

An overview of Indian Wildlife & its Conservation



Outline

- 1110 to 1205h
- 1210 to 1305 h

- Part I : Introduction
- Part II : A visual journey through Indian Wilderness
- Part II : Threats & Conservation

- Discussion mode...







India is one of the seventeen mega-biodiversity countries of the world

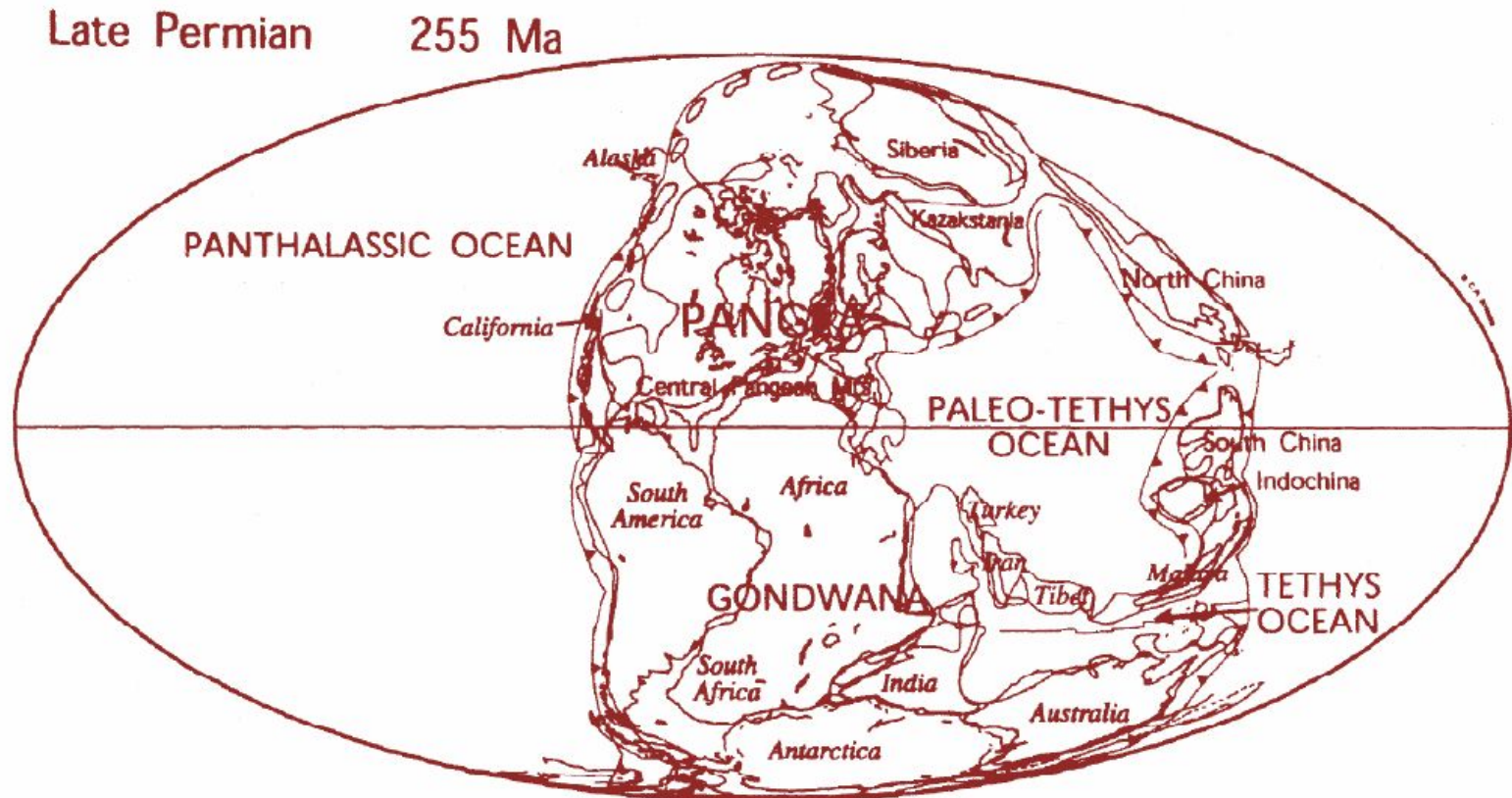
Mexico, Colombia, Ecuador, Peru, Venezuela, Brazil, USA, Congo, South Africa, Madagascar, China, India, Malaysia, Indonesia, Philippines, Papua New Guinea, and Australia.

One of the five mega diversity countries in Asia
(India, Philippines, Malaysia, Indonesia, China)

Mega diverse countries are that contain as much as 7-8% per cent of the world's species.

Distribution of Flora and Fauna

The dramatic geological history of the Indian subcontinent has had profound effects on regional climates and biota.



All the present land masses formed one huge super continent- **Pangea** in the past,

(Source: Chatterjee and Scotese, 1999)

The Indian plate separated from Africa along with Madagascar in the Middle Jurassic *ca.* 160 Ma, then from Madagascar in the mid-Cretaceous *ca.* 90 Ma, moving at the remarkable rate of 15–25 cm/y before colliding into Asia in the early Cenozoic, uplifting the Himalayas.

Middle Jurassic 180 Ma

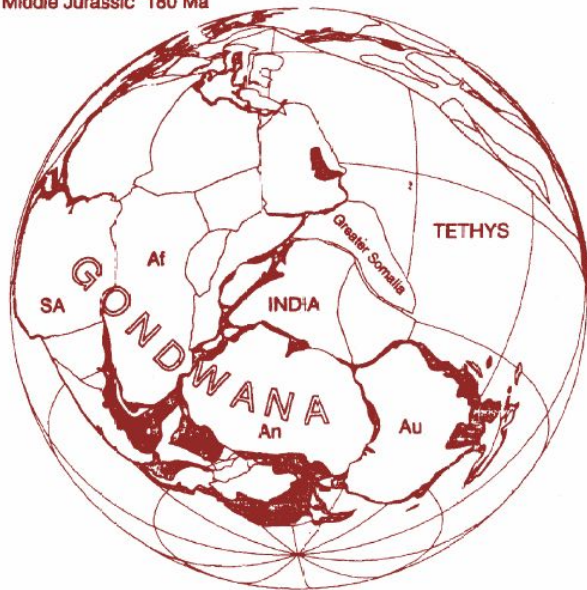


Fig. 6 Palaeogeographic reconstruction of Gondwana showing the India's position during the Middle Jurassic (180 Ma) period.

Late Jurassic 160 Ma

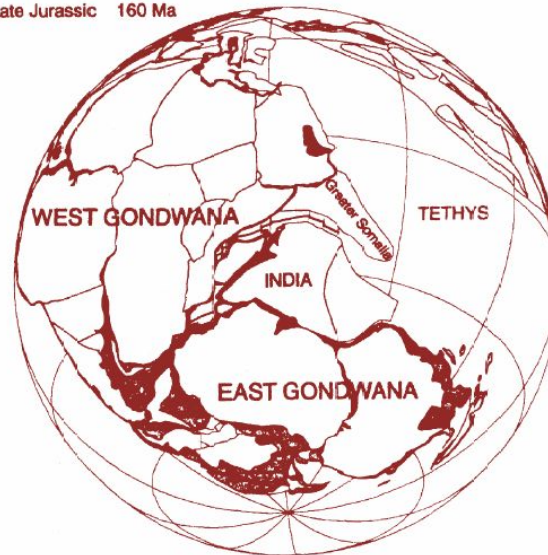


Fig. 7 Palaeogeographic reconstruction showing the initial breakup of Gondwana into western and eastern components during the Late Jurassic (160 Ma) period. Indo-Madagascar-Seychelles became part of the eastern Gondwana. New Mid-ocean rifts occur between Antarctica and Mozambique, between Madagascar and Tanzania, and between northwest India and Madagascar. Migration routes remain open between all parts of Gondwana.

Cretaceous-Tertiary Boundary 65 Ma

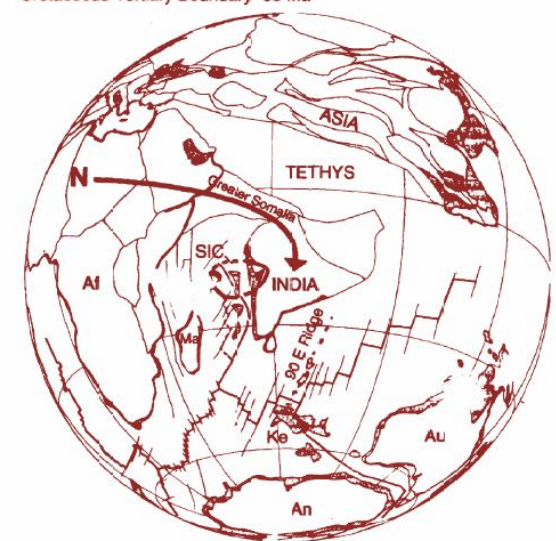


Fig. 14 Palaeogeographic reconstruction showing the positions of Gondwana continents during the Cretaceous-Tertiary (KT) boundary when dinosaurs and two-thirds of marine organisms were wiped out. The Shiva crater at the India-Seychelles rift margin and the Chicxulub crater in Mexico have emerged as prime candidates for the KT impact sites.

Present-day

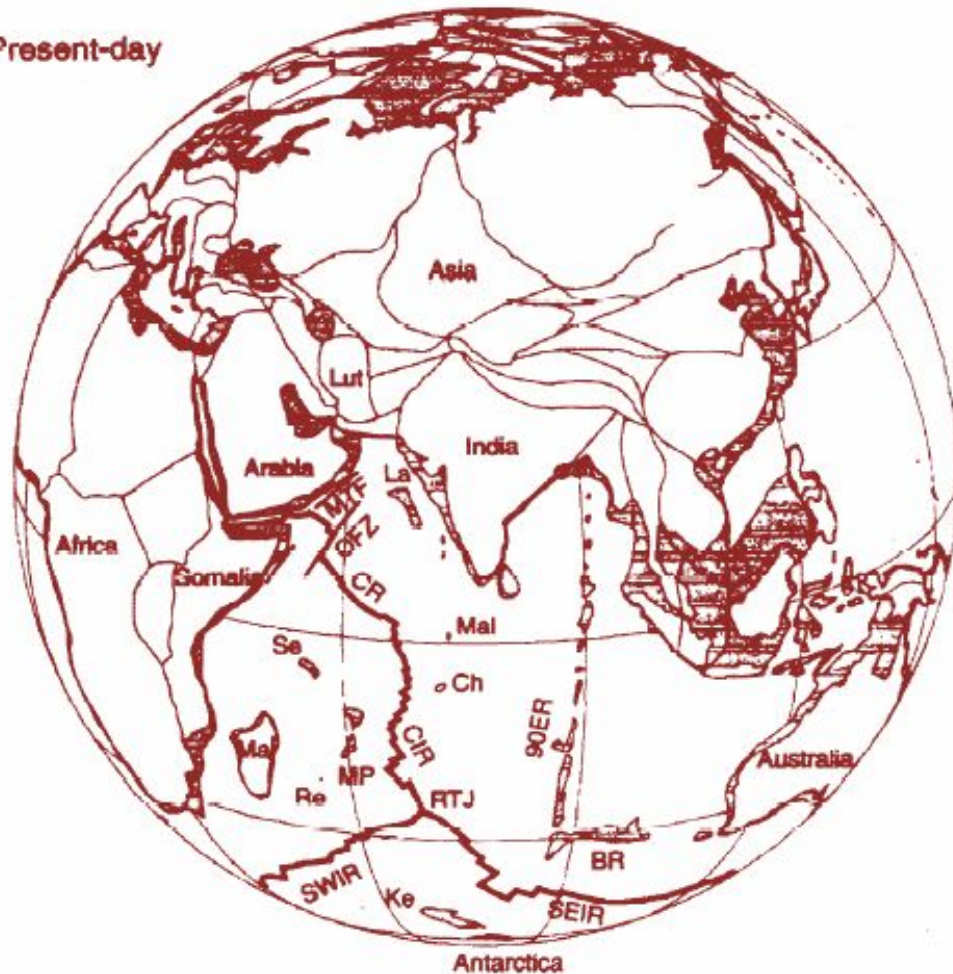


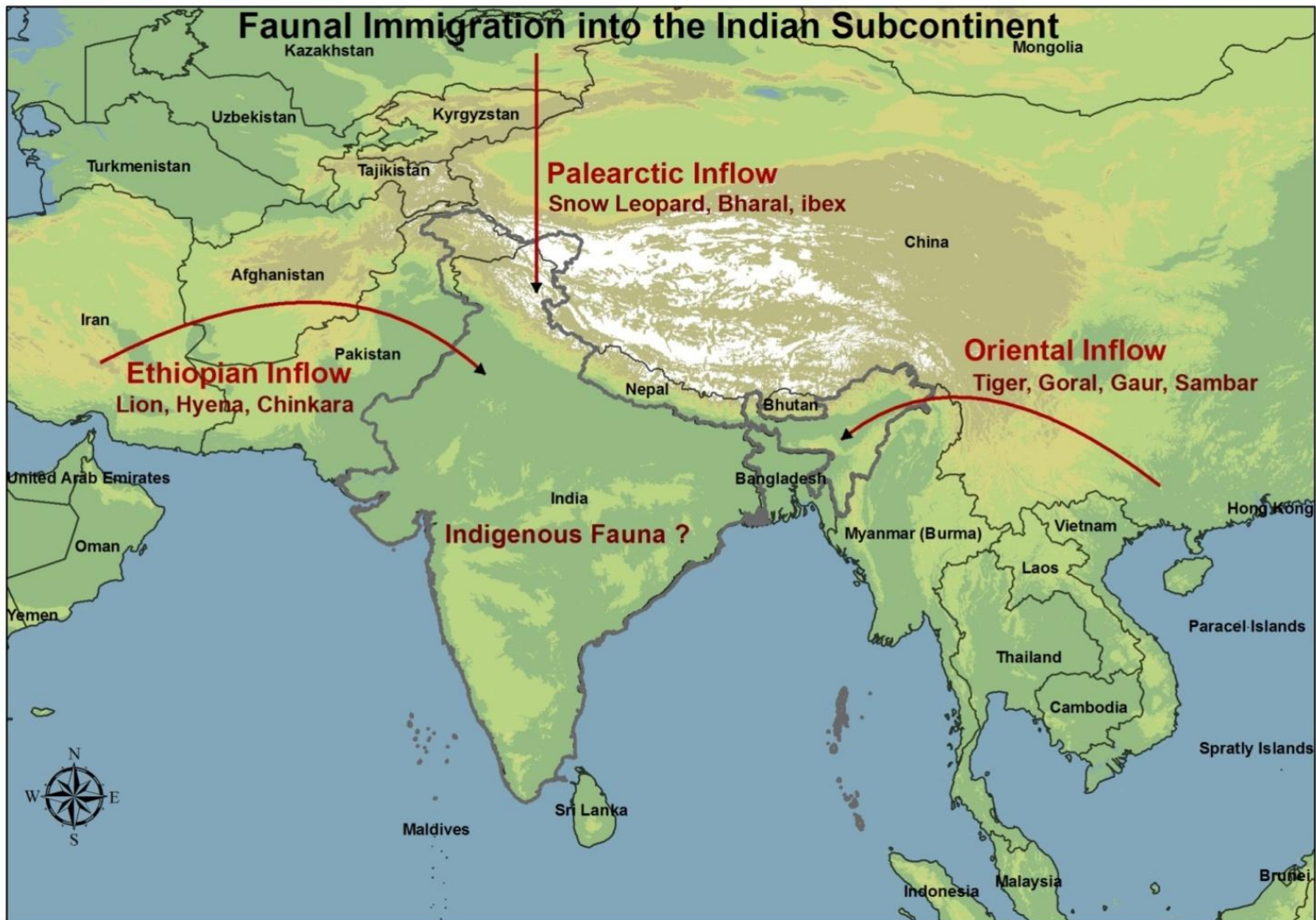
Fig. 1 Present-day plate Map of the Indian Ocean illustrating the location of mid-ocean rifts (heavy black line) and submarine plateaus. Abbreviations: BR, Broken Ridge; CH, Chagos; CIR, Central Indian Ridge; CR, Carlsberg Ridge; KE, Kerguelen Plateau; LA, Laccadive; MA, Madagascar; MAL, Maldives; MTF, Masirah Transform Fault; 90ER, Ninetyeast Ridge; SE, Seychelles.

The present biota of India, have elements from Africa, Madagascar, and often the Seychelles (eg: animal taxa boiod snakes, killi fishes)

Plant taxa include two genera of trees related to figs as well as the family Dipterocarpaceae.

(Source: Chatterjee and Scotese, 1999)

- India lies at the confluence of three regions
- Its fauna and flora includes African, European, Eurasian and Mediterranean elements



Species that have reached Sri Lanka.....

Rhododendron arboreum



Mesua ferrea : National tree of Sri Lanka



***Elephant, mouse deer, chital, sambar, rusty-spotted cat, jungle cat, leopard
but not the Tiger !***

Factors contributing to India's biodiversity richness

- Variations in elevation (from sea level to nival zone).
- Physiography, climate and geography of India.
- The protection of wildlife -tradition in Indian history.
- Protected Area (PA) network .
- Cultural and religious sentiments of the people.
- Conservation movements.
- Enabling laws and policies.
- Vegetarianism (largely).



Angiosperms: 15000-16000

Butterflies: 1500

Fishes: 2546

Amphibians: 271

Reptiles: 447

Birds: 1302

Mammals: 425

- *26 recognized endemic centres for flowering plants*
- *30% world's flora*
- *7.31% global fauna*

Notable wildlife values of India

- India harbours more than half the tiger (ca. 1700) and Asian elephant (ca. 25,000) population.
- Nearly 80 % of the one horned rhino population (ca. 2200).
- Only subcontinent to have wild buffaloes, swamp deer, Asiatic wild ass.
- Exceptional mountain ungulate diversity : 19 species.

Many sub-species occur as single populations

Lion (*Panthera leo persica*),

Hangul or Kashmir stag (*Cervus elaphus hanglu*),

Manipur brow-antlered deer (*Cervus eldii eldii*),

Hard ground Barasingha (*Rucervus duvaceli branderi*)







Protected Area Network of India

Protected Areas (771) represent (162099.47 km²) or 4.93% geographical area of India

National Parks: 104

Wildlife Sanctuaries: 544

Conservation Reserves: 77

Community Reserves: 46

Tiger Reserves



Project Tiger was launched in the year 1973. Starting from nine (9) reserves in 1973-2016 the number is grown up to fifty (50), covering an area of 71027.10 sq.km in 18 states.

RAMSAR Wetland sites



26 RAMSAR Wetland sites covering an area of 12,119 sq.km

Elephant Reserves



- ❑ PROJECT ELEPHANT was launched by the Government of India in the year 1992 as a Centrally Sponsored Scheme being mainly implemented in 16 States / UTs , viz. Andhra Pradesh, Arunachal Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, Orissa, Tamil Nadu, Tripura, Uttarakhand, Uttar Pradesh, West Bengal.
- ❑ 32 ERs in 10 landscapes covering an area of 69,582.80 sq.km.

Natural World Heritage Sites



7 Natural World Heritage Sites (GHNP, Nanda Devi and Valley of Flowers, Bharatpur, Kaziranga, Manas, Sunderbans, W.Ghats) and 1 Mixed site (Khangchendzonga National Park)

Important Coastal and Marine Biodiversity Areas (ICMBAs)



106 sites (62 in WC and 44 in EC) have been identified and prioritized as Important Coastal and Marine Areas (ICMBAs) by the Wildlife Institute of India. 22 ICMBAs have been prioritized for immediate conservation action by upgradation to Protected Areas under categories such as Conservation or Communities Reserve to increase participation of the local communities in governance.

Important Bird Areas (IBAs) in India



The IBA programme of Birdlife International aims to identify, monitor and protect a global network of IBAs for conservation of the world's birds and associated biodiversity. The Bombay Natural History Society (BNHS; www.bnhs.org) and Birdlife International have identified 467 IBAs in India (Islam and Rahmani, 2004). Forty percent of these IBAs fall outside the PA network and thus form an important tool for landscape-level conservation planning.

Key Biodiversity Areas

- ❑ Key Biodiversity Areas (KBAs) is an umbrella term commonly used to include areas that contribute to the global persistence of biodiversity, including vital habitat for threatened plant and animal species in terrestrial, freshwater and marine ecosystems.
- ❑ Globally KBAs are designated based on 11 criteria defined under five broad categories of threatened biodiversity; geographically restricted biodiversity; ecological integrity; biological processes; and, irreplaceability.
- ❑ The criteria for designating a site as KBA have been described in the document "The Global Standard for the Identification of Key Biodiversity Areas (2016)" by International Union for Conservation of Nature (IUCN).
- ❑ IUCN identifies 531 KBA sites in India as on July
- ❑ <http://www.keybiodiversityareas.org/home>].

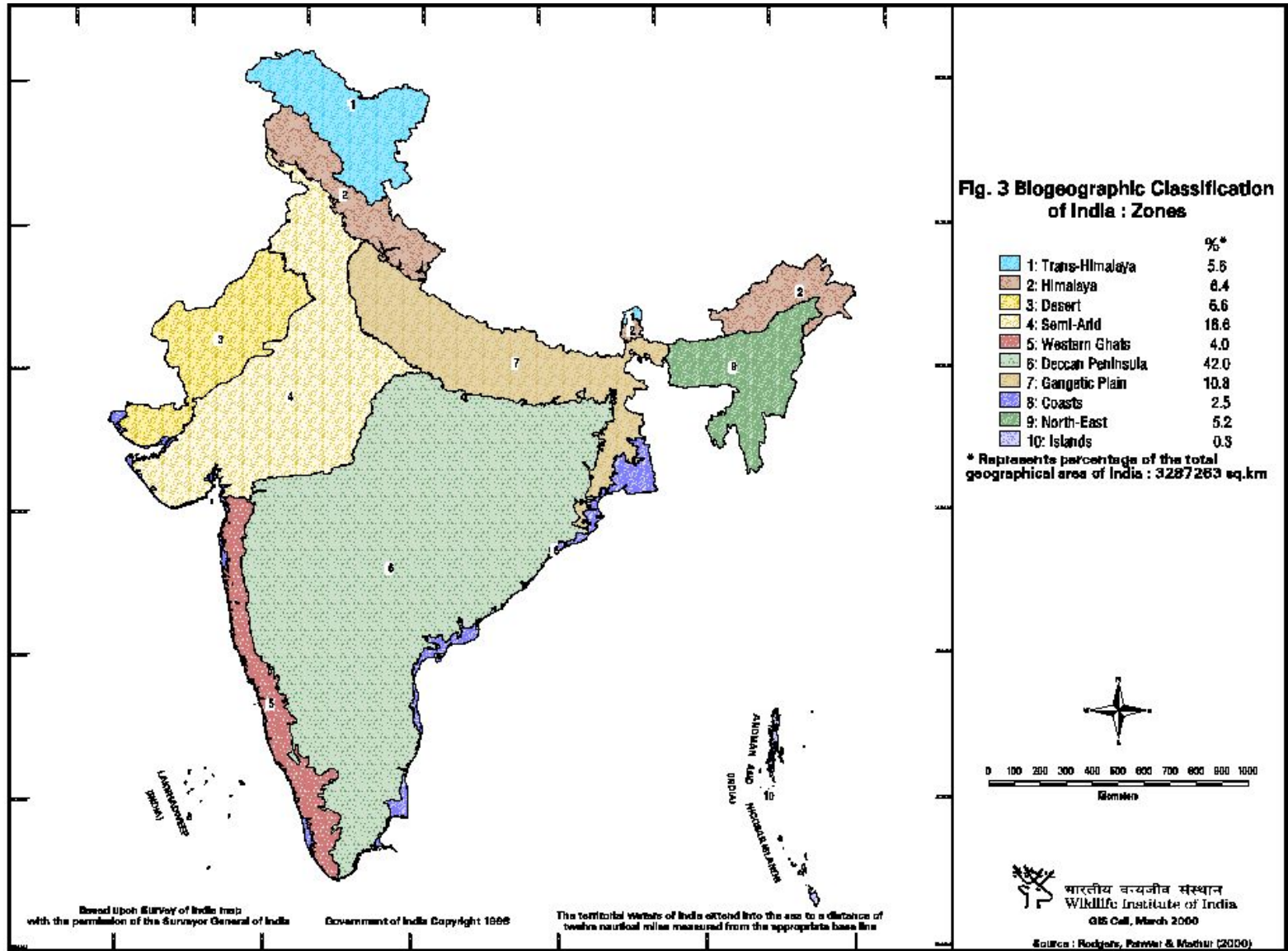
Biodiversity Heritage Sites

- “Biodiversity Heritage Sites” (BHS) are well defined areas that are unique, ecologically fragile ecosystems - terrestrial, coastal and inland waters and, marine having rich biodiversity comprising of any one or more of the following components: richness of wild as well as domesticated species or intra-specific categories, high endemism, presence of rare and threatened species, keystone species, species of evolutionary significance, wild ancestors of domestic/ cultivated species or their varieties, past pre-eminence of biological components represented by fossil beds and having significant cultural, ethical or aesthetic values and are important for the maintenance of cultural diversity, with or without a long history of human association with them. (Source: NBA, India)
- 12 BHS have been notified till April 2018

Part II

Biogeographic Zones

Biogeographic Zones of India

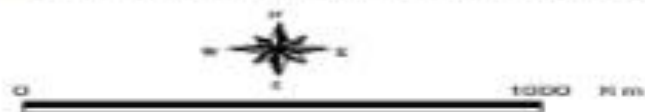


Biogeographic Classification of India



- 1A: Trans-Himalaya-Ladakh Mtns.
- 1B: Trans-Himalaya-Tibetan Plateau
- 2A: Himalaya-North-West Himalaya
- 2B: Himalaya-West Himalaya
- 2C: Himalaya-Central Himalaya
- 2D: Himalaya-East Himalaya
- 3A: Desert-Thar
- 3B: Desert-Katchchh
- 4A: Semi-Arid-Punjab Plains
- 4B: Semi-Arid-Gujarat Rajasthan
- 5A: Western Ghats-Malabar Plains
- 5B: Western Ghats-Western Ghats Mtns.
- 6A: Deccan Peninsula-Central Highlands

- 6B: Deccan Peninsula-Chhota-Nagpur
- 6C: Deccan Peninsula-Eastern Highlands
- 6D: Deccan Peninsula-Central Plateau
- 6E: Deccan Peninsula-Deccan South
- 7A: Gangetic Plain-Upper Gangetic Plain
- 7B: Gangetic Plain-Lower Gangetic Plain
- 8A: Coasts-West Coast
- 8B: Coasts-East Coast
- 8C: Coasts-Lakshadweep
- 9A: North-East-Brahmaputra Valley
- 9B: North-East-North-East Hills
- 10A: Islands-Andamans
- 10B: Islands-Nicobars





Trans Himalaya

Comprise of the Tibetan plateau and Tibetan marginal mountains covering 2.5 million sq. km with altitude range 4500 - 6000 m asl

Characterized by dry alpine steppe formed by grasses, sedges, forbs and shrubs adapted to cold-arid environment



<http://www.onthegotours.com/India/White-Tours/Snow-Leopard>



Iconic PAs

- J&K: Hemis NP & Changtang Cold Desert WLS
- Himachal: Kibber WLS



Entrance to Kibber Wildlife Sanctuary



Copyright, Jagpreet Pabla



Himalaya (West, Central and East)



Three major geographical entities- Himadri (greater Himalaya), Himachal (lesser Himalaya) and Shiwaliks (outer Himalaya)

Characterized by tropical rainforests, dense subtropical and alpine forests and rich temperate flora, evergreen tall trees- oak, chestnut, pine, deodar;



Iconic PAs

- J&K: Dachigam NP
- Himachal: GHNP
- Uttarakhand: Nanda Devi, Valley of Flowers
- Sikkim: Khanchendzonga
- Arunachal Pradesh:





Desert

Represented by parts of Rajasthan, Kutch, Haryana and parts of Gujarat spanning over 320,000 sq km

Characterized by tropical thorn forests and tropical dry deciduous forests, sandy deserts, seasonal salt marshes and mangroves near estuaries



Arpit Deomurari /Conservation



Iconic PAs

Rajasthan:

Desert NP

Gujarat:

Kachchh Desert Wildlife
Sanctuary





Rachit Shah

Semi Arid



Transitional zone between desert and denser forests of Western Ghats

Characterized by thorn forests with grasses and bamboo in some regions, xerophytic and ephemeral herbs; few trees such as *Acacia* and *Prosopis*, *Calotropis*.



Iconic PAs

Gujarat:

Gir NP

Rajasthan:

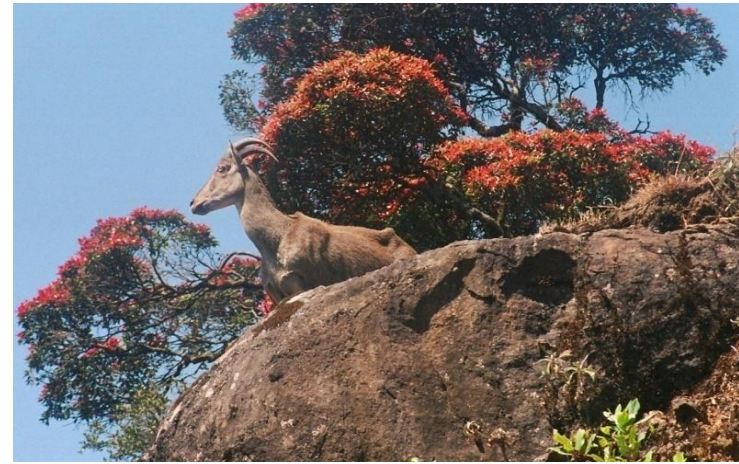
Sariska, Ranthambore





©Karthik Ak

Western Ghats



Iconic PAs

- Maharashtra:
- ✓ Radhanagari WLS
- Goa:
- ✓ Cotigao WLS
- Karnataka:
- ✓ Kudremukh
- Tamil Nadu:
- ✓ Kalakkad-Mundanthurai
- Kerala:
- ✓ Periyar NP, Eravikulam NP







Deccan Peninsula

Semi-arid region lying in the rain shadow of the Western Ghats covering about 43% of India's land surface

Bound by Satpuras on the north, Western Ghats on the west and Eastern Ghats on the east



Photo credit: Ameen Ahmed/WWF-India



Iconic PAs

- MP:
Kanha, Bandhavgarh
- Chattisgarh:
Indravati
- Maharashtra:
Melghat, Tadoba
- Odisha:
Similipal
- Andhra Pradesh:
NSTR
- Telengana:
Kawal TR
- Karnataka:
Daroji
- Tamil Nadu:
Satyamangalam





Gangetic Plains



Cover an area of 72.4 mha in the drainage of the Ganga and Brahmaputra

Represent arid, semi-arid to humid landscapes; geomorphologically classified as bhabar, terai, bhangar, khadar

Fauna include Asian elephant, blackbuck, one-horned rhinoceros, freshwater turtles, waterfowl in riverine ecosystems, gharial



Iconic PAs

UP:

Dudhwa, Katarniaghat

Bihar:

Valmiki







Coasts



Photo: K Sivakumar



Extends over 7517 km in the west and east covering nine coastal states and two union territories

Characterized by mangrove forests in estuarine tracts on both east and west coasts

Fauna: Olive Ridley turtles, dugong, dolphin, crocodiles, avifauna



Iconic PAs

West Coast:

- ❑ Gujarat:

Gulf of Kutch

East Coast:

- ❑ West Bengal:

Sunderbans

- ❑ Odisha:

Bhitarkanika, Gahirmatha

- ❑ Andhra:

Coringa, Pulicat

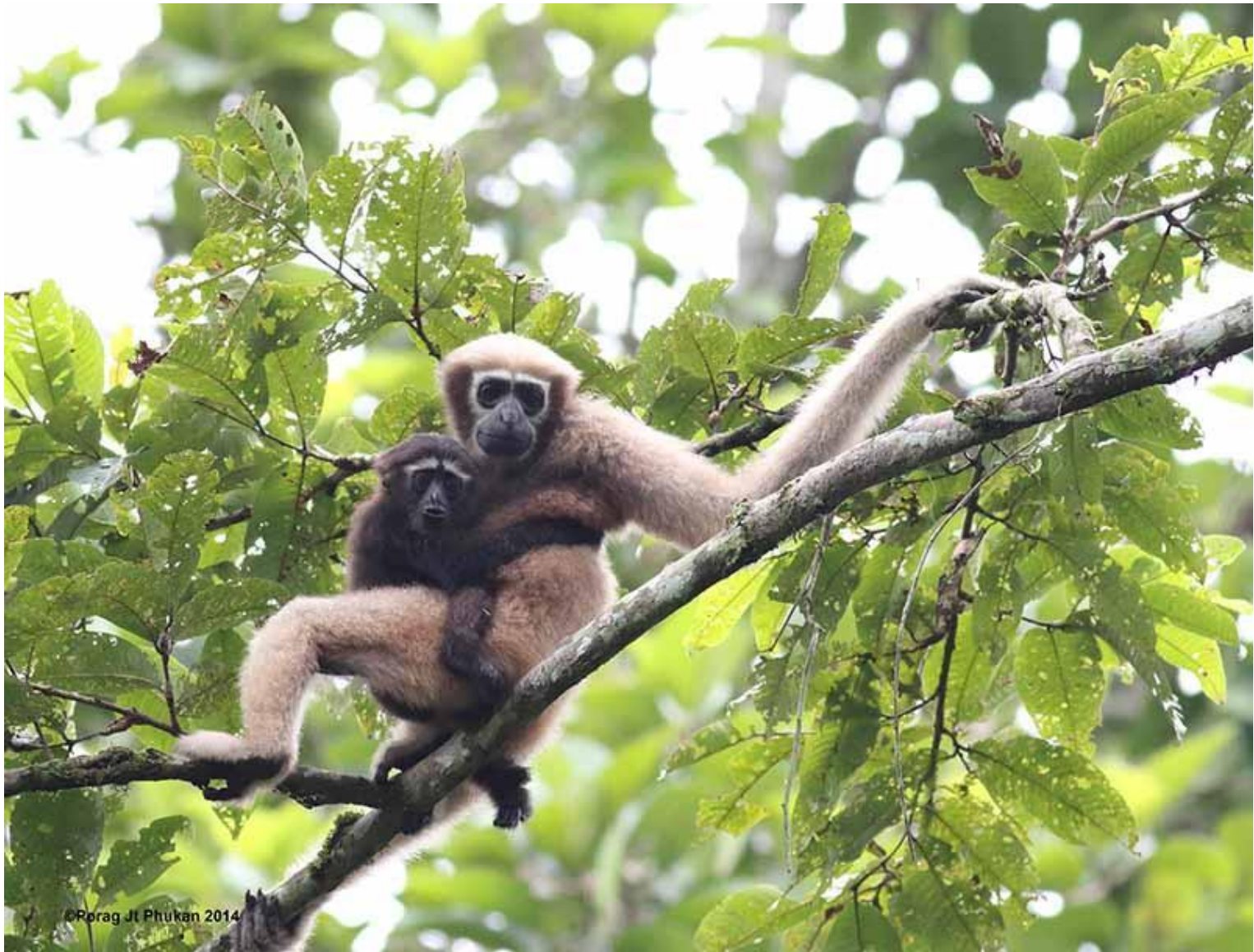
- ❑ Tamil Nadu:

Point Calimere





Srikant h Chandrasekharan



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North East

Spread across 7 north eastern states

Characterised by the tropical vegetation evergreen and semi-evergreen rain forests, moist deciduous monsoon forests, swamps and grasslands

Harbour many endemic species of orchids, bamboo, ferns



Iconic PAs

- ❑ Sikkim:
 - Khangchendzonga NP
- ❑ Assam:
 - Kaziranga TR
- ❑ Arunachal:
 - Namdapha TR
- ❑ Manipur:
 - Keibul Lamjao NP
- ❑ Tripura:
 - Sepajijhala NP
- ❑ Mizoram:
 - Dampa TR
- ❑ Nagaland:
 - Intanki NP







Dr K.Sivakumar

Islands



Include two main groups of islands: the Lakshadweep (36 islands) and Andaman and Nicobar islands (572 islands), in addition to smaller islands that dot the coastline of mainland India

Contribute at least 200 endemic species



Iconic PAs

- Andamans
- ✓ Mahatma Gandhi Marine NP
- ✓ Mount Harriet NP
- ✓ Narcondam Island NP

- Nicobars
- ✓ Galathea NP
- ✓ Campbell Bay NP

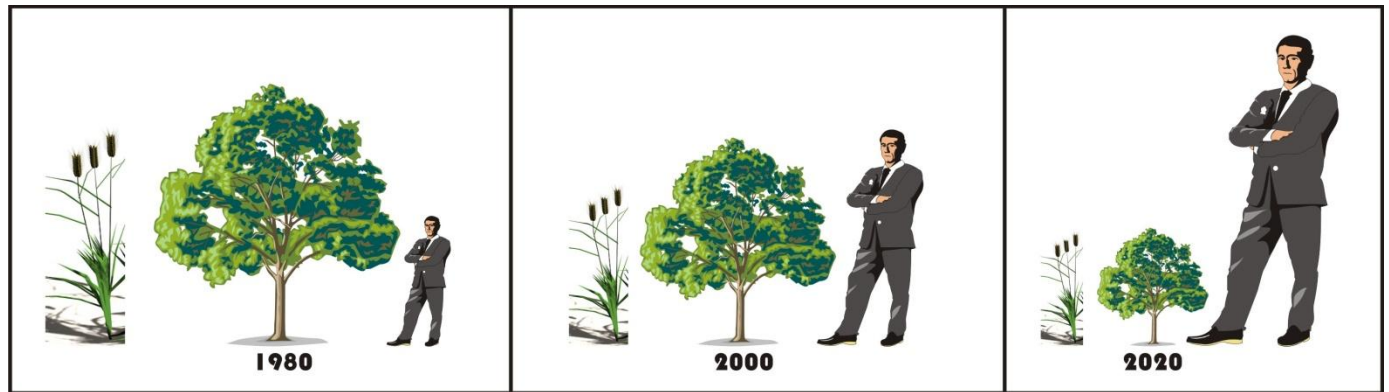
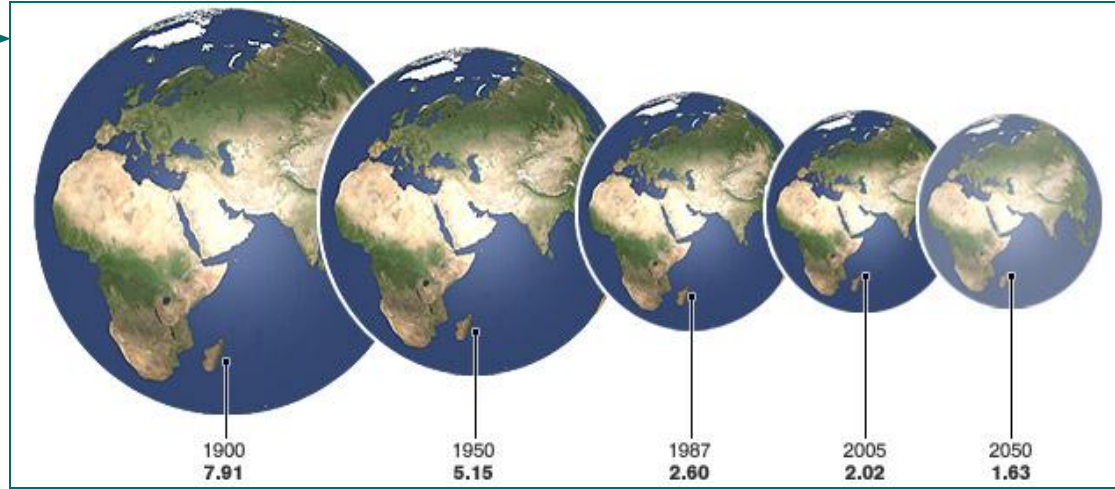
- Lakshadweep
- ✓ Pitti Bird Sanctuary



Part III

Threats to biodiversity

Rising population



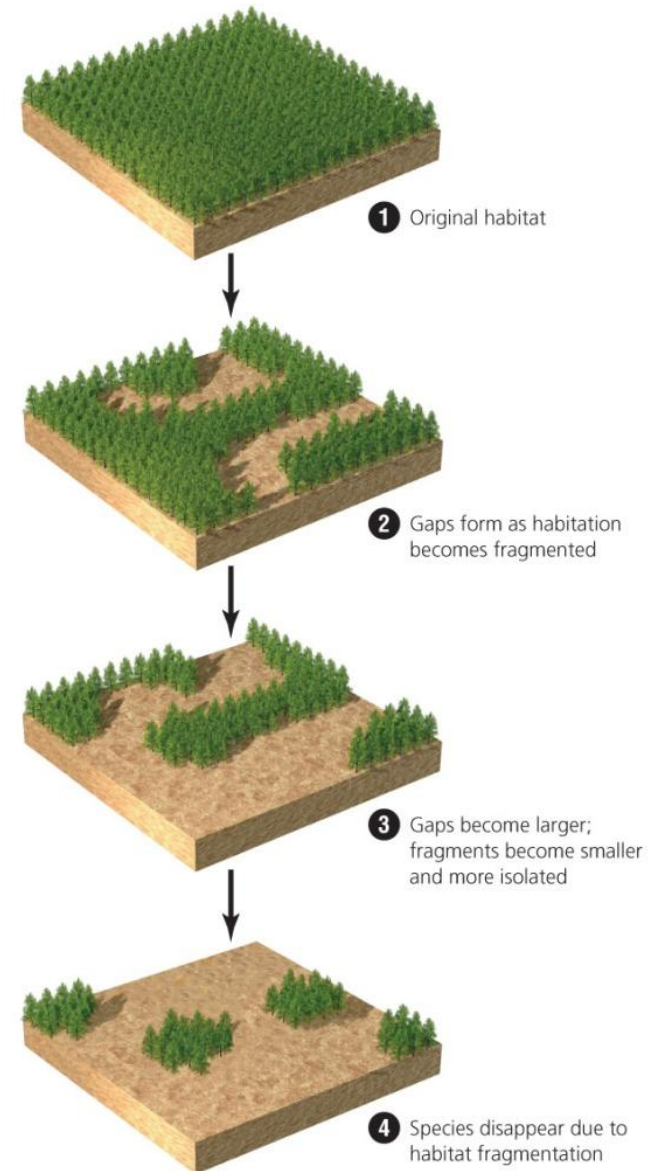
(Source: Anon, 2000)

Ecological Disasters



Habitat fragmentation: biggest threat

*Smaller fragments
hold fewer species*



Linear infrastructure development



Land degradation and mining



[energy/2008/coal-cost/](#)

Hydropower

Endangerment of habitat
of many threatened
species



Invasive species



Ipomoea carnea,

Shifting cultivation, north-eastern India



Human interference leads to resource conflict



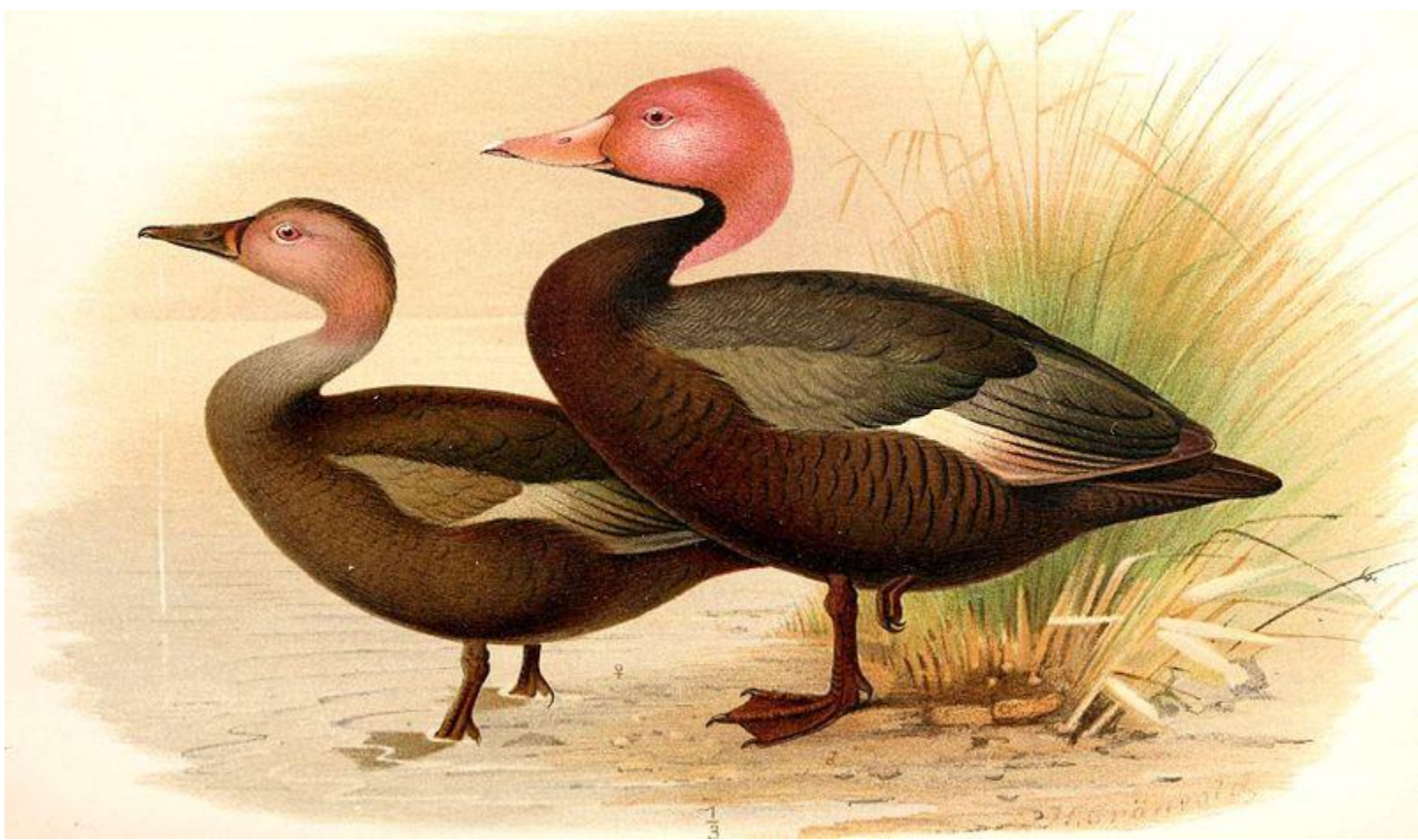
As a result we have lost some splendid species...

Cheetah *Acionyx jubatus*



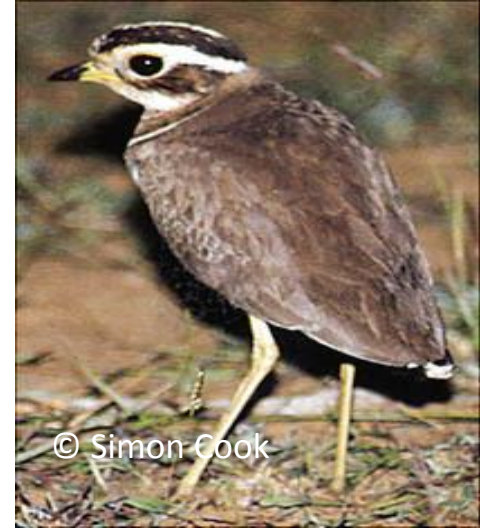
200 years ago cheetah was a problem species in Tirunelveli district, Tamil Nadu

The Pink-headed Duck *Rhodonessa caryophyllacea* used to be found in eastern India, Bangladesh and northern Myanmar. They became extinct during 1960s,



Species lost and found

Jerdon's Courser *Rhinoptilus bitorquatus* was rediscovered in 1986 in Andhra Pradesh



The Forest Owlet *Athene blewitti* was last collected in 1884 and rediscovered in 1997 in Bhandara near Melghat Tiger Reserve



The Mishmi (rusty-throated) Wren Babbler was rediscovered from Arunachal Pradesh in 2005, after its last recorded in 1947



Discovery of animal and plant species new to science

Arunachal macaque (*Macaca munzala*),



White-tailed Monal, (*Bugun liocichla*)



Fourteen new species of tiny “dancing frogs” have been discovered in the jungles of western India,



Castoe's Coral Snake *Calliophis castoe* was discovered recently in 2012 by researchers in the Anamalai hills



Ctenactis Triangularis recently found new coral species in the Andaman Sea.



The butterfly *Hypolycaena narada* also called the Banded Tit, was recently discovered in the Changlang District of Arunachal Pradesh in July this year



Zoothera salimalii Image credit: Per Alstrom



Thank you !