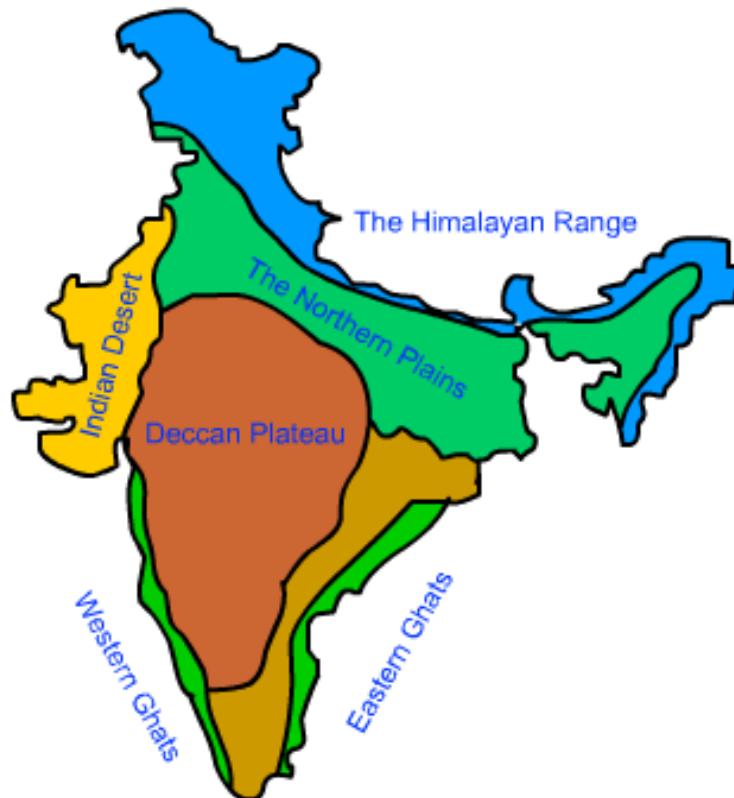


Paper 6.1- Ecology, Zoogeography and Wildlife Biology

Unit: X: Wildlife Distribution in India

Distribution of living forms is determined by ecological and historical factors. Animals and plants, are **living indicators** of the characteristics of their environment, their ranges mark the places in which environmental conditions are the same or similar.

The science of Zoo-geography has both ecological and historical aspects. India forms a part of the Oriental region, one of the **six great zoological realms** into which the earth has been divided to study the distribution of its animal life. Each of these realms supports its characteristic animal life. This vast continent has been divided into various zones or sub-regions each of which supports its characteristic assemblage of wild animals. There is no sharp line demarcation between these zones. The animal life of one zone merges imperceptibly into that of another and there are widespread species which live in one or more zones.



I. THE HIMALAYAN SUB-REGION:

The Himalayan Mountains, between Indus in the west and the Brahmaputra in the east, support an animal life more or less distinct from the rest of India. But the great range of altitude of these mountains has naturally resulted in marked peculiarities of distribution in its flora and fauna.

Three distinct sub-zones:

- a. **The Forest zone** covers the whole of the forested slopes of the Himalayas from the eastern frontiers of Kashmir to Bhutan.
- b. **The western Himalayas** from Kashmir and eastern Ladhak to Chitral.
- c. **The Arid plateau** of eastern Ladhak and Tibet. The Tibet is regarded as transition zone between the arid zone and the tree line and grassland of Himalayan plains.

1. **The Forest Zone:** The foot hills and lower valleys or ‘**dhuns**’ of the Forest Zone are covered with dense tropical vegetation. These lower forests are inhabited mainly by animals which are found in the forests of the peninsula. **Tiger, Elephants, Gaur, Sambar deer** and the **Muntjac** (Barking Deer) are common. In the swamps and forests of Terai, the strip of low-lying country which adjoins the foot hills, Gaur is replaced by **Wild Buffalos, Chital** (Spotted Deer), **Hog-Deers** and **Swamp Deers**. When an altitude between 1525 to 1830m is reached the character of the vegetation changes. The forests become dark and gloomy. Oaks, magnolias, laurels and birches covered with moss and ferns replace Sal, Silk-cotton trees and giant bamboos of the foothills.

At an elevation of about 2745 to 3660m one enters forests of pine and fir trees, yew and juniper, with an undergrowth of scrubby rhododendrons and dwarf bamboo. We enter a temperate zone with temperate vegetation. The fauna is quite distinguished by the absence of many species which inhabit the Indian peninsula, and by the presence of many Indo-Chinese forms, which are common in the hill-forests of Assam, Burma and southern China. These include; **Pandas, Hog-badgers, Ferret-Badgers, crestless Porcupines**, the **Gorals** (Goat-Antelope) and the **Serow** are some of the common inhabitants of temperate forests. These are not found in peninsular India.

2. **The Western Zone** consists of the western Himalayas from Kashmir and eastern Ladhak to Chitral. The Indo-Chinese mammals of the central and eastern Himalayas are here replaced largely by Indian species which include the **Muntjac**, the **Blackbuck** and the **Chinkara**. The Sambar Deer is absent. The most distinctive deer is the ‘Kashmir Stag’, a relative of the Red Deer of Europe.
3. **The Transition Zone** includes arid plateau of eastern Ladhak and Tibet. It includes the bare peaks above the tree-line and the strip of luscious grass country. The huge mass of the Himalayas form great obstacle for the free migration of animals. This obstacle combined with the great difference in climate north and south of the range has resulted in a fairly sharp line of demarcation at about 28° latitude between two distinct faunas, the Oriental in the south and the Palaearctic in the north. Fauna: **Moles, Water shrews, Mouse-hares, Marmots, Musk Deers**, the **Bharal** while the south of it the forests are inhabited by typically Oriental animals like **Flying foxes, Fruit bats, Tree shrews, Civets, Mongooses** and **Oriental squirrels**.

The Tibetan Zone includes Tibetan plateau together with eastern Ladhak is regarded as a distinct faunal area. The terrain includes barren plateau and uplands which lie beyond the Himalayas, windswept region of scanty rainfall, intense cold and high elevation.

Fauna: The **Wild Ass, Woolly hare**, the **Great Tibetan Sheep**, the **Bharal** and the **Yak**.

II. THE INDIAN PENINSULAR SUB-REGION:

India proper from the base of the Himalayas to Cape Comorin (Kanya kumari), with the exception of the Malabar Coast, is regarded as a single sub-region, the cis-Gangetic or the Indian Peninsular Sub-Region. The northern plains of this sub-region comprise the alluvial plains of the Ganges, the Indus and the Brahmaputra rivers, and their tributaries. It covers greater part of the States of Assam, East and West Bengal, Bihar, Uttar Pradesh, East and West Punjab and Sind.

The region of peninsular India and the drainage basin of the Ganges consist of tropical moist deciduous to tropical dry deciduous and scrub forest depending upon the rainfall. The northern and the eastern part which receive more rain has Sal as the predominant species and the southern part has teak as the main species. Western ghats of the western portion if the central belt receive very high rainfall and support evergreen vegetation.

The peninsular India has a variety of wild animals such as Elephant, Muntjac, Sambar, Wild boar, Gaur, Chittal, Hog deer, Swamp deer (Barasingha), Nilgai, blackbuck, Wild dog, Tiger, Leopard, Lion, Hyena, Jackal, Jungle cat, Common Mongoose, Wolf, Squirrel, Hare etc. The Spotted deer, Nilgai, Blackbuck, Four-horned antelope (Chausingha) and Sloth bear found in the triangular land bounded by the Vindhya in the north and the western and eastern ghats on the other two sides, constitute the true Indian fauna which are not found anywhere else outside India.

1. Indian Desert Region: The desert region of Rajasthan lying on the west of the Aravali ranges and east of the Indus Valley also known as **Thar**, connected with salt flats of Little Rann of Kutch. The desert area of this sub-region consist of dry tropical, dry mixed deciduous, thorn forests, scrub forests and dry Savanna forests. The desert trees are thorny with reduced leaf surface Cacti and Succulents are the plant species in the desert area.

Fauna: The animals have also developed adaptations to face the scarcity of water and severity of high temperature. The fauna found in this area are Asiatic Wild-ass, Blackbuck, Desert cat, Caracal, Desert fox, Snakes, Lizards and Tortoises.

2. Tropical Rain Forests:

This sub-region comprises Arunachal Pradesh, Assam, Meghalaya, Nagaland, Tripura, Western ghats, West Bengal and Andaman and Nicobar Islands which receive heavy rainfall. These areas are covered with evergreen forests. These forests have three storeyed vegetation. The upper level consisting of tall and magnetic trees forms the top canopy receiving most of the sunlight. Trees of lesser height form the middle level. They prefer shade and require less height. The thick, dense and rich environment is capable of providing food and shelter to a

host of animals of all kinds-the ground dwellers as well as tree dwellers. In the south-Nilgiris, Annamalai, Palani hills and other south Indian ranges have extensive grass land dotted with patches of dense evergreen forests. These grasslands are known as **sholas**. They provides shelter to elephants, gaur and other large animals. Himalayan animals such as Thar, Pine marten and European Otter, live here. The Vegetation and animals of the region show affinity height with high altitude forests of Assam.

The other species found in this region are Nilgiri langur, Nilgiri brown mongoose, stripe-necked mongoose, lion-tailed macaque, slender toris, malabar civet and spring mouse. In north eastern part, Hoolock gibbon and golden langur are found. Binturong, red-pandas, slow lories are the characteristics of this part. Giant squirrel, civets and bats also dwell in these tropical rain forests.

The forests of Andaman and Nicobar islands come under the equatorial belt of tropical rain forests. Due to their separation from the main land, most of the islands are free from human settlement. They carry one of the most beautiful forest in the world. There are about 200 species of trees of which Padauk, Gurjain, silver-gray etc are prominent. Some of the endemic species of the islands are wild pig, norcondum, hornbill, Nicobar-megapode, Andaman teal, Nicobar pigeon, white bellied sea eagle, Andaman Cat snake, Nicobar legless snake etc. There are 16 species of bats and 13 species of rats. Constituting nearly $\frac{3}{4}$ th of the total numbers of mammals. The representative of ungulates, squirrels, carnivora and larger mammals are absent. Deer species were introduced in the Island during 1920s. All of them except Sambar have survived civet was also introduced which has multiplied to dangerous proportion. The fauna now found are macaque, palm civet, spotted deer, barking deer, hog deer, dugong etc. The marine life consist of crocodile, turtle, coconut-crabs, water monitor, green lizard and 40 species of snakes including cobra, viper, coral and sea snakes and pythons.

3. **The Sunder bans:** The highest number of tigers is found in mangrove forest which is found in Sunder bans delta formed by the estuaries of Ganga and the Brahmaputra. The animal besides Tiger are Spotted deer, Wild Boars, Rhesus macaques, Monkey, Lizard, Water monitor, Crocodile, Crabs and Fishes . The fish-the mud Skipper-can climbs trees. Weaver ants found here make their nest in the trees. The Tiger here is the most interesting animal which swims in the creeks, preys on fish and crabs besides spotted deer and wild boar. The tigers here have the propensity of killing human beings.

Source:

- **The Book Of Indian Mammals (2014): S.H. Prater, C.M.Z.S,** Former Curator, Bombay Natural History Society. Oxford University Press.

Unit XII: Wildlife Conservation:

According to Webster's dictionary, 'Wildlife' means living beings that are neither human or domesticated; especially mammals, birds, reptiles, amphibians or fishes hunted by man Or 'The flora and fauna living in their natural habitat'.

The conservation of wildlife in India is old as Indian history. The 'Rishi Ashrams' were our historical parks, where every form of wildlife was protected, nurtured and preserved. Asoka (242 BC), the then emperor, had motivated the protection of animals and plants.

Importance of Wildlife:

1. **Population Balance:** The wildlife balances population and maintains food chain and natural cycles. Thus, it preserves the environment as a self sustaining system, Destruction of Wildlife may cause upset in ecological balance resulting in severe consequences as follows; absence of carnivores, herbivores, plants etc. Absence of carnivores/predators will increase enormous no. of herbivores which result in reduction of producer community from the ecosystem. In the absence of producers, all the consumers will perish from starvation and finally the area will get deserted.
Ex: Decrease in snakes may lead in **over population** of rodents which directly affects mankind as they form serious pests. Similarly, decrease in herbivores will lead in the decrease of carnivores and other opportunistic predators or they may start to take down the domestic animals or even human beings due to the absence of their natural prey. This leads to a serious kind of conflict - '**human-animal conflict**' and result in devastating effect over the ecosystem.
Absence of Plants: Quinine extracted from Cinchona in Peru is used as treatment for Malaria. If such medicinally important trees and shrubs get vanished from earth, then it again directly affects the mankind.
2. **Recreation Value:** Wildlife has a recreation value for human beings. Natural activities of various organisms attract and please the viewers. Live and dead animals can be preserved in zoos or museums of natural history.
3. **Gene Banks** works as an **Exsitu type** of conservation. They form a kind of breeding programmes in the field of agriculture, animal husbandry, fishery etc. Plant and animal breeders have been able to produce high yielding disease free and stress resistant varieties of plants and animals. Cross breeding to produce high yielding, disease resistant strains, wide range of plants and animals have to be analysed and selected.
4. **Economic value:** Wildlife is important from economic point of view. It's a vast natural resource. World's marine fisheries produce annual output of about 100 million tones of sea food. Freshwater fish and other aquatic animals provide large amount of food to us.

5. Scientific value:

- Sea urchins have helped greatly in understanding the human embryology.
- Rhesus macaques have contributed to the present knowledge of human blood groups.
- Antlers of Deers help in determining the degrees of radioactive contamination of natural environment.
- Connecting links (Sphenodon, Nautilus, Lung fishes, Peripatus, Limulus etc) provide considerable evolutionary history to organic evolution.
- Visits to sanctuaries and national parks impart education to the students of schools and colleges.

6. Aesthetic and Ethical value: Aesthetic value due to their sheer beauty and appeal to the human spirit. Melodious, brilliant colored birds, graceful beasts and rapturous, enchanting forests provide pleasure to human life.

AIMS OF WILDLIFE CONSERVATION:

- To maintain the balance of ecosystem.
- To protect, preserve and help in rapid reproduction of the rare species to save them from extinction.
- To preserve the breeding stock.
- To prevent deforestation and encourage afforestation.
- To study ecological relationship of plants and animals in natural habitat.
- Conservation of wildlife is essential because they carry many useful genes which are lost in domesticated animals.

Refer: Wildlife - strategies and Conservation. PDF

PROJECT TIGER

Background

The Government of India has taken a pioneering initiative for conserving its national animal, the tiger, by launching the 'Project Tiger' in 1973. From 9 tiger reserves since its formative years, the Project Tiger coverage has increased to 47 at present, spread out in 18 of our tiger range states. This amounts to around 2.08% of the geographical area of our country. The tiger reserves are constituted on a core/buffer strategy. The core areas have the legal status of a national park or a sanctuary, whereas the buffer or peripheral areas are a mix of forest and non-forest land, managed as a multiple use area. The Project Tiger aims to foster an exclusive tiger agenda in the core areas of tiger reserves, with an inclusive people oriented agenda in the buffer.

Project Tiger is an ongoing Centrally Sponsored Scheme of the Ministry of Environment, Forests and Climate Change providing central assistance to the tiger States for tiger conservation in designated tiger reserves.

The **National Tiger Conservation Authority (NTCA)** is a statutory body of the Ministry, with an overarching supervisory / coordination role, performing functions as provided in the Wildlife (Protection) Act, 1972.

The **ADG (Project Tiger)** and his officers also service the NTCA. The Regional Offices of the NTCA have been recently established at Bengaluru, Guwahati and Nagpur, each headed by an IGF and assisted by an AIG.

The allocation for Project Tiger during the XII Plan is Rs 1245 crore. The expenditure during 2012-13 and 2013-14 are Rs 163.87 crore and 169.48 crore respectively.

Current Activities:

Providing central assistance to States under the ongoing Centrally Sponsored Scheme of Project Tiger for tiger reserves, for activities (recurring / non-recurring), as reflected in the Annual Plan of Operations of tiger reserves, based on their Tiger Conservation Plans is an important activity. This, interalia, includes protection, habitat amelioration, day to day monitoring, eco-development for local people in buffer areas, voluntary relocation of people from core/critical tiger habitats, and addressing human-wildlife conflicts, within the ambit of the Wildlife (Protection) Act, 1972 and guidelines of Project Tiger / National Tiger Conservation Authority.

The NTCA / Project Tiger also conducts the country level assessment of the status of tiger, co-predators, prey and habitat once in four years, using the refined methodology, as approved by the Tiger Task Force.

Special thrust on tiger protection and antipoaching operations

The illegal demand for body parts and derivatives of tiger outside the country continues to be a serious threat to wild tigers. Therefore, protection is accorded topmost priority in Project Tiger / NTCA. The States are engaged in an ongoing manner through the NTCA Headquarters as well as its Regional Offices, while issuing alerts, besides closely working with the CBI, Wildlife Crime Control Bureau and the Police Departments. The following actions are taken in this context:

- Alerting the States as and when required
- Transmitting backward / forward linkages of information relating to poachers
- Advising the States for combing forest floor to check snares / traps
- Performing supervisory field visits through the National Tiger Conservation Authority and its regional offices
- Providing assistance to States for anti-poaching operations
- Using information technology for improved surveillance (e-Eye system) using thermal cameras launched in Corbett
- Launching tiger reserve level monitoring using camera trap to keep a photo ID database of individual tigers
- Preparing a national database of individual tiger photo captures to establish linkage with body parts seized or dead tigers
- Assisting States to refine protection oriented monitoring through monitoring system for tiger's intensive protection and ecological status (**M-STrIPES**)
- Providing grant through NTCA for patrolling in tiger rich sensitive forest areas outside tiger reserves
- Assisting States to deploy local workforce in a big way for protection to complement the efforts of field staff. [In all, approximately 24 lakh mandays are generated annually with 50% central assistance amounting to around Rs. 24 crores (excluding matching 50% share given by States) under Project Tiger. In case of Northern- eastern States the share is 90:10 i.e. 90% central assistance and 10% matching share given by states. Many local tribes constitute such local workforce (besides non-tribals), eg. **Baigas**, **Gonds** in Madhya Pradesh & Maharashtra, **Chenchus** in Andhra Pradesh, **Sholigas** in Karnataka, **Gujjars** in Uttarakhand and **Irulas** in Tamil Nadu to name a few. The deployment of such local tribals has been fostered / encouraged in the last two years].
- Supporting States for raising, arming and deploying the Special Tiger Protection Force

Managing moving tigers in human dominated landscapes

In several productive tiger landscapes, tigers move out from the core/critical tiger habitats/source areas. This is an innate behavior owing to their social dynamics. Since the tiger landscapes have human settlements and varied land uses, there are frequent human-tiger/ wildlife interface issues. The NTCA / Project Tiger is actively engaging with the States to address such issues and a SOP has been put in place in this regard.

The important thrust areas for the Plan period:

1. Stepped up protection/networking/surveillance
2. Voluntary relocation of people from core/critical tiger habitat to provide inviolate space for tiger
3. Strengthening of protection infrastructure and habitat management as per Tiger Conservation Plans of tiger reserves
4. Use of information technology in wildlife crime prevention
5. Addressing human-wildlife conflicts
6. Addressing the issue of resource dependency of local people through sustainable livelihood options
7. Capacity building of frontline personnel
8. Developing a national repository of camera trap tiger photographs with IDs
9. Active management for rescuing moving tigers from human dominated landscape
10. Conducting the next round of country level assessment of tiger, co-predators, prey besides habitat status monitoring
11. Conducting the next round of the independent management effectiveness evaluation
12. Strengthening the regional offices of the NTCA
13. Declaring and consolidating new tiger reserves
14. Fostering awareness for eliciting local public support
15. Fostering Research

Due to concerted efforts under Project Tiger, at present India has the distinction of having the maximum number of **tigers in the world (1706) as per 2010 assessment**, when compared to other tiger range countries. The 2010 country level tiger assessment has also shown a 20% increase of tigers in the country (from 1411 in 2006 to 1706 in 2010). However, there is a decline in tiger occupancy (12.6%) in other areas of tiger States. The tiger corridors for gene flow have been mapped in the GIS domain.

At present, there are 2500 tigers in India (2016 Assessment).

GOVT. ORGANIZATIONS & NON-GOVT. ORGANIZATIONS:**NGO's....**

- 1. The Wildlife Conservation Trust (WCT)** currently works in over 130 national parks and sanctuaries of India across 23 states, covering 82% of 50 tiger reserves and 18% of 733 nature reserves. With over 3.5 million people living inside tiger reserves and several hundred million dependent on natural ecosystems, we cannot separate communities from conservation. Thus, WCT lays equal emphasis on wildlife conservation and community development.

The communities living in and around India's forests depend heavily on forest produce to supplement their income. It help impart vocational training to young people and co-ordinate with over 100 job providers to find them gainful employment, thereby reducing their dependency and negative impact on forests. Realizing that these remotely-located communities lack access to quality healthcare, WCT conduct health camps, providing relief to both villagers and forest department-staff.

The efforts in these three arenas are greatly complimented by our protection initiatives. They work closely with forest departments to ensure that they have the best equipment and training to carry out their duties. In a first of its kind initiative, they provided multi-utility rescue vehicles to parks to tackle man-animal conflict and also equipped 2,100 Anti-poaching Camps in over 60 parks. WCT team has imparted enforcement training to over 8,700 staff and continues to conduct sessions in forest institutes. Above all we conduct scientific research to push for more robust wildlife management policies.

KEY Achievements:

- WCT is the largest organization to support the State and Central government in the field of tiger conservation outside of the Government.
- WCT has expanded its reach from five parks in 2009 to 130 parks in January 2017.
- WCT has been able to leverage government support for most of its projects.
- WCT is a member of the Advisory Board of the Global Tiger Forum (GTF).
- WCT is a member of the Advisory Board of National Tiger Conservation Authority (NTCA).
- WCT is a member of the State Board of Wildlife of Maharashtra, Madhya Pradesh and Rajasthan.
- WCT is a member of the Executive Committee of Madhya Pradesh Tiger Conservation Foundation.
- WCT is the only NGO globally that conducts large-scale tiger population estimation programmes in corridors and habitats outside protected areas.
- WCT was one of the four NGOs invited by the NTCA to carry out population estimation of tigers and their prey in the All India Tiger Population Estimation exercise in 2014.
- WCT is the only NGO that conducts diagnostic health check-up camps and provides clinical consultation to the frontline forest staff, including permanent (forest guards) and temporary (watchers) staff. These health check-up camps have reached over 16,000 beneficiaries.

2. Wildlife SOS :



Wildlife SOS was established in 1995 by a small group of individuals inspired to start a movement and make lasting change to protect and conserve India's natural heritage, forest and wildlife wealth. Today, the organization has evolved to actively work towards protecting Indian wildlife, conserving habitat, studying biodiversity, conducting research and creating alternative and sustainable livelihoods for erstwhile poacher communities or those communities that depend on wildlife for sustenance.

Kartick Satyanarayan and Geeta Seshamani with their shared enthusiasm dedicated themselves to the mission of eradicating the abusive practice of '**dancing**' bears in India completely.

Wildlife SOS consistently makes a difference to give back to the planet, to give back to nature and help protect the environment and wildlife.

Objectives:

- Responsible for taking action against animal cruelty, rescuing wildlife in distress, working to resolve man-animal conflicts while promoting and educating the public about the need for habitat protection.
- Works with communities who depend on wildlife for sustenance and providing them alternative and sustainable livelihoods as that is the key to sustainable conservation.
- Wildlife SOS emphasizes the value of ex-situ research in veterinary areas, behavioral studies, reproductive physiology and other fields in collaboration with national and international universities and organizations.
- They conduct projects such as Project: Leopards, Elephants, Reptiles and other animals. They work on various projects targeted at environment and biodiversity conservation as well as reducing our carbon footprint.

With the help of our dedicated staff and volunteers, grant programs and supportive agencies, both national and international, everyday they renew their commitment to the animals and to finding innovative ways to sustain and grow their mission. Wildlife SOS has formal 'co-operative' agreements in place with state governments and forest departments in more than nine states in India.

3. BNHS : Bombay Natural History Society:

BNHS was started by eight amateur naturalists of Mumbai, of which two were Indians. These pioneers were Dr D Macdonald, Mr E H Aitken, Col C Swinhoe, Mr J C Anderson, Mr J Johnston, **Dr Atmaram Pandurang**, Dr G A Maconochie and **Dr Sakharam Arjun**. The guiding principle of BNHS is the former president, **Dr Sálim Ali** - world renowned ornithologist and receiver of Padma Bhushan and Padma Vibhushan awards by Government of India. Other

Rushikesh Pawar, Dept. of Zoology, SACN

past stalwarts at BNHS included Mr B G Deshmukh, former president, who was Cabinet Secretary, Government of India and Mr J C Daniel, former vice-president and director, who was an internationally known wildlife biologist and conservationist.

BNHS-India, a pan-India wildlife research organization, has been promoting the cause of nature conservation for the past 133 years, since 1883.

BNHS Mission: Conservation of Nature, primarily Biological Diversity through action based on Research, Education and Public Awareness

BNHS Vision: Premier independent scientific organization with a broad based constituency, excelling in the conservation of threatened species and habitats.

4. Centre for Wildlife Studies (CWS):

The Centre for Wildlife Studies (CWS), Bengaluru, Karnataka state, India is a non-profit charitable trust registered in 1984, under the Indian Trusts Act 1952. CWS is recognized as a “**Scientific and Industrial Research Organization**” (SIRO) by the Ministry of Science and Technology, Government of India. CWS is also recognized as a centre of excellence by the Vision Group on Science and Technology, Government of Karnataka.

CWS is also recognized by Manipal University, Karnataka, for registering students pursuing doctoral degrees in wildlife biology and conservation.

CWS is a National NGO Member of the Global Tiger Forum (GTF) which is an international and inter-governmental organization for the conservation of tigers in the wild.

CWS has collaborations (Memoranda of Understanding) with the National Center for Biological Sciences, Wildlife Institute of India, Duke University and the US Geological Survey.

A Board of Trustees with eminent citizens/conservationists as members oversees the activities of the CWS Trust. CWS has a Research Advisory Board, with reputed wildlife scientists as members to guide its research and academic programs.

Objectives of CWS

- To promote and carry out scientific study, appreciation and conservation of natural habitats and wildlife with special emphasis on ecological field studies, with the objective of generating reliable knowledge to provide a basis for conservation.
- To build the capacity of individuals and institutions through collaborative formal and non-formal education and training programs.
- To aid and assist the Government and civil society institutions in improving the scientific management of nature reserves, zoos and wildlife habitats in India/Asia.
- To undertake studies on human dimensions of conservation including mitigating ecological impacts of humans on wildlife and habitats.
- To promote conservation objectives by means of production of scientific articles, books, brochures as well as various audio-visual, video-graphic, photographic and other communication tools and techniques that reach out to a broader audience.

Activities of CWS

Year	Project
2008-Present	Meta-population dynamics of Tigers in Malenad – Mysore Landscape of Karnataka.
2003-2007	Distribution and dynamics of tiger and prey populations in Karnataka, India
2001-2005	Distribution and dynamics of tiger and prey populations in Maharashtra, India
1998-2001	Karnataka Tiger Conservation Project
1995-2000	Ecological status and conservation of tigers in India
1989-1995	Ecology and management of large carnivores
1986-1989	Predator-prey relationships in Nagarahole National Park, India
1985-1986	A preliminary assessment of the impact of proposed upper Bhadra dam on the forest and wildlife resources of Karnataka
1983-84	Ecological survey of Lion-tailed Macaques in Karnataka

5. WCS : Wildlife Conservation Society

The Wildlife Conservation Society is committed to saving wildlife and wild places worldwide. It does so through science, conservation, education and the management of the world's largest system of urban wildlife parks, led by the flagship Bronx Zoo. Together, these activities change attitudes towards nature and help people imagine wildlife and humans living in harmony. WCS is committed to this mission because it is essential to the integrity of life on earth. Wildlife Conservation Society has furthered its global mission in India since 1988 through activities of its staff and partners.

WCS – India Program

Wildlife Conservation Society – India Program describes the work of several partner institutions engaged in saving wildlife and wild lands in full compliance with all Indian laws.

Its roots go back to 1963, to the first-ever scientific study of wild tigers by Dr. George Schaller. Following his footsteps, a quarter century later, WCS scientist Dr. Ullas Karanth initiated the first detailed ecological study of tigers in India employing radio telemetry at Nagarahole, Karnataka. This single research project in Nagarahole has today grown into a successful country wide effort to understand and save India's national animal.

WCS – India Program mission has combined cutting-edge research on tigers and other wildlife, with national capacity building and effective site-based conservation through constructive collaborations with governmental and non-governmental partners. Uncompromisingly committed to wildlife conservation, WCS – India Program inspires and nurtures positive attitude towards nature in people through its scientific and conservation endeavors.

6. CITES: The Convention on International Trade in Endangered Species of Wild Fauna and Flora

CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. **Convention on International Trade in Endangered Species**, in full **Convention on International Trade in Endangered Species of Wild Fauna and Flora**, [international agreement](#) adopted in March 1973 to regulate worldwide commercial trade in wild animal and plant [species](#). The goal of CITES is to ensure that [international trade](#) does not threaten the survival of any species. Since 1973 the number of state parties to the convention has grown to more than 170.

CITES is one of the largest and oldest conservation and sustainable use agreements in existence. Participation is voluntary, and countries that have agreed to be bound by the Convention are known as Parties. Although CITES is legally binding on the Parties, it does not take the place of national laws. Rather it provides a framework respected by each Party, which must adopt their own domestic legislation to implement CITES at the national level.

❖ RAMSAR CONVENTION: The Convention on Wetlands.

The Convention on Wetlands, called the RAMSAR Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

Number of Contracting Parties: **169**

Number of Ramsar Sites: 2,301

Total surface of designated sites: 225,643,711 hectare.

Wetlands are vital for human survival. They are among the world's most productive environments; cradles of biological diversity that provide the water and productivity upon which countless species of plants and animals depend for survival. The Convention uses a broad definition of wetlands. This includes all lakes and rivers, underground aquifers, swamps and marshes, wet grasslands, peatlands, oases, estuaries, deltas and tidal flats, mangroves and other coastal areas, coral reefs, and all human-made sites such as fish ponds, rice paddies, reservoirs and salt pans.

The Convention's mission is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".

Under the "three pillars" of the Convention, the Contracting Parties commit to:

- work towards the wise use of all their wetlands;
- designate suitable wetlands for the list of Wetlands of International Importance (the "Ramsar List") and ensure their effective management;
- cooperate internationally on transboundary wetlands, shared wetland systems and shared species.

At the time of joining the Convention, each Contracting Party must designate at least one wetland site within their territory for inclusion in the List of Wetlands of International Importance (the Ramsar List).

These Ramsar Sites acquire a new national and international status. They are recognized as being of significant value not only for the country or the countries in which they are located, but for humanity as a whole.

There are currently over 2,200 Ramsar Sites around the world. They cover over 2.1 million square kilometres, an area larger than Mexico.

Parties continue to designate wetlands for inclusion in the List. They select suitable wetlands for designation by referring to the Criteria for identifying Wetlands of International Importance.

The Convention has provided guidance to Contracting Parties on the management of Ramsar Sites, in addition to its guidance on the wise use of all wetlands.

The inclusion of a wetland in the List embodies the government's commitment to take the steps necessary to ensure that its ecological character is maintained. The Convention includes various measures to respond to threats to the ecological character of Sites.

❖ **CBD: Convention on Biological Diversity**

Introduction

The Earth's biological resources are vital to humanity's economic and social development. As a result, there is a growing recognition that biological diversity is a global asset of tremendous value to present and future generations. At the same time, the threat to species and ecosystems has never been so great as it is today. Species extinction caused by human activities continues at an alarming rate.

In response, the United Nations Environment Programme (UNEP) convened the Ad Hoc Working Group of Experts on Biological Diversity in November 1988 to explore the need for an international convention on biological diversity.

The Convention was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (the Rio "Earth Summit"). It remained open for signature until 4 June 1993, by which time it had received 168 signatures. The Convention entered into force on 29 December 1993, which was 90 days after the 30th ratification. The first session of the Conference.

3 main objectives:

1. The conservation of biological diversity
2. The sustainable use of the components of biological diversity
3. The fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

DEFINITION OF THREATENED CATEGORIES

1. The Red List

The International Union for Conservation of Nature (IUCN) keeps a “Red List of Threatened Species.” The Red List defines the severity and specific causes of a species’ threat of extinction.

The Red List has seven levels of conservation: **least concern, near threatened, vulnerable, endangered, critically endangered, extinct in the wild, and extinct.** Each category represents a different threat level.

- Species that are not threatened by extinction are placed within the first two categories—least concern and near-threatened.
- Those that are most threatened are placed within the next three categories, known as the threatened categories—**vulnerable, endangered, and critically endangered.**
- Those species that are extinct in some form are placed within the last two categories—**extinct in the wild** and **extinct.**

Classifying a species as endangered has to do with its range and habitat, as well as its actual population. For this reason, a species can be of least concern in one area, and endangered in another. The gray whale, for instance, has a healthy population in the eastern Pacific Ocean, along the coast of North and South America. The population in the western Pacific, however, is critically endangered.

- a. **Least Concern (LC):** Least Concern is the lowest level of conservation. A species of least concern is one that has a widespread and abundant population. Human beings are a species of least concern, along with most domestic animals, such as dogs and cats. Many wild animals, such as pigeons and houseflies, are also classified as least concern.
- b. **Near Threatened (NT):** A near threatened species is one that is likely to qualify for a threatened category in the near future.

Many species of violets, native to tropical jungles in South America and Africa, are near threatened, for instance. They have healthy populations, but their rain forest habitat is disappearing at a fast pace. People are cutting down huge areas of rain forest for development and timber. Many violet species are likely to become threatened.

- c. **Vulnerable Species (VU):** The definitions of the three threatened categories (vulnerable, endangered, and critically endangered) are based on five criteria:

population reduction rate, geographic range, population size, population restrictions, and probability of extinction.

- d. Endangered Species (En):** An endangered species is a type of organism that is threatened by extinction. A species is classified as endangered when its population has declined between 50 and 70 percent. This decline is measured over 10 years or three generations of the species, whichever is longer.
- e. Critically endangered species (CR):** A critically endangered species' population has declined between 80 and 90 percent. This decline is measured over 10 years or three generations of the species, whichever is longer.
- f. Extinct in the wild (EW):** A species is extinct in the wild when it only survives in cultivation (plants), in captivity (animals), or as a population well outside its established range. A species may be listed as extinct in the wild only after years of surveys have failed to record an individual in its native or expected habitat.
- g. Extinct (EX):** A species is extinct when there is no reasonable doubt that the last remaining individual of that species has died.

Source: <http://www.nationalgeographic.org/encyclopedia/endangered-species/>