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**SCIENCE CITY**  
THE SCIENCE OF WOW



# WETLAND ECOSYSTEM AND BIRD GALLERY

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## What are Ecosystems?

An ecosystem is a community of living organisms in conjunction with the nonliving components of their environment, interacting as a system. These biotic and abiotic components are linked together through nutrient cycles and energy flows.

## Types of Ecosystems

The major types of ecosystems are forests, grasslands, deserts, tundra, freshwater and marine.



Freshwater



Forests



Grasslands



Deserts



Tundra

Marine

- ❑ The state of Punjab derives its name from water (*Punj* : five, *aab*: water)
- ❑ It is well known for its bountiful water bodies - rivers, lakes and ponds
- ❑ The wetland ecosystem supports major biodiversity in the state and is home to several rare species of migratory birds.
- ❑ The state harbours more than 400 species of birds (both resident and migratory), accounting for almost 25% of the total bird diversity found in India

**Pushpa Gujral Science City has thus set up a Wetland ecosystem and bird Gallery**

## Importance of fresh water ecosystems to Punjab

Freshwater ecosystem is important for many reasons:

- ❑ It helps in regulating hydrological regimes, attenuating floods, recycling of nutrients, purification of water and recharging of aquifers.
- ❑ It supports a wide range of biodiversity, sustaining and sheltering their living environment for the aquatic life, besides providing congenial habitats for dependent terrestrial wildlife.
- ❑ Freshwater systems also provide vital ecosystem services for humans, e.g., drinking water, flood control, climate regulation, food production, etc.



Biodiversity Support



Food Resource



Fresh Water Resource



Livelihood Option

## **Wetlands**

As per the definition adopted at Ramsar Convention (1971) “Wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters”.

- ❑ Wetlands, due to their biological, ecological, socio-cultural and economic values, form an important component of environment.
- ❑ They are among the world’s most productive ecosystem and provide habitat and support diverse range of biodiversity.



## Types of Wetlands

Classification of wetland types currently in use, was adopted by the Conference of the Parties in 1990 at the Ramsar. It divides wetlands into three main categories:

- Marine and coastal wetlands
- Inland wetlands
- Man-made wetlands

### Ramsar Sites

A Ramsar Site is a wetland site designated of international importance under the Ramsar Convention, The Ramsar Convention on Wetlands is one of the oldest intergovernmental treaty that symbolize the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the wise use, or sustainable use, of all of the wetlands in their territories. The convention was signed on February 2, 1971 in a place called Ramsar in Iran. Since than, February 2<sup>nd</sup> is celebrated as “World Wetlands Day”. It marks the date of signing of the convention on wetlands.

## Ramsar Sites of India

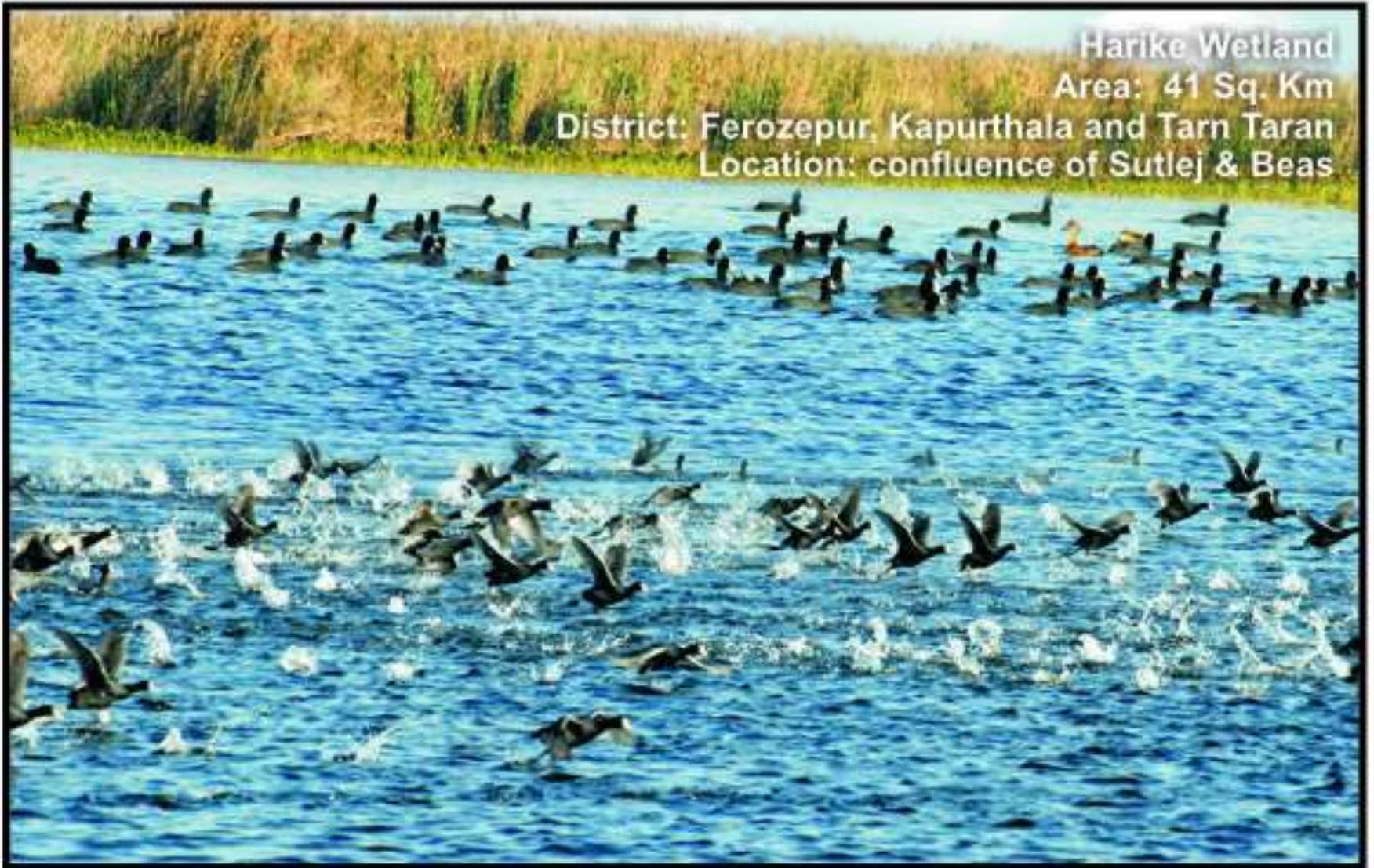
In 2019, India has added 10 more wetlands selected under Ramsar Convention taking total number of Ramsar wetlands in the country to 37 covering about 10,679.39 sq km area across 15 different Indian States and two Union Territories (UTs). Out of 37 Ramsar wetlands in India now, 20 are located in three states and two UTs in North India, 13 of them are situated in just two states of Uttar Pradesh (7) and Punjab (6), where the large states of Madhya Pradesh, Maharashtra, Gujarat, Andhra Pradesh and Tamil Nadu have just one Ramsar site each.

## Ramsar Sites of Punjab

Out of 37 Ramsar sites declared in India, Punjab has six. Earlier, Punjab had three wetlands designated as Ramsar sites. Now, three more have been added.

Earlier sites	New sites
Harike (notified in 1990)	Keshopur, (2020)
Ropar (2002)	Nangal (2020)
Kanjli (2002)	Beas River (2020)

Harike Wetland  
Area: 41 Sq. Km  
District: Ferozepur, Kapurthala and Tarn Taran  
Location: confluence of Sutlej & Beas

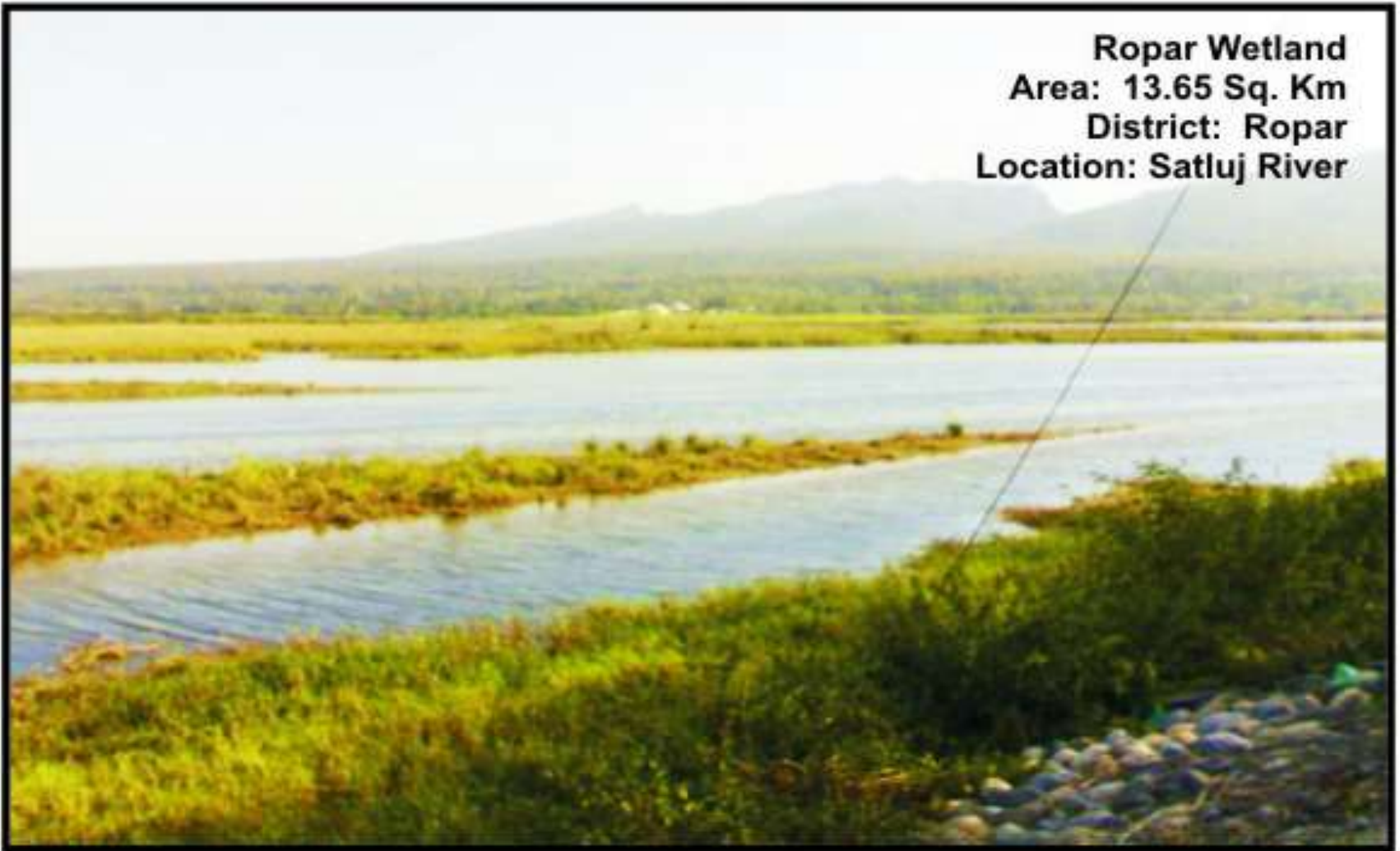


## Harike Wetland

Source: [www.punenvs.nic.in](http://www.punenvs.nic.in)



**Ropar Wetland**  
**Area: 13.65 Sq. Km**  
**District: Ropar**  
**Location: Satluj River**



## **Ropar Wetland**

**Source: [www.punenvs.nic.in](http://www.punenvs.nic.in)**



## Kanjli Wetland

Source: [www.punenvs.nic.in](http://www.punenvs.nic.in)

# Know about the gallery

☐ India is a home of large number of migratory and resident birds in its natural and man-made habitat.

☐ It is an interactive gallery, the objective is to familiarize the visitors about wetlands and avian biodiversity of India.

- I. A diorama depicting pair of Indian Pea fowl (National Bird) in dancing posture is made at the entrance of the gallery.
- II. A large Banyan tree is fabricated at the middle portion and commonly available bird's species of Punjab are mounted on tree structure. The Banyan tree is surrounded by wetland diorama consisted of models of species/ varieties of flora and fauna commonly available in wetlands of Punjab surrounded by replica of natural scenic beauty.
- III. On one side of the gallery a large map of India is made on wall demarcating various states, adjacent to different states on the map different bird's models of national importance (State birds) are mounted on the wall. These bird's models are placed in such postures to give life like experience.
- IV. A large avian skeletal structure is wall mounted on one side of the gallery to give detailed information about the skeletal system and the feathers and the muscles which are helpful for their flight.



## I. Diorama on National Bird of India

❑ The Indian Pea fowl (*Pavo cristatus*) is the National Bird of India.

❑ A pair meets visitors at the entrance to enchant them with their natural beauty

❑ This is among the favorite photographic point for Science City visitors.



**Indian Pea fowl (*Pavo cristatus*) in dancing posture**





## II. Banyan tree surrounded by Wetland Diorama

### Banyan Tree structure with common Birds of Punjab

- ❑ A 15 ft tall Banyan tree structure grows in the middle of the gallery.
- ❑ The birds on the tree will take your breath away
- ❑ A control panel with push buttons with the bird's name is provided in front of the Banyan tree structure.
- ❑ Find them and hear their calls as you push the buttons on the control panel (a fascinating sound/call of that particular bird is generated. The respective bird is illuminated with the help of LED at the same time).



**Banyan tree structure surrounded by Wetland Diorama**








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## See and Hear the following bird calls on the Banyan tree

Common Name	Scientific Name	Bird Photograph
Baya Weaver	<i>Ploceus philippinus</i>	
Hoopoe	<i>Upupa epops</i>	
Koel	<i>Eudynamys scolopaceus</i>	





Common Name	Scientific Name	Bird Photograph
Crow	<i>Corvus splendens</i>	
Parakeet	<i>Psittacula eupatria</i>	
Sparrow	<i>Passer domesticus</i>	








Common Name	Scientific Name	Bird Photograph
Red-vented Bulbul	<i>Pycnonotus cafer</i>	
Blue Rock Pigeon	<i>Columba livia</i>	
Myna	<i>Acridotheres tristis</i>	







Common Name	Scientific Name	Bird Photograph
Northern Goshawk	<i>Accipiter gentilis</i>	
Collared Dove	<i>Streptopelia decaocto</i>	
Red Wattled Lapwing	<i>Vanellus indicus</i>	





# Diorama on Wetlands of Punjab




- ❑ Wetland diorama consists of models of species/varieties of flora and fauna commonly available in wetlands of Punjab surrounded by replica of natural scenic beauty.
- ❑ The objective is to create awareness about aquatic biodiversity.
- ❑ About 25 number of wetland birds are shown in diorama.





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Common Name	Scientific Name	Bird Photograph
Greylag geese	<i>Anser anser</i>	
Bar-headed geese	<i>Anser indicus</i>	
Ruddy Shelduck	<i>Tadoma ferruginea</i>	
Mallard	<i>Anas platyrhynchos</i>	
Northern Pintail	<i>Anas acuta</i>	










Common Name	Scientific Name	Bird Photograph
Red-crested Pochard	<i>Netta ruffian</i>	
Common Pochard	<i>Aythya ferina</i>	
Gadwall	<i>Anas strepera</i>	
Woolly necked stork	<i>Ciconia episcopus</i>	
Painted stork	<i>Mycteria leucophala</i>	





Common Name	Scientific Name	Bird Photograph
Brown headed gull	<i>Larus brunnicephalus</i>	
Common Kingfisher	<i>Alcedo atthis</i>	
Common coot	<i>Fulica atra</i>	
Red vented Bulbul	<i>Pycnonotus cafer</i>	
Coucal	<i>Centropus sinensis</i>	










Common Name	Scientific Name	Bird Photograph
Spot billed duck	<i>Anas poecilorhyncha</i>	
Lesser whistling duck	<i>Dendrocygna javaniva</i>	
Common teal	<i>Anas crocca</i>	
River tern	<i>Sterna aurantica</i>	
Shikra	<i>Accipiter badius</i>	





Common Name	Scientific Name	Bird Photograph
Common moorhen	<i>Gallinula chloropus</i>	
Pheasant tailed jacana	<i>Hydrophasianus chirurgus</i>	
Indian skimmer	<i>Rynchops albicollis</i>	
Yellow eyed pigeon	<i>Columba eversmanni</i>	
Sindh sparrow	<i>Passer pyrrhonotus</i>	








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**Clusters of various terrestrial and aquatic plants are shown to give a real life look to the wetland diorama.**

Common Name	Scientific Name	Plant Photograph
Jujube	<i>Zizyphus jujuba</i>	
Mosquito fern	<i>Azolla pinnata</i>	
Waterthyme	<i>Hydrilla verticillata</i>	











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Common Name	Scientific Name	Plant Photograph
Lotus	<i>Nelumbo nucifera</i>	
Cattail	<i>Typha latifolia</i>	
Bladderwort	<i>Utricularia vulgaris</i>	
Shrubs and grasses		



# Characteristics of aquatic plants or Hydrophytes



- Most aquatic plants do not need cuticles or have thin cuticles as cuticles prevent loss of water.
- On each side of their leaves are a number of stomata.
- Aquatic plants keep their stomata always open as they do not need to retain water.
- They have less rigid structure since water pressure supports them.
- Since they need to float, leaves on the surface of plants are flat.
- The presence of air sacs enables them to float.
- The roots are smaller so water can spread freely and directly into the leaves.
- The roots are light and feathery since they do not need to prop up the plants.
- Roots are specialized to take in oxygen.



### III. Learn about the State Birds of India

- ❑ A large map of India has been made on wall demarcating various states, along with life size models of different birds
- ❑ A control panel with push buttons with the bird's name is provided on the front of the exhibit.
- ❑ When a visitor pushes button on the control panel the respective bird is illuminated with the help of LED along with the state on map at the same time.



**Models of State Birds**








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## State Birds




State	Common Name	Scientific Name	Bird Photograph
Punjab	Northern Goshawk	<i>Accipiter gentilis</i>	
Haryana	Black Francolin	<i>Francolinus francolinus</i>	
Himachal Pradesh	Western Tragopan	<i>Tragopan melanocephalus</i>	





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State	Common Name	Scientific Name	Bird Photograph
Jammu and Kashmir-	Black-necked Crane	<i>Grus nigricollis</i>	
Rajasthan	Great Indian Bustard	<i>Ardeotis nigriceps</i>	
Gujarat	Greater Flamingo	<i>Phoenicopterus roseus</i>	








State	Common Name	Scientific Name	Bird Photograph
Uttarakhand	Himalayan Monal	<i>Lophophorus impejanus</i>	
Uttar Pradesh	Sarus Crane	<i>Grus antigone</i>	
Bihar	House Sparrow	<i>Passer domesticus</i>	








State	Common Name	Scientific Name	Bird Photograph
West Bengal	White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	
Sikkim	Blood Pheasant	<i>Ithaginis cruentus</i>	
Manipur and Mizoram	Mrs. Hume`s Pheasant	<i>Syrmaticus humiae</i>	








State	Common Name	Scientific Name	Bird Photograph
Nagaland	Blyth`s Tragopan	<i>Tragopan blythii</i>	
Meghalaya and Chattisgarh	Hill Myna	<i>Gracula religiosa</i>	
Arunachal Pradesh and Kerala	Great Hornbill	<i>Buceros bicornis</i>	









State	Common Name	Scientific Name	Bird Photograph
Madhya Pradesh	Asian Paradise Flycatcher	<i>Terpsiphone paradisi</i>	
Jharkhand	Asian Koel	<i>Eudynamys scolopacea</i>	
Tamil Nadu	Emerald Dove	<i>Chalcophaps indica</i>	





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State	Common Name	Scientific Name	Bird Photograph
Assam	White-winged Wood Duck	<i>Cairina scutulata</i>	
Andhra Pradesh, Karnataka, Odisha and Telangana	Indian Roller	<i>Coracias benghalensis</i>	
Maharashtra	Yellow-footed Green Pigeon	<i>Treron phoenicoptera</i>	





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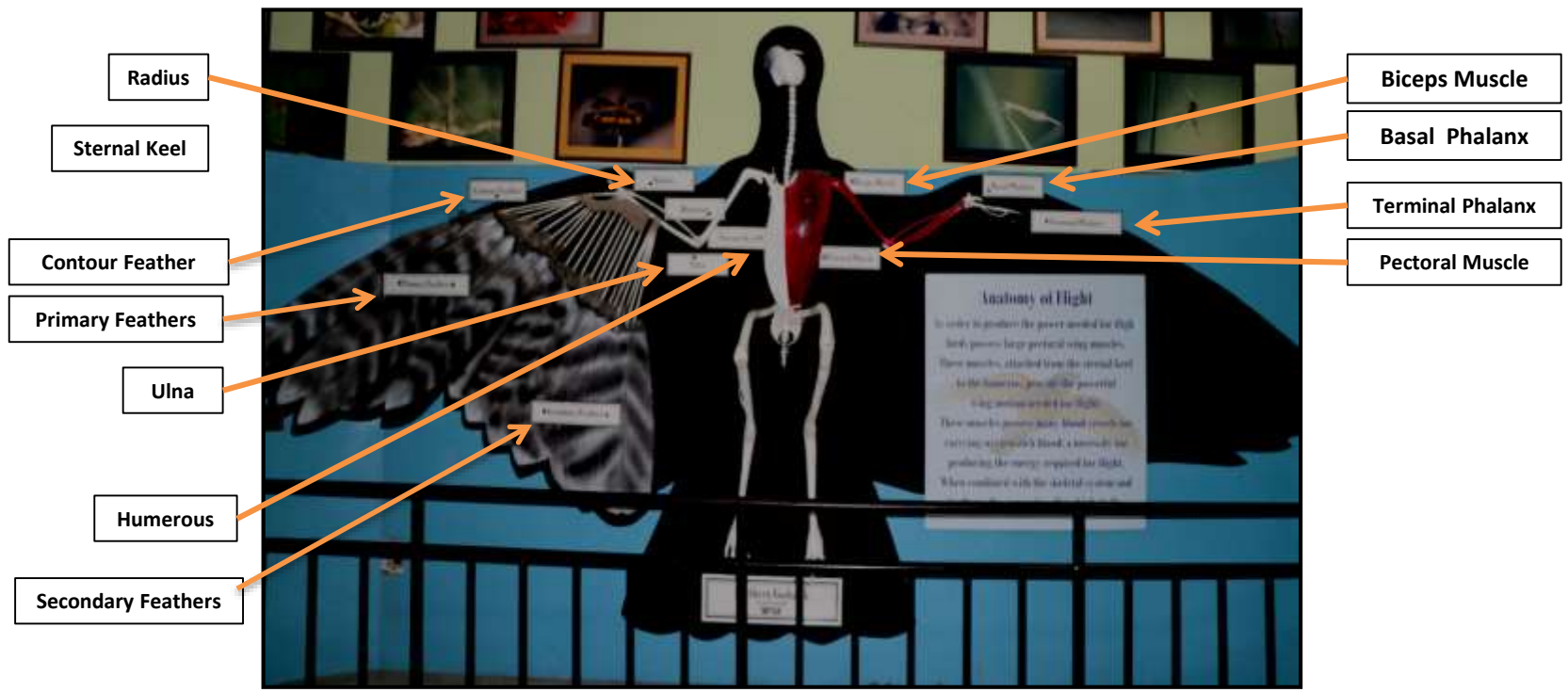
State	Common Name	Scientific Name	Bird Photograph
Tripura	Green imperial pigeon	<i>Ducula aenea</i>	
Goa	Black-crested bulbul	<i>Pycnonotus gularis</i>	





# IV. Avian Skeletal Structure

Learn the features of a birds body which help it fly. See the avian skeletal structure, their feathers and the muscles which make the bird fly.



**Structure represents the bones, feathers and the musculature of the birds**





## How do birds fly



- To produce the power needed for flight, birds possess large pectoral wing muscles.
- These muscles, attached from the sternum to the humerus, which gives a powerful wing motion needed for flight.
- These muscles possess many blood vessels for carrying oxygen-rich blood; necessary for producing energy required for flight.
- When combined with the skeletal system and the feathers, these muscles allow birds to fly.





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**To let your imagination fly  
with the birds and to hear  
their calls visit PGSC**

**Thank you**

