 of these nations, which are mostly located in the tropical and subtropical region.
- **Criteria**
  - The principle criterion is **endemism**, first at the species level and then at higher taxonomic levels such as genus and family. To qualify as a Megadiverse Country, a country must:
    - i. Have at least 5,000 of the world's plants as endemics (native restricted to a certain place)
    - ii. Have marine ecosystem within its border.

- Purpose of this classification [Raises awareness about biodiversity conservation; complements biodiversity hotspots and HBWA in protection of biodiversity; Demonstrates how a few countries hold a large portion of global biodiversity and therefore have disproportionate political responsibility]

**List of 17 megadiverse countries according the conservation international:**

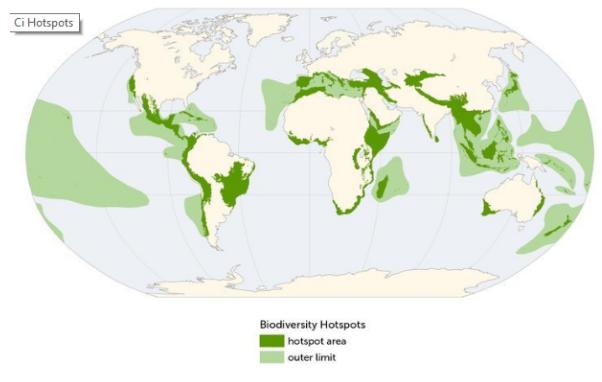
- USA
- Mexico
- Brazil
- Venezuela
- Colombia
- Ecuador
- Peru
- Democratic Republic of Congo
- South Africa
- Madagascar
- India
- China
- Malaysia
- Indonesia
- Philippines
- Papua New Guinea
- Australia



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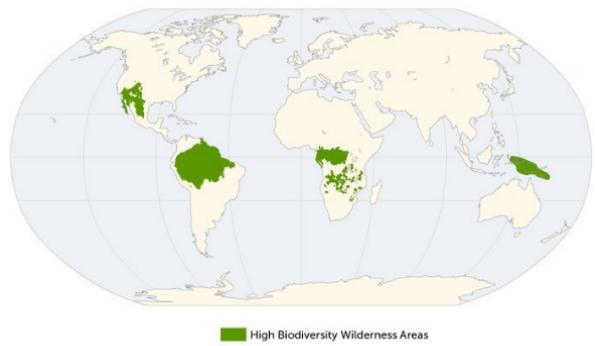
#### 4) BIODIVERSITY HOTSPOTS

- Biodiversity hotspots are **regions containing exceptional concentrations of plant endemism and experiencing high rates of habitat loss.**
- Of the total 35/36 globally identified biodiversity hotspots India has 4 of them i.e. **Eastern Himalayas**, Nepal, India; **Indo-Burma**, India and Myanmar, **Western Ghats**, India; **Sundaland**s: include Nicobar group of islands (and Indonesia, Malaysia, Singapore, Brunei and Philippines)
- Norman Meyers wrote about the concept in two articles in "The Environmentalist" (1988) & (1990)
- **Description:** Biodiversity hotspots are a method to identify those regions of the world where attention is needed to address biodiversity loss and to guide investment in conservation.
- To qualify as a biodiversity hotspot on Meyers 2000 edition of the hotspot-map, a region must meet **two strict criteria**
  - i. **Plant Endemism:** It must contain at least 0.5% of the world's total or 1500 species of vascular plants as endemics.
  - ii. **Serious Habitat Loss :** It has to have lost at least 70% of its primary vegetation.
- Around the world 36 areas qualify under this definition, with some other possible candidates.
- Supported by Conservation International



## 5) HIGH BIODIVERSITY WILDERNESS AREA

- The large intact ecosystems of the world that hold significant levels of global biodiversity.
- Approach developed by **Conservation International**.
- HBWAs consist of 5 of the 24 major wilderness areas that hold globally significant levels of biodiversity.
- The 5 HBWAs are Amazonia, the Congo forest of Central Africa, New Guinea, the Miombo-Mopane woodlands of Southern Africa (including the Okvango delta), Northern American desert complex of northern Mexico and South Western part of USA.
- In the **past**, the HBWAs were mostly considered to have 'low vulnerability' because of their low level of past habitat loss. However, recent analysis suggests that the high cultivation potential of many HBWAs makes them a target for future agri-expansion.



## 6) THREE LEVELS OF BIODIVERSITY

### a. Genetic diversity

- Genetic diversity refers to variety at the level of genes. It consists of variation of genes in a particular species.
- Significance of genetic diversity
  - High Genetic Diversity -> Higher Adaptability -> Higher chance of survival
- **E.g.**
  - India has more than 50,000 genetically different strains of rice, and 1,000 varieties of mangoes.
- **E.g. of low genetic diversity :**
  - Only one species of Asiatic Cheetah survives in the world today and due to **inbreeding**, this species has lost genetic diversity.
    - Hence Cheetahs are prone to genetic disorders and low reproductive success.
  - Koalas in Europe

### b. Species diversity

- Diversity at the species level.
- Species diversity refers to variety of plants and animals' species present in a community or ecosystem.
- Species differ from one another, markedly in their **genetic makeup, do-not interbreed in nature**.
- Closely-related species however have in common much of their hereditary characteristics. For instance, about 98.4% of the genes of humans and chimpanzees are the same.
- It is the **ratio of one species population over total number of organisms across all species in the given biome**.
  - 'Zero' would be infinite diversity, and 'one' represents only one species present.
- For e.g.
  - Western Ghats have greater amphibian species diversity than the Eastern Ghats.

- **Species diversity is high in:**
  - Tropical rain forests
  - Coastal zones
  
- **Species diversity is low in:**
  - Small isolated islands
  - Polar regions

### c. Ecosystem Community Diversity (Ecological Diversity)

- Ecosystem diversity refers to **variety of ecosystems** found in a given area or region.
- This refers to the **different type of habitats**. A habitat is the cumulative factor of the climate, vegetation and geography of a region.
- There are several kinds of habitats around the world. **Corals, grasslands, wetlands, desert, mangrove and tropical rain forests are example of ecosystems.**
- As the environment changes, species best adapted to that environment becomes predominant. **Thus, the variety of diversity of species in the ecosystem is influenced by the nature of the ecosystem.**
- E.g.
  - **India** with its deserts, rain forests, mangroves, coral reefs, wetlands, estuaries, and alpine meadows has **a greater ecosystem diversity than a Scandinavian country like Norway.**

## 7) FACTORS WHICH DETERMINE THE DEGREE OF DIVERSITY

- **Habitat stress:** Diversity is low in habitats under any stress like **harsh climate or pollution**
- **Geographical isolation:** Diversity is **less in isolated regions** like an island. If a species in an island disappears, it can't be easily replaced.
- **Dominance by one species:** The dominant species **consumes a disproportionate share of the resources**. This does not allow many species to evolve and flourish.
- **Availability of ecological niches:** A **complex community offers a greater variety of niches** than a simple community and promotes greater diversity.
- **Edge Effect:** Always **greater diversity at ecotones** or transition areas between ecosystem.
- **Geological history:** **Old and stable ecosystems like rain forests** that have not experienced many changes have high diversity. **An ecosystem like the Arctic has undergone many changes and this does not allow species to establish themselves.**

## 8) SIGNIFICANCE OF BIODIVERSITY

### A) BIODIVERSITY AND FOOD SECURITY

- Biodiversity is the **cornerstone of healthy and sustainable food system**.
  - » It plays a role in **protecting pollinators; improving soil fertility; and building resilience of food system to the effects of climate change**. It is thus **crucial for fighting global hunger**.

### B) BIODIVERSITY PROVIDES A NUMBER OF NATURAL SERVICES FOR HUMANS

- a. **Ecosystem Services**
  - Protection of water resources

- Soil formation and protection
- Nutrient storage and recycling
- Pollution breakdown and absorption
- Contribution to climate stability
- Maintenance of ecosystem
- Recovery from Unpredictable events

**b. Biodiversity Services**

- Food
- Wood Products
- Ornamental Plants
- Medicinal resources and pharmaceutical drugs
- Breeding stocks, population reservoirs
- Future resources
- Diversity in genes, species and ecosystems

**c. Social Services**

- Research, education and monitoring
- Recreation and tourism
- Cultural values

## 9) ENDEMIC SPECIES

- An endemic species is found only in a specific geographical location, and not found anywhere else. A species may be native to an area, but is not endemic to that area, if it is found elsewhere too.
  - For e.g., the **Lion-tailed macaque** (*Macaca silenus*), and the **Nilgiri Langur** are endemic to the **western Ghats of India**.

## 10) KEYSTONE SPECIES

- Keystone species are those species which have disproportionately large effect on the communities in which it occurs. It plays an essential role in the structure, functioning in fact, it determines the ability of a large number of species in the community to survive.
- When a keystone species disappears, it could result in a series of extinction of other species.
  - **E.g. 1:** An example is the **wild durian**, a tree endemic to the western Ghats.
    - Its fruits attract insects and birds come in to eat insects. Reptiles consume both insects and birds. The tree is also the habitat of monkeys, which eat the fruits, leaves and insects. Even tigers may come to eat the animals that are attracted by all the food in the tree ecosystem.
    - **If the wild durian tree is removed from the ecosystem, many of the species will be adversely affected and some may disappear.**
  - **E.g. 2: Wolves**

- If wolves go extinct in an ecosystem, the population of deer and other herbivores will increase exponentially. Due to excessive grazing by the herbivores, many plants may go extinct. Then, the small animals and insects that feed on the plants may disappear.

## 11) INDICATOR SPECIES

- Indicator species is one whose presence, absence, or abundance reflects a specific environmental condition. They are very **sensitive indicators of environmental problems**. They give early warning of problems that could potentially affect other species. They are also called sentinel species.
  - E.g. **Lichen**, which is sensitive to the presence of heavy metals or acids in rain. Its behaviour may indicate that acid rain is falling in the area.
    - Lichens are mutualistic association of fungus and algae or cyanobacterium and occurs as a crusty patch or busy growths on trees, rocks and bare grounds.
    - Lichens are very sensitive to SO<sub>2</sub> pollution and since industrial revolution a number of their population have become extinct. **So, if air is badly polluted by SO<sub>2</sub>, no lichens may be present.**
- Top predators like tigers and snow leopards** are also indicator species. Their presence indicates that entire ecosystem is healthy.
- Frogs and other amphibians** may also be indicator species

## 12) FLAGSHIP SPECIES

- A flagship species is a species selected to act as an ambassador, icon or symbol for a defined habitat, issue, campaign or environmental cause. It is chosen to raise support for biodiversity conservation in a chosen place or context. These species have the ability to capture the imagination of public and induce people to support conservation action and/or to donate funds.
- By focusing on, and achieving conservation of that species, the status of many other species which share its habitat - or are vulnerable to the same threats - may be improved.
- They are usually relatively large and considered to be **charismatic** in western countries.
- They may or may not be keystone species and may or may not be good indicators of biological process.
- E.g.
  - Bengal Tiger**
  - Jerdon's Courser (a CR bird found only in Andhra Pradesh)
- Some limitations**
  - May skew the management and conservation priorities in their favour and to detriment of more threatened species.
  - The disappearance of the flagship can have negative impact on the attitude of conservation stakeholders.

## 13) PRIORITY SPECIES

- It is a **WWF** term which is solely for the purpose of planning and simple communication.

- For WWF, a priority species may be either a **flagship specie** or a **keystone specie** and is chosen to represent an ecoregion or region.
- A priority species is **reflective of a key threat** across that eco-region - such that **conservation of the species will contribute significantly to a broader threat mitigation outcome**. It is often crucial to the economic and/or spiritual well-being of people within that eco-region.
  - **Note:** World Wide Fund for Nature was originally called World Wildlife Fund (WWF), a term which is still used in Canada and USA. It is an international NGO founded in 1961 working in the field of biodiversity preservation and the reduction of human impact on environment.
- **WWF Priority species of India**
  - Asian Elephant (EN)
  - Bengal Tiger (EN)
  - One-horned Rhino (VU)
  - Ganges River Dolphin
  - Snow Leopard
  - Red Panda

#### 14) INVASIVE SPECIES

- **Introduction:**
  - **An alien** plant/animal also referred to as exotic, introduced, foreign etc. is one that has been introduced by humans intentionally or otherwise through human agency or accidentally from one region to another.
  - An alien plant/animal that has escaped from its original ecosystem and is reproducing at its own in the regional flora is considered a **naturalized species**.
  - Those naturalized aliens that become **so successful as to spread in the flora/fauna and displace native biota or threaten valued environmental, agricultural or personal resources** by the damage it causes are considered **invasive**.
    - **To be called invasive, it should also be a threat** to the native species of the area by rapidly growing in population. This happens when the invasive species has no predator in the area.

#### A) ASSESSMENT REPORT ON INVASIVE ALIEN SPECIES AND THEIR CONTROL: BY INTERGOVERNMENTAL PLATFORM ON BIODIVERSITY AND ECOSYSTEM SERVICES (IPBES)

- Human beings have introduced 37,000 alien species, including plants and animals. Of these 3,500 are invasive alien species that have played a key role in 60% of global plant and animal extinction recorded.
- The report has noted that the number of alien species (species introduced to new regions through human activities) has been rising continuously for centuries. But now, they are rising at unprecedented rate, with increased human travel, trade and expansion of global economy.
- **E.g.:**
  - » **Water Hyacinth** is the world's most widespread invasive alien species on land.
  - » **Lantana**, a flowering shrub, and the **black rat** are the second and third most widespread globally.
- Invasive alien species are one of the five major direct drivers of biodiversity loss globally, alongside land and sea use change, direct exploitation of organisms, climate change, and pollution.

## B) EXAMPLE OF INVASIVE SPECIES

### DOMESTICATED CATS (*FELIS CATUS*):

- The State of Indian Birds, 2023 have highlighted that cats are a silent bird killer lurking in India's urban areas. SO along with other threats like industrialization, forest degradation, and climate change, climate change is also a threat for birds in India.
- **But**, detailed studies are lacking in India. In the USA, where detailed studies have been done, it is estimated that free ranging domestic cats kill billions of birds every year.
  - One study says that cats may be the single greatest source of anthropogenic mortality for the birds and mammals in the USA.
- **Worldwide**, free ranging domestic cats have caused or contributed to dozens of extinctions of birds species recorded in the IUCN red list.
- **Cats are more dangerous than free ranging dogs:**
  - As they can climb easily and thus reach the bird habitat.
  - Cat saliva is also more likely to contain bacteria (*Pasteurella multocida*) that are lethal to birds. So, if the cat attack doesn't kill the bird, the bacteria does.
  - Cats also maintain a landscape of fear making birds avoid or nesting in these regions.
- **Origin of Domestic Cats:**
  - **Domestic Cats (*Felis catus*)** are the only domesticated species in the family **Felidae**.
  - Studies show that Wild Cats (*Felis sylvestris*) were probably first domesticated in West Asia around 10,000 years ago and since then they have spread to different parts of the world.
  - Today, they are one of the world's 100 worst invasive alien species.
- **Handling Domestic Cats:**
  - A popular method in the West has been **Trap-Neuter-Return (TNR) policy**, whereby stray dogs and cats are trapped, sterilized and returned in the hope that this will reduce their population. But this hasn't been very successful.

### RABBITS IN AUSTRALIA

### AFRICAN CATFISH:

- The fish species is not native to India and is originally found in Africa and the middle east.
- It is known to be aggressive feeder, eating even the chicks of waterfowl. It poses a **major threat to native fauna**.
- The female matures in about 3 years and can bear 10s of thousands of eggs.
- The species has now spread to subcontinent and is found in Cauvery, Ganga, Yamuna and even the streams of western Ghats.
- This was introduced by businessmen for commercial fish cultivation in the National Park as it could adapt to poor quality of water, raised in high densities, and reproduce well in captivity, making it ideal for those looking to sell the fish for food. Though, **the cultivation of this specie was banned by Agriculture Ministry in 2000 itself**.

### **RED EARED SLIDER TURTLE IN NORTH-EAST INDIA**

» This is a cute American turtle popular as a pet. But it is threatening to invade the natural water bodies across the northeast, home to 21 of the 29 vulnerable native Indian species of freshwater turtles and tortoises.

### **CARIBBEAN FALSE MUSSEL (*MYTILOPSIS SALlei*):**

**Origin:** The Caribbean false mussel is originally from the Atlantic and Pacific coast of South and Central America. They may have travelled to Indian subcontinent via ships (ballast water) and then using small vessels spread to estuaries.

**Damage:** It is damaging locally important fishery in Kerala, by wiping out native clams and oysters.



### **ACHATINA FULICA (AFRICAN APPLE SNAIL)**

The snail (a mollusk) is native to coastal areas and islands of east Africa.

It is invasive species across the world. It has a broad diet preference and cause heavy loss to farmers.

In India, it is **most invasive of all faunas**.

Most invasive of all fauna

It was first reported in A&N island but today it is found all across the country and is threatening habitats of several native species.



### **C) IN 2017, ZOOLOGICAL SURVEY OF INDIA (ZSI) HAS FOR THE FIRST TIME COME UP WITH LIST OF 157 ALIEN INVASIVE SPECIES IN INDIA**

- While invasive plant species have been studied in the past, the **animal species was analysed in detail for the first time**. Invasive animal species like the plant species pose threat to biodiversity.
- **Key Highlights**
  - i. Of the **157 species** 58 are found on land and the remaining 99 in Marine ecosystem.
  - ii. Of the 58 invasive species on land, 38 are arthropods, 19 of fish, three of Mollusks and birds, one reptile and two mammals.
- **Examples of Alien species found on Land** (including rivers)
  - i. **Paracoccus Marginatus (Papaya Mealy Bug)**
    - Destroyed crops of Papaya in Assam, WB and TN.

- Originally from Mexico and Central America
- ii. **Phenacoccus Solenopsis (Cotton Mealybug)**
  - Severely affected cotton crops of deccan
  - Native to North America.
- iii. **Invasive Fish Species**
  - **Pterygoplichthys pardalis** (Amaxon sailfin Catfish)
    - Destroying fish population in wetlands of Kolkata.
- **Examples of Alien Species found in Marine Ecosystem**
  - i. **Tubastrea Coccinea** (Orange Cup- Coral)
    - Originated in Indo-east-pacific but has now been reported in the A&N Islands, the Gulf of Kutch, Kerala, and Lakshadweep.

## 15) SPECIATION

- Speciation refers to formation of new species due to genetic changes in an existing species. Speciation occurs when a group within a species separates from other members of its species and develops its own characteristics. In the process of a species adapting itself to changing environmental conditions, a new species may emerge.
- **There are five types of speciation:**
  - **Allopatric Speciation:** It occurs when a species separates into two separate groups which are isolated from one another. A Physical barrier, such as mountain ranges or a waterway, makes it impossible to breed with one another. Each species develops differently, based on the demand of their unique habitat or the genetic characteristics of the group that are passed to the offsprings.
    - **For e.g.:**
      - Four distinct sub-species of the Asian elephant probably emerged due to allopatric speciation.
      - Squirrels and other small mammals on the two sides of Grand Canyons
  - **Peripatric Speciation:** When small group of individuals break off from the larger group and form a new species. This is called peripatric speciation. Like allopatric speciation, here also, physical barriers make it impossible for members of the group to interbreed with one another.
    - **Main difference** between Allopatric Speciation and peripatric Speciation is that in peripatric speciation, one group is much smaller than the other.
  - **Parapatric Speciation:** In this method, a species is spread over large geographical area. Although, it is possible for any member of the species to mate with another member, individual only mate with those in their own geographical region. Like allopatric and peripatric speciation, different habitats influence the development of different species in parapatric speciation. **Instead of being separated by a physical barrier**, the species are **separated by differences in the same environment**.
  - **Sympatric Speciation:** It is controversial. Some scientists don't believe that it exists. It occurs when there are no physical barriers preventing any members of species from mating with

another, and all the members are in close proximity to one another. A new species, perhaps based on a different food source or characteristic, seems to develop spontaneously. The theory is that some individuals become dependent on certain aspects of environment - such as shelter or food source, while others don't.

- For e.g., the parasitic great spotted cuckoo, and its magpie host, both native to southern Europe, are considered to be sympatric species.
- **Artificial Speciation:** It is creation of new species by people. This is achieved through lab experiments, where scientists mostly research insects like fruit flies.

## 16) MEASUREMENT OF BIODIVERSITY

- **Diversity is a single statistic** in which the number of species richness and evenness are compounded. Biodiversity is measured in two components:
  - Species Richness
  - Species Evenness
- **Species Richness**
  - It is the measure of number of species found in a community
    - **Alpha Diversity**
      - The diversity within a particular area or ecosystem and is usually expressed by the number of species (i.e., species richness) in that system.
    - **Beta Diversity**
      - It represents **differences in species composition among sites (ecosystem)**.
        - It is something of a bridge from local (alpha) to the regional (gamma) scale.
        - It can be considered a metric of dissimilarities between sites.
        - It can also be interpreted as rate of accumulation of diversity with an increasing number of sites sampled.
      - In simple terms it is ratio between gamma (regional) and alpha(local) diversities.
    - **Gamma Diversity**
      - It is the measure of **diversity of the entire landscape** (regional species pool).
- **Species Evenness**
  - It measures the proportion of species at a given site, e.g. low evenness indicates that only few species dominate the site.

## 17) CLASSIFICATION OF LIFE FORMS

- **Kingdom** (Monera, Protista, Fungi, Plantae, Animalia)
- **Phylum** (For animals) / **Division** (for plants)
  - **Class**
  - **Order**
  - **Family**
  - **Genus**
  - **Species**

E.g. For tiger

Kingdom: Animalia  
Phylum: Chordata  
Class: Mammalia  
Order: Carnivora  
Family: Felidae  
Genus: Panthera  
Species: P. Tigris

E.g. For Humans

Kingdom: Animalia  
Phylum: Chordata  
Class: Mammalia  
Order: Primates  
Family: Hominidae

- Members of this family are known as great apes or hominids. Currently it consist of four genera.
  - **Pongo** (Bornean, Sumtran, and Tapanuli Orangutan); **Gorilla** (the eastern and western Gorilla); **Pan** (the Chimpanzee and the bonobo); and **Homo** (of which only Homo Sapiens remain)

Genus: Homo

Species: H. sapiens

### 3. IUCN CLASSIFICATION

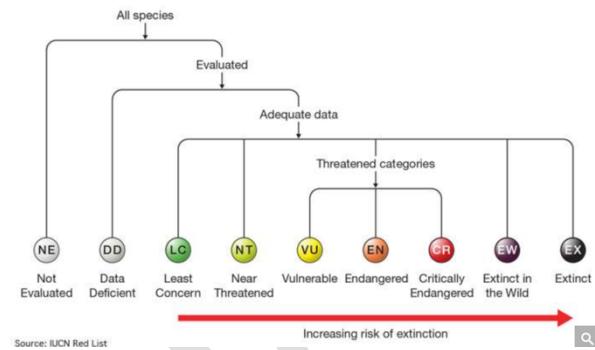
#### 1) THE RED DATA BOOK

- 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's a loose-leaf volume of information on the status of many kinds of species. This volume is continuously updated and is issued by International Union for Conservation of Nature (IUCN) located in Merges, Switzerland.
- The red data book was **first issued in 1966** by the IUCN's special Survival Commission as a guide for information, 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.
- "Red" of course is symbolic of danger that species both plants and animals presently experience throughout the globe.
  - **The Pink page** in this publication include the critically endangered species. As the status of the species change, 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.

## 2) DETAILS ABOUT IUCN

- IUCN is a membership union composed of both government and civil society organizations.
- It harnesses the experience, resources, and reach of its more than 1,400 member organizations.
- It is a democratic union that brings together the world's most influential organizations and top experts in a combined effort to conserve nature and accelerate the transition to sustainable development.
- The **Red Databook** of IUCN is the most cited list of threatened species.
- It classifies the **conservation status** of individual species based on their probability of extinction.



## 3) IUCN DATABASE OF CONSERVATION PRIORITY

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.
2. **Extinct in Wild (EW):** A taxon is extinct in 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 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.
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**

- A. **Reduction in population size**

- (>=90% over the last 10 years or three generations, whichever is longer), where the causes of reduction is clearly reversible AND understood AND ceased.
- (>= 80% over the last 10 years of three generations, whichever is longer), where the causes of reduction may not have ceased to exist OR may not be understood OR may not be reversible
- (>=80%, projected or suspected to be met within the next 10 years or three generations, whichever is longer (upto a maximum of 100 years)
- An observed estimated inferred, projected or suspected population size reduction of >= 80% over any 10 year or three generation period, whichever is longer (upto a maximum of 100 years in future), where the time period must include both the past and the future, and where the reduction and its causes may not have ceased OR may not be understood OR may not be reversible.

**B. Geographical Range** in the form of either B1 (**extent of occurrence**) OR B2 (**area of occupancy**) OR both:

- **Extent of occurrence** estimated to be less than 100 Km<sup>2</sup>, and estimate indicating atleast two of the following
  - Severely fragmented or known to exist only at a single location
  - Continuing decline
    - Extent of occurrence
    - Area of occupancy
    - Area, extent and/or quality of habitat
    - Number of locations and subpopulations
    - Number of mature individuals
  - Extreme fluctuation in any of the following
    - Extent of occurrence
    - Area of occupancy
    - Number of locations or subpopulations
    - Number of mature individuals
- **Area of Occupancy** estimated to be less than 10 Km<sup>2</sup>, and at least 2 of the following
  - Same three criteria as above (extent of occurrence)

**C. Population size** estimated to number fewer than 250 mature individuals and either

- An estimated continuing decline of 25% within three years or one generation, whichever is longer,(upto a maximum of 100 years in future)
- A continuing decline, of mature individuals AND atleast one of the following
  - Population structure in the form of one of the following
    - No subpopulation estimated to contain more than 50 mature individuals, OR
    - Atleast 90% of mature individuals in one subpopulation
  - Extreme fluctuation in number of mature individuals

**D. Population size** (number less than 50 mature individuals)

**E. Quantitative analysis** showing the **probability of extinction** in wild at least 50% in their 10 years or three generations, whichever is longer(upto maximum 100 years)

4. **Endangered**

5. **Vulnerable (VU)**

6. **Near Threatened (NT)**

- A taxon is near threatened when it has been evaluated against the criteria but does not qualify for CR, EN, VU now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

7. **Least Concern (LC)**

- A taxon is least concern when it has been evaluated against the criteria and does not qualify for CR, EN, VU, or NT. Widespread and abundant taxa are included in this category.

8. **Data Deficient (DD)**

- A taxon is DD when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution or population status. Appropriate data on abundance and/or distribution is lacking. 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. Not Evaluated (NE)

- When it has not yet been evaluated against the criteria.

### 4) IUCN HAS RELEASED THEIR NEW RED LIST OF THREATENED SPECIES DURING UNFCCC COP28 IN DEC 2023

- Over 44,000 species are threatened with extinction (around 2,000 more than last year) of the total 157,190 species in the IUCN Red List.
- The update includes the First Broad Assessment of the health of freshwater fish species. Around 25% of the species (around 3,000) are facing risk of extinction.
  - » Climate change, pollution, overfishing and invasive species are the major challenge.
- Atlantic Salmon (a ray-finned species) found in northern Atlantic Ocean Basin has declined by 23% (2006-2020) thus moving it to Near Threatened (from LC)
- Green Turtles (of Central South Pacific and East Pacific) populations are respectively Endangered and Vulnerable.
- Mahogany Tree (*Swietenia macrophylla*), also known as Honduran Mahogany or big leaf mahogany, has become Endangered.
  - » It is one of the species that yields genuine mahogany timber.
  - » It is native to South America, Central America and Mexico. It is also naturalized in Phillipines, Singapore, Malaysia and Hawaii and is cultivated in plantations and windbreak elsewhere.
  - » Note: *Swietenia mahogani*, is another species which is also found in India and is NT
- Some Success Stories:

**Scimitar-horned oryx:** It has moved from EW to EN showcasing the reintroduction efforts the republic of Chad.



**Saiga Antelope** improves from CR to NT due to conservation measures.

In past it inhabited a vast area of Eurasian Steppe.

Today, it is only found in Russia, Mongolia, Kazakhstan, Turkmenistan, Uzbekistan etc.

**Key Feature:** Unusual hanging nose.



A male at the Steppnoi Nature Sanctuary of Astrakhan Oblast, Russia



A female at the Askania-Nova Biosphere Reserve of Kakhovka Raion, Ukraine

## 5) NATIONAL ENDANGERED SPECIES DAY

- The National Endangered Species Day is celebrated on the **third Friday of May every year** across the USA. It was established by the US Senate, in 2006.
- **2023 Theme:** "Celebrating 50<sup>th</sup> anniversary of endangered species act".  
**Note:** In USA, the Endangered Species Act was enacted in 1973.

## 4. MAMMALS – EXTINCT

### 1) ASIATIC CHEETAH (EXTINCT IN INDIA)

- **IUCN Status of Asiatic Cheetah**
  - **CR** in Iran (Iran has a subspecies of Asiatic Cheetah, but has refused to share it with India)
  - **EX** in India.
  - It is the only large carnivore that got wiped out of India, mainly due to over-hunting and habitat loss.
  - The last **physical evidence** of Asiatic Cheetah in India was from Madhya Pradesh in 1947 when it was hunted by Maharaja Ramanuja Pratap Deo of Surguja State. A female is also said to have been sighted in **Koriya District** of Chhattisgarh, in 1951.
- **Why extinct?**
  - » Hunting (excessive from Mughal Era to British Period)
  - » Two key characteristics:
    - The Cat was very easy to tame. Therefore, it was regularly caught for sports.
    - It was nearly impossible to breed in captivity.
      - There is only 1 formally recorded instance of captive breeding in Emperor Jahangir's Tuzuk-i-Jahangiri.
  - » **Classification as Vermin** by Britishers in 19th century was the last nail in the coffin.

### A) ACTION PLAN FOR INTRODUCTION OF CHEETAH IN INDIA: PROJECT CHEETAH

- Project Cheetah is the world's first inter-continental large wild carnivore translocation project. Under this there is a plan to introduce 50 African Cheetahs in various protected areas of India under 'Action Plan for Introduction of Cheetah in India'.
- **Goals of Reintroduction:**
  - » **Establish viable Cheetah metapopulation** in India that allows the Cheetahs to perform its functional role as a top predator and provide space for the expansion of the Cheetah within its historical range thereby contributing to its conservation efforts.
- **Reintroduction:**

- » **20 African Cheetah** have been imported so far.
  - **The first batch** of 8 Cheetah arrived in Sep 2022 from **Namibia**.
  - **Another batch** of 12 Cheetah arrived in Feb 2023 from South Africa.
  
- Now, Cheetah is the **sixth in the list of Big cats found in India** after **Royal Bengal Tiger (Panthera Tigris tigris)**, **Asiatic Lion (Panthera leo leo)**, **Indian Leopard (Panthera pardus fusca)**, **Snow Leopard (Panthera uncia)**, and **Clouded Leopard (Neofelis nebulosa)**.
  
- **Cheetahs were not directly released into wild:**
  - They were first kept in **quarantine for a month**. Then they are released into **large electronically fenced area** to get acclimatized. Finally, they were released into wild.
  
- **One Year of Project Cheetah (Sep 2023)**
  - **The Project** has achieved success on **four fronts**:
    - » **50% survival** of the introduced Cheetahs
    - » **Establishment of home ranges**
    - » **Birth of cubs in Kuno**
    - » **Increased tourism and revenue for local communities.**
  - **Yet**, as of Jan 2024, the **project lost 45% of its functional adult population**. Of the 20 Cheetahs that arrived in India, **7 died** (Dhatri, Shasha and Shaurya from Namibia and Suraj, Uday, Daksha, and Tejas from South Africa); 2 (Jwala and Nabha from Namibia) were deemed unfit for wild.
  - **Four cubs** were born in India March 2023, **three of which died** due to heatwaves, and the fourth is being raised in captivity.
  - **3 more cubs** were born in Jan 2024 to Namibian Cheetah **Aasha**. This was also born in captivity.
  - **3 more cubs were born** in Jan 2024 to **Namibian Cheetah Jwala**.
  - As of **16<sup>th</sup> Feb 2024**, there are **20 Cheetahs at Kuno Palpur** (13 adults (7 females, 6 males), 7 cubs)
  
- **Why so many deaths?**
  - **Different weather pattern** between home and host countries.
    - » The cheetahs introduced to India, were from **countries in southern hemisphere**, where the weather cycle is opposite.
    - » **Namibia and South Africa had much drier conditions** when compared to India. Namibian and south African Cheetah had **never experienced heavy rains** which they had to face in Kuno.
    - » **Collars** also became a problem. The Cheetahs were **unable to lick and clean their wounds** as the collars posed an obstruction which then gave rise to bacteria and maggots.
    - » For e.g. Dhatri died on 12th Aug 2023, because of **infection due to maggot infestation due to humidity**. Earlier, two male cheetahs had died of the same cause.
  - **Negligence** by authorities.
  
- **Steps being taken:**
  - Cheetahs **were brought back to enclosures** and were properly being monitored. Their collar has also been removed.
  - Experts suggest that **India may need to bring Cheetah from northern hemisphere** from countries like Somalia.
  - There is a **suggestion for developing much bigger habitats before bringing in more Cheetahs.**

- **Where are Cheetahs being reintroduced?**
  - They are being brought to Kuno Palpur National Park (KNP) in MP. This site was rated the highest among the 10 surveyed sites.
    - KNP is 748 sq km in area, devoid of human settlements.
    - It is probably the only wildlife site in the country where there has been a complete relocation of villages from inside the park. It forms part of Sheopur-Shivpuri deciduous open forest landscape and is estimated to have a capacity to sustain 21 cheetahs.
    - It also has good population of Chinkara, spotted deer, and blackbuck, on which Cheetahs can prey and grow in the wild.
    - Here facilities for the big cats have been developed, staff have been trained, and larger predators, such as leopards, have been moved away.
  - The **Other Sites** recommended for holding and conservation breeding of Cheetahs in India, in controlled conditions are:
    - i. Nauradehi Wildlife Sanctuary (1,197 sq. km, habitat 5,500 sq.km), Madhya Pradesh
    - ii. Gandhi Sagar Wildlife Sanctuary – Bhainsrorgarh Wildlife Sanctuary complex (~2500 sq.km), Madhya Pradesh
    - iii. Shahgarh bulge in Jaisalmer, Rajasthan (4,220 sq.km)
    - iv. Mukundara Tiger Reserve as fenced enclosure (~80 sq.km), Rajasthan
- **Where are Cheetahs coming from?**
  - Since, it is not possible to source the CR Asiatic Cheetah from IRAN without affecting this subspecies, India has sourced Cheetahs from Namibia and South Africa.
  - **African Cheetahs have other advantages** (why they are suitable for introduction in India)
    - They have maximum observed genetic diversity among extant cheetahs, an important attribute for a founding population stock.
    - They are also ancestral to all the other cheetah lineage including those found in Iran.
  - **Note:** Cheetahs being introduced are African Cheetah and Cheetahs which had gone extinct from India were Asiatic Cheetah and they are today found in small numbers only in Iran.
- **Background: Genesis of the Plan**
  - Cheetah reintroduction project was first conceived in 2009 and an expert panel formed in 2010 recommended KunoPalpur (MP), Velvadar National Park (Gujarat) and Tal Chappar Sanctuary (Rajasthan) for reintroducing Cheetah.
  - But the plans were quashed by the SC as it may have conflicted with reintroduction of Lions here.
  - After many hurdles, in Jan 2020, the SC had given the green signal to introduction of African Cheetah on pilot basis to a suitable habitat in India.

## 5. BIODIVERSITY IN INDIA: MAMMALS – CRITICALLY ENDANGERED

## 1) ANDAMAN WHITE TOOTHED SHREW (CROCIDURA ANDAMANENSIS), JENKIN'S ANDAMAN SPINY SHREW (CROCIDURA JENKINSI) AND NICOBAR WHITE TAILED SHREW

### - Distribution

- Andaman White toothed shrew is found on Mount Harriet in the South Andaman Islands. It is endemic to South Andaman Island.
- Jenkin's Andaman Spiny Shrew is found on Wright Myo and Mount Harriet in the South Andaman Islands
- Nicobar White Tailed Shrew 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.



### - All three of them are endemic to India.

- They are usually active by twilight or in the night and have specialized habitat requirements.



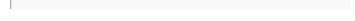
### - Habitat: Leaf litter and rock crevices

### - Threats : Habitat loss due to selective logging, natural disasters such as the tsunami and drastic weather changes.

### - WPA: Schedule-2 (as amended in 2022)

## 2) THE LARGE ROCK RAT (ELVIRA RAT) (CREMNOMYS ELVIRA)

- It is a medium size, nocturnal and burrowing rodent, endemic to India.
- Habitat:** Tropical dry deciduous shrubland forest, seen in rocky areas.  
**Distribution:** Known only from eastern Ghats of Tamil Nadu, India.
- Threats:** Major threats are habitat loss, conversion of forests and fuel wood collection.



## 3) THE NAMDAPHA FLYING SQUIRREL (BISWAMOYOPTERUS BISWASI)

The Namdapha flying squirrel is an arboreal, nocturnal flying squirrel endemic to India.

It was sole in the genus Biswamoyopterus until the description of the Laotian giant flying squirrel (*Biswamoyopterus laoensis*) in 2013.

It was first recorded in 1981 where a single individual was found in Namdapha Tiger Reserve. After that it wasn't seen till 2022.

**Updates:** Missing for 42 years, Namdapha flying squirrel resurfaces in Arunachal (Dec 2023)

IUCN: CR

WPA: Schedule-1 (after 2022 amendment)



**Habitat:** Tropical forests

**Distribution :** It is now restricted to as single valley in the Namdapha N.P. (or) W.L.S. in Arunachal Pradesh.

Namdapha National park is the **largest protected area in the Eastern Himalayan Biodiversity hotspot** and is located in Arunachal Pradesh. It is also **one of the largest National Park in India in terms of area** (after hemis, desert, Simlipal and Gangotri)

**Threats:** It is CR due to habitat loss. In addition it is **hunted for food, and skins/fur.**



**Note:** Namdapha is home to another flying squirrel (Red Giant Flying Squirrel) (*Petaurista petaurista*), whose IUCN status is LC. Like other flying squirrels, Red Giant Flying Squirrel is also mostly nocturnal and is able to glide long distance between trees.

#### 4) MALABAR CIVET (VIVERRA CIVETTINA) ALSO KNOWN AS MALABAR LARGE SPOTTED CIVET

- It is considered one of the world's rarest mammals. It is endemic to India and was first reported from Travancore, Kerala.
- Nocturnal in nature
- **Distribution:** Found exclusively in western Ghats.
- **Habitat :** Wooded plains and hill slopes of evergreen forests.
- **Threats :** Deforestation and commercial plantations are major threats.
- WPA (as amended in 2022): Schedule-1



#### 5) HIMALYAN BROWN BEAR/ RED BEAR (URSUS ARCTOS ISABELLINUS)

- **Why in news?**
  - » A Himalayan brown bear (*Ursus arctos isabellinus*) as captured by J&K Wildlife Department on May 13, 2023, at Rajwara in the North Kashmir district of Handwara, days after it was found wrecking graveyards, reportedly in search of human cadavers to eat (June 2023: Source - DTE)

It is the largest animal in Himalayas and is usually reddish brown in color. They inhabit altitudes ranging from 2,000 to 2,500 metres, predominantly above the tree line.

It also shows sexual dimorphism (Males (1.5 - 2.2m), Females (1.37 - 1.83m)).

**Distribution:** Nepal, Pakistan, and Northern India. In Hemis National Park, Great Himalayan National Park, Nanda Devi Park -> this may be seen as the giant mammal walking upright.

**IUCN Status:** CR

Please note that IUCN status of Brown bear is LC (due to its wide distribution). But the Himalayan subspecies is CR.

#### Updates:

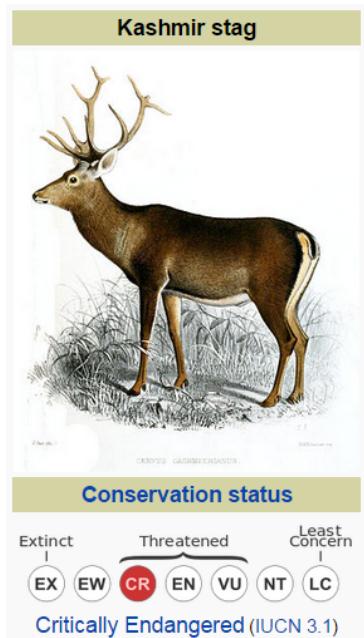
Human encroachment in wildlife has led to bears straying more often into human-dominated areas. Several incidents from various villages of J&K such as Behnipora, Budshungi, and Shatiam have been reported, where more than one bear may have entered.

**Key reasons:** Insufficient food in their habitats;



## 6) HANGUL/KASHMIR RED STAG (CERVUS ELAPHUS HANGUL)

- A sub species of red deer which is native to India.
- Hangul has red-brownish coat bringing them in the fold of red deer. The **color, however, changes with season and age**.
- **Note:** Earlier it was believed to be a subspecies of red deer. But Mitochondria DNA genetic studies have revealed that is part of the Asian Clade of elk.
- It is native to Jammu and Kashmir, where it is the **state animal**.
- Known for its giant antlers bearing 11 to 16 points. Hangul has been hunted over centuries and its habitat destroyed.
- **Habitat/Distribution:** In dense riverine forests, high valleys, and mountains of the Kashmir valley and northern Chamba in Himachal Pradesh.
- **Threat:**
  1. habitat destruction
  2. Over-grazing by domestic livestock
  3. Poaching.
- **In 2016, Hangul was classified as CR by IUCN**



- Once found in thousands in the mountains of Kashmir Valley, the population of the famed Kashmir red deer, has dwindled to less than 150, according to senior wildlife scientists.
- Its **last bastion** is **Dachigam National Park** located on foothills of Zabarwan range on the outskirts of Srinagar, J&K.

## 7) CHINESE PANGOLIN

The Chinese Pangolin is a pangolin found in Northern India, Nepal, Bhutan, Bangladesh and Myanmar, northern Indo China, through most of Taiwan, and Southern China.



## 7) SUMATRAN RHINO AND JAVAN RHINO – EXTINCT IN INDIA

### More About Sumatran Rhino

- It is the smallest hairiest and most endangered of the five rhinoceros species.
- It is now thought to be regionally extinct in India, though its ones occurred in foothills of Himalayas and north east India.
- They are now critically endangered, with only five substantial populations in the wild: four on Sumatra, and one in Borneo (Indonesian Borneo).
- In total **only 80 Sumatran Rhino** are thought to exist in the wild now. All are found in Indonesia.

### Key threats

- Isolation** is the biggest threat this species face. This is because the females of this species can develop cysts and fibroids in their reproductive tracts if they go too long without mating.
  - It is because of this, in 2018, the world's leading conservation non-profits, including the National Geographic society, announced an unprecedented collaboration called the Sumatran Rhino Rescue. The aim was to find and safely capture as many Sumatran Rhino as possible so that they can be brought together for captive breeding.
- Habitat destruction** have remained a major concern for long.

### Sumatran rhinoceros<sup>[1]</sup>



Sumatran rhinos

### Conservation status



Critically Endangered (IUCN 3.1)<sup>[2]</sup>

The Javan Rhinoceros (*Rhinoceros sondaicus*) is also believed to be extinct in India and only a small number survive in Java and Vietnam

### Other Important Rhino species (not found in India)

#### 1. Northern White Rhino (*Ceratotherium simum cottoni*)

##### Introduction:

- The northern white rhinoceros, or northern square-lipped rhinoceros, was one of the two subspecies of the white rhinoceros.
- Formerly, found in several countries in East and Central Africa of the Sahara, it is listed as **Critically Endangered**.
- Other subspecies of white Rhino, the Southern White Rhino has the conservation status of **Least Concerned**.

##### Northern white rhinoceros



Angalifu, a male northern white rhinoceros at the San Diego Zoo Safari Park. Angalifu died 14 December 2014<sup>[1]</sup>

##### Conservation status



##### Main Reasons for decreased population

- **Poaching:** Demand for northern white Rhino Horns which can be sold at \$50,000 per kg making them more valuable than gold. The demand was fueled by belief in Asia of it treating various ailments.
- **Habitat Loss**

There are only **2 rhinos of this subspecies** left.

- Both belong to the Dvur Kralove Zoo in the Czech Republic but live in the **Ol Pejeta Conservancy in Kenya** and are protected round the clock with armed guards.
- These two rhinos are
  - Two females (mother-daughter) Najin and Fatu.
- Existence of no males makes the species **functionally extinct**.
  - It is "possibly extinct in the wild".

In March 2018, Sudan the last male white Rhino Died

##### Future Prospects

- Developing **in-vitro-fertilization techniques** using eggs from the last two remaining females, stored northern-white rhino semen from males and surrogate southern white rhino females.
- There is a chance that females of Northern white rhino can mate with males of Southern white Rhino a subspecies. Offspring will not be a 100% northern white Rhino; it would be better than nothing.

**Note:** there are **five Rhino species in the world**: White Rhino (Southern White Rhino (LC) and Northern White Rhino (EW) are two subspecies of this); Black Rhino (CR); Greater One Horned Rhino (VU); Sumatran Rhino (CR); and Javan Rhino (CR).

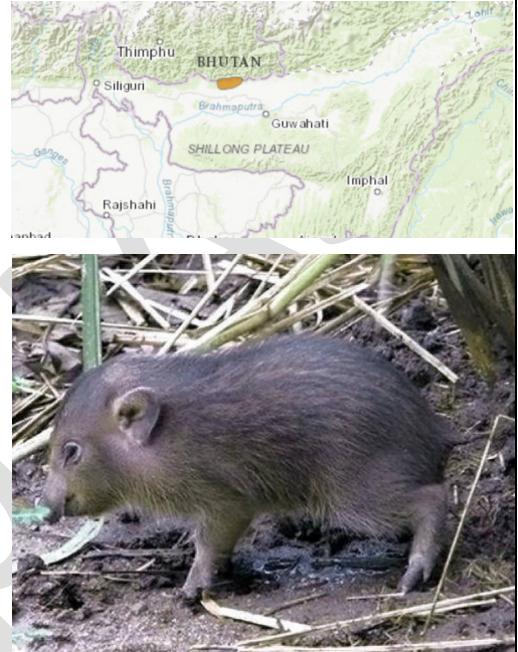
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## 6. BIODIVERSITY IN INDIA: MAMMALS – ENDANGERED

### 1) TIGER – COVERED

### 2) PIGMY HOG

- **Geographical Range**
  - » It is only known from India.
  - » Its presence is uncertain in Bhutan and is extinct from Nepal and Bangladesh.
- **More Details about Pigmy Hog**
  - » World's smallest wild pig, with adults weighing only 8 kg.
  - » **Habitat:** Grassland - Found in relatively undistributed tall Tarai 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**.
  - » **Threats:** The main threats are the loss and degradation of grasslands, dry season burning, livestock grazing and afforestation of grasslands. Hunting is also a threat to the remnant population.
  - » It is one of the most useful indicators of the management status of the grass land habitats. The grassland where the pigmy hog resides are crucial for the survival of another endangered species such as Indian Rhinoceros, Swamp Deer, Wild Buffalo, Hispid Hare, Bengal Florican and Swamp Francolin.
  - » In 1996, a captive breeding program was initiated in Assam, and some hogs were reintroduced in Sonai Rupai area in 2009.
- **Conservation Status**
  - » IUCN - EN
  - » WPA (as amended in 2022) - Schedule-1
- **Pygmy Hog Sucking Louse**, a parasite that feeds only on Pygmy Hogs will also fall in the same risk category of EN as its survival is linked to that of the host species.



### 3) ASIATIC LION

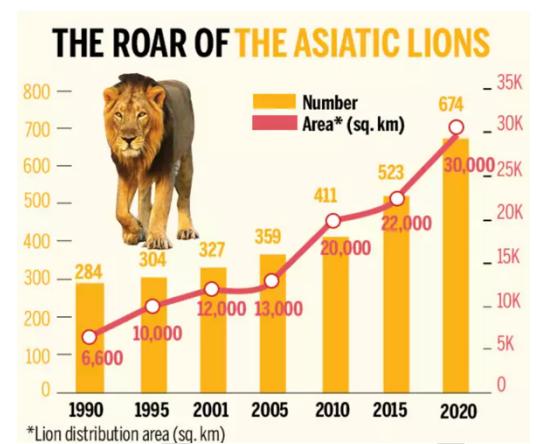
- Asiatic lions once ranged from Persia to Eastern India, but were almost drawn to extinction by indiscriminate hunting and habitat loss.
- **By 1890s, a single population of about 50 Lions** remained in the Gir Forests of Gujarat.
- **With timely and stringent protection offered** by the state government and the central government, they have increased to over 674 now.
  - » Of this around 50% are found outside protected areas.

- » Note: The Gir Protected Area Network includes **Gir National Park, Gir Sanctuary, Pania Sanctuary, Mitiyala Sanctuary adjoining forest reserves, protected forests and unclassed forests.**
- » Lions has been recorded in a total area of about 30,000 sq kms of which, only about 1,650 sq km is in five Protected areas. The protected areas carrying capacity seems to be exceeded.

- Over last several years, the lion population in Gujarat has been steadily rising.
- Male female ratio: 161:260

- **Asiatic Lions and African Lions**

- » They are both distinct subspecies of Lion. They are the second largest cats in the world after tigers. Male Lions are characterized by thick mane of hairs around their head which is absent in females.



Characteristics	Asiatic Lion	African Lion
<b>Distribution:</b>	Only in Gujarat, India	Several countries across Africa, from the Savannah in east Africa to dry grasslands of South Africa
<b>Physical Appearance</b>	Slightly smaller than African Lion, with <u>a shorter mane and fold of skin on their bellies</u>	African Lions have <u>larger manes</u> .
<b>Genetics</b>	The two subspecies have <u>distinct genetic profile</u> . They diverged from the same ancestor around 1,00,000 years ago	
<b>Behaviour</b>	Asiatic Lions are <u>more solitary</u> and <u>live in pairs or small groups</u> of related females and their cubs.	The African Lions are known for their social behaviour and live in large groups called <b>Prides</b> , consisting of <u>several females, their cubs, and one or more males</u> .
<b>IUCN Status</b>	EN	VU

## B) WORLD LION DAY: AUG 10

- » Celebrated on Aug 10 of every year to raise awareness about lions and to mobilize support for their protection and conservation.
- » World Lion Day is the brainchild of co-founders Dereck and Beverly Joubert, a husband-and-wife team with a passion for big cats. They began the initiative in 2013, bringing together both **National Geographic** and the **Big Cat Initiative under a single banner** to protect the remaining big cats living in the wild.

### C) CONSERVATION STATUS:

- » IUCN: Endangered
- » WPA (as amended in 2022): Scheduled 1
- » CITES: Appendix 1

### D) 8 ASIATIC LIONS TESTING POSITIVE FOR COVID-19 (MAY 2021)

- » Where? Nehru Zoological Park, Hyderabad
- » This was the first case of the human infecting the feline and making them sick in India.

### E) PROJECT LION

- » It was announced by PM on Aug 15, 2020. It will be on the lines of Project Tiger and Project Elephant.
- » The project has been launched for the conservation of Asiatic Lion and will focus on habitat development by engaging modern technologies in management as well as in addressing the issue of disease in lion.
- » The **Wildlife Institute of India** with the Gujarat Forest Department have created a Project Lion Proposal and set it to the Union MoEF&CC.
- » **Six new sites** apart from the Kuno-Palpur WLS have been identified under Project Lion for possible lion relocation.
  - Madhav National Park, Madhya Pradesh
  - Sitamata Wildlife Sanctuary, Rajasthan
  - Mukundra Hills Tiger Reserve, Rajasthan
  - Gandhi Sagar WLS, Madhya Pradesh
  - Kumbhalgarh WLS, Rajasthan
  - Jessor-Belaram Ambaji WLS and adjoining landscape, Gujarat.
- » In Dec 2022, Minister of State for EF&CC, Shri Ashwini Choubey, informed that the Project Lion document titled "Lion@ 47: Vision for Amrit Kal" has been prepared with the following objectives to secure and restore lions' habitats for managing and growing population; scale up livelihood generation, and participation of local communities; become global hub of knowledge on big cat disease diagnostics and treatment and create inclusive biodiversity conservation through project lion initiative.

### F) ISSUE OF RELOCATION OF LIONS

- IUCN has raised concerns here "The Asiatic Lion currently exists as a single subpopulation, and is thus vulnerable to extinction from unpredictable events, such as an endemic or large forest fire."
- **Other Reasons to support translocation:** A large number of lions are outside the PA. These places are human dominated and have very little prey population. Thus, they depend on livestock which they kill or livestock carcass which are dumped outside the villages.
- **The Project Lion document of 2020** have also mentioned that babesiosis and CDV in Gir and that it has resulted the death of at least more than 60 lions in 2018-19.
  - It cautions that "the CDV can also spread very fast within the entire lion population of Gir, especially when containment is not possible due to feral animal vectors in a landscape that remains connected for disease transmission.

- Therefore, IUCN has recommended "establishment of at least one other wild population for population safety, for maximizing genetic diversity and in terms of ecology (re-establishing of the lion as a component of the fauna in its former range).
- **Wildlife activists** have been demanding transfer of lion to a second home **since 1990s**.
- **Studies** of three potential sites with the historical range of the Asiatic Lion **identified Kuno-Palpur sanctuary** in MP to be the most suitable for introducing the species.
  - In 2004, the Center had written to Gujarat for the first time for this relocation, but Gujarat kept dragging the issue and the matter reached Supreme Court.
- **Supreme Court of India** in April 2013, after several recommendations by various expert groups had ordered translocation of Gujarat Lions to Madhya Pradesh. This was done to ensure a second home for the endangered species and to save it from extinction, due to catastrophe like extinction.
  - The review and curative petitions by Gujarat were rejected by the court in 2014.
- **But the transfer hasn't happened yet**. In 2022, government officials have stated that there are no plans to translocate lions outside Gujarat and they will facilitate natural dispersal of lions within Gujarat.
  - These statements completely disregard 2013 SC verdicts and doesn't make any ecological sense.
- **Reason for non-removal** - it has more to do with **politics** than the effectiveness of translocation.

#### G) ISSUE OF DEATHS OF LION - CANINE DISTEMPER VIRUS (CDV)

- **More than two dozen** lions died in 2018 due to outbreak of canine distemper virus (CDV) and babesiosis.
  - **Canine Distemper Virus**
    - » Canine distemper is a contagious and serious disease caused by virus that attacks the respiratory, gastrointestinal, and nervous system of puppies and dogs. The virus has also been reported in Lions, tigers and other wild animals.
  - **Babesiosis:**
    - » It is caused by microscopic parasites that infect red blood cells and are spread by certain ticks.
- **Incidence of death due to disease in past**
  - In 2007, there were evidence of the Peste Des Petits Ruminants virus (PPRV) which had caused some death. PPRV (also known as Goat Plague) is highly contagious and can be deadlier than even CDV that wiped out a third of Africa's lion.

#### 4) ELEPHANT

- **Introduction**
  - Elephant (Elephas maximum) is the **largest terrestrial mammal of India**.
  - **In past centuries**, forests of India literally teemed with elephants. Mughal emperors are known to have more than 1,00,000 elephants in their services giving us an idea about huge population of elephant in our country then.

- Today's population is obviously a fraction of the population of that time, but large numbers of sustainable herd exist - particularly in south and northeast.
- India has also declared elephant as 'National Heritage Animal'.

- **Conservation Status:**

- IUCN: Endangered
- WPA: Schedule 1
- CITES: Appendix 1

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#### **A) POPULATION OF ELEPHANTS (ELEPHANT CENSUS, 2017 REPORT ("SYNCHRONIZED ELEPHANT POPULATION ESTIMATION INDIA, 2017"))**

- The census pegs India's total Asian Elephant population at 27312 across 23 states (a decrease over 2012 numbers of around 30,000 - but previous counts were not synchronized and may have had duplications. Therefore, experts say that comparisons should not be drawn). This was the first all India synchronized census which avoided many errors in estimation due to movement of elephants across different states.
- State wise:** Karnataka has the highest number of elephants, followed by Assam and Kerala
  - » Karnataka (6,049)
  - » Assam (5,719)
  - » Kerala (3,054)
- Region wise:** Highest in Southern (11, 960), followed by northeast (10,139), east central (3,128) and northern region (2,085)
  - » Further another survey in 2000 found that there are around 3,400 domesticated animal in the country.

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#### **B) INITIATIVES: PROJECT ELEPHANT**

- Launched by GoI in 1992 as a centrally sponsored scheme.
- Objectives**
  - » To assist states having free ranging population of wild elephants.
  - » To protect elephants, their habitat & corridors.
  - » Addressing the human-elephant conflict issues
  - » Improving the welfare of captive animals.
- 16 states/UT in focus**
  - » The projected is being mainly implemented in 16 states
    - » Andhra, Arunachal, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Orissa, TN, Tripura, Uttaranchal, UP and WB.
- Steps taken**
  - » **Elephant Reserves:**
    - » Establishment of 33 elephant reserves throughout the elephant's traditional range and covering a total area of more than 30,000 km<sup>2</sup>.
    - » Tamil Nadu and Assam have the highest number of elephant reserves (five each), followed by Kerala (4), Odisha (3), UP (2), Arunachal (2), Chhattisgarh (2), Karnataka (2), Nagaland (2), and West Bengal (2), Andhra (1), Jharkhand (1), Meghalaya (1), and Uttarakhand (1).

- In 2022, on the 30th anniversary of Project Elephant, government announced formation of three Elephant Reserves (LEMRU ER (Chhattisgarh), Agasthyamalai ER (TN) and Terai ER (UP)).

### **TERAI ELEPHANT RESERVE: INDIA'S 33RD ELEPHANT RESERVE IN UTTAR PRADESH (OCT 2022)**

- The Centre has approved setting up of Terai Elephant Reserve (TER) at Dudhwa-Pilibhit in Uttar Pradesh.
  - The TER will be developed in joint forest area of Pilibhit tiger reserves and Dudhwa TR, covering conservation of four wild species such as Tiger, Asian Elephant, Swamp Deer, and One-horned Rhinoceros in the entire landscape that also includes Kishanpur and Katarnighat WLS.
  - It is situated on India-Nepal border.
- The TER will also implement human-elephant conflict mitigation strategy and protect villagers living in the Indo-Nepal border areas of Uttar Pradesh.

### **LEMRU ELEPHANT RESERVE – CHHATTISGARH**

#### **AGASTHYAMALAI ELEPHANT RESERVE**

- Central government has accepted the proposal of the TN government to establish one more elephant reserve in the state in Agasthyamalai.
- Its total area would by 1,197 sq km.
- It is TN's 5th Elephant Reserve

### **C) INITIATIVE: MIKE**

- MIKE (Monitoring of Illegal killing of Elephants) program of CITES.
- Discovered a significant increase in the poaching of bull tuskers, which has damaged population dynamics by disturbing the sex ratio.
  - In some areas the normal level of 1:12 ratio has been so distorted that 1:100 has been known.
  - This abnormality seriously affects the genetic viability of what on the surface can look like healthy sustainable population.

### **D) ODISHA TURNS TO SEED BOMBS TO FIGHT ELEPHANT PROBLEM**

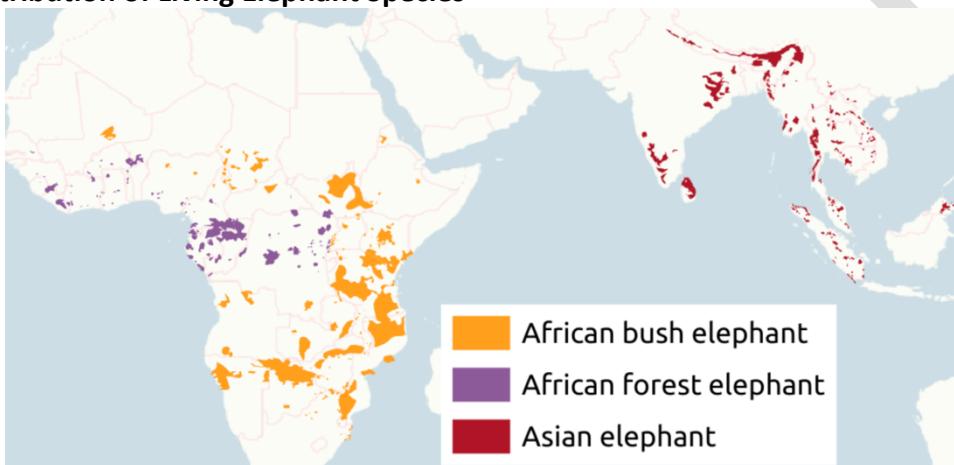
### **E) WORLD ELEPHANT DAY: 12<sup>TH</sup> AUG**

- It was launched on 12th of August 2012 globally to mobilize attention and support for conservation of Asian and African Elephants.
- As per the available population estimates there are 4,00,000 African Elephants and 40,000 Asian elephants on earth.
- **India adopted the World Elephant Day in Aug 2016** to conserve and protect elephant in India and improve their welfare.
- **Nationwide Campaign "Gaj Yatra"**
  - Was first launched on Aug 12, 2017, by WTI (Wildlife Trust of India).

- **Aims to** protect elephant population.
- **Runs campaign** in 12 elephant range states

## F) SOME GYAN ABOUT AFRICAN ELEPHANT

- African elephants are the largest elephant walking the earth. Their herd wander through 37 countries.
  - There are **two species of African Elephants**.
    - » The Savanna (or bush) elephant
    - » The Forest Elephant
  - **Savanna elephant** are larger than the forest elephants and their tusk curve outwards. They are the largest species of elephants and the biggest terrestrial animal on earth.
    - » IUCN: EN
- **Forest elephants** are smaller and darker; their tusks are straighter and point downwards. There are also difference in the size and the shape of the skull and skeleton between the two species.
  - » IUCN: CR
- **Distribution of Living Elephant Species**

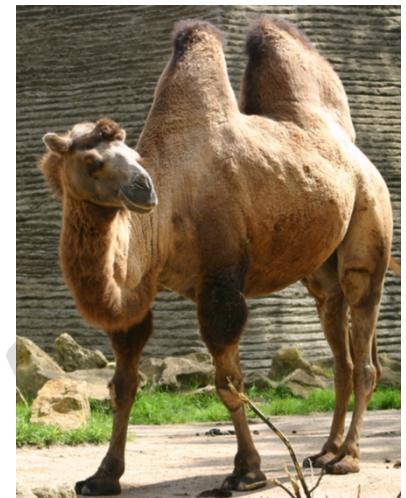


## 5) CAMELS IN RAJASTHAN

- **Different Types of Camels in India:**
  - The National Bureau of Animal Genetic Resources (NBAGR) lists **nine dromedary (*Camelus dromedarius*) breeds** of camel in India.
    - » **Five** (Bikaneri, Jaisalmeri, Jalori, Marwari, and Mewari) originated in Rajasthan
    - » **One - Mewati** can be seen in both Rajasthan and Haryana.
    - » **Two** (Kutchi and Khrai) are Gujarati
    - » **One** (Malvi) belongs to Madhya Pradesh.



- India also has a small population of the double-humped Bactrian Camel (*Camelus bactrianus*), found mostly in the Nubra valley in Ladakh.
- India's total camel population - all of them descendants of wild dromedary, or Arabian, Camels - decreased by 37% between 2012 and 2019.
  - Current estimates suggest that there are fewer than 200,000 camels left among the nine breeds, and 80% of these animals live in Rajasthan, where they are bred to provide transport, wool, and milk, as well as plough field.
  - **Why decrease in Camel population?**
    - Development in Western India -> new roads, vehicles etc. -> reduces the need of camel transportation.
    - Irrigation projects; Solar and Wind Farms etc. have reduced the land available for grazing of camels.
    - Collapsing tourism (COVID-19 pandemic)
    - Ban on export and sale of male camels including blanket ban on the sale of camel meat.



- **Can Camel milk bring a solution?**
  - Camel milk is touted as the next superfood. It has low amounts of sugar, is rich in vitamins and minerals, such as Vitamin C and potassium, and is alternative for lactose intolerance.
  - Some studies have also shown that Camel milk may reduce a person's need for Insulin (in case of Type-1 diabetes).
  - **Hurdles in promotion of use of Camel Milk?**
    - Supply and potential demand centres are very far away.
    - To transport raw camel milk to cities, it must be pasteurized and refrigerated, a costly process.
    - Learn from Gujarat model where camel milk dairies have proven profitable. Camel herders from Kutch region have partnered with Amul, which launched camel milk in 2019.

## A) KHARAI CAMEL

- **Details**
  - » Kharai Camel are a unique breed of camels found **only in Kutch**. They are known for their ability to swim in water. They have webbed feet like that of a frog.
  - » The name is derived from the local word Kharai which means Saline. They are also known as **dariyataru** (meaning sea-swimmer).
  - » During the rainy season, they swim along the Gulf Of Kutch, an inlet of the Arabian sea, to small forest islands and graze on mangroves and other saline-loving plants.
  - » **IUCN: EN**
  - » **WPA: Schedule-1**
  - » **Key threats:**
    - Habitat destruction (mangrove forests they feed on are being destroyed)

- Salt pans have increased in the area, and they have destroyed habitat and blocked to path of travel for the camels.
- **Recognition as separate Breed:**
  - » The Kharai camels were recognized as a separate breed only in 2015.
- **Declining numbers**
  - » In 2010, there were about 10,000 camels in the region, which has now (2020) declined to around 5,000.
- **Key recent efforts**
  - » Amul have started making camel milk products to support camel herders.
- **Altercations between Kharai Camel Owners (Of Jamnagar and Devbhumi Dwarka) and Forest Department (Sep 2021) -> Grazing in Marine National Park**

## 6) KONDANA SOFT FURRED RAT (ALSO KNOWN AS KONDANA RAT OR LARGE METAD)

- Nocturnal burrowing rodent that is found only in India. It is sometimes known to build nests.
- **Habitat:** Its natural habitat are subtropical and tropical dry forests, subtropical or tropical dry lowland grassland, and urban areas.
- **Distribution:** Known only from the small Sinhagharh Plateau (about 1 km<sup>2</sup>), near Pune in Maharashtra.
- **Threats:** Major threats are habitat loss, overgrazing of vegetation, and disturbance from tourism.

## 7) Dhole/ ASIATIC WILD DOG OR INDIAN WILD DOG (CUON ALPINUS)

- **Other Names:** Indian wild dog, whistling dog, Chennai dog, Asiatic Wild Dog, red wolf etc.
- **Distribution:** Native to central Asia, South-East Asia.
  - » In India there are few remaining adults in the wild. They can be seen in protected areas of Karnataka, Maharashtra, and Kerala.
- **Population:** With less than 2,500 individuals surviving in the wild globally, the dhole is already extinct in about 10 Asian countries.
- **Very efficient predators:** They are so efficient as predators that there have been reports of them even attacking tigers.
- **Threat**
  - » Habitat loss
  - » Loss of prey



- » Competition with other species
- » Persecution
- » Possibly diseases transfer from other dogs (domestic and feral dogs).

## 8) BROW-ANTLERED DEER/SANGAI DEER (PANOLIA ELDII)

**Specific Habitat requirements:** They inhabit the floating biomass in Loktak Lake Manipur.

**Key threats:** Hunted for their bow-shaped antlers.

**Note:** Sangai Deer (EN) is an endemic and endangered subspecies of brow-antlered deer found only in Manipur, India.

- It's original habitat is the floating marshy grasslands of the Keibul Lamjao National Park, located in the southern part of the Loktak lake, which is the largest freshwater lake in eastern India.
- State animal of Manipur.
- They are also known as **dancing deer**. This is because while walking on the floating island it often balances itself and appear to be dancing.



### A) SANGAI FESTIVAL

- It is a **10-day annual cultural festival** organized by Manipur Tourism department every year from Nov 21 to 30.
- It was first celebrated in 2010. It was earlier called tourism festival which has been renamed to Sangai festival to promote the uniqueness of brow-antler deer.
- The festival also promotes Manipur's unique art, handicraft, sports, cuisine.
- Some **folk dances** of Manipur like **Kabui Naga Dance, Bamboo Dance, Maibi Dance, Lai Haraoba Dance, Khamba Thoibi Dance** etc could be seen here.
- **Manipur's martial art** form **Thang Ta** can also be seen here.
- **Some games** include:
  - **Yubi-Lakpi**, which is a game played like a rugby with greased coconut;
  - **Mukna Kangjei**, a game combining hockey and wrestling.
  - **Sangol Kangjei**, or Polo - It is believed that modern polo came from Manipur Polo, Sagol Kangjei.
- **Manipur cuisines** such as **Nga-thongba** (fish curry), and the popular **Eromba** (a mixture of boiled veggies with fermented fish) are also available at the festival.

### B) LOKTAK LAKE

## About the Lake

- It is one of the largest freshwater lakes in India. It is pulsating lake with surface area varying from 250 sq km to 500 sq km during the rainy season with a typical area of 287 sq km.
- It is lake in Manipur, which is located 40 kms south of Imphal.
- The town of Moirang, on its bank, was the headquarter of the Indian National Army where they established a provisional independent government after defeating the British.
- The lake covers 61% of the total identified wetlands of the state. It plays a significant role in socio-economic and cultural life of Manipuris.
- It is famous for Phumdis (soil and organic matter at various stages of decomposition) floating over it. The largest of all the phumdis covers an area of 40 km<sup>2</sup> and is situated on the southeastern shore of the lake. Located, on this Phumdi, Keibul Lamjao National Park is the only floating national park in the world. The park is the last natural refuge of the endangered Sangai (state animal).
- Once considered extinct, the population of brow-antlered deer found only on Keibul Lamjao National Park.
- Loktak lake is also one of the Ramsar sites in India.
  - It is also in Montreux Record and government is taking a lot of steps to get it delisted.



## Key threats:

- Human Pressure - Floating houses and fishing structures.
- Ithai Barrage - brought about drastic changes in the characteristics of the wetlands.
- Pollution: Moreover, River Nambul that flows from Imphal into the lake, dumps in the untreated sewage of the entire city.

## About Ithai Barrage

In 1983, NHPC constructed a barrage at the confluence of the Manipur and Khuga river - two of the five major rivers that drain into Loktak lake. This barrage has provided electricity and irrigation water to the region, but has created a number of problems for Loktak lake.

- Now even during dry season water level is high in Loktak lake and the Phumdis are not able to reach ground and absorb nutrition from there.
- Further, the dead biomass remains in the Lake only as the outflow has been blocked due to the barrage.
- The barrage has also blocked the route of migratory fish coming into the lake from Myanmar and so Loktak can no longer meet the demand of the entire state.

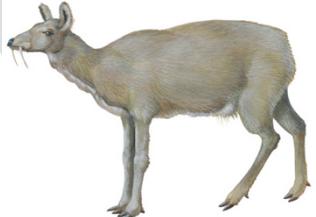
## 9) GEE'S GOLDEN LANGUR (TRACHYPITHECUS GEEI)

- **Distribution:** Golden langur is an old-world monkey, found in small regions of **western Assam, India and neighboring foothills of the Black Mountains of Bhutan.**
  - Manas National Park provides good sighting of this animal.
- **Status:** Endangered. One of the most endangered primate species of India.
- They have been named for their luscious coats and are considered sacred by Himalayan people.



## 10) HIMALAYAN WHITE BELLIED MUSK DEER

- **Habitat/Distribution:** Kashmir, Kumaon, Sikkim in India. Himalayas of Nepal and China.
- **Threats**
  - **Poaching and illegal trade for its musk**
  - **Musk:** is a substance with a persistent odor obtained from a gland of the male musk deer (only male produces the musk). The substance has been used as perfume fixative, incense material and medicine.



## 11) ALPINE MUSK DEER (MOSCHUS CHRYOSOGASTER)

- Alpine musk deer is a musk deer species native to the eastern Himalayas in Nepal, Bhutan and India to the highlands of Tibet.
  - It is now considered a separate species, to Himalayan Musk Deer. It is the state Animal of Uttarakhand.
  - IUCN Status: EN



## 12) KASHMIR MUSK DEER (MOSCHUS CUPREUS)

- It is an endangered species of musk deer native to Afghanistan, India, Pakistan and Nepal.
- In the past, the species was described as a subspecies to the alpine musk deer, but is now classified as a separate species.
- **IUCN:** EN

### 13) HISPID HARE

- **Details:** The Hispid hare, also called Assam rabbit, is a leporid, native to South Asia.
- **Habitat/Distribution:**
  - Historically it had wider range in southern Himalayan foothills, now distributed only patchily in India, Bangladesh, Nepal and Possibly Bhutan.
  - A significant population is found in Shuklaphanta National Park in Nepal, elsewhere it only occurs sporadically.
  - Habitat is highly fragmented due to increasing agriculture, flood control, and human development.



### 14) HOG DEER

**Habitat/Distribution:** Habitat ranges from Pakistan, through northern India, to mainland southeast Asia.

- But it has lost ground in most of its range.
- **Two sub species** of hog deer have been reported from its range
  - The western race is distributed from Pakistan and Terai Grassland (along the Himalayan foothills), from Punjab to Arunachal Pradesh.
  - The Eastern Race of hog deer is found in Thailand, Indo-China, Laos, Cambodia, and Vietnam.

**Name:** The hog deer runs through the forests with its head hung low (hog-like manner) so that it ducks under obstacles instead of leaping over them like most other deer do.



**Eastern Hog Deer (*Axius Porcinus annamiticus*) - A rare subspecies of hog deer found in Keibul Lamjao National Park (2018)**

- The sub-species was earlier believed to be confined to the eastern part of Thailand.
- **Genetic Study** by researchers at WII, Dehradun have reported presence of small population of Hog Deer at Keibul Lamjao National Park in Manipur.

### 15) LION TAILED MACAQUE / WANDEROO (MACACA SILENUS)

- **Details:** It's an old-world monkey, endemic to the Western Ghats of South India. They avoid human presence and they do not live, feed or travel through plantations.
- **Habitat:**
  - They 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**
  - **Habit Fragmentation:** Due to spread of agriculture and tea, coffee, teak, and Cinchona, construction of water reservoirs and human settlements to support such activities.
- **Conservation Efforts**



- **Captive Breeding:** Aringnar Anna Zoological Park, Chennai and in Mysore Zoo.

## 16) NILGIRI TAHR

It is the only mountain ungulate in southern India amongst the 12 species present in India. It is also the state animal of Tamil Nadu. It is a sure-footed ungulate that inhabits the open montane grasslands habitats at elevations from 1200 m to 2600 m of the Southwestern ghats.

### Distribution:

- Earlier, it was found throughout western ghats.
- But, today, it is distributed along a narrow stretch of 400 km between Nilgiris in the north and Kanyakumari in South. It has become locally extinct in around 14% of its traditional shola forests -grassland habitats.
- There are smaller populations found in the Palani Hills, Srivilliputtur, and the Meghamalai and Agasthiyar ranges, only two well protected large population is documented - one from the Nilgiris and the other from the Anamalais, including the high range of Kerala.
  - The Eravikulam National Park in Anamalai hills, Kerala, is home to the largest population of Nilgiri Tahr, with more than 700 individuals.
  - **Mukurthi National Park (TN)**, was created to protect this endangered species

### Conservation Status

- IUCN/WPA/CITES: EN/Schedule-1/Appendix 1

### Threats

- Habitat loss, overgrazing, illegal hunting.

### Historical references:

- Referred in Tamil Sangam literature 2,000 years back.
- Late Mesolithic paintings (10000-4000 BCE) also highlight significance of Tahr in the folklore, culture and life.



## A) NILGIRI TAHR CONSERVATION PROJECT (DEC 2022)

- It is an initiative launched by TN government, at a cost of Rs 24.14 crores.
- Under this, the government wants to:
  - » Develop a better understanding of the Nilgiri Tahr Population through surveys and radio telemetry studies.
  - » Reintroduce the Tahrs to their historical habitats
  - » Address Proximate threats
  - » Increase public awareness of species.
- The funds, for the project is provided by the TN Pollution Control Board (TNPCB).
- Further, Oct 7, will be celebrated as 'Nilgiri Tahr Day' in honour of E.R.C. Davidar, who was responsible for pioneering one of the first studies of the species in 1975.

## 17) INDIAN PANGOLIN

### - About Indian Pangolin

- The Indian Pangolin, thick tailed pangolin, or scaly pangolin is a pangolin found in the **plains and hills of India, Sri Lanka, Nepal, and Bhutan.**
- It is an **insectivore** that feeds on ants and termites, digging them out of mounds and logs using its long claws, which are as long as its fore limbs. It is a **solitary, shy, slow moving, nocturnal mammal.**



### - Main Threats

- **Hunting for its meat and scale**
- Various body parts used in traditional medicines

### - Conservation Status

- IUCN: Endangered
- WPA: Scheduled 1
- CITES: Appendix 1 (reclassified in 2016 from Appendix 2 to Appendix 1)

### - Pangolins and India

- Among **8 species of Pangolin** found globally, four each are found in Asia and Africa. **India is home to two species - the Chinese Pangolin and the Indian Pangolin.**

- Recently, CITES COP19 has urged member countries to **remove references to Pangolins from Pharmacopoeia** – an official collection of approved pharmaceutical standards.

## 18) RED PANDA (AILURUS FULGENS) (LESSER PANDA, RED BEAR-CAT, AND RED CAT-BEAR

It is a **small arboreal mammal** native to **eastern Himalayas and south-western China.**

**Habitat/ Distribution:** **Sikkim, Assam, Meghalaya, Northern Arunachal Pradesh and Darjeeling.** Almost **50% of the Red Pandas** inhabit eastern Himalayas.



**Physical features:** It has **reddish brown fur** and a long shaggy tail.

**Diet:** Omnivorous (mainly on bamboo)

**Conservation Status**

- IUCN/WPA/CITES: EN/Schedule 1/ Appendix 1

**Threats:** Habitat loss and fragmentation; Poaching for Furs; Inbreeding Individuals;



### A) THE PADMAJA NAIDU HIMALAYAN ZOOLOGICAL PARK (PNHZP) (DARJEELING ZOO) HAS STARTED AN INITIATIVE TO **RELEASE 20 RED PANDAS** IN FORESTS IN THE NEXT FIVE YEARS.

- **About the Zoo:**

- It is a zoological park located in Darjeeling. It is named after Padmaja Naidu, the former Governor of West Bengal, India. She is also the daughter of Indian Independence leader Sarojini Naidu.
  - It is a park situated 2,000 meters above the sea level. It was established in 1958 and is the largest high-altitude zoo in India.
  - It has been quite successful in captive breeding of the Red Panda. As of July 2022, there are 27 Red Pandas in the zoo.
- **Release of Red Pandas in Wild:**
- In the first re-wilding program of red Pandas in India, the PNHZP has started an ambitious program to release 20 of these mammals in about five years to the forests. They will be released in Singalila National Park.
  - In the past, two pairs of Red Pandas were released in 2021. Two animals managed to survive.

## B) A RECENT PUBLICATION BY SCIENTISTS OF ZOOLOGICAL SURVEY OF INDIA (ZSI) HAVE RESOLVED THE MYSTERY AROUND DEMOGRAPHY AND SPECIATION OF RED PANDA.

- India is home to both the (sub) species - Himalayan Red Panda (*Ailurus fulgens*) and the Chinese red Panda (*Ailurus Styani*) and the Sang River in Arunachal Pradesh splits the two phylogenetic species.

### 19) ASIAN WILD BUFFALOE

- It is the large bovine native to the Indian subcontinent and Southeast Asia.
- It has been listed as endangered since 1986 and remaining population totals less than 4,000. More than 90% of its population is found in India, mostly in Assam.



## 7. TIGER (IUCN: EN, WPA – SCHEDULE-1; CITES – APPENDIX-1)

- **Introduction**
- The tiger can be called a keystone species because it has a strong influence on other animals and plants in the ecosystem, especially deer and boar. From the conservation perspective it is also called Umbrella Species because when its ecological needs are met, so are those of myriad other living things that share its landscapes.
  - It is estimated that India had 40,000 tigers in 1900, and the number declined to 1800 in 1972. Similarly, world had around 1,00,000 tigers in 1900's, to less than 4,000 in the 1970's.
  - Tigers have the species name **Panthera Tigris**. There are nine sub-species of tigers, three of which are extinct.

- Tiger Sub-Species

Species (non-extinct)	Other details
Bengal (Panthera tigris tigris)	India, Nepal, Bhutan and Bangladesh; most numerous, about 4,000
Indo-Chinese	Thailand, Cambodia, Vietnam, Laos, Myanmar, China etc fewer than 300 remain
Malayan	Malay peninsula and in the southern tip of Thailand; 500
Siberian or Amur	Russian Far East; 300
South China	China; probably extinct in the wild
Sumatran	Sumatra, Indonesia; 500-600
<b>Species (Extinct)</b>	
Bali	
Caspian	
Javan	



- IUCN has recently (2022) confirmed that tigers have gone extinct in Cambodia, Laos, and Vietnam. Poaching and habitat loss are the key reasons.

- Major Threats faced by Tigers.

1. **Poaching** driven by illegal international demand for tiger parts and products.
  - For e.g. Bangladesh has also emerged as a major hub in the illicit poaching and trafficking of tigers.
2. **Depletion of prey** caused by illegal bush meat consumption
3. **Habitat loss** due to ever increasing demand of forest lands
4. **Inbreeding**
5. **Human-Animal Conflicts**

## 1) INTERNATIONAL TIGER CONSERVATION EFFORTS

### A) GLOBAL TIGER INITIATIVE, 2008

**Global Tiger Initiative (GTI), 2008** is a global alliance of governments, international organizations, civil society, the conservation and scientific community, and the private sector committed to working together towards a common agenda to save wild tigers from extinction.

- » It was launched in 2008 by founding partners the World Bank, Global Environmental Facility, Smithsonian Institution, Save the Tiger Fund and International Tiger Coalition (representing more than 40 NGOs).
- » It is led by 13 tiger range countries (TRCs).
  - Russia, China, India, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, Laos, Cambodia, Vietnam, Indonesia and Malaysia.
- » GTI secretariat, based at the World Bank in Washington, DC, assists 13 tiger range countries to carry out their conservation strategies and drive the global tiger conservation agenda, through planning, coordination and continuous communication.
- » The TRCs came together in an unprecedented pledge to double the world's tiger population by 2022 (which is the year of the Tiger on the Asian lunar Calendar), with a goal of achieving at least 6,000 tigers.
- » GTI is contributing through protection of habitat, fighting wildlife crime, building capacity, reducing demand, engaging community, and innovation.

## B) GLOBAL TIGER RECOVERY PROGRAM 2.0 (GTRP 2.0)

- » Why in news?
  - Countries submit population numbers from 2010-2022 to Global Tiger Recovery Program, CITES (Jan 2024)
- » About GTRP:
  - GTRP (2010-22) was launched in 2010 under the GTI by the World Bank to save wild tigers. Tiger Range countries committed to doubling the tiger population by 2022.
  - How effective was it?
    - Successes in South Asia and Russia.
    - Failures (decline) in Southeast Asia.
- » GTRP 2.0:
  - On 29th July 2023, marking Global Tiger Day, the Global Tiger Initiative (GTI) introduced the latest iteration of the **Global Tiger Recovery Program (GTRP 2.0) For the Year 2022 to 2034**. It aligns with Post-2020 Global Biodiversity Framework (GBF), providing an opportunity for TRCs to integrate tiger conservation with global goals.
  - The following outcomes are expected from the GTRP 2.0:
    - Cross Sectoral Conservation
    - Increased Investment
    - Habitat protection
    - Conflict Management
    - Reduced Wildlife Trade
- » Submission of Numbers by Countries:
  - The submissions were made under GTRP 2.0 and CITES.
  - There has been overall increase in tiger population by 60%, taking the number to 5,870.
    - However, Bhutan, Myanmar, Cambodia, Lao-PDR, and Vietnam showed decline in tiger population. It makes the situation grim in the Tiger Range Countries (TRC) of southeast Asia.

### C) TX2

GTI adopted St Petersburg declaration on Tiger Conservation and endorsed TX2 in 2010.

- Goal of TX2 is to double the number of tigers across their geographical areas.

### D) TX2 TIGER CONSERVATION AWARD (TTCA)

- The Awards celebrate the 10-year anniversary of all 13 Tiger Range countries committing to double the global population of wild tigers by 2022 - a goal called TX2.
- It is given in two categories.
  - » **TX2 Conservation Excellence Award**
    - The award recognizes a site that has achieved excellence in two or more of five themes:
      - » Tiger and prey population monitoring and research (tiger translocation/prey augmentation);
      - » Effective site management.
      - » Enhanced law enforcement, protection and ranger welfare improvement;
      - » Community-based conservation, benefits and human-wildlife conflict mitigation and.
      - » Habitat and prey management.
  - » **TX2 Award** - It is given for efforts to increase tiger population and includes a financial grant to assist the ongoing conservation efforts.
    - These awards are supported by Conservation Assured | Tiger Standards (CA|TS), Fauna & Flora International, Global Tiger Forum (GTF), IUCN Panthera, UNDP, WildLife Conservation Society (WCS), and WWF.
- In 2023, Pench Tiger Reserve (PTR), Maharashtra, is among the three tiger reserves to win the TX2 Award for a fivefold increase in its tiger population from 9 individual in 2006 to 44 in 2021.
  - » The other two tiger reserves include Pench (Madhya Pradesh) and Satpura Tiger Reserve. While Pench (MP) increased its tiger population from 33 (2006) to 87 (2018), STR increased its numbers from 13 in 2010 to 48 in 2021.

### E) INTEGRATED TIGER HABITATION CONSERVATION PROGRAM (ITHCP)

- **Why in news?**
  - IUCN Tiger Program launches phase-IV (Aug 2023)
- It is a strategic funding mechanism which aims to save tiger in the wild, their habitats and to support human populations in key locations throughout Asia. It was launched in 2014.
- **IUCN** is the program implementing agency.
  - » It is supported by German Government and the German Development Bank (KfW) and was launched in late 2014.
  - » The program contributed to the international goal set up during the 2010 St Petersburg Summit to double wild tiger population by 2022.
- **In India**, it was launched in Karnataka in 2016.
  - » In 2018, it was extended for further five years.

- **Updates:** Launch of Phase IV (Aug 2023)
  - » ITHCP has launched a call for Concept Notes for Phase IV of the Tiger Program.
    - It aims to allocate a total of Euro 10.7 million and, for the first time, the program will extend eligibility to other species that significantly contribute to the intricate tapestry of tiger conservation.
    - Projects can target one of the following species: Tigers (Panthera tigris), leopard (Panthera Pardus), and Clouded leopards (both mainland and Sunda)
    - Countries eligible under this call for concept notes include Nepal, Bhutan, India, Bangladesh, Myanmar, Thailand, Cambodia and Indonesia.
    - It should be noted that funding will exclusively be channeled towards specific Designated Program Areas, ensuring a focused and targeted approach to conservation efforts.
  - » By embracing a comprehensive and diversified strategy that encompasses a wider array of species, the program will continue to secure a viable future for these Species, their Habitats and the people that live in and around them.

## F) CONSERVATION ASSURED TIGER STANDARDS (CATS)

- **CATS** is a conservation tool that specifies best practices and standards to manage target species and encourages assessments to benchmark progress.
  - It is a partnership of 13 Tiger range governments, inter-government agencies, NGOs, and conservation organizations.
  - WWF is helping the Tiger range countries to implement CATS.
  - It was launched in 2013 and Tigers are the first species selected for the initiative.
- **In July 2020:**
  - NTCA has decided to adopt the Conservation Assured Tiger Standards (CATS) across all fifty tiger reserve across the country.
    - » The Global Tiger Forum (GTF) and World Wildlife Fund India are the two implementing partners of the NTCA for CATS assessment.
  - This makes India the first among 13 Tiger range countries to nationally adopt CATS, which are a set of minimum standard setting benchmark for managing conservation sites.
    - » This will bring India's total number of registered sites to 94 including sites outside tiger reserves.

## G) WORLD TIGER DAY/ INTERNATIONAL TIGER DAY: 29<sup>TH</sup> JULY

- **Why 29th July?**
  - It was a reminder of agreement signed by countries at St Petersburg Tiger Summit in Russia, 2010, to raise awareness about decline of global tiger population.
  - It was established in 2010 to raise awareness about the decline of wild tiger numbers.
- Tadoba Tiger Reserve, Maharashtra plays host for National Global Tiger Day Celebrations 2022

## 2) NATIONAL EFFORTS FOR TIGER CONSERVATION

### A) PROJECT TIGER

- **News:** Project Tiger completes 50 years in 2023.
- It is a centrally sponsored tiger conservation programme launched in 1973 by the MoEF&CC, GoI.
- **Objectives / Aims**
  - » Ensuring a viable population of Bengal Tigers in their natural habitats and also to protect them from extinction.
  - » Preserving areas of biological importance as a national heritage for the benefit education and enjoyment of people.
  - » Harmonizing the rights of tribal people living in and around tiger reserves.
- **Tiger Reserves**
  - Tiger reserves are the areas that are notified for the protection of the tiger and its prey, and are governed by Project Tiger and administered by the National Tiger Conservation Authority.
- Tiger reserves are constituted on a **core/buffer strategy**:
  - The **Core Area** have the legal status of a national park or a sanctuary with an **exclusive tiger agenda**.
    - These areas are required to be kept inviolate for the purposes of tiger conservation, without affecting the rights of Scheduled Tribes or such other forest dwellers.
- The **Buffer or peripheral areas** are a mix of forest and non-forest land, managed as a multiple use area with an inclusive people-oriented agenda.
  - » It aims to promote coexistence between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of the local people.
  - » Limits of such area are determined on the basis of scientific and objective criteria in consultation with the concerned Gram Sabha and an Expert Committee constituted for the purpose.
- **Corridor Habitat**
  - » 2010 tiger census showed a decline in tiger occupied area. This decline in tiger occupancy area was recorded in areas outside the tiger reserves, indicating loss of habitat quality and extent - a crucial element essential for maintaining genetic connectivity between individual tiger population.
  - » To address this vital conservation concern, the **NTCA in collaboration with the WII delineated the minimal tiger habitat corridors connecting tiger reserves** for implementing landscape scale tiger conservation.
  - » Now all tiger reserves manage their tiger populations based on a Tiger Conservation Plan (TCP), which addresses specific prescriptions for core, buffer, and corridor habitats.
- Currently, there are 54 tiger reserves spread across 75,796 km<sup>2</sup>, effectively covering 2.3% of India's total land area.

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## B) NATIONAL TIGER CONSERVATION AUTHORITY (NTCA)

- Wildlife Protection Act of 1972 was amended in 2006 to provide for the formation of National Tiger Conservation Authority to aid in the implementation of measures for the conservation of tiger. It comes under MoEFCC.
- **What does it do?**
  - » Providing central assistance to states under the ongoing Project Tiger, for activities based on Tiger Conservation Plan.
  - » **Conducting countrywide tiger census every four years.** It does assessment of the status of tiger, co-predators, prey, and habitat using the refined methodology approved by the Tiger Task Force.
  - » Taking steps for protection and act against poaching
    - Alert states as and when required; Transmit backward/forward linkages of information relating to poachers.
    - Use IT for improved surveillance (e-Eye system) using thermal cameras.
    - Launch tiger reserve level monitoring using camera trap to keep a photo ID database of individual tigers.
    - Prepare a national database (Tiger Net) of individual tiger photo captures to establish linkage with body parts seized or dead tigers.
    - Assist states to refine protection oriented monitoring through Monitoring System for tiger's intensive protection and ecological status (M-STIPES).
      - It is an android app which was launched in 2010.
    - Support states for raising, arming and deploying the Special Tiger Protection Force.
  - Address issues such as the movement of tigers out of their habitats into human settlements.

### C) MANAGEMENT EFFECTIVE EVALUATION (MEE) OF TIGER RESERVES IN INDIA

- MEE is a globally accepted framework for measuring the conservation efforts of tiger reserves. It has been adopted from the framework of the IUCN World Commission on Protected Areas and has emerged as the most important tool to assist and improve management perspectives of Tiger Reserves and their associated landscape connectivity.
- In India MEE is being jointly conducted by the NTCA and WII and has paved the way for a successful evaluation of national tiger conservation effort.
- **India is the only country in the world to have institutionalized and effectively completed five cycles of MEE of Tiger Reserves in the country.**
- **Key Highlights of the fifth cycle of Evaluation:**
  - A total of 51/53 tiger reserves have been independently evaluated through the MEE process in the fifth cycle in 2022.
  - 10 independent regional expert committees (RECs) were constituted and deputed in 10 different clusters of five tiger landscapes to evaluate the 51 tiger reserves of the country.
    - Each team consisted of a chairperson and 2-3 members (retired IFS officers having experience in wildlife management, especially in the field of tiger reserves).

- **33 criteria/Indicators** were used for evaluation of six elements of MEE framework.
- **The results** were classified in four categories based on the percentage of maximum possible score: (50-59% rated as '**Fair**'; 60-74% rated as '**Good**'; 75-89% rated as '**very good**' and >=90% rated as **excellent**).

- **Results:**

- Overall average score of 78.01% for 51 Tiger Reserves.
- **12 tiger reserves got excellent category (score >=90%).**
  - These include - Periyar (KER), Satpura (MP), Bandipur, Nagarhole, Kanha, Biligiri Ranganatha Swamy Temple (KAR), Annamalai (TN), Pench (MHA), Bhadra (KAR), Kali (Dandeli-Anshi) (KAR), Simlipal (Odisha), Mudumalai (TN).
- 21 tiger reserves got very good category; 13 'Good' category and 5 Tiger Reserves in 'Fair Category;
  - "**Very Good**" tiger reserves include - Pench (MP), Tadoba-Andhari (MHA), Manas (Assam), Melghat (MHA), Sathyamangalam (TN), Parambikulam (Kerala), Kaziranga (Assam), Navegaon-Nagzira (MHA), Bandhavgarh (MP), Panna (MP), Kalakad-Mundanthurai (TN), NSTR (AP), Dudhwa (UP), Corbett (UK), Sahyadri (MHA), Amrabad (Telangana), Bor (MHA), Pakke (Arunachal), Valimiki (Bihar), Sundarbans (WB) and Satkosia Odisha)
  - "**Good**" tiger reserve includes Kawal (Telangana), Ranthambore (Raj), Kamlang (Arunachal), Sanjay-Dubri (MP), Pilibhit (UP), Achanakmar (Chhattisgarh), Rajaji (UK), Orang (Assam), Palamu (Jharkhand), Sariska (Raj), Buxa (WB), Srivilluputhur Megamalai (TN), Mukundra (Raj)
  - "**Fair**" tiger reserves include Namdapha (Arunahcal), Udanti-Sitanadi (Chhattisgarh), Nameri (Assam), Indravati (Chhattisgarh) and Dampa (Mizoram).

#### **D) CENTER MERGES PROJECT TIGER AND PROJECT ELEPHANT (JULY 2023)**

- **The MoEF&CC** announced the merger in April and notified Project Tiger (PT) as Project Tiger and Elephant (PTE).
  - » **The Project Tiger Division** has been merged with **Project Elephant** and a new division with the name 'Project Tiger and Elephant Division' has been created under the MoEF&CC.
  - » After the merger, the staff and divisional heads of Project Elephant (PE) will now report to the additional director general of forests (ADGF), Project Tiger (PT), who has now been designated as ADGF (PT&E).
- **Criticism:**
  - » **Decision without any discussion:**
  - » **May hamper Project Tiger** as it may get bogged down in the bureaucratic quagmire of MoEF&CC.
    - NTCA has a single-minded focused attention on conserving tiger and is disconnected from the tentacles of the vast bureaucracy.
  - » A similar proposal of planning commission was rejected by NBWL in the past.

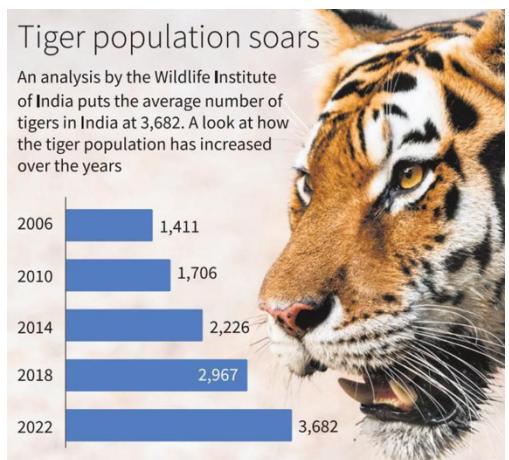
## E) TIGER REVIVAL PROGRAM OF NTCA: TRANSLOCATION OF BIG CATS TO MADHAV NATIONAL PARK IN MP TO BEGIN ON MARCH 10, 2023

- In March 2023, the Madhya Pradesh Forest department has released tigers in Madhav National Park as part of the tiger reintroduction project.
  - » It will be first time in two decades that the park will have tigers.
- This is the **third time** the MP forest department has reintroduced a tiger in a wildlife sanctuary, which is devoid of majestic beasts.
  - » Earlier, the tigers have been successfully rehabilitated in the Panna Tiger Reserve and the Nauradehi WLS in Sagar

## F) INTER-STATE TIGER TRANSLOCATION PROJECT – CLASS DISCUSSION

### 3) TIGER ESTIMATES IN THE COUNTRY

- NTCA has been conducting a survey of tiger population every four years since 2006.
- NTCA's census of tigers conducted in 2006, 2010, 2014, 2018 and 2022 show an increasing trend.
- India currently harbors 75% of the world's wild tiger population.
- **Key Highlights of All India Tiger Estimates - 2022:** Release of detailed report (July 2023)
  - » **Total Tiger Population** - 3682 (as per detailed report released in 2023)
    - Note: In April 2022, PM Modi declared the minimum tiger population of 3167, which is the population estimate from the camera trapped area.
      - Now (2023), further analysis of data done by Wildlife Institute of India (WII), from both camera-trapped and non-camera trapped tiger presence areas, the upper limit of tiger population is estimated to be 3925 and the average number is 3682 tigers, reflecting a commendable annual growth rate of 6.1% per annum.
  - » **States with Highest Tiger Population:** MP (785); Karnataka (563); Uttarakhand (560) and Maharashtra (444)
    - **Some states**, including Mizoram (0), Nagaland (0), Jharkhand (1), Goa (5), Chhattisgarh, and Arunachal Pradesh (9), have reported disquieting trends with smaller tiger population.
  - » **Tiger reserves with highest number of tigers:** Corbett (260), Bandipur (150), Nagarhole (141), Bandhavgarh (135), Dudhwa (135) etc.
    - **Corbett** also has the highest density of wild tigers in the world.



- » **Reserves with no tigers** (Dampa (Mizoram); Kamlang (Arunachal Pradesh); Kawal (Telangana), Satkosia (Odisha), Sahyadri (MHA);
- » **Tiger Reserves with less than 10 big cats:** These are Ranipur in Uttar Pradesh; Achanakmar, Indravati and Udanti Sitanadi in Chhattisgarh; Palamau in Jharkhand; Bor in Maharashtra; Mukundara and Ramgarh Vishdhari in Rajasthan; Kalakad Mundanthurai in Tamil Nadu; Nameri in Assam; Pakke and Namdapha in Arunachal Pradesh and Buxa in West Bengal.
- » **Landscape wide distribution:**
  - i. **Central India landscape** has seen an increase in tiger population to **1161** (from 1033 in 2018).
  - ii. **Western Ghats** showed a decline of tiger population (**824**)
  - iii. **Shivalik Hills and Gangetic Plains** landscape had **804** tigers and have witnessed an increase from 648 population in 2018.
  - iv. **Northeastern Hills and Brahmaputra Plains landscape** - have shown evidence of **194 tigers**.
  - v. **Sundarbans** (100) also saw an increase from 88 in 2018.
- » **Techniques used for estimation:**
  - **M-STrIPES** (Monitoring System for Tiger-Intensive Protection and Ecological Status): It uses a GPS and remote sensing to collect information from the field.
  - **Camera-Trap based capture**
  - **Extracting DNA from SCATs** in area where camera traps were not possible.

## G) ODISHA WANTS ITS OWN CENSUS (SEP 2023)

- **Why?**
  - » It disagrees with NTCA findings.
    - All India Tiger Estimate (AITE) had said that more than half the tigers of Odisha had in 2016, have vanished, with one of its two notified tiger reserves Satkosia has none.
    - Odisha says that this is an inaccurate representation as the sampling intensity was very low.
      - They said though the AITE protocol mandates that the phase-I survey be carried out in all forest beats (in tiger reserves, protected areas, reserve forests, protected forests, revenue forests in all wildlife and territorial divisions) and phase-III in all potential tiger-bearing forest blocks, in Odisha, it was carried out only in limited areas. The state claimed a total of 733 camera traps were deployed in Odisha, as against 6,894 and 4,872 in Madhya Pradesh and Maharashtra respectively.
- **How will Odisha do Census?**
  - » While the AITE since 2006 has replaced the pugmark method with new technologies, Odisha's survey will rely on the camera trap method along with pugmark and other approaches.
  - » **Where?**
    - All districts (except coastal districts)

## H) INAUGURATION OF INTERNATIONAL BIG CAT ALLIANCE

- PM Modi inaugurated the International Big Cat Alliance (IBCA) in Karnataka's Mysuru (April 2023)
  - » India has proposed to launch a mega global alliance to protect big cats and assured support over five years with guaranteed funding of \$100 million (over Rs 800 crores).
  - » The IBCA will focus upon conserving 7 major big cats of the world - Tiger, Lion, Leopard, Snow Leopard, Puma, Jaguar, and Cheetah
  - » The alliance aims to reach out to 97 range countries covering the natural habitats of Tiger, Lions, Snow Leopard, Leopard, Puma, Jaguar, and Cheetah.
  - » It will further strengthen global cooperation and efforts to conserve wild denizens, especially big cats.
  - » **Governance:** General Assembly, Council and Secretariat

## I) PROTECTION OF BLACK TIGER (MELANISTIC TIGER)

- **Melanistic tigers** have been recorded only in Similipal Tiger Reserve in Odisha. As per the 2022 census, there are total 16 individual tigers in Similipal out of which **10 are melanistic**.
- **A standard operating Procedure (SOP)** has been issued by the NTCA for active management towards rehabilitation of tigers from source areas at the landscape level.
  - Based on genetic composition, the Similipal Tiger Reserve has been identified as a distinct genetic cluster for conservation. **Funding assistance is provided** under the ongoing Centrally sponsored scheme of Integrated Development of Wildlife Habitats (CSS-IDWH) to the Similipal Tiger Reserve for conservation of tigers, raising awareness on tiger & other wildlife conservation, habitat management, protection, eco-development, human resource and infrastructure development, voluntary village relocation, as per the sanctioned Annual Plan of Operation of the Tiger Reserve which emanates from a statutory Tiger Conservation Plan (TCP).

## 8. VULNERABLE MAMMALS OF INDIA

### 4) GREAT INDIAN ONE HORNED RHINO

**Details:** Fifth largest land animal.

#### Threats:

- Poaching - rhino horn great demand in China and other Asian countries for traditional medicines.
- Habitat loss
- Fragmentation of Habitat

#### Habitat and Distribution

- **Past:** Once ranged throughout the entire stretch of Indo-Gangetic Plain.
  - Population went down to a mere 200 in the early 1990s, and was declared to be endangered.
- **Present:** Found only in the tall grasslands and forests in the foothills of the Himalayas. Today more than 3,000 Rhino live in wild, most of them confined in Assam (2500+). They range from few pockets in Southern Nepal, northern Bengal, and Brahmaputra Valley.
  - Today, they are mostly found in 7 protected areas:
    - In Assam: Kaziranga National Park, Pobitora WLS, Orang NP, Manas NP
    - In WB: Jaldapara NP and Gorumara NP
    - In UP: Dudhwa NP
  - Protected Areas for Rhino (all three in Assam)
    - Kaziranga National Park
    - Pabitora Wildlife Sanctuary
    - Manas National Park



Indian rhinoceros (<sup>[1]</sup>*Rhinoceros unicornis*)

in the Kaziranga National Park



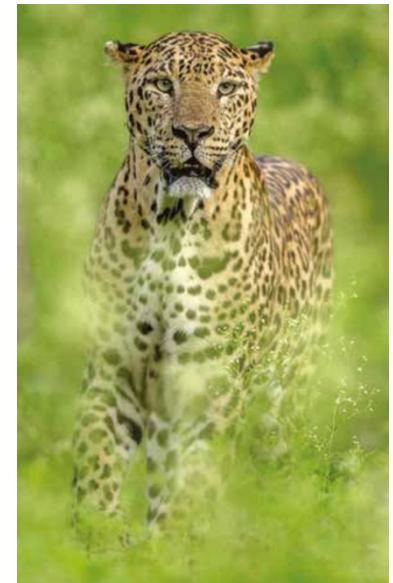
#### A) INDIAN RHINO VISION 2020 COMES TO AN END

- It was a partnership among the government of Assam, the International Rhino foundation, WWF, the Bodoland Territorial Council, and the US Fish and Wildlife Service that aims to increase the number of Rhino population and provide long term viability in seven of Assam's protected areas by 2020.
- Need of such mission
  - Rhino population had been confined to 2-3 protected areas of Assam.
- The main feature of the vision was the translocation of rhinos from Kaziranga, Orang and Pobitora to other protected areas.
  - Other activities involved anti-poaching, monitoring, community conservation efforts etc.

- The ambitious program came to a **close in April 2021** with the release of two Rhinos in Assam's Manas National Park transported from Pobitora WLS about 185 km to the east.
  - There were total eight rounds of rhino translocation under IRV2020.
  - Manas NP has received a total of 22 Rhinos from other protected areas.
- **Has the target been achieved:**
  - It is believed to have achieved its target of attaining a population of 3,000 Rhinos in Assam. (2018 Census had 2650 Rhinos)
  - But, the plan to spread the Rhinoceros unicornis across 7 Protected Areas of Assam didn't materialize completely.

## 2) INDIAN LEOPARD (PANTHERA PARDUS FUSCA)

- **Details about Leopard**
  - They are found in **widely distributed and adaptable habitats**. It is absent only in arid deserts and above timber line in the Himalayas and are found throughout the country. In Himalayas, they are sympatric with snow leopard (Panthera uncia).
  - Among all sub-species, the Indian leopard retains the largest population size and range outside Africa.
  - In areas devoid of any other large carnivore, the leopards can act as an **umbrella species for biodiversity conservation**.
- **Protection Status**
  - IUCN: VU
  - WPA: Schedule - 1
  - CITES: Appendix-1
- **Status of Leopard in India, 2018** (published in 2020)
  - During the **All-India tiger estimation** of 2018, leopard population was also estimated within the forested habitats in tiger occupied states.
    - » Note: Non-forested areas like coffee and tea plantation, higher reaches of Himalayas, arid landscape and majority of north-eastern landscapes were not sampled, and therefore this population estimate should be considered as minimum number of leopards in each of the landscapes.
- **Key highlights**
  - **Total Population:** 12,852
  - **60% increase in population** in 2018 when compared to 2014.
    - » **But North-eastern region** see the population facing major threat due to land use changes triggered by agriculture, tea gardens and linear infrastructure projects.
  - **Regional Distribution** (MP > KAR > MHA > TN > Chhattisgarh > UK )



- » **Shivalik Hills and Gangetic Plains:** 1,253 leopards
  - Uttarakhand > UP > Bihar
- » **North-eastern Landscape:** 141 leopards
  - WB > Assam > Arunachal
- » **Central India and Eastern Ghats:** 8071 leopards
  - MP > MHA > Chhattisgarh
- » **Western Ghats:** 3,386 leopards
  - Karnataka > TN > Kerala

### 3) SNOW LEOPARD

#### Distribution:

- Native to mountain ranges of central and South Asia, it is found along the upper reaches of Himalayas at elevations between 3000-4000 m.
  - It is known as the "**ghost of mountain**" and is the top predator of the region. It is a flagship species for high altitude Himalayas. It is also an indicator species and its presence gives an indication about the whole mountain ecosystem.
  - Reclusive nature of Snow Leopard and difficult terrain have made population estimation difficult.
- In India it is found in **Ladakh, Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh**.
  - **Hemis** (Ladakh) is also known as the snow leopard capital of the world.
  - India has identified **three landscapes** namely:
    1. **Hemis-Spiti** across Ladakh and Himachal Pradesh;
    2. **Nanda Devi - Gangotri** in Uttarakhand
    3. **Khangchendzonga - Tawang** across Sikkim and Arunachal Pradesh.
- Globally, it is found in **12 countries** of South Asia and Central Asia - India, Nepal, Bhutan, China, Mongolia, Russia, Pakistan, Afghanistan, Kyrgyzstan, Kazakhstan, Tajikistan, and Uzbekistan.

#### Conservation Status

- IUCN: VU
  - Note: IUCN moved it from endangered to vulnerable in 2017
- WPA: Schedule 1 (Part 1)
- CITES: Appendix 1
- Convention on Migratory Species (Appendix - 1)

**Snow leopard**



Snow leopard in Wakhan District, Afghanistan



At Hemis National Park, India

#### Conservation status



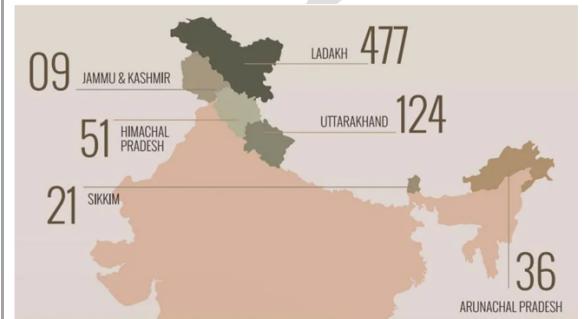
**National Heritage Animal:** Snow leopard is national heritage animal of Afghanistan and Pakistan.

#### Key threats

- Habitat loss, fragmentation, human-animal conflict, hostile habitat -> traditionally lower population

#### Status Report of Snow leopard in India (Jan 2024)

- The report was released by the Union Minister of EF&CC during the National Board of Wildlife Meeting in Delhi.
- The Snow Leopard Population Assessment in India (SPA) Program is the first ever scientific exercise** about snow leopard population in India.
- The Wildlife Institute of India (WII)** is the National Coordinator for this exercise that was carried out with the support of all snow leopard range states and two conservation partners, the Nature Conservation Foundation, Mysuru and WWF-India.
- The SPAI systematically covered over 70% of the potential snow leopard range in the country of around 1,20,000 sq km. It covered the UT of Ladakh, UT of J&K, and states such as Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh.
- The exercise was carried out between 2019-2023 using a meticulous two step framework:
  - The first step** involved evaluating snow leopard spatial distribution.
  - The second step** snow leopard abundance was estimated using the camera traps in each identified stratified region.



#### Key Highlights of the report:

**Total Population:** 718

Ladakh (477), UK (124), Himachal (51), Arunachal (36), Sikkim (21), and Jammu and Kashmir (9)

The report also mentions the need for establishing a dedicated Snow Leopard Cell at WII under MoEF&CC with primary focus on long-term population monitoring, supported by well-structured study designs and consistent field surveys.

#### Programs by GoI to protect Snow Leopard

##### A) SECURE HIMALAYAS

- It is a GEF-UNDP funded project which is focused on conservation of high altitude biodiversity and reducing the dependence on local communities on the natural ecosystem.
  - It is currently operational in four snow leopard ranges - J&K, Himachal, UK and Sikkim.

##### B) PROJECT SNOW LEOPARD (LAUNCHED BY GOI IN 2009)

- It is an initiative for strengthening wildlife conservation in the Himalayan High altitudes, covering Jammu and Kashmir, Himachal Pradesh, UK, Sikkim and Arunachal Pradesh.
- It aims at promoting knowledge-based and adaptive conservation framework that fully involves local communities, who share snow-leopard's range, in conservation efforts.

- » The project facilitates a landscape level approach to wildlife conservation by developing scientific frameworks for comprehensive surveys, rationalizing the existing protected area network and improving protected area management.

#### C) "HIMAL SANRAKSHAK" - COMMUNITY VOLUNTEER PROGRAM

- Launched in Oct 2020

#### D) THE UT OF LADAKH HAS ADOPTED SNOW LEOPARD AND BLACK NECKED CRANE, AS THE STATE ANIMAL AND STATE BIRD (SEP 2021)

#### E) SNOW LEOPARD CONSERVATION BREEDING PROGRAM

- It is being carried out at Padmaja Naidu Himalayan Zoological Park.

### International Efforts

#### A) INTERNATIONAL SNOW LEOPARD DAY: 23RD OCTOBER

- It marks the adoption of Bishkek Declaration by 12 countries on the conservation of snow leopard in 2013.
- The Global Snow Leopard & Ecosystem Protection Program (GSLEP) was also launched on the same day.

#### B) GLOBAL SNOW LEOPARD & ECOSYSTEM PROTECTION PROGRAM (GSLEP)

- The GSLEP is a first-of-its kind intergovernmental alliance for the conservation of the snow leopard and its unique system. It was created in 2013 when officials, and conservationists arrived at a common conservation strategy enshrined in the Bishkek Declaration (2013) to cooperate in the conservation of this species and its habitat.
- It is a range wide effort and unites range country government, NGOs, local communities, and private sector to conserve snow leopard and their ecosystem.
- It is led by environment ministers of 12 countries in Asia which form the home range of snow leopards.
- The GSLEP secretariat is in Bishkek.
- India is a member of GSLEP since 2013.
  - Gol also hosted 4th Steering Committee of the GSLEP in 2019 which also resulted in the "New Delhi Statement" of strengthening the resolve of the snow leopard range countries towards conservation of the mountain ecosystem of Central and South Asia.

### 4) CLOUDED LEOPARD (NEOFELIS NEBULOSA)

- Why in news?
  - » A new study reveal that clouded leopard doesn't follow any specific pattern of operating in a certain space, unlike other carnivores (Aug 2023)
- About Clouded Leopard

The clouded leopard has been named so after the cloud-shaped pattern on its skin. They are considered evolutionary link between big cats and small cats.

#### Habitations

They are typically rainforest dwellers, but can also be found in drier forest of South East Asia.

**Distribution:** Himalayan foot hills to Southeast Asia and China. In India, they are distributed in Northern West Bengal, Sikkim, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.



IUCN Status: VU

It is also the **state animal of Meghalaya**

**Study:** A new study revealed that clouded leopard doesn't follow any specific pattern of operating in a certain space, unlike other carnivores. They seemed to go wherever they pleased without worrying about other predators, primarily because of their ability to climb trees, even hang upside down from large branches.

## 5) BLACK PANTHERS

- It is a melanistic color variant of any big cat species.
  - o In Asia and Africa, they are leopards.
  - o In Americas they are jaguars.
- **Conservation Status**
  - o IUCN/WPA/CITES: VU/Schedule 1/ Appendix 1
- **Distribution in India**
  - o Odisha to Kerala



## 6) FISHING CAT

Fishing cats are generally twice the size of the household cats. They are generally found on the Marshy wetlands of northern and eastern India, and on the mangroves of the east coast.

- They are found in Sundarbans of India and Bangladesh, Chilika Lake and surrounding wetlands in Odisha, Coringa and Krishna Mangroves in Andhra Pradesh.
- The fishing cat has also been document in Ranthambore Tiger Reserve, Pilibhit, Dudhwa, Valmiki Tiger Reserve, and Sur Sarovar Bird Sanctuary.



Protection Status

» IUCN: VU

- They are generally observed while hunting along the edges of water bodies grabbing prey from the water or diving in to catch prey farther from the banks.

» **CITES:** APPENDIX-II

» **WPA:** Schedule-1

#### **Other features**

- They are mostly active at night and adults are solitary in nature

#### **World's First Fishing Cat Census done in Chilika (June 2022)**

- » The Chilika Lake, Asia's largest brackish water lagoon, has 176 fishing cats: As per the census done by Chilika Development Authority in collaboration with the Fishing Cat Conservation Alliance (FCCA), a non-profit.
- » **About Fishing Cat Conservation Alliance (FCCA)**
  - It is an NGO which consists of team of conservationists, researchers, and enthusiasts across the world working to achieve a single dream - a world with functioning floodplains and coastal ecosystems that ensure survival of the fishing cat and all species with which it shares a home.
- **Fishing Cat Project** launched by Chilika Development Authority in collaboration with FCCA in 2010
  - » As part of the project awareness will be created among local people and fishermen for the animal's conservation.

- In 2012, **WB government** declared fishing cat as the **state animal** and the Calcutta Zoo has two big enclosures dedicated to them.

#### **Major threats**

- » **Habitat Loss** (wetland degradation, and conversion of aquaculture, and other commercial projects), **Sandmining along riverbanks, agriculture intensification** etc.
- » Killed by people under assumption that it is a juvenile tiger and thus dangerous.

## **7) BINTURONG (ARCTICTIS BINTURONG) (BEARCAT)**

It is also known as **bearcat** and is an arboreal mammal. It is native to south and Southeast Asia.



**Distribution:** It is found in India, Nepal, Bangladesh, Bhutan, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Philippines and Yunnan in China.

In India, it is confined in tall forests of the foothills and hills with good tree cover. It is known from Manas National Park, Karbi Anglong and other regions.

IUCN: VU

WPA: Schedule-1

**Recent Development (Jan 2024): Kaziranga National Park adds two new Mammal Species - Binturong (Arctictis binturong), and the Small Clawed otter (Aonyx cinera).**

## 8) HIMALAYAN SEROW (**CAPRICORNIS SUMATRAENSIS THAR**)

- There are several species of serows, and all are found in Asia. The **Himalayan serow is restricted to Himalayan region** and are typically found at altitudes between 2,000 meters and 4,000 meters. They are found in eastern, central and Western Himalayas but not in trans-Himalayan region.
- Taxonomically it is a subspecies of the mainland serow (*Capricornis Sumatrensis*).



## 9) GAUR/ INDIAN BISON (BAUS GAURUS)

It is also known as Indian Bison and is a bovine native to South Asia and Southeast Asia. It is the biggest among wild cattles.

IUCN: VU

**Habitat:** Largely confined to evergreen forests or semi-evergreen and moist deciduous forests.

**Historical Distribution:** It occurred throughout mainland south and southeast Asia.

### Present Distribution:

- But today the population is fragmented, with it being extinct from Sri Lanka and Malaysian Peninsula.
- They are largely confined to evergreen forests or semi-evergreen and moist deciduous forests, but also inhabits deciduous forest areas at the periphery.

**Note:** The domesticated form of the gaur is called gayal (*Bos frontalis*) or mithun.



### Distribution in India:

- Western Ghats** in particular Wayanad - Nagarhole - Mudumalai - Bandipur complex constitute one of the most extensive extant strongholds of gaur. Nilgiri forest division is estimated to have a population of more than 2,000.
- Eastern Ghats** also has some population of gaurs in Odisha and Andhra Pradesh.

**Interesting Fact:** The famous drink "Red Bull" is based on a Thai drink 'Gratin Daang', meaning "red gaur".

### ***Bos frontalis (Mithun) - Domesticated form of Gaur:***

**Recent News:** The Food Safety and Standards Authority of India (FSSAI) has recognized the mithun as a '**food animal**' with effect from 1st Sep. With this, the mithun can be commercially farmed and its meat processed for pickles, soups, wafers nd biryani.

Work is on to help farmers and tribal village communities benefit commercially from the sale and processing of Mithun.

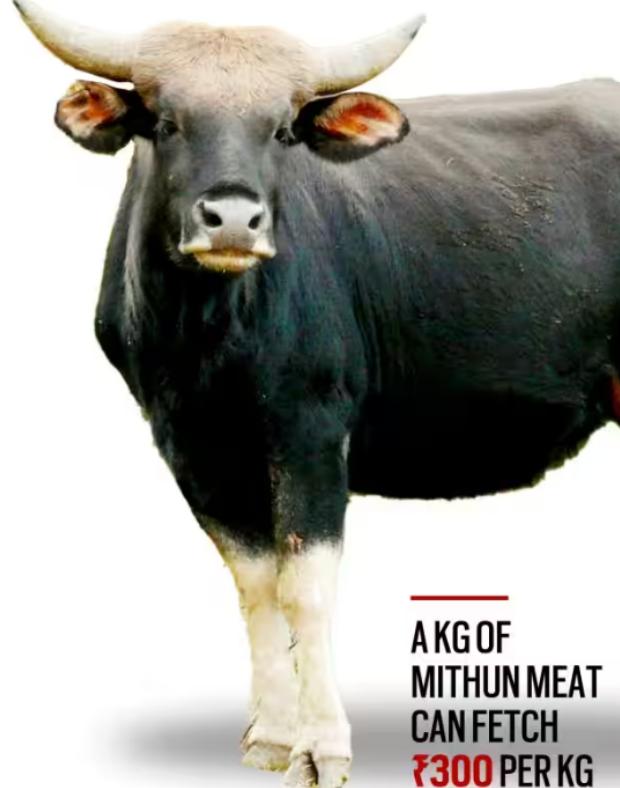
The **Animal** is endemic to Arunachal Pradesh, Nagaland, Manipur and Mizoram. It is semi-domesticated and is reared in free range forest ecosystem. The only supplementary feed that it needs is salt.

It is the **state animal** of both Arunachal Pradesh, and Nagaland.

The slaughter of the mithun is traditionally reserved for special occasions such as festivals or weddings (and now a days - elections)

**Biodiversity Significance:** The "food animal" status can increase the commercial value and may increase the population of Mithun.

### **Mithuns: From farms to the table**



A KG OF  
MITHUN MEAT  
CAN FETCH  
**₹300 PER KG**

## **10) FOUR HORNED ANTELOPES (*TETRACERUS QUADRICORNIS*)**

**Details:** Species of small antelope found in **open forests of India and Nepal**.

It is the only species currently classified in genus Tetracerus. It is the smallest of Asian bovids.

Males are unique among extant animals as they possess four permanent horns.

**Threats:** Loss of natural habitat to agriculture land.

It should drink water regularly to survive.



Conservation status					
Extinct	EW	CR	EN	VU	Least Concern
EX	EW	CR	EN	VU	NT LC

## **11) NILGIRI MARTEN**

**Details:** The Nilgiri Marten is the only species of Marten found in South India. Only species of marten which is considered Vulnerable to extinction.



**Habitat:** Hills of Nilgiris and parts of Western Ghats. Endemic to western Ghats, inhibit areas that are far from human disturbance.

**Threat:** Habitat loss and fragmentation; Hunting for fur

## 12) NILGIRI LANGUR / NILGIRI LEAF MONKEY (TRACHYPITHECUS JOHNII)

- **Endemic to** Southern India. Distributed in southern western ghats - Karnataka, TN and Kerala.
  - It prefers higher altitude and is a canopy dweller. It forages on fruits and vegetables.
- **Threats**
  - **Habitat Destruction:** Deforestation
  - **Poaching:** For fur and Flesh (which is believed to have aphrodisiac properties)



## 13) BARASINGHA OR SWAMP DEER

- **Habitat/Distribution**
  - » It has a very patchy distribution.
  - » There are **three subspecies of the swamp deer**:
    - **Southern Swamp Deer/Hard Ground Barasingha** are found in Central and North India. They have hard hooves and is adapted to the flooded tall grassland habitat in the Indo-Gangetic plain.
      - They are restricted to Kanha National Park and Satpura Tiger Reserve.
    - **Eastern Swamp Deer** are found in Kaziranga (Assam).
    - **Western Swamp Deer** has splayed hooves and is adapted to the flooded tall grassland habitat in the Indo-Gangetic plains.
  - » **IUCN:** VU



## 14) ORIENTAL SMALL CLAWED OTTER AND SMOOTH COATED OTTER

### A) ORIENTAL SMALL CLAWED OTTER / ASIAN SMALL CLAWED OTTER

Smallest otter species in the world, weighing less than 5 Kg. It posses partially webbed feet with short claws, enhancing their hunting skills in aquatic environments. They predominantly inhabit freshwater habitats, sustaining themselves on a fish, crustaceans and mollusk diet.



**Habitat:** Live on mangrove swamp or fresh water wetlands of Bangladesh, Burma, India, South China and South East Asia.

In India, its presence is noted in WB, Assam, Arunachal, Karnataka, TN and some parts of Kerala.

**Threat :** Habitat loss, pollution, trade and hunting.

- Trade is rampant as the pups of both these otters are high in demand in Asian market and can fetch upto \$10,000.

**IUCN:** VU

**CITES:** Appendix-1

**WPA:** Schedule-1 (2022 amendment)

**Recent Development (Jan 2024): Kaziranga National Park adds two new Mammal Species - Binturong (*Arctictis binturong*), and the Small Clawed otter (*Aonyx cinera*).**

## B) SMOOTH COATED OTTER (LUTROGALE PERSPICILLATE)

- It is a species of otter, the only extant representative of the genus Lutrogale.
- The species is found in **most of the subcontinent and eastward in South East Asia**, with a disjunct population in Iraq.
- As its name suggest the fur of the species is smoother and shorter than that of other otters.
- The otter lives in rivers, lakes, peat swamp forests, mangroves and estuaries.
  - It uses swamps as natal den sites and nursery during the breeding season in early winter.
- CITES:** Appendix-1
- WPA:** Schdeule-1



## THE EURASIAN OTTER (IUCN: NT)

Other than oriental small, clawed otter and smooth coated otter, India also has Eurasian Otter.

**About Eurasian Otter:** It is classified as NT on the IUCN red list. It is regarded as a flagship species and indicators of high-quality aquatic habitat.



**Distribution:** it has one of the widest distributions of all palaearctic mammals. Its range covers parts of Europe, Africa and Asia.

In India, it occurs in northern, northeastern and southern India.

Recently, a team of scientists have camera trapped **three Eurasian Otters** - two adults and one sub-adult in the NEERU stream of the Chenab catchment (March 2023)

Neeru river is a tributary of the **Chenab river** and the finding shows that upper stretch of its remain unpolluted.



## 15) ASIAN BLACK BEAR/ MOON BEAR OR WHITE CHESTED BEAR

- **Details:** Medium size bear, largely adapted for arboreal life.
- **Habitat:** Asian Black Bear has wide distribution in the higher elevation of N and NE India and other Southeast Asia.
  - > Out of the **7 subspecies**, 'Himalayan Black Bear, Indo Chinese Black Bear, and Tibetan Black Bear are distributed within the Indian boundaries of its global distribution.
  - > **Himalayan subspecies** is found in Kashmir Himalayan and Sikkim.
  - > **Indochinese subspecies** is distributed in Himalayas along the China Border
  - > **Tibetan subspecies** is found in Nepal and Assam.
  - > Threats: Deforestation and hunting for its body parts.
- **Threats:** Deforestation and hunting for its body parts.
- **WPA:** Schedule-1 (2022 amendment)



## 16) INDIAN SLOTH BEAR (MELURSUS URSINUS URSINUS) – SUBSPECIES OF SLOTH BEAR

- It is one of the eight bear species found in India. It is endemic to Indian sub-continent. They have evolved from ancestor brown bear during the Pleistocene and shares features found in insect-eating mammals.
- **They are unique bears** -> they carry their young on their backs for six-nine months and 50% of their diet is made up of termites and ants. They also feed on honeybee colony and fruits.
- **Population Decline:** In last 3 decades, the population has fallen by 40%-50%.

- **Key threats:**
  - Habitat loss and Fragmentation
  - Poaching
  - Increasing Human Animal conflict:
    - The sloth bear is more inclined to attack man unprovoked than almost any other animal, and casualties inflicted by it are unfortunately very common.
  - In the past, the ethnic group of Kalandars captured these bears and tortured them to perform.
- **Conservation Status**
  - **IUCN:** Vulnerable
  - **WPA:** Schedule 1
  - **CITES:** Appendix II
- **Where are they found in India?**
  - It is the most widespread bear species in India, where it mostly occurs in areas with forest cover, low hills bordering outer ranges of Himalayas from Punjab to Arunachal Pradesh.
  - It is absent in high mountains of Himachal and Jammu and Kashmir, the northwestern deserts of Rajasthan, and a broad unforested swath in south, where Mount Abu WLS is located.
- **Global Distribution:** Sloth bear's geographical range includes **India**, the **Southern lowlands of Nepal**, and **Sri Lanka**. It is regionally extinct in Bangladesh.
  - In Nepal, only a tiny scattering of this species is found.
  - In Sri Lanka a subspecies is found.
  - Thus, **India is the main home** of this species and 90% of the global sloth bear population is found in India.
  - It occurs in wide range of habitats including wet and dry tropical forests, Savannahs, Scrublands, and grassland below 1500 m on the Indian sub-continent

## 17) HIMALAYAN YAK

### Categorization as Food Animal:

- **Background:** The request was submitted by National Research Centre on Yak (NRC-Y) based in Arunachal Pradesh's Dirang in 2021.

**FSSAI's Approval came in Nov 2022.**

### Significance:

- The categorization is expected to help check the decline in the population by making it part of the conventional milk and meat industry.
- It will also contribute to development of local entrepreneurship.
- Yak Milk and Meat are nutrient loaded:



**Yaks** are traditionally reared under a transhumance system which is primitive, unorganized and full of hardship. But the Yak Population in the country had been decreasing at alarming rate (It has dropped by 25% to 58,000 in 2019 from the 2012 numbers).

The mains reason is the less remuneration from the bovid. It is mainly because Yak milk and meat are not a part of

- Yak Milk has 78-82% of water; 7.5-8.5% of fat; 4.9 - 5.3% protein, 4.5-5.0% lactose and 12-13% of solids-not fat.
- Yak Meat is also lean with 21.7% protein and 1.5% crude fat.

the conventional dairy and meat industry. Thus, there sale is limited to local consumers.

IUCN: VU

CITES: Appendix-1

WPA: Schedule-1

## 9. NEAR THREATENED MAMMALS

### 1) ASIAN WILD ASS / KHUR (EQUUS HEMIONUS KHUR)

- Locally known as **GHUDKHAR**
- **Past Distribution:** Once extended from western India, southern Pakistan, Afghanistan, Southeastern Iran etc.
- **Today, Distribution:**
  - Last refuge lies in the **Indian Wild Ass Sanctuary, Little Rann of Kutch.**
- **Conservation Status**
  - IUCN: NT (was moved from EN to NT in 2016)
  - WPA: Schedule 1 (2022 amendment)
- **Threat**
  - **Diseases**
    - In 1958-60, surra disease, caused by Trypanosoma evansi (a Protozoa) and transmitted by horse flies.
    - In 1961, outbreak of south African horse sickness.
  - **Other Threats**
    - Habitat degradation due to salt activities
    - Invasion of Prosopis juliflora shrub
    - Encroachment and grazing by the **Maldhari**
    - Uninformed release of water from Sardar Sarovar dam impacting short grasslands on which it depends.
    - **Human wild-life conflict increasing** (now 1/3rd of the Wild Ass Population lives outside the protected area)



### A) BANNI GRASSLAND

- The grassland consists of an area of 2,500 sq km in the Kutch district. It is the largest natural grassland in the Indian subcontinent.
- **In the past** it was among Asia's finest grasslands, with nearly 200 varieties of vegetation.
- The grassland has degraded over the years, owing largely to an invasion of an alien woody species - **Prosopis Juliflora**, known locally as **Gando baval**.

## B) CHARI DHAND WETLAND CONSERVATION

This is a seasonal reserve wetland and only gets swampy during a good monsoon, receiving water from north flowing rivers as well as the huge catchment areas of many surrounding hills.

## 2) CHIRU/ TIBETAN ANTELOPE

- **Details:** The Tibetan antelope is a medium sized bovid native to the Tibetan Plateau.
- **Habitat:** Tibet Cold desert.
  - In India, it is found in the Ladakh region besides some places in Himachal Pradesh bordering Tibet, Sikkim and Nepal.
- **Threat**
  - Hunting
    - » Soft and warm wool known as **shahtoosh** (usually obtained after death).
    - » Magnificent horns
    - » Meat
- **Protection**
  - Included under Schedule-I of Wildlife (Protection) Act, 1972.
    - It gets highest degree of protection.
    - Hunting of these species, and trade of its parts and products, including shawls made of Chiru wool are prohibited under the Act.
  - CITES
    - Selling or owning Shahtoosh was made illegal in all countries that signed the CITES in 1975.
- **In 2017, Parliamentary Panel on Environment and Climate Change headed by Congress leader Renuka Chowdhury has recommended lifting ban, allowing weaving and trading in the world's most expensive fabric, shahtoosh, made from the fine fur undercoat of the endangered Tibetan Antelope known as "Chiru".**
  - It recommended that MoEF&CC should conserve and breed the Chiru goat and vast tract of land should be utilized for conserving the Chiru goat.
  - These goats can be given to shawl makers for collecting hair. This would not only increase the number of goats but would also help in sustainable livelihood opportunities of the people of Jammu and Kashmir.
  - China and Mongolia are already doing captive breeding of these animals.
  - **Currently, Shawl's sale or possession is banned in India and in many countries**
- **But in 2018, MoEF&CC refused to allow captive breeding** as this species have poor survival rate in captivity.



### 3) MARKHOR

- **Distribution:** Northeastern Afghanistan, Northern Khyber Pakhtunkhwa, Jammu and Kashmir, South Tajikistan, and Uzbekistan.
- **National Animal:** The markhor is also **national animal of Pakistan.**
- **Status:** Till 2015, IUCN classified it as endangered, but now it has been down listed to Near Threatened, as their numbers have increased in recent years by an estimated 20% for last decade.
- **Threats**
  - **Hunting:** For meat and for its twisted horns.
  - **Armed Conflict**
  - **Habitat loss**



### 4) SLENDER LORIS (GREY SLENDER LORIS)

- **Details**
  - » Slender Loris are small nocturnal animals. They are arboreal in nature as they spend most of their lives on trees.
  - » **IUCN status:** NT
  - » WPA: Schedule-1
- **Benefits for farmers:**
  - The species act as a biological predator of pests (insects) in agricultural crops and benefits farmers.
- **Least Known behaviour:** The behavior of the gray slender loris is amongst the least known of the primates, despite the relatively large number of studies undertaken since 2000s.
- **Four Subspecies:**
  - Malabar Slender Loris
  - Mysore Slender Loris
  - Northern Ceylonese Slender Loris
  - Highland Slender Loris
- **TN notifies India's first slender loris sanctuary (Oct 2022)**
  - The state government notified 'Kadavur Slender Loris Sanctuary' under section 26(A)(1)(b) of Wildlife (Protection) Act, 1972.
  - **The Kadavur Slender Loris Sanctuary** is to cover 11,086 hectares in Karur and Dindigul districts.
- **Note:** Red Slender Loris are native to Sri Lankan rain forests and are EN in the IUCN red list.
- **Note:** In recent times, TN government has also notified India's first Dugong Conservation Reserve in Palk Bay, the Kazhuvedi Bird Sanctuary in Villupuram, the Nanjarayan Tank Bird Sanctuary in Tiruppur, and a fifth elephant reserve at Agasthyamalai in the Tirunelveli district.



## 10. OTHER MAMMALS IN NEWS

## 1) NILGAI (BOSELAPHUS TRAGOCAMELUS)

Nilgai is the largest Asian Antelope. It is the sole member of genus Boselaphus.

It shows sexual diamorphism - Females and juveniles are orange to tawny, adult males have a bluish grey coat. Only males possess horn.

It is a diurnal animal (i.e., it is active mainly during daytime).

**Distribution and habitat:** Nilgai prefer areas with short bushes and scattered trees in scrub forests and grassy plains. Major population occur in the Indian and Nepali Terai. Pakistan and Bangladesh also have some population.

Other than **Terai region of India**, it is also found in Haryana, Rajasthan, Madhya Pradesh, Chhattisgarh, Maharashtra, Andhra Pradesh etc.

It is also common in agricultural land, but rarely in dense forests. It is a **herbivore** and prefers grasses and herbs; woody plants are commonly eaten in the dry tropical forests of India.

The nilgai can survive for long periods without water and doesn't drink regularly even in summers.



IUCN: LC

WPA: Schedule-II (2022 amendment)

## 2) BLACK BUCK (ANTILOPE CERVICAPRA)

### - Details:

- Black Buck, also known as Indian Antelope, is an antelope found only on Indian subcontinent in Nepal, Pakistan and India.
- In India it is found in Punjab Haryana in North to TN in south, and Rajasthan-Gujarat in the west to Odisha in the east. But it is **not found in very vast herds** anywhere.
- **Details:** Only living species of genus antelope. It shows sexual dimorphism.
- **Protection**
  - IUCN: LC
  - WPA: Schedule -1 (i.e., highest protection)
- **Habitat:** Grassland
- **Distribution:** Today, Black buck population is confined to area of MHA, Orissa, Punjab, Rajasthan, Haryana, Gujarat, Andhra Pradesh, Karnataka, and Tamil Nadu.
  - They occur in protected areas of India.



- **Blackbuck National Park, Velavadar** in Bhavnagar, Gujarat.
    - Highest numbers here
  - **Point Calimere Wildlife and Bird Sanctuary**, Nagapattinam TN.
  - **Tal Chhappar Sanctuary**, Churu District, Rajasthan.
  - **National Chambal Sanctuary**, near the Tripoint of Rajasthan, MP and Uttar Pradesh.
  - **Keoladeo National Park**, Bharatpur, Rajasthan. Formerly known as the Bharatpur Bird Sanctuary.
  - **Rehekuri Blackbuck Sanctuary** in Ahmednagar district Maharashtra.
  - **Ranibennur Blackbuck Sanctuary**, Haveri District Karnataka.
  - **Guindy National Park**, Chennai, TN
- In Rajasthan, there are many areas such as Guda Vishnoiyan, Dhawa Doli and Kankania (where actor Salman Khan allegedly hunted in 1998), that are **protected by the Bishnoi Community** who consider blackbuck sacred. Similarly in parts of Haryana and Punjab a few thousand black bucks are surviving in Bishnoi dominated areas.
- **Threat:**
- Poaching, habitat destruction, habitat fragmentation, urbanization, and neglect are the major causes for disappearance of Blackbuck.
  - A new menace is the free ranging village dogs which now roam all over India killing Blackbuck, Chinkara, Nilgai etc.
  - Excessive hunting for meat and sporting trophies, as well as habitat loss.

### 3) PASHMINA GOAT/ CHANGTHANGI GOAT

Changthangi or Pashmina Goat is a special breed of goat indigenous to the high altitude regions of Ladakh. They are raised for ultra-fine Kashmere wool, known as Pashmina, once woven. The textile is home spun and were first woven in Kashmir.

These goats are generally domesticated and reared by nomadic communities called the Changpa in the Changthang region of Great Ladakh. They live in tough and hostile terrain of **Changthang** and are solely dependent on Pashmina for livelihood. At present there are around 2,400 families rearing around 2.5 lakh goats.

**Ladakh produces around 50 MT of the finest grade Pashmina in the world (12-15 microns).**

**IUCN: LC**

**In 2019, PASHMINA products have received BIS Certifications.**

BIS has published an Indian standard for identification, marking and labelling of Pashmina products to certify its purity.



### Significance of BIS Certification

- It will discourage counterfeit or substandard products presently mislabeled and sold as genuine Pashmina in the market.
- It will also ensure better prices for the goat herding community in Ladakh as well as Local handloom artisans producing genuine Pashmina products. They are till now disadvantaged due to rampant marketing malpractices.

## 11. MARINE MAMMALS

### 1) FRESH WATER DOLPHINS

- Fresh Water Dolphins of India: Ganga River Dolphin ('Susu')
  - » Habitat/ Distribution: India, Bangladesh, Nepal.
- At present World has 7 Fresh Water Dolphins
  - » Amazon River Dolphin (*Inia geoffrensis*) (VU)
  - » Bolivian River Dolphin (*Inia boliviensis*) (VU)
  - » Ganges River Dolphin (*Platanista gangetica*) (EN)
  - » Indus River Dolphin (*Platanista gangetica minor*) (EN)
  - » Irrawaddy River Dolphin (*Orcaella brevirostris*) (EN) (not a true freshwater dolphin can be found in brackish water also)
    - It traverses three rivers in South and Southeast Asia: the Irrawaddy, the Mahakam, and the Mekong.
  - » The Yangtze Finless Porpoise (*Neophocaena asiaeorientalis*) (CR)
    - Note: The difference between a dolphin and a porpoise has to do with their appearance: dolphins have longer snouts, bigger mouths, more curved dorsal fins, and longer, leaner bodies than porpoises
  - » Tucuxi from Amazon and Orinco river basin (*Sotalia fluviatilis*) (EN)
    - With the latest update it was moved from DD to EN, which has effectively led to all the world's freshwater dolphin species being listed as threatened.
- Species in the subcontinent: Species in Indian Subcontinent are divided into two subspecies. (Recent studies have shown that they are two separate species)
  - » Ganges River Dolphin (*Platanista gangetica gangetica*) ~ 3000 individuals
    - Assam: 962 (based on the Jan-March 2018 assessment)
    - UP: 1,272 (assessment in 201
  - » Indus River Dolphin (*Platanista gangetica minor*) ~ 1500 individuals.
- Note: Both sub-species are effectively blind.

### 2) PROJECT DOLPHIN

- Details

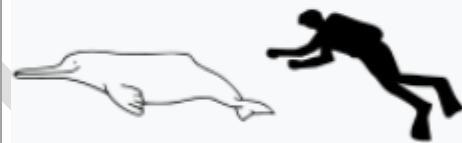
- The plans about the project were announced by PM Modi during his Independence Day speech in Aug 2020.
- It will be aimed at saving both river and ocean dolphins.
- The project will be on lines of Project Tiger which has helped in increasing tiger population. Such an initiative got in-principal approval in December 2019 itself, at the first meet of the National Ganga Council headed by the PM.
- The proposed project is aimed at saving both river and marine dolphin.

## A) GANGES RIVER DOLPHIN

- **Conservation Status:**
  - » IUCN: Endangered
  - » WPA: Scheduled 1 (even after the 2022 amendment)
  - » CITES: Appendix 1
  - » CMS: Appendix 1
- **Habitat/Distribution:** Ganges and Brahmaputra River, and their tributaries in India, Bangladesh and Nepal.
  - » In India, distributed in Uttar Pradesh, Bihar, Jharkhand, WB, Rajasthan, Madhya Pradesh and Assam.
  - » Note: Various examples of the dolphin found in rivers of Odisha.
- **National Aquatic Animal of India.**
- **WB** got India's first river dolphin reserve on Hoogly river.
- **Key threats**
  - » Loss of habitat due to increased development work on the river.
    - National Waterway Project is threatening Gangetic Dolphins: Conservationist
  - » Rising salinity in Sundarbans is also causing a decrease in population of Gangetic Dolphin.
  - » **Biological Resource Use**
    - Fishing & harvesting aquatic resources.
    - Depletion of prey base
    - Accidental mortality in fishing net



Ganges river dolphin leaping out of the water



Size compared to an average human



### Important Steps for Protection:

- » **Project Dolphin:** In his Independence Day speech on 15th Aug 2020, PM Modi announced Project Dolphin on lines of the Project Tiger and Project Elephant. It was officially launched in 2021.
  - The project will focus on both river dolphins and sea dolphins and strengthen biodiversity, create employment, and attract tourism.
- » **National Ganga River Dolphin Day** - 5th Oct

<ul style="list-style-type: none"> <li>» Accidental deaths due to vessel propellers</li> <li>» <b>Invasive &amp; other problematic species</b></li> <li>» <b>Pollution</b> <ul style="list-style-type: none"> <li>▪ Domestic, industrial and agricultural pollution</li> </ul> </li> </ul> <p>- <b>Other features:</b> Essentially Blind - Hunt by ultrasonic sound</p> <p>- <b>Why its crucial to save Gangetic Dolphin?</b></p> <ul style="list-style-type: none"> <li>» Aquatic life is an <u>indicator</u> of the <u>health of the river ecosystems</u>. Since the Gangetic Dolphin is at the <u>top of the food chain</u>, protecting the species and its habitat will ensure <u>conservation of aquatic lives of the river</u>.</li> </ul>	<ul style="list-style-type: none"> <li>• It was on this day, the then PM Dr. Manmohan Singh, while presiding over the meeting of NGRBA, <u>declared Ganga Dolphin as the National Aquatic Animal</u>.</li> </ul> <p>» <b>Declared National Aquatic Animal</b></p> <p>» <b>Protected Areas:</b></p> <ul style="list-style-type: none"> <li>• <b>Vikramshila Sanctuary (Bihar)</b> - 1991</li> <li>• <b>Hastinapur Sanctuary (UP)</b> - Proposed</li> </ul>
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#### RESCUE OF GANGETIC RIVER DOLPHIN FROM ODISHA (JAN 2024)

- A fisherman in Odisha's Balasore district captured a rare and endangered Gangetic dolphin in the Jalaka river on 18th Jan 2024. Forest authorities then rescued the dolphin from a pond locals put it in and are planning to release it into Budhabalang river soon.

#### REPORT: 'RESCUING GANGES RIVER DOLPHINS FROM IRRIGATION CANALS IN UTTAR PRADESH, NORTH INDIA, 2013-2020 (OCT 2023)

- The publication says that dams and barrages have severely affected river habitat and dolphins have moved into irrigation canals where they were at risk of injury or death due to multiple factors, such as rapidly receding waters, heat stroke and human interference.

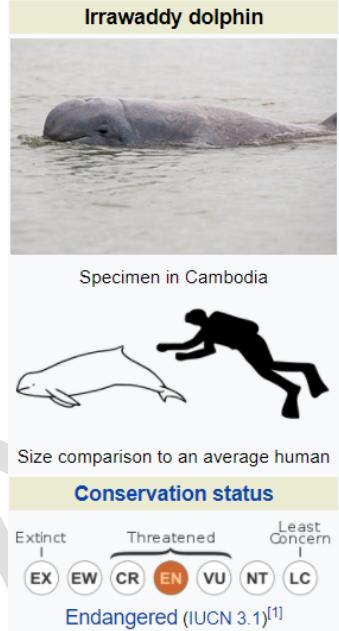
### B) INDUS RIVER DOLPHIN (EN)

- Habitat/Distribution: Indus River in Pakistan and its Beas and Sutlej tributaries.
- Also called **Bhulan**

### 3) OCEANIC DOLPHINS

#### A) IRRAWADY RIVER DOLPHIN

- It is an eutrophic species of oceanic dolphin found in discontinuous sub-populations near sea coasts and estuaries and rivers in parts of Bay of Bengal. It is also found in South-east Asia.
- **Protection Status**
  - IUCN: EN
  - WPA: Schedule 1
  - CITES: Appendix 2



## B) VAQUITA PORPOISE

- **Why in news?**
  - » The plight of the vaquita forces International Whaling Commission to issue first extinction alert (Aug 2023)

**Drastic Decline in Population:** The Species global population is down to only 10. The species has seen a 98% decline in population in 2 decades.

- » It is the world's smallest cetacean and the most endangered marine mammal.
- » IUCN: CR

**Where is it found?**

- » They are all found in northern part of the Gulf of California or Sea of Cortez.
- » It has smallest range of any whale, dolphin or porpoise and live in small 1500 square mile area in Mexico's upper Gulf of California, near the town of San Felipe.



**Extinction Alert:** The first extinction alert by IWC was released on 7th Aug 2023. it is to encourage wider recognition of the warning signs of impending extinctions, and to generate support and encouragement at every level for the actions needed now to save the vaquita.

The vaquita is caught as bycatch in gillnets meant for totoaba, a fish the swimbladders of which are priced in Chinese cuisines.

## 4) HERBIVOROUS MARINE MAMMALS

### F) DUGONG (DUGONG DUGON)

- **Why in news?**

- World Dugong Day - 28th May

- **About Dugong**

- Dugong is commonly known as **sea-cow** as it is a herbivorous marine mammal. It is a medium sized marine mammal which is fighting for its survival in Indian waters.
- **IUCN: VU, WPA (Schedule - 1), CITES (Appendix - 1)**
- **Habitat:** Swamps, rivers, estuaries, marine wetlands, and coastal marine waters.
- **Threats:** Hunting (meat and oil), habitat degradation, and fishing related fatalities.
- **Distribution in India** - According to a study by Zoological Survey of India (ZSI), there are only 250 Dugongs left in India.
  - Marine National Park in Gulf of Kutch, Jamnagar, Gujarat.
    - First Marine National Park of India.
    - Only remaining population of Dugong in Western India.
  - Gulf of Mannar Marine National Park and Palk Strait
    - Here population is seriously depleted.
  - Andaman and Nicobar Islands
    - **State Animal** of the territory.



## G) MANATEES (VU) - ALSO KNOWN AS SEA COWS

- **Habitat/Distribution:** Caribbean Sea, Gulf of Mexico, the Amazon Basin, and West Africa
- **Threat:** Coastal development, red tide, hunting.
- Also known as **West Indian Manatees** (referring to West Indies)



## 5) NOTE: WHALES, DOLPHINS, AND PROPOISES ARE ALL MAMMALS

- In fact Whales, Dolphins and Porpoises belong to the Cetacean family and share several physiological traits with one another including blowholes, breathing oxygen, maintaining constant awareness of their breathing and being able to dispose of additional salt that are taken in by their body when they consume food.
- As marine mammals they are also warm-blooded animals that give birth to their young and produce milk to feed their babies.

## 12. FEW UNIQUE MAMMALS

### 1) FLYING MAMMAL

- **Note:** Bats are the only flying mammal.
- **Bats in India**
  - i. India is home to 130 known bat species
- **Important Species:**

#### Indian Flying Fox (Pteropus medius)

It is one of the world's largest bat species. It is also known as the fruit bat or great Indian Fruit Bat.

The bat is named so due to its fox like appearance, distinguishable long snout, and large eyes.

**Important Disease vector:** It is capable of transmitting several viruses to humans.

IUCN: LC



### 2) EGG LAYING MAMMALS (MONOTREMES)

- The unique feature of monotremes a subdivision of mammal, is that monotremes lay eggs rather than giving birth to the young ones.
- **Only 5 living monotremes**
  - Duck Billed Platypus
  - 4 species of Spiny Anteaters (also known as echidna)
- **Habitat**
  - Australia and New Guinea Region

## A) PLATYPUS

- A semi aquatic animal - endemic to **eastern Australia including Tasmania**.
- 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 is poisonous - its venom can kill a small dog or cause excruciating pain among humans.



Conservation status



Least Concern (IUCN 3.1)<sup>[2]</sup>

## B) ECHIDNAS (SPINY ANT EATERS)

- **Habitat / Distribution:** Australia and New Guinea
- In Echidnas eggs are 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.



Western long-beaked echidna

Note: Organisms which roll up to protect vulnerable parts

- Hedgehog
- Pangolin

### OTHER SPINY MAMMALS

**Hedgehog** - they are small, spiny mammals that roll themselves up into a tight ball when threatened



Armadillos - they are small armored mammals that can roll themselves up into a ball to protect themselves



- Echidnas
- Pangolins

## 6) MARSUPIALS

- Group of mammals commonly thought of as pouched mammals (like the **wallaby and Kangaroo**). They give live birth, but they don't have long gestation times like placental mammals. Instead, 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.
- Like other mammals, the marsupials are covered with hair. Mother nurse their young - a young Kangaroo may nurse even when it has grown almost to the mother's size.
- **E.g. of Marsupials**

### A) KANGAROO (LC)

### B) KOALAS

- The Koala is an arboreal, herbivorous marsupial native to Australia.
- It is found in coastal areas of mainland's eastern and southern regions, inhabiting Queensland, New South Wales, Victoria, and South Australia. It is a major attraction for tourists in Australia.
- **Physical features:** It is easily recognizable by its stout, tailless body, and large head with round, fluffy ears and large spoon - shaped nose.
- **Conservation Status:**
  - IUCN: VU
- **Key threats faced:**
  - Habitat destruction due to agriculture, urbanization and forest fires.



### C) THYLACINE (TASMANIAN TIGER, TASMANIAN WOLF)

- Tasmanian government has recently released a document, reporting eight sightings of a Tasmanian tiger from across the continent in past three years (Nov 2019)



## D) TASMANIAN DEVIL

### - Details

#### ▫ Current distribution:

- Till recently, it was only found in Island state of Tasmania, but it has now been reintroduced to New South Wales in mainland Australia, with a small breeding population.
- They had become extinct from Australian mainland thousands of years ago most probably by Wild Australian Dogs known as dingoes.
- The birth of these babies is a baby step towards bringing Tasmanian devil back in Australia's wilderness.
- It remains unclear how the animals would fare outside the fenced 1,000 acre wildlife preserve where they were born.

Other Examples of Marsupials: Wallabies, possums, opossums, wombats etc.

