

BUCEROS

ENVIS Resource Partner on AVIAN ECOLOGY

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SPECIAL ISSUE

BIRDS OF THE INDIAN SUBCONTINENT – IN A NUTSHELL



ABOUT ENVIS

ENVIS (Environmental Information System) is a network of subject-specific centres located in various institutions throughout India. The focal point of the present 63 ENVIS centres in India is at the Ministry of Environment, Forest and Climate Change, New Delhi, which further serves as the Regional Service Centre (RSC) for INFOTERRA, the global information network of the United Nations Environment Programme (UNEP) to cater to environment information needs in the South Asian sub-region. The primary objective of all ENVIS centres is to collect, collate, store and disseminate environment-related information to various user groups, including researchers, policy planners, and decision makers.

The ENVIS Resource Partner on Avian Ecology at the Bombay Natural History Society was set up in June 1996 to serve as a source of information on Avian Ecology.

Objectives of the ENVIS Centre at BNHS

- ✍ To create a bibliographic database of published literature related to avian ecology study
- ✍ To publish and distribute BUCEROS newsletter on avian ecology to its members
- ✍ To create and upload databases on avian ecology on ENVIS website www.bnhsenvis.nic.in
- ✍ To reply to queries related to birds
- ✍ To conduct GSDP Certificate Courses
- ✍ To collect data for GRIDSS

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Hemicircus canente
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Editorial

On the occasion of World Environment Day, BNHS-ENVIS is pleased to bring out this special issue on the birds of the Indian Subcontinent. The avifauna of the Subcontinent (in fact, its flora and fauna as a whole) has been undergoing drastic declines, especially in the last five decades, with the burgeoning human population and the associated ravages on the last remaining forests, grasslands, wetlands and coastal habitats. It is estimated that India will surpass China to become the world's most populous country by 2024 — about 50,000 Indians are born each day in the country (<https://countrymeters.info/en/India>)!

This BNHS-ENVIS document provides a general account of the birds of the Indian Subcontinent, and mainly caters to amateur birders rather than ornithologists. However, in the absence of such information on Indian birds in a nutshell, ornithologists too may find it of value. We trust this publication will be welcomed by the Indian birders, naturalists, conservations and wildlife managers.

To provide a quick overview of the article, it begins with a general profile of the birds of the Indian Subcontinent, dealing with the makeup of its native avifauna. This is followed by discussions on the migrants from the Palearctic (or other regions) that winter in the Subcontinent, with some accounts on the movement patterns of resident birds. The next section is a treatise on the different biogeographic regions of the Subcontinent (with pictures of the regions) and their characteristic avifauna (with plates of the representative species of the regions). Waterbirds of the Subcontinent and the major wetland habitats that support them appear separately. The article concludes with an account of the migration and movement patterns of the birds in the Indian Subcontinent. As this is primarily a semi-popular article, in-text citations are avoided; however, region-wise literature sources are provided at the end of the article.

The scientific and common names used in this article follow the BirdLife International bird checklist available online, albeit with a style change in the common name. In the case of group names of birds that comprise two nouns (such as serpent-eagle), the first alphabet of each is capitalized (as is in Sálím Ali and S. Dillon Ripley's 'Handbook'). To cite an example, 'Hawk-Owl', and not 'Hawk-owl' like it is in BirdLife International's list and in some recent field guides. This is on the grounds that capitalizing only the first word would make the second name look subservient. This is an irony as the species in such cases (e.g., Andaman Hawk-Owl) actually belongs to the latter family (owls) and not the former (hawks). Grammatically, this makes sense as proper names are capitalized, for example, Anglo-Saxon, Indo-Malayan, African-American or even Mercedes-Benz for that matter.

Another 'deviation' from BirdLife's checklist is that for the common names of the birds of Sri Lanka that carry the prefix of the island's name, 'Sri Lankan' (and not 'Sri Lanka') is used as in the case of Indian Peafowl, Himalayan Quail or Ethiopian Wolf.

Coming back to the contentious issue of common bird names, we hope that rather than BirdLife International being the sole authority in deciding on the common names of birds, the opinions of others, especially from countries with endemic species, would be given due consideration. For example, in the BirdLife International's list, *Turdoides affinis*, native to south India and Sri Lanka, is given the name Yellow-billed Babbler, which is quite an ill-chosen name since many babblers have a yellowish bill, and moreover, the bill is not that large or prominent in the species to be named after its bill. The earlier name used for the species, White-headed Babbler, was no doubt inappropriate since none of the races have what may be called as a white head, but the more apt Pale-headed Babbler (used in the BNHS field guide) would have been much more appropriate. Another suggested change for an Indian endemic species is with regard to White-naped Tit. The white nape is present in many similar-looking tit species. Instead Pied Tit would be very apt. An example of unwarranted change is Rock Dove from the centuries-old Rock Pigeon. So what will it be from now — dove racing instead of pigeon racing, and dove proofing instead of pigeon proofing?

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Birds of the Indian Subcontinent – In a Nutshell

Ranjit Manakadan & Asif N. Khan



Indian Skimmer

THE INDIAN SUBCONTINENT

The Indian Subcontinent rests largely on the Indian Plate and encompasses India, Pakistan, Nepal, Bhutan, Bangladesh and Sri Lanka, along with Andaman and Nicobar Islands in the Bay of Bengal, and the Maldives and Lakshadweep archipelagos in the Arabian Sea. BIRDS OF SOUTH ASIA: THE RIPLEY GUIDE (Rasmussen and Anderton 2012) also includes Afghanistan (usually clumped with Central Asia) and the Chagos Peninsula (the group of islands in the Indian Ocean south of the Maldives). In recent times, the Indian Subcontinent is often referred to as South Asia.

The Indian Subcontinent is separated from Central Asia by the Himalayas. The mountain barriers to the northwest and northeast are the Hindu Kush (in Afghanistan and Pakistan) and Arakan (bordering northeast India and Myanmar) respectively. The seas/oceans that fringe its southern expanse are the Arabian Sea to the west, Bay of Bengal to the east, and the Indian Ocean to the south.



Source: LITHOGRAPH FROM JOHN GOULD'S BIRDS OF ASIA

Lesser Florican *Sypheotides indica*

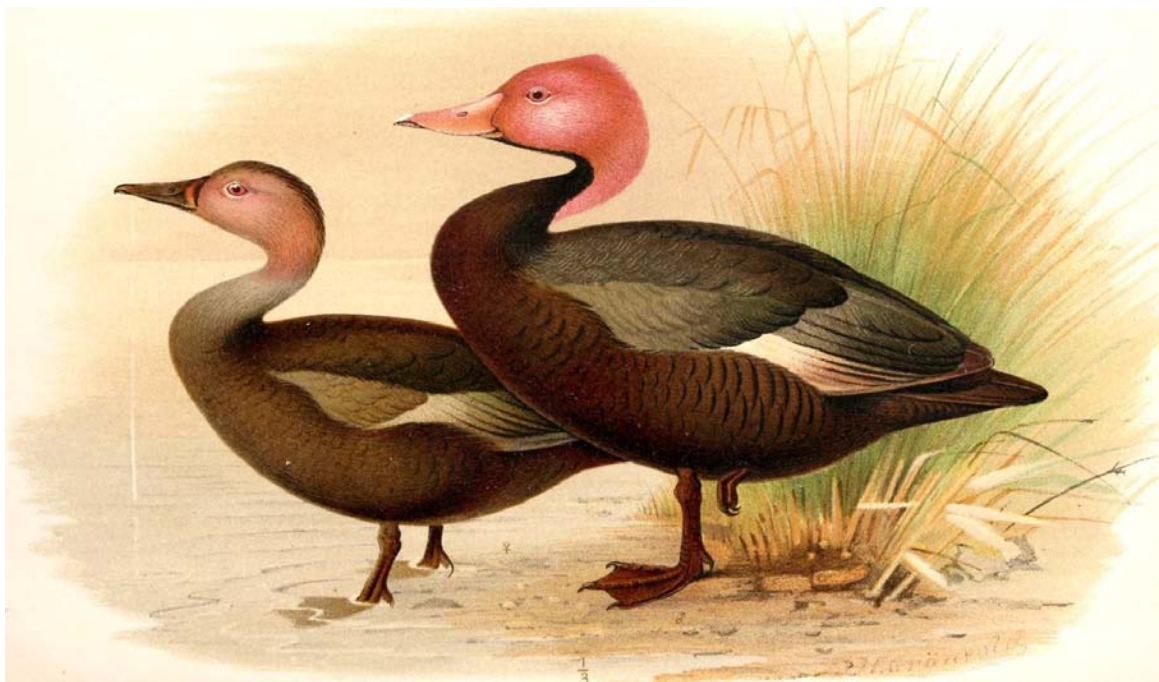
PROFILE OF THE AVIFAUNA OF THE INDIAN SUBCONTINENT

The Indian region has one of the most diverse avifauna on earth, brought about by the diversity of climatic and physical features of the landmass, which have given rise to an assortment of habitat types ranging from desert to montane forests. About 1,300-odd species of birds are reported from the Subcontinent, these constituting c. 13% of the world's birds. About 193 (taxonomy-dependent) endemic/near-endemic species occur in the Subcontinent. With bird studies, birdwatching and bird photography picking up momentum especially in recent years, new species are getting discovered and described to science, the most spectacular being the Bugun Liocichla *Liocichla bugunorum* in 2006 from the Eaglenest Sanctuary in Arunachal Pradesh.

Even as these discoveries are coming to light, the Indian Subcontinent is losing its species. For instance, the Himalayan Quail *Ophrysia superciliosa* and Pink-headed Duck *Rhodonessa caryophyllacea* are now presumed to be extinct.

The Siberian Crane *Leucogeranus leucogeranus*, which was a regular winter visitor to the Keoladeo National Park in Rajasthan, has not been recorded in India since the winter of 2001–2002. Two species that were considered extinct, Jerdon's Courser *Rhinoptilus bitorquatus* and Forest Owlet *Heteroglaux blewitti*, were rediscovered, but the status of the former is uncertain again.

The IUCN (International Union for Conservation of Nature) has placed 17 species that occur in the Subcontinent as Critically Endangered (some of which are probably extinct): Himalayan Quail *Ophrysia superciliosa*, Baer's Pochard *Aythya baeri*, Pink-headed Duck *Rhodonessa caryophyllacea*, Siberian Crane *Leucogeranus leucogeranus*, Great Indian Bustard *Ardeotis nigriceps*, Bengal Florican *Houbaropsis bengalensis*, White-bellied Heron *Ardea insignis*, Christmas Island Frigatebird *Fregata andrewsi*, Sociable Lapwing *Vanellus gregarius*, Spoon-billed



Pink-headed Duck *Rhodonessa caryophyllacea*

Source: HENRIK GRÖNVOLD'S LITHOGRAPH FROM THE JOURNAL OF BOMBAY NATURAL HISTORY SOCIETY, VOLUME 18

Sandpiper *Calidris pygmaea*, Jerdon's Courser *Rhinoptilus bitorquatus*, Red-headed Vulture *Sarcogyps calvus*, White-rumped Vulture (or Oriental White-backed Vulture) *Gyps bengalensis*, Indian Vulture (or Long-billed Vulture) *Gyps indicus*, Slender-billed Vulture *Gyps tenuirostris* and Yellow-breasted Bunting *Emberiza aureola* and Bugun Liocichla *Liocichla bugunorum*. Other than these, there are species categorized as Endangered (26 species), Vulnerable (77 species), and Near Threatened (92 species), bringing the total number of threatened birds to 212 species (for species list, see the IUCN Red List of Threatened Species: <https://www.iucnredlist.org>.)

Based on the residency status and migration/movement pattern, the birds of the Indian Subcontinent may be grouped as follows:



20th Century British illustrator
D.M. Henry's lithograph of Jerdon's Courser
Rhinoptilus bitorquatus

Residents

The avifauna of the Indian region comprises typical birds of the Indo-Malayan region (e.g., leafbirds, fairy-bluebirds, barbets and junglefowl), and characteristic groups of the Indian Subcontinent (e.g., pheasants, pittas, Old World babblers and flowerpeckers). There is also a good chunk of Palearctic birds in the Himalayas (e.g., Eurasian Jackdaw *Corvus monedula*, snowcocks, snowfinches, nuthatches, treecreepers, and accentors). And, Afrotropical groups of North Africa and West Asia (e.g., coursers, bustards, honeyguides and hypocolius), along with families that are common to both the Afrotropical and Indo-Malayan region (e.g., bulbuls, sunbirds and weavers). As for native waterbirds comprising about 12% of the Subcontinent's avifauna (and 50% of the region's waterbirds), they are discussed towards the end of the article under WATERBIRDS OF THE INDIAN SUBCONTINENT. For further insights into the biogeographic aspects of the resident birds of the Indian Subcontinent, see Ripley (1959).

Some of the world's most cosmopolitan species (e.g., Peregrine Falcon *Falco peregrinus*, Osprey *Pandion haliaetus*, Common Barn-Owl *Tyto alba*, Gull-billed Tern *Gelochelidon nilotica*, Cattle Egret *Bubulcus ibis*, Great White Egret *Ardea alba*, House Sparrow *Passer domesticus* and Rock Dove/Rock Pigeon *Columba livia*) have resident populations in the Indian Subcontinent. Populations of some of the resident species get augmented in winter by an influx of migrant populations of their kin from the Palearctic region, e.g., Great White Egret *Ardea alba*, Grey Heron *Ardea cinerea*, Glossy Ibis *Plegadis falcinellus*, Eurasian Spoonbill *Platalea leucorodia*, Common Kestrel *Falco tinnunculus*, Peregrine Falcon *Falco peregrinus*, Eurasian Coot *Fulica atra*, Kentish Plover *Charadrius alexandrinus*, Little Ringed Plover *C. dubius*, Common Gull-billed Tern, *Gelochelidon nilotica*, Common Tern *Sterna hirundo*, Common Hoopoe *Upupa epops* and House Sparrow *Passer domesticus*.

Winter Migrants

About 23% of the 1,300-odd species reported in the Indian Subcontinent are winter migrants. These originate largely from the Palearctic region beyond the Himalayas, breeding mainly in northern Asia (Russia, Mongolia, and China) and the countries

of Central Asia (Kazakhstan, Turkmenistan, Uzbekistan, Kyrgyzstan, and Tajikistan). A few species come from as far as extreme Western Europe. More well-known and common among the winter migrants are the raptors, storks, ducks and geese, waders (shorebirds), cranes and

SOME OF THE WINTER MIGRANTS TO THE INDIAN SUBCONTINENT:

Pelicans, Egrets, Herons, Bitterns, Storks, Cranes and Bustards

Great White Pelican	<i>Pelecanus onocrotalus</i>
Dalmatian Pelican	<i>Pelecanus crispus</i>
Eurasian Bittern	<i>Botaurus stellaris</i>
White Stork	<i>Ciconia ciconia</i>
Black Stork	<i>Ciconia nigra</i>
Demoiselle Crane	<i>Anthropoides virgo</i>
Common Crane	<i>Grus grus</i>
Siberian Crane	<i>Leucogeranus leucogeranus</i>
Asian Houbara	<i>Chlamydotis macqueenii</i>

Waders (Shorebirds)

Pacific Golden Plover	<i>Pluvialis fulva</i>
Grey Plover	<i>Pluvialis squatarola</i>
White-tailed Lapwing	<i>Vanellus leucurus</i>
Sociable Lapwing	<i>Vanellus gregarius</i>
Northern Lapwing	<i>Vanellus vanellus</i>
Grey-headed Lapwing	<i>Vanellus cinereus</i>
Lesser Sandplover	<i>Charadrius mongolus</i>
Greater Sandplover	<i>Charadrius leschenaultii</i>
Kentish Plover	<i>Charadrius alexandrinus</i>
Crab-Plover	<i>Dromas ardeola</i>
Pied Avocet	<i>Recurvirostra avosetta</i>
Eurasian Oystercatcher	<i>Haematopus ostralegus</i>
Whimbrel	<i>Numenius phaeopus</i>
Eurasian Curlew	<i>Numenius arquata</i>
Black-tailed Godwit	<i>Limosa limosa</i>
Bar-tailed Godwit	<i>Limosa lapponica</i>
Common Redshank	<i>Tringa totanus</i>
Spotted Redshank	<i>Tringa erythropus</i>
Marsh Sandpiper	<i>Tringa stagnatilis</i>
Common Greenshank	<i>Tringa nebularia</i>
Spotted Greenshank	<i>Tringa guttifer</i>
Green Sandpiper	<i>Tringa ochropus</i>

Waders (Shorebirds) (contd.)

Wood Sandpiper	<i>Tringa glareola</i>
Terek Sandpiper	<i>Xenus cinereus</i>
Asian Dowitcher	<i>Limnodromus semipalmatus</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Solitary Snipe	<i>Gallinago solitaria</i>
Pintail Snipe	<i>Gallinago stenura</i>
Swinhoe's Snipe	<i>Gallinago megala</i>
Great Snipe	<i>Gallinago media</i>
Common Snipe	<i>Gallinago gallinago</i>
Jack Snipe	<i>Lymnocyptes minimus</i>
Great Knot	<i>Calidris tenuirostris</i>
Sanderling	<i>Calidris alba</i>
Little Stint	<i>Calidris minuta</i>
Temminck's Stint	<i>Calidris temminckii</i>
Red-necked Stint	<i>Calidris ruficollis</i>
Spoon-billed Sandpiper	<i>Calidris pygmaea</i>
Dunlin	<i>Calidris alpina</i>
Curlew Sandpiper	<i>Calidris ferruginea</i>
Ruff	<i>Calidris pugnax</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>

Ducks and Geese

Greylag Goose	<i>Anser anser</i>
Bar-headed Goose	<i>Anser indicus</i>
Ruddy Shelduck	<i>Tadorna ferruginea</i>
Common Shelduck	<i>Tadorna tadorna</i>
Northern Pintail	<i>Anas acuta</i>
Common Teal	<i>Anas crecca</i>
Baikal Teal	<i>Sibirionetta formosa</i>
Falcated Duck	<i>Mareca falcata</i>
Mallard	<i>Anas platyrhynchos</i>
Eurasian Wigeon	<i>Mareca penelope</i>
Gadwall	<i>Mareca strepera</i>
Garganey	<i>Spatula querquedula</i>
Northern Shoveler	<i>Spatula clypeata</i>
Red-crested Pochard	<i>Netta rufina</i>
Common Pochard	<i>Aythya ferina</i>
Baer's Pochard	<i>Aythya baeri</i>
Ferruginous Pochard	<i>Aythya nyroca</i>
Tufted Duck	<i>Aythya fuligula</i>

Ducks and Geese (*contd.*)

Greater Scaup	<i>Aythya marila</i>
Common Goldeneye	<i>Bucephala clangula</i>
Smew	<i>Mergellus albellus</i>
Red-breasted Merganser	<i>Mergus serrator</i>

Rails, Crakes and Allies

Western Water Rail	<i>Rallus aquaticus</i>
Eastern Water Rail	<i>Rallus indicus</i>
Corncrake	<i>Crex crex</i>
Little Crake	<i>Zapornia parva</i>
Baillon's Crake	<i>Zapornia pusilla</i>
Spotted Crake	<i>Porzana porzana</i>
Common Coot	<i>Fulica atra</i>

Gulls and Terns

Pallas's Gull	<i>Larus ichthyaetus</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Brown-headed Gull	<i>Larus brunnicephalus</i>
Black-headed Gull	<i>Larus ridibundus</i>
Sandwich Tern	<i>Thalasseus sandvicensis</i>
Caspian Tern	<i>Hydroprogne caspia</i>
Common Tern	<i>Sterna hirundo</i>

Raptors

Osprey	<i>Pandion haliaetus</i>
Steppe Eagle	<i>Aquila nipalensis</i>
Eastern Imperial Eagle	<i>Aquila heliaca</i>
White-tailed Sea-Eagle	<i>Haliaeetus albicilla</i>
Hen Harrier	<i>Circus cyaneus</i>
Pallid Harrier	<i>Circus macrourus</i>
Montagu's Harrier	<i>Circus pygargus</i>
Western Marsh-Harrier	<i>Circus aeruginosus</i>
Peregrine Falcon	<i>Falco peregrinus calidus</i>
Eurasian Hobby	<i>Falco subbuteo</i>
Merlin	<i>Falco columbarius</i>
Common Kestrel	<i>Falco tinnunculus</i>
Lesser Kestrel	<i>Falco naumanni</i>
Northern Long-eared Owl	<i>Asio otus</i>
Short-eared Owl	<i>Asio flammeus</i>

Terrestrial Birds

European Bee-eater	<i>Merops apiaster</i>
European Roller	<i>Coracias garrulus</i>
Eurasian Wryneck	<i>Jynx torquilla</i>
Barn Swallow	<i>Hirundo rustica</i>
Brown Shrike	<i>Lanius cristatus</i>
Bimaculated Lark	<i>Melanocorypha bimaculata</i>
Greater Short-toed Lark	<i>Calandrella brachydactyla</i>
Hume's Lark	<i>Calandrella acutirostris</i>
Eastern Short-toed Lark	<i>Calandrella dukhunensis</i>
Lesser Short-toed Lark	<i>Alaudala rufescens</i>
Forest Wagtail	<i>Dendronanthus indicus</i>
Citrine Wagtail	<i>Motacilla citreola</i>
Richard's Pipit	<i>Anthus richardi</i>
Tawny Pipit	<i>Anthus campestris</i>
Blyth's Pipit	<i>Anthus godlewskii</i>
Brown Shrike	<i>Lanius cristatus</i>
Siberian Thrush	<i>Geokichla sibirica</i>
Grey-sided Thrush	<i>Turdus feae</i>
Eyebrowed Thrush	<i>Turdus obscurus</i>
Siberian Rubythroat	<i>Calliope calliope</i>
Bluethroat	<i>Cyanecula svecica</i>
Eversmann's Redstart	<i>Phoenicurus erythronotus</i>
White-throated Bushchat	<i>Saxicola insignis</i>
Common Stonechat	<i>Saxicola torquatus</i>
Red-breasted Flycatcher	<i>Ficedula parva</i>
Red-throated Flycatcher	<i>Ficedula albicilla</i>
Lanceolated Warbler	<i>Locustella lanceolata</i>
Moustached Warbler	<i>Acrocephalus melanopogon</i>
Paddyfield Warbler	<i>Acrocephalus agricola</i>
Blyth's Reed-Warbler	<i>Acrocephalus dumetorum</i>
Thick-billed Warbler	<i>Arundinax aedon</i>
Dusky Warbler	<i>Phylloscopus fuscatus</i>
Booted Warbler	<i>Iduna caligata</i>
Lesser Whitethroat	<i>Sylvia curruca</i>
Asian Desert Warbler	<i>Sylvia nana</i>
Pine Bunting	<i>Emberiza leucocephalos</i>
Yellow-breasted Bunting	<i>Emberiza aureola</i>
Black-headed Bunting	<i>Emberiza melanocephala</i>
Common Chaffinch	<i>Fringilla coelebs</i>
Brambling	<i>Fringilla montifringilla</i>
Spanish Sparrow	<i>Passer hispaniolensis</i>
Rosy Starling	<i>Pastor roseus</i>
Common Starling	<i>Sturnus vulgaris</i>

the passerines comprising swallows, flycatchers, warblers, thrushes, chats, wheatears, redstarts, pipits, wagtails, buntings and finches.

Some of the migratory waterbird species have populations/races that breed (mostly in small numbers) in the Trans-Himalayas in summer, e.g., Bar-headed Goose *Anser indicus*, Ruddy Shelduck *Tadorna ferruginea*, Mallard *Anas platyrhynchos*, Lesser Sandplover *Charadrius mongolus*, Common Sandpiper *Actitis hypoleucos*, Common Redshank *Tringa totanus* and Brown-headed Gull *Larus brunnicephalus*. As in the case of most other migrants, these also migrate southward after breeding, to spend the winter in the

warmer climes of the Subcontinent. Besides, there are some other species among waterbirds and landbirds that have populations/races breeding in different areas of the mainland, as discussed under Residents.

Not all winter migrants spend the entire winter in the Subcontinent. Instead, they only make stopovers to rest and feed while passing through the region enroute to their wintering grounds in Africa or the Middle East: Amur Falcon *Falco amurensis*, Common Cuckoo *Cuculus canorus* Ortolan Bunting *Emberiza hortulana*, Common Whitethroat *Sylvia communis*, Rufous-tailed Scrub-Robin *Cercotrichas galactotes*, Rufous-tailed Rock-Thrush *Monticola*

SOME OF THE SUMMER (BREEDING) MIGRANTS OF THE INDIAN SUBCONTINENT:

Black Baza	<i>Aviceda leuphotes</i>
Common Kestrel	<i>Falco tinnunculus</i>
Oriental Hobby	<i>Falco severus</i>
Eurasian Hobby	<i>Falco subbuteo</i>
Wood Snipe	<i>Gallinago nemoricola</i>
Lesser Cuckoo	<i>Cuculus poliocephalus</i>
Chestnut-winged Cuckoo	<i>Clamator coromandus</i>
Large Hawk-Cuckoo	<i>Hierococcyx sparveroides</i>
Asian House-Martin	<i>Delichon dasypus</i>
Northern House-Martin	<i>Delichon urbicum</i>
Eurasian Crag-Martin	<i>Ptyonoprogne rupestris</i>
Rosy Pipit	<i>Anthus roseatus</i>
Grey-backed Shrike	<i>Lanius tephronotus</i>
Blue-capped Rock-Thrush	<i>Monticola cinclorhyncha</i>
Pied Thrush	<i>Geokichla wardii</i>
Rusty-tailed Flycatcher	<i>Ficedula ruficauda</i>
Ultramarine Flycatcher	<i>Ficedula superciliaris</i>
Kashmir Flycatcher	<i>Ficedula subrubra</i>
Verditer Flycatcher	<i>Eumyias thalassinus</i>
Chestnut-crowned Bush-Warbler	<i>Cettia major</i>
Grey-sided Bush-Warbler	<i>Cettia brunnifrons</i>
Sulphur-bellied Warbler	<i>Phylloscopus griseolus</i>
Tickell's Leaf-Warbler	<i>Phylloscopus affinis</i>
Tytler's Leaf-Warbler	<i>Phylloscopus tytleri</i>
Large-billed Leaf-Warbler	<i>Phylloscopus magnirostris</i>
Western Crowned Leaf-Warbler	<i>Phylloscopus occipitalis</i>



Indian Pitta *Pitta brachyura*

saxatilis and Red-backed Shrike *Lanius collurio*. Vagrants (e.g., swans and divers) have been recorded wintering in the Subcontinent on rare occasions. They mostly arrive following extreme weather conditions in the northern climes.

Summer (Breeding) Migrants

Similar to the migration pattern of the extralimital migrants to the Subcontinent is the movement of birds to the Himalayas and the Northeast hills in summer to breed. Post-breeding, these species winter in northern India or migrate further south into the Peninsula. These summer (breeding) migrants behave like true migrants from the Palaearctic, and this is like a compacted case of the North-to-South migration brought about by the presence of the Himalayas and the adjoining hills, which due to their elevation, mimic the conditions of the breeding grounds in the northern climes.

Altitudinal Migrants

A much shorter migration is undertaken by resident Himalayan birds. These species move down to the lower reaches and foothills of the range with the advent of winter (to escape the cold conditions) and return with the onset of spring. Examples are Grandala *Grandala coelicolor*, Ibisbill *Ibidorhyncha struthersii*, Wallcreeper *Tichodroma muraria* and treecreepers. Other than arboreal species, the cursorial pheasants and their allies undertake such migrations, travelling largely on foot. Altitudinal migration by resident birds also takes place in the Western Ghats, for example, in the Square-tailed Bulbul *Hypsipetes ganeesa*, with birds moving to the foothills during the cold weather.

Local (Seasonal) Migrants

Many resident species of the Indian Subcontinent undertake regular, seasonal internal movements, while some undertake irregular, nomadic movements. Little precise information is available on the movements of local migrants, and a better picture will emerge with intensive bird banding, satellite-tracking or geolocator studies — as is being done on winter migrants.

Well-known among the local (seasonal) migrants is the Indian Pitta *Pitta brachyura*. It breeds in the hills of central and western India, and also in the Himalayas, and migrates into the southern part of the Peninsula and Sri Lanka in winter. Another is the Indian Paradise-Flycatcher *Terpsiphone paradisi*, comprising three subspecies, all of which undertake seasonal/local movements within the Subcontinent. Yet another is the Indian Golden Oriole *Oriolus kundoo*, which largely breeds in parts of north Pakistan, Himalayas, northern India, Nepal and central India and migrates, post-breeding, into the southern parts of the Peninsula. The Blue-tailed Bee-eater *Merops philippinus* breeds in summer in north Pakistan and parts of northern and central India, and southeast Sri

Lanka, and winters in southern India, Sri Lanka, and the Andaman and Nicobar Islands, mainly from September to April.

Among the resident bustards, the Lesser Florican *Sypheotides indicus* is a species that is presumed to undertake seasonal, long-distance movements. Its stronghold is in northwestern and central India (mainly in Gujarat and western Madhya Pradesh) where it breeds during the monsoon, and it has been recorded widely across India outside the season. It has also been recorded breeding in other parts of the country; BNHS studies have documented that it breeds regularly in the protected grassland enclosures of Rollapadu Wildlife Sanctuary (Kurnool district, Andhra Pradesh). It is conjectured that the birds migrate and breed in winter in the southern parts of the Peninsula if the monsoon has been poor in their northern strongholds.

Among the waterbirds occurring in the Indian Subcontinent that undertake significant seasonal/nomadic movements are the flamingos. Both the Greater Flamingo *Phoenicopterus roseus* and Lesser Flamingo *Phoeniconaias minor* largely breed in the Kachchh (Kutch) region of Gujarat, and from winter up to the onset of the southwest monsoon, flamingos are recorded from many sites in the mainland, especially in peninsular India. However, the origin/origins of these wintering birds are still uncertain. For instance, Greater Flamingos ringed in Iran and Kazakhstan have been recovered in the Indian Subcontinent. Till date, the movement pattern of 'Kachchh birds' into southern India (and elsewhere) is unknown with no recoveries either from the nearly two hundred young individuals ringed in the 1940s from the Great Rann of Kachchh, or from birds ringed over the decades from BNHS field stations in southern India. Likewise, there is uncertainty on the origins of the Lesser Flamingo wintering in the Subcontinent. Since the mid-1990s, up to 100,000 Lesser Flamingos have been recorded in



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Blue-tailed Bee-eater *Merops philippinus*

the Mahul-Sewri Creek of Mumbai. This when compared with the low numbers and scarce nesting records reported in Kachchh in the past, and also the significant numbers reported in winter in Kachchh (as in the wetlands around Mumbai) in recent years, suggests migration/movements of birds between Africa (the stronghold of the species) and India.

Apart from the systematic seasonal movements by some resident birds, quite a few undertake (irregular) nomadic movements within the Indian Subcontinent, mainly in quest of food. Frugivorous birds such as green-pigeons are known to undertake long-distance movements in search of fruits. Nomadism is also not uncommon among fish-eating waterbirds, which fly long distances to forage and return to their breeding sites only during the breeding season. The Spot-billed Pelican *Pelecanus philippensis* is a good example, as revealed by BNHS



**Greater Flamingos *Phoenicopterus roseus* and Lesser Flamingos *Phoeniconaias minor*
in Mahul-Sewri Creek, Mumbai**

study in southern India. That many of the egrets occurring in an area do not breed anywhere in the vicinity is itself a good indicator that nomadism is rampant in fish-eating birds. Grain-eaters also move to regions with food resources, especially during the dry season or drought.

Many of the small and less ‘glamorous’ landbird species should also be undertaking seasonal/nomadic movements that are not apparent. One ‘astonishing’ example of this was the recovery

of a Purple Sunbird *Cinnyris asiaticus* ringed in Bharatpur (Rajasthan) in March 1968 by BNHS. The individual was recovered after three years at Dehradun (Uttarakhand), 350 km to the north of Bharatpur. As Sálím Ali says in his BOOK OF INDIAN BIRDS, “Thus, practically no square kilometre of the Indian Subcontinent is static for any length of time as regards its bird population, and there is an unending chain of comings and goings of species and individuals.”

BIOGEOGRAPHIC REGIONS OF THE INDIAN SUBCONTINENT AND THEIR AVIFAUNA

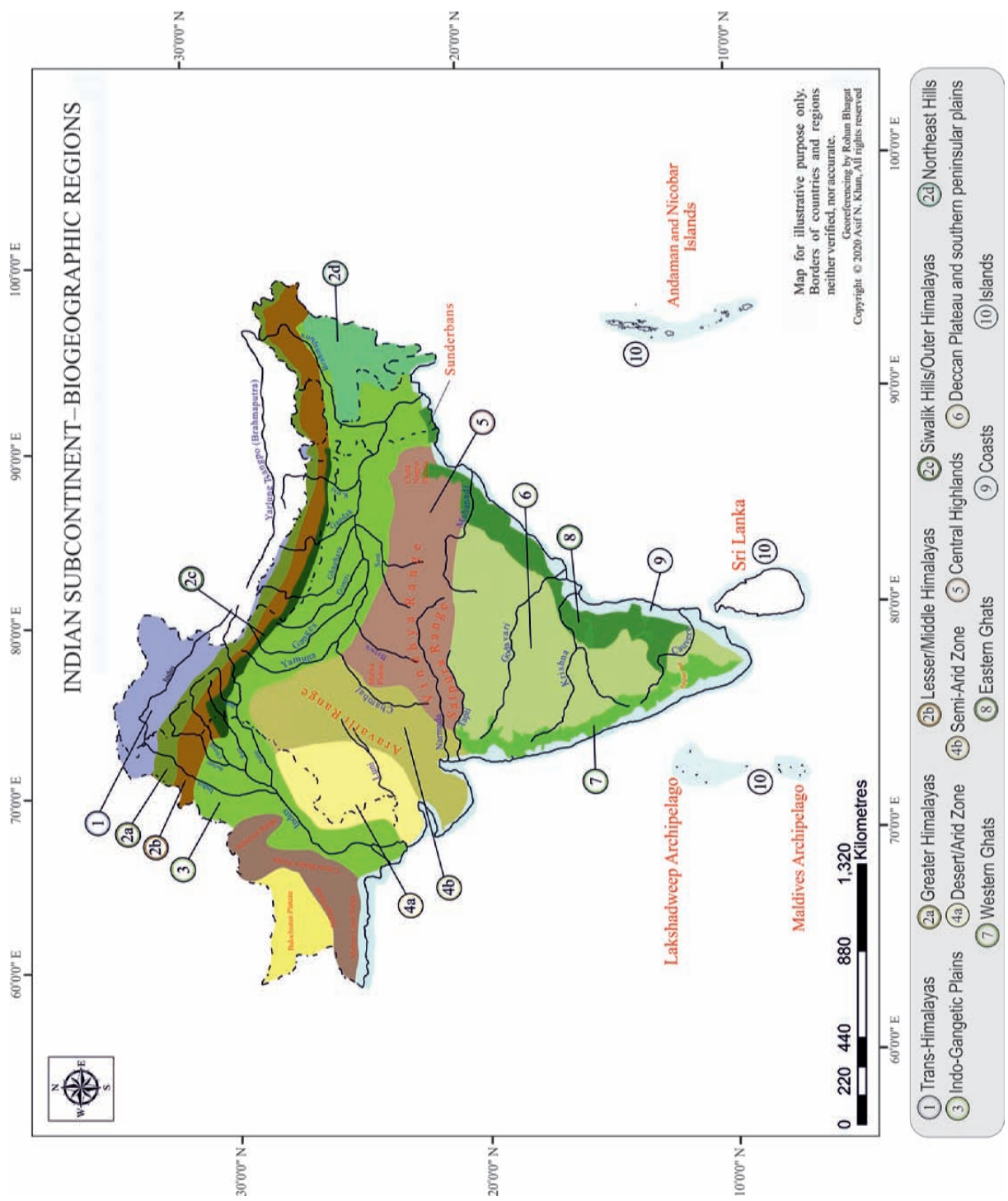
The Indian Subcontinent falls under the Indo-Malayan (formerly known as Oriental) ecozone that extends to Southeast Asia. Biogeographically, the Indian Subcontinent (and its adjoins) is one of the most fascinating regions in the world with a wide diversity of ecosystems ranging from mountains to the plains, with an assortment of forest types, deserts, savannah-like formations, alpine and shola grasslands, wetlands, rivers, seas and oceans. From an ornithological perspective,

we have classified the Indian Subcontinent into ten biogeographic regions (Table 1 and Fig. 1). This map has been arrived at after referring to a number of maps (which differed with regard to country and region boundaries), and so, it is to be considered as more of a representative (and not accurate) map for the different zones. The biogeographic classification follows the Wildlife Institute of India (Rodgers et al. 2000), but differs from it in that the Central Highlands is considered

Table 1: The biogeographic regions of the Indian Subcontinent from the ornithological perspective

S.No.	Biogeographic Regions	Realms
1.	Trans-Himalayas	The cold desert areas of the Ladakh region (viz., the mountains in the western part, and the Changthang Plateau in the east that abuts the Tibetan Plateau), Lahaul and Spiti in Himachal Pradesh, and along the northern edges of Uttarakhand, Nepal and Sikkim that border the Tibetan Plateau.
2.	Himalayas (including the Northeast Hills)	The mountainous region south of the Trans-Himalayas from the Hindu Kush to Arunachal Pradesh; Northeast Hills
3.	Indo-Gangetic Plains	Alluvial stretch south of the Himalayas: Indus Valley Plains and Gangetic Plains
4.	Desert and Semi-Arid Zone	Thar Desert, Kachchh, Punjab Plains, Gujarat and Rajasthan
5.	Central Highlands	Vindhyas, Satpuras, Malwa Plateau, Chota Nagpur Plateau
6.	Deccan Plateau, and the southern peninsular plains	The Deccan tableland south of the Central Highlands, along with the southern peninsular plains
7.	Western Ghats	The mountainous region running along the west of the Indian Peninsula
8.	Eastern Ghats	The mountainous region running largely along the east of the Indian Peninsula
9.	Coasts	The east and west coasts of India, extending into Bangladesh and Pakistan respectively.
10.	Islands	i) Lakshadweep and the Maldives ii) Andaman and Nicobar Islands iii) Sri Lanka

Fig.1: The biogeographic regions of the Indian Subcontinent from the ornithological perspective



as a separate biogeographic entity (contra merging it with the Deccan Plateau), and similarly, also assigning biogeographic status to the Eastern Ghats (contra to treating it as part of the Deccan Plateau).

Our classification is logical from the avifaunal point of view. For example, the occurrence of two endemic/near-endemic species in the Eastern Ghats, and the occurrence of resident species in the Central Highlands that are also found in the Himalayas and the Western Ghats, but are not found in Deccan Plateau. Another major deviation from the WII classification is that ours covers the Indian Subcontinent (contra India in the WII classification). As for the write-ups of sites and the birdlife of the different regions, these tend to be largely India centric, except in the case of Sri Lanka due to the high occurrence of endemic species. In the case of the other countries of the subcontinent, unless where mention is felt necessary, there is no or little mention of birds (and major bird sites) of

these countries due to similarity in the avifauna in the biogeographic regions they fall under that is contiguous with India.

Most of the information available on the avifauna of the biogeographic regions is based on accounts of short-term surveys/collections or anecdotal accounts of some representative sites. Thus, except for information pertaining to a few sites (mostly Protected Areas), there is inadequate baseline data on the birds of these regions. However, with documentation of birds taking a quantum leap in the current century and with the growing number of birdwatchers recording and also photo-documenting birds in various parts of the Subcontinent, we can expect a more precise picture to emerge in the near future on the distribution of birds in the region. We will now look at the biogeographic zones and their birdlife. The species discussed are mainly terrestrial birds; waterbirds are discussed separately towards the end of the article.

TRANS-HIMALAYAS



Ladakh, Trans-Himalayas

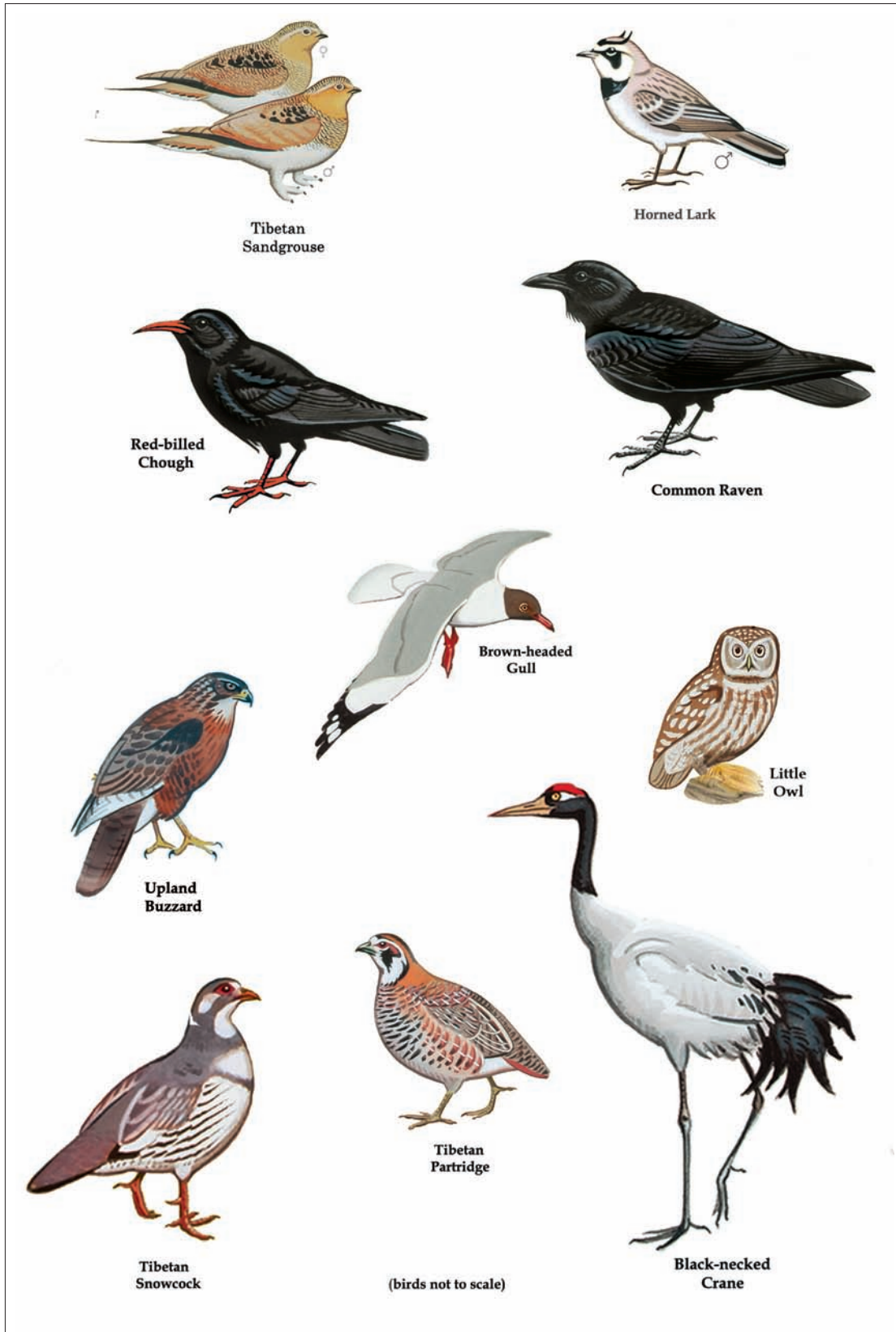
The Trans-Himalayan region lies in the rain shadow area north of the Greater Himalayas. It comprises the cold desert areas of the Ladakh region (viz., the mountains in the western part, and the Changthang Plateau in the east that abuts the Tibetan Plateau), the Lahaul and Spiti areas in Himachal Pradesh, and tracts along the northern edges of Uttarakhand, Nepal and Sikkim bordering the Tibetan Plateau.

This ill-defined biogeographic zone is largely located at over 4000 m AMSL. This zone has extensive areas of bare rock and glaciers and sparse alpine grassland with scattered shrubs; snowline is bereft of vegetation. Unlike the main Himalayas, the Trans-Himalayan mountains are not divided by deep river gorges and lack a definite alignment. The Indus River

has its origins in the Tibetan Plateau, near Lake Manasarovar. There are a number of lakes in the region.

The characteristic bird species of this region are akin to those of the Tibetan Plateau and Central Asia. Some examples of this landscape include Tibetan Snowcock *Tetraogallus tibetanus*, Himalayan Snowcock *Tetraogallus himalayensis*, Tibetan Partridge *Perdix hodgsoniae*, Upland Buzzard *Buteo hemilasius*, Tibetan Sandgrouse *Syrrhaptes tibetanus*, Little Owl *Athene noctua*, Horned Lark *Eremophila alpestris*, Ground Tit *Pseudopodoces humilis*, Red-billed Chough *Pyrrhocorax pyrrhocorax* and Common Raven *Corvus corax*, besides various species of wheatears, redstarts, accentors, finches and robins. This region is also an important staging ground for migratory

CHARACTERISTIC BIRDS OF THE TRANS-HIMALAYAS





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Hanle, Trans-Himalayas



DIBYENDU ASH (WIKIPEDIA)

Black-necked Crane *Grus nigricollis* in Tso-Kar lake, Ladakh

birds that cross the Himalayas during the spring and autumn migrations. The Black-necked Crane *Grus nigricollis*, mostly distributed in the Tibetan Plateau, occurs and breeds in small numbers in eastern Ladakh (Chushul and adjoining areas). The lakes of Pangong Tso, Tso Moriri, Tso-Kar and Startsapuk-Tso serve as breeding grounds for a variety of birds in summer, including the Bar-headed Goose *Anser indicus*, Ruddy Shelduck *Tadorna ferruginea*, Mallard *Anas platyrhynchos*, Brown-headed Gull *Larus brunnicephalus*, Great Crested Grebe *Podiceps cristatus*, Lesser Sandplover *Charadrius mongolus*, Common Sandpiper, Common Redshank and Common Tern *Sterna hirundo*.

HIMALAYAS (INCLUDING THE NORTHEAST HILLS)

The Himalayan mountain range consists of a series of ranges stretching from the Hindu Kush in north Pakistan, eastwards to Arunachal Pradesh and the adjoining areas in China and Myanmar. To the south of the Himalayas in Pakistan, and along parts of its western provinces is another mountain range, the Sulaiman Range, which we will not cover in this article. The Himalayas varies in width from 400 km in the west to 150 km in the east. It separates the Indo-Gangetic Plains from the Tibetan Plateau. The rivers Indus, Ganga (or Ganges) and Brahmaputra — which flow in the Indo-Gangetic Plains — originate in these mountains. The Himalayan range (including the Trans-Himalayas) has a number of lakes.

Some of the well-known ones are Rakshastal and Manasarovar in Tibet; Rara, Tilicho and Shey-Phoksundo in Nepal; Pangong Tso, Tso Moriri and Tso Kar in Ladakh; Tsomgo and Gurudongmar in Sikkim; Nainital in Uttarakhand; Sangetsar in Arunachal Pradesh; and Gangabal in Jammu and Kashmir. The Himalayas comprises three regions:

Greater/Great Himalayas (6000 m): The northern part of the Himalayas south of the Trans Himalayas and Tibetan Plateau. The Greater Himalayan stretch has some of the world's highest peaks like Mt. Everest (8,845 m), Kanchenjunga (8,598 m) and Nanga Parbat (8,126 m). Most of the Greater Himalayas lies above the tree line and is



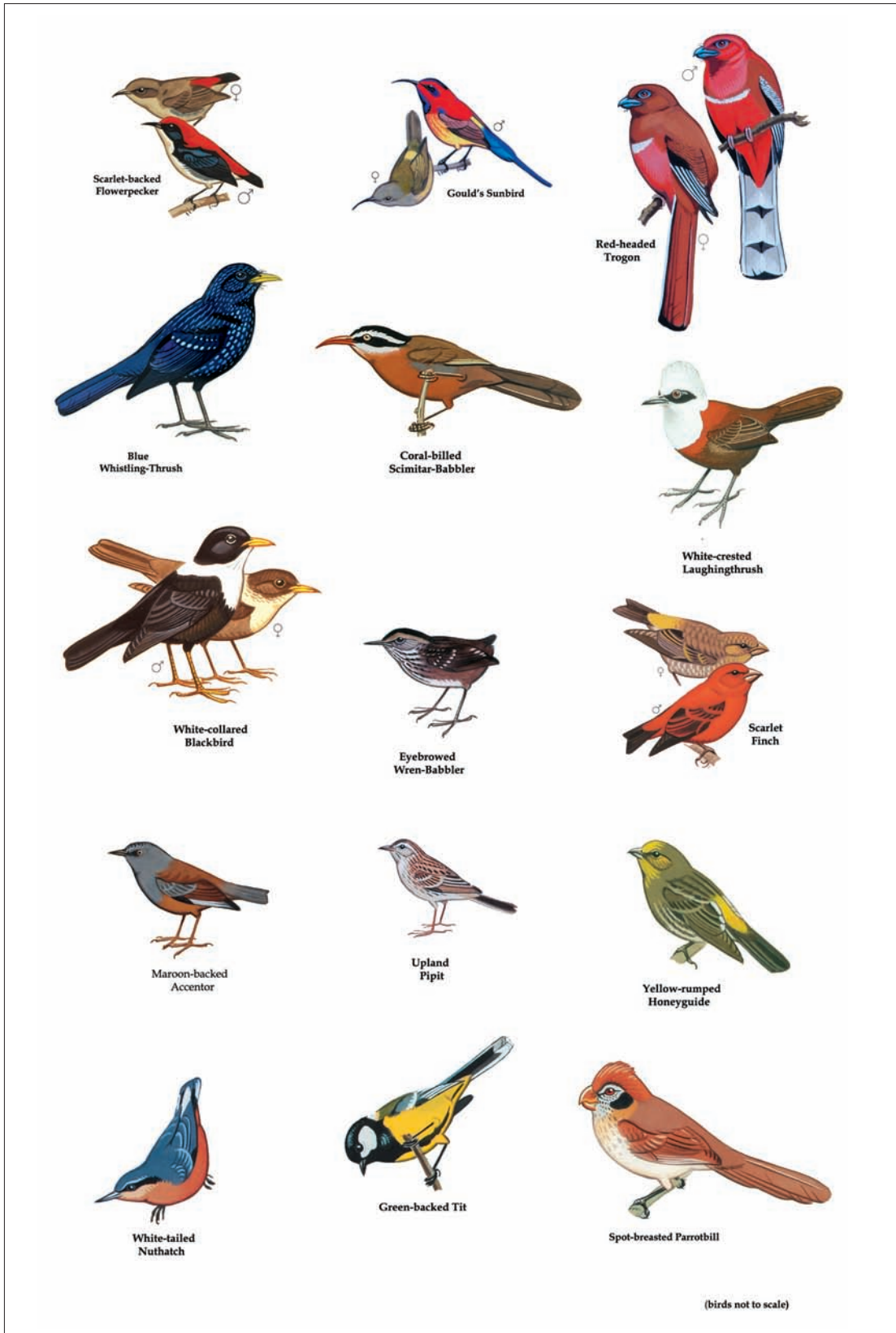
The Greater Himalayas in Nepal, with the Lesser Himalayas (or Middle Himalayas) in the foreground

CHARACTERISTIC BIRDS OF THE HIMALAYAS



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)

CHARACTERISTIC BIRDS OF THE HIMALAYAS



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)

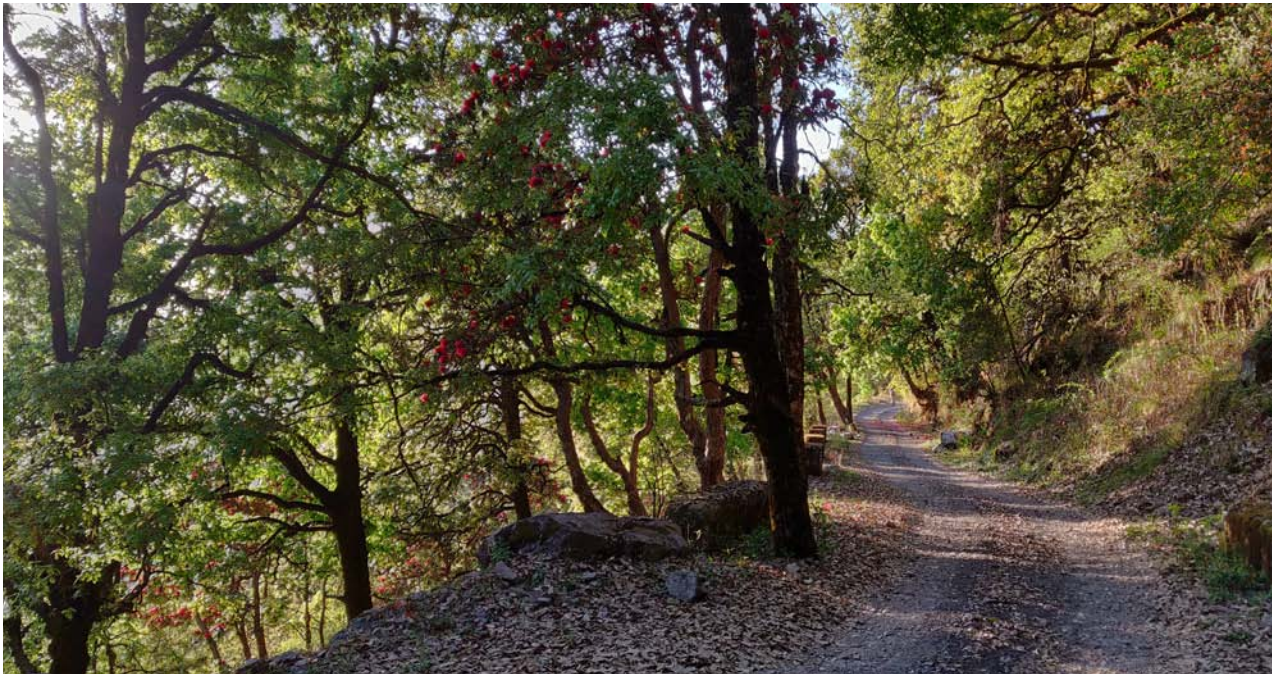


Pangot, Siwaliks



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Valley of Flowers, Western Himalayas



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Uttarakhand, Western Himalayas

characterized by sub-alpine shrub and meadows, and subalpine conifers.

Lesser/Middle Himalayas (3000–3500 m): This is the middle stretch sandwiched between the Greater Himalayas and the Siwaliks. The Lesser Himalayas largely has subalpine conifers and broadleaf forest.

Siwaliks/Outer Himalayas (900–1200 m): The Siwaliks constitutes the southernmost hills that abut the Indo-Gangetic Plains. The broadleaf forest of the Lesser Himalayas continues into these foothills.

Northeast Hills: The Northeast Hill range occurs in the Indian states of Meghalaya, Nagaland, Manipur, Mizoram, Tripura, the southern edge of Assam, and the regions of Chittagong and the low hills of Sylhet in Bangladesh. The range comprises a series of comparatively low hills (*c.* 1,000 m AMSL), these collectively called the Purvanchal Range (some areas being part of the northern part of the Arakan Mountains of Myanmar). Since the Northeast Hill range forms a southward extension of the Eastern Himalayas and shares many similarities with it, biogeographers tend to clump

the hills with the latter. Some of the major hill ranges are Patkai-Bum that starts from Arunachal and merges with the Naga Hills in Nagaland; Khasi-Garo-Jaintia Hills in Meghalaya; the Lushai Hills (also known as Mizo Hills) located partially in Mizoram, Tripura and Myanmar; Jampui Hills in Tripura and Chin Hills that runs northwards from Manipur to the Chin State of Myanmar. In the adjoining Bangladesh, the Chittagong Hill tracts in the southeast that border Tripura in the north and Mizoram in the south are the only extensively hilly areas in the country. This is one of the regions in the world that receive the highest rainfall. The vegetation comprises moist evergreen, semi-evergreen and moist deciduous forests, bamboo jungle, open grass-covered slopes, swamps, and grasslands. The largest and most well-known wetland of the region is Loktak Lake (in Manipur), a freshwater wetland designated as a Ramsar site (Wetland of International Importance). Among the prominent groups of birds that characterize the birdlife of the Himalayas is Phasianidae, especially the large and colourful pheasants (8 species), monals (2 species) and tragopans

DHIRAJ KUMAR DAS



Manas National Park, foothills of Eastern Himalayas

HIMADRI SEKHAR MONDAL



Namdapha Tiger Reserve, Eastern Himalayas



Kalij Pheasant *Lophura leucomelanos*

(4 species). Typical raptors of this region are Golden Eagle *Aquila chrysaetos*, Mountain Hawk-Eagle *Nisaetus nipalensis*, Changeable Hawk-Eagle *N. cirrhatous*, Bearded Vulture *Gypaetus barbatus* and Himalayan Griffon (or Himalayan Vulture) *Gyps himalayensis*. The other bird groups characteristic of the Himalayas are the fork-tails, flycatchers, thrushes, laughingthrushes, shortwings, robins, yuhinas, fulvettas, barwings, sibilias, minlas, shrike-babblers, scimitar-babblers, wren-babblers, parrotbills, bush-warblers, tesias, treecreepers, nuthatches, tits, accentors, finches and allies, drongos, nutcrackers, choughs, magpies, and jays. The Himalayan habitats are also the breeding grounds for many species of bush-warblers (resident or migrant) that are largely restricted to the region and warblers that winter in the rest of the Subcontinent.

Some species are distributed over the whole or large parts of the Himalayas such as Snow Partridge *Lerwa lerwa*, Himalayan Monal *Lophophorus impejanus*, Kalij Pheasant (or Kaleej Pheasant) *Lophura leucomelanos*, Wood Snipe *Gallinago nemoricola*, Snow Pigeon *Columba leuconota*, Speckled Woodpigeon *Columba hodgsonii*, Crested Kingfisher (or Himalayan Pied Kingfisher) *Megaceryle lugubris*, Red-headed Trogon *Harpactes erythrocephalus*, Great Barbet *Psilopogon virens*, Yellow-rumped Honeyguide *Indicator*

xanthonotus, Long-tailed Broadbill *Psarisomus dalhousiae*, Upland Pipit *Anthus sylvanus*, Himalayan Bulbul *Pycnonotus leucogenys*, Yellow-bellied Fairy-Fantail *Chelidorhynch hypoxanthus*, two dipper species, Grandala *Grandala coelicolor*, Blue Whistling-Thrush *Myophonus caeruleus*, Little Forktail *Enicurus scouleri*, Spotted Forktail *Enicurus maculatus*, Plumbeous Water-Redstart *Phoenicurus fuliginosus*, Northern Wren (or Winter Wren) *Troglodytes troglodytes*, Striated Prinia *Prinia crinigera*, Green-backed Tit *Parus monticolus*, Fire-breasted Flowerpecker *Dicaeum ignipectus*, Southern Nutcracker *Nucifraga hemispila*, Common Raven *Corvus corax*, Eurasian Jay *Garrulus glandarius*, Yellow-billed Blue Magpie *Urocissa flavirostris*, and Grey Treepie *Dendrocitta formosae*. Pheasants, accentors, grosbeaks, crossbeaks, nutcrackers, and choughs are characteristic of the Greater Himalayas; finches, treecreepers, fork-tails, robins, shortwings, minlas, yuhinas, and thrushes, of the Lesser/Middle Himalayas; bulbuls, green-pigeons, woodpeckers, flycatchers, warblers, and parakeets of the Siwaliks.

Longitudinally, the Himalayas is divisible into two parts: the Western Himalayas (Pakistan eastwards to western Nepal) and the steeper, moister, warmer, more densely forested and biodiversity-rich Eastern Himalayas (eastern Nepal eastwards to Arunachal Pradesh, and also Northeast Hills). The central part, comprising solely of Nepal, is sometimes referred to as the Central Himalayas.

Western Himalayas: This part is characterized by alpine shrub and meadows, sub-alpine conifer forest and broadleaf forest. Protected Areas such as the Great Himalayan National Park, and Nanda Devi Biosphere Reserve, including the Valley of Flowers National Park, are situated in this region. About 300-odd bird species are reported from the Western Himalayas. Some of those that are endemic/near endemic or have a stronghold in

this region are the Western Tragopan *Tragopan melanocephalus* (the State Bird of Himachal Pradesh), Koklass Pheasant *Pucrasia macrolopha*, Cheer Pheasant *Catreus wallichii*, Kashmir Flycatcher *Ficedula subrubra*, Kashmir Nuthatch *Sitta cashmirensis* and Orange Bullfinch *Pyrrhula aurantiaca*. The Himalayan Quail *Ophrysia superciliosa* is endemic to this region (Mussoorie and Nainital in Uttaranchal), but this Critically Endangered bird has not been sighted since 1876.

Eastern Himalayas (including the Northeast Hills): Tropical and sub-tropical rainforests, along with alpine shrubs and meadows, temperate conifer forests and broadleaf forests, give the region its distinctive identity. Protected Areas such as Neora Valley National Park, Jigme Dorji National Park (Bhutan), and Eaglenest Wildlife Sanctuary are situated in this region. About 500-odd bird species are reported from the Eastern Himalayas (including Northeast Hills), with significantly fewer species (c. 200-odd species) in the coniferous belt. Some of the species/families that are endemic/near-endemic or have a stronghold in this region are the Chestnut-breasted Hill Partridge *Arborophila mandellii*, White-cheeked Hill-Partridge *Arborophila atrogularis*, Temminck's Tragopan *Tragopan temminckii*, Blyth's Tragopan *Tragopan blythii* (the State Bird of Nagaland), Sclater's Monal *Lophophorus*

sclateri, Mrs Hume's Pheasant *Syrnaticus humiae* (the State Bird of both Manipur and Mizoram), Grey Peacock Pheasant *Polyplectron bicalcaratum*, Green Peafowl *Pavo muticus*, Ward's Trogon *Harpactes wardi*, Lord Derby's Parakeet *Psittacula derbiana*, Blyth's Kingfisher *Alcedo hercules*, Rufous-necked Hornbill *Aceros nipalensis*, Blue-eared Barbet *Psilopogon cyanotis*, Silver-breasted Broadbill *Serilophus lunatus*, Dark-rumped Swift *Apus acuticauda*, and many species of songbirds. Among the waterbirds with a stronghold in this region are the White-bellied Heron *Ardea insignis*, White-winged Duck *Asarcornis scutulata* and Fulvous Whistling-Duck (or Large Whistling-Duck) *Dendrocygna bicolor*, the latter distributed largely in the lowlands of the northeast Subcontinent and is also reported outside this region.

Central Himalayas: This region acts as the transition between the Western and Eastern Himalayas. It has a single endemic species, the Spiny Babbler *Acanthoptila nipalensis*.

BirdLife International has identified the three Himalayan regions as Endemic Bird Areas (EBAs), i.e., sites important for habitat-based bird conservation since they contain the habitats of restricted-range bird species, which thereby make them endemic to the region. The restricted-range species of the three regions are:

Western Himalayas

1. Cheer Pheasant *Catreus wallichii*
2. Himalayan Quail *Ophrysia superciliosa*
3. Western Tragopan *Tragopan melanocephalus*
4. White-throated Tit *Aegithalos niveogularis*
5. Brooks's Leaf-Warbler *Phylloscopus subviridis*
6. Tytler's Leaf-Warbler *Phylloscopus tytleri*
7. Kashmir Nuthatch *Sitta cashmirensis*
8. Kashmir Flycatcher *Ficedula subrubra*
9. Spectacled Finch *Callacanthus burtoni*
10. Orange Bullfinch *Pyrrhula aurantiaca*

Central Himalayas

1. Nepal Cupwing (or Nepal Wren-Babbler) *Pnoepyga immaculata*
2. Spiny Babbler *Acanthoptila nipalensis*
3. Hoary-throated Barwing *Sibia nipalensis*
4. Satyr Tragopan *Tragopan satyra*

Eastern Himalayas (including the Northeast Hills)

1. Sclater's Monal *Lophophorus sclateri*
2. Chestnut-breasted Partridge *Arborophila mandellii*
3. Blyth's Tragopan *Tragopan blythii*
4. Dark-rumped Swift *Apus acuticauda*
5. Ward's Trogon *Harpactes wardi*
6. Yellow-vented Warbler *Phylloscopus cantator*
7. Broad-billed Warbler *Tickellia hodgsoni*
8. Rufous-throated Wren-Babbler *Spelaeornis caudatus*
9. Rusty-throated Wren-Babbler *Spelaeornis badeigularis* (Endemic-India)
10. Tawny-breasted Wren-Babbler *Spelaeornis longicaudatus* (Endemic-India)
11. Blackish-breasted Babbler *Stachyris humei*
12. Snowy-throated Babbler *Stachyris oglei*
13. Striped Laughingthrush *Trochalopteron virgatum*
14. Brown-capped Laughingthrush *Trochalopteron austeni*
15. Hoary-throated Barwing *Sibia nipalensis*
16. Streak-throated Barwing *Sibia waldeni*
17. Brown-throated Fulvetta *Fulvetta ludlowi*
18. Grey Sibia *Heterophasia gracilis*
19. Beautiful Sibia *Heterophasia pulchella*
20. White-naped Yuhina *Yuhina bakeri*
21. White-browed Nuthatch *Sitta victoriae*
22. Rusty-bellied Shortwing *Brachypteryx hyperythra*

INDO-GANGETIC PLAINS

The Indo-Gangetic Plains encompasses the fertile alluvial stretch lying south of the Himalayas and north of the Central Highlands and Chota Nagpur Plateau. It stretches from the Punjab province of Pakistan in the west to parts of West Bengal and Assam, and almost all of Bangladesh in the east. Extremely fertile, this region is one of the most populated and intensively farmed areas on the earth, drained by the Indus, Ganga (Ganges) and Brahmaputra, and their tributaries. The western part (Indus Valley Plains) lies in the Punjab regions of Pakistan and India, drained by the Indus and extends southwards into Sindh,

with a small portion in the Kachchh region. To its east, and lying in India, the plains of Nepal, and most of Bangladesh is the Gangetic Plains.

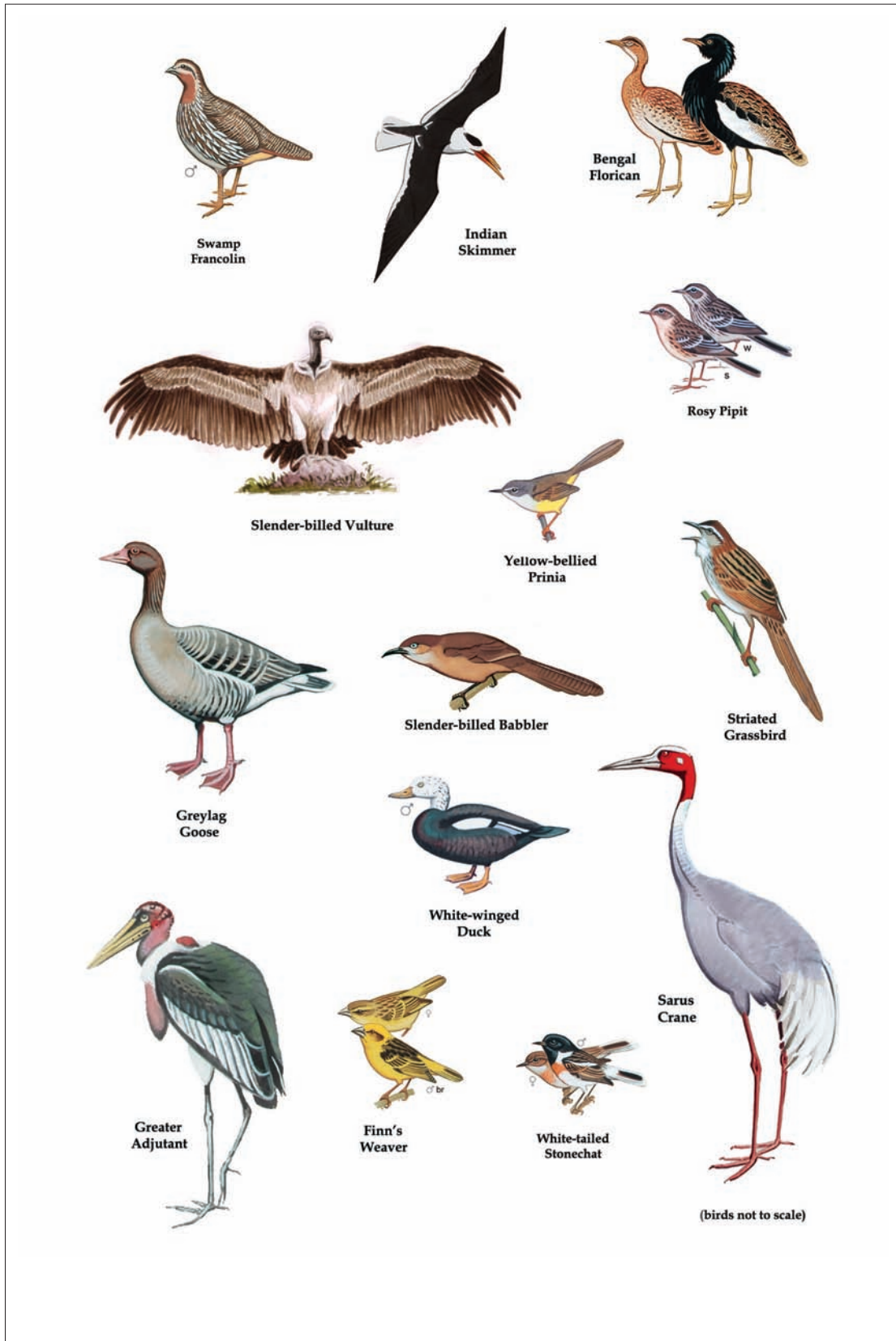
The region originally comprised a belt of grassland and associated scrub woodland country, and tropical moist deciduous forest in the plains at the lower reaches of the confluence of the Ganges and Brahmaputra rivers, but this fertile plain is now almost bereft of the natural vegetation. The major rivers of northern India flow through the plains and a number of wetlands, small and large, dot the landscape. One of the most well-known bird sanctuaries in the Gangetic Plains, primarily



SUJIT NARWADE

Dudhwa, Gangetic Plains

CHARACTERISTIC BIRDS OF THE INDO-GANGETIC PLAINS



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)

for wetland birds, is the Keoladeo National Park in Rajasthan. The major subdivisions of the geomorphology of the Gangetic Plains are:

Bhabar: Bhabar is a 7–15 km belt of gravelly slopes adjacent to the Siwalik foothills above the terai belt. Bhabar is known as dooars/duar in northern West Bengal and Assam. The vegetation varies from west to east with rainfall ranging from moist deciduous in the west to the semi-evergreen forests of the moister Brahmaputra Valley in the east. The corresponding bhabar belt in the xeric western region in Pakistan and its adjoins is characterized by thorn scrub forests.

Doon: Doon or Dun refers to the hummocky broken country, often broad valleys, between the Siwaliks and Lesser Himalayas. Examples include Dehradun in India and Chitwan in Nepal. This belt has Himalayan subtropical broadleaf forests largely dominated by sal (*Shorea robusta*).

Terai: Terai refers to the undulating alluvial, often marshy strip of country along the southern

edge of the bhabar, stretching from Uttar Pradesh and Nepal to northern West Bengal and Assam. This belt is a mosaic of grasslands, savannahs, and deciduous and evergreen forests that include some of the world's tallest grasslands characterized by species such as *Saccharum bengalensis*, *Arundo donax* and *Phragmites karka*.

Situated immediately in the plains of the Himalayas, the Indo-Gangetic Plains is the first stopoversiteformigratorybirdsfromthePalearctic Region (and Himalayas), which winter further south in the Subcontinent, and the major/main wintering destination for some migrants (e.g. Greylag Goose *Anser anser*, Common Shelduck *Tadorna tadorna*, Dalmatian Pelican *Pelecanus crispus*, White Stork *Ciconia ciconia*, Common Crane *Grus grus* and Rosy Pipit *Anthus roseatus*). The White-throated Bushchat *Saxicola insignis* and Hume's Lark *Calandrella acutirostris* are two migratory landbird species that winter in the grasslands of the Gangetic Plains.

The characteristic grassland-associated birds of the Gangetic Plains include the Bengal Florican *Houbaropsis bengalensis*, Indian Grass-Babbler *Graminicola bengalensis*, White-tailed Stonechat *Saxicola leucurus* and Jerdon's Babbler *Chrysomma altirostre*, the latter an inhabitant of the floodplains of the Indus and Brahmaputra. Some of the endemic/near-endemic bird species, or those that have a stronghold in the region, are the Manipur Bush-Quail *Perdicula manipurensis*, Slender-billed Vulture *Gyps tenuirostris*, Slender-billed Babbler *Chatarrhaea longirostris*, Bristled Grassbird *Chaetornis striata*, Yellow-bellied Prinia *Prinia flaviventris*, Grey-crowned Prinia *P. cinereocapilla*, and Finn's Weaver *Ploceus megarhynchus*. The Pied Harrier *Circus melanoleucos*, a Palearctic species that winters mainly in the NE region of the Subcontinent, occasionally breeds in the grasslands of Assam. Other characteristic species in the swampy, grass-jungle habitat of the terai



Finn's Weaver *Ploceus megarhynchus*

RAJAT BHARGAVA



ASIF KHAN

Indian Skimmer *Rynchops albicollis*

are Swamp Francolin *Francoelinus gularis* and Black-breasted Weaver *Ploceus benghalensis* – both these species also occur in the Northeast.

The region has a rich variety of other birds, these mostly comprising species occurring in the lower Himalayas (Siwaliks) in the north with representative birds from the Northeast Hills in the areas of Assam and West Bengal. They include francolins, quails, Red Junglefowl *Gallus gallus*, Indian Peafowl *Pavo cristatus*, parakeets, pigeons, doves, a variety of owls and other raptors, bee-eaters including the Blue-bearded Bee-eater *Nyctyornis athertoni*, barbets, hornbills including the Great Pied Hornbill *Buceros bicornis*, a wide diversity of woodpeckers including the Great Slaty Woodpecker *Mulleripicus pulverulentus*, the cuckoos and allies, bulbuls, fantails including the Yellow-bellied Fairy-Fantail *Chelidorhynx hypoxanthus*, leafbirds, minivets, cuckooshrikes, thrushes, robins and chats, flycatchers, babblers,

warblers nuthatches, tits, flowerpeckers, sunbirds, weavers, munias, sparrows, finches, buntings, mynas, drongos, orioles, and treepies among others.

The Chambal, Ganga and Brahmaputra watercourses that run through this region are major breeding sites for the Indian Skimmer *Rynchops albicollis*. The plains of Assam with its wetlands are the last remaining breeding sites in the Subcontinent for Greater Adjutant *Leptoptilos dubius*. Assam also supports the last breeding sites of the Spot-billed Pelican *Pelecanus philippensis* in the northern part of the Indian Subcontinent. The foraging range of these two species, and also of the Lesser Adjutant *L. javanicus*, extends into the Gangetic Plains in the west, including the Keoladeo wetland in eastern Rajasthan. A resident crane species that is characteristic of the region, though not confined to it, is the Sarus Crane *Antigone antigone*.

DESERT AND SEMI-ARID ZONE



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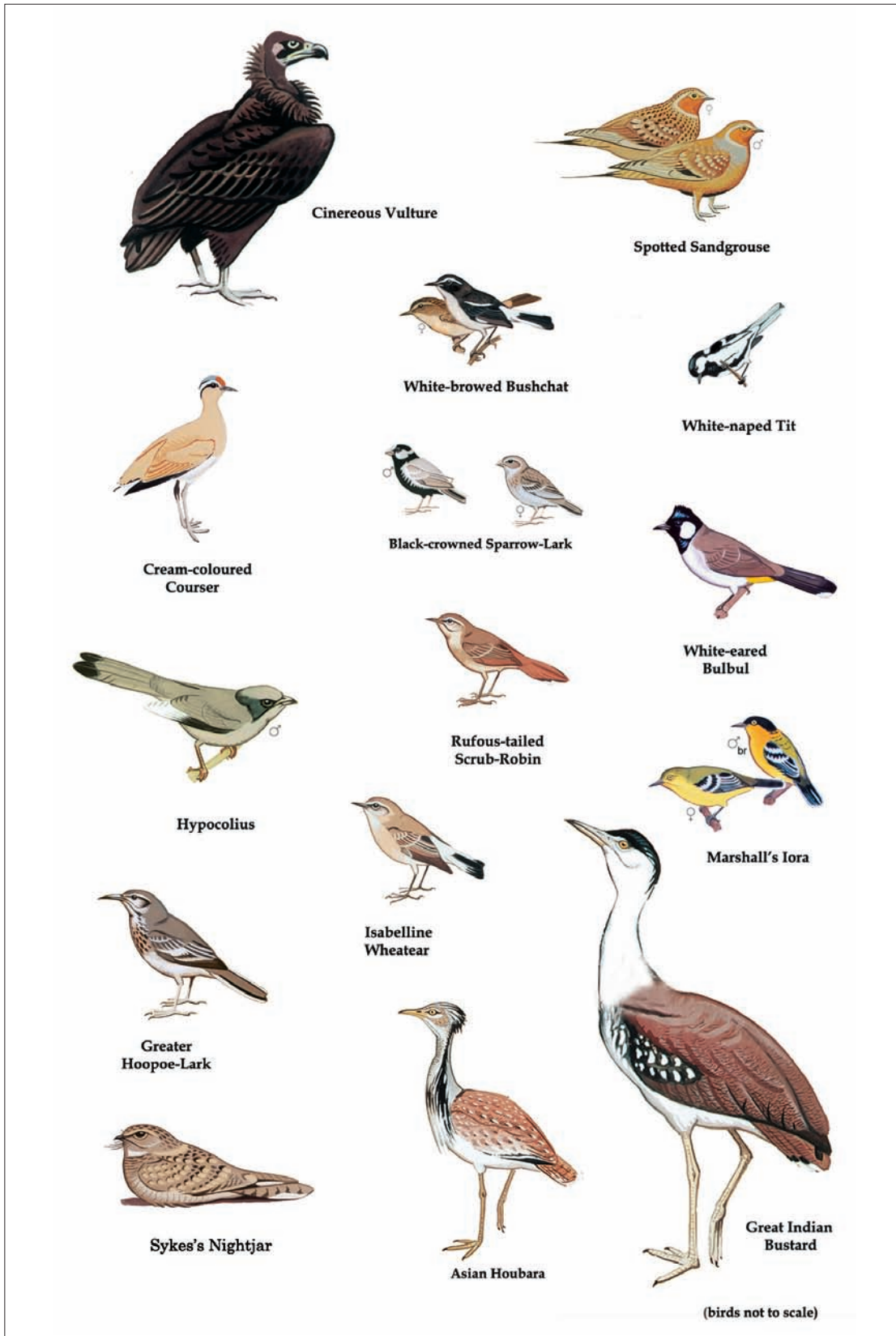
Thar Desert, Desert National Park, Rajasthan

The Thar Desert is situated in the northwestern part of the Indian landmass with about 85% of it in India and the remaining in Pakistan. It is bordered by the irrigated Indus plains in the west, the Aravalli hill ranges in the east, Rann of Kachchh in the south and the southern plains of Punjab and Haryana in the north and northeast – these constituting the semi-arid zone bordering the desert. The climate is characterized by a very hot and dry summer, and a cold winter. The annual rainfall is less than 300 mm and is very erratic with some regions not experiencing rainfall for a couple of years. The summer months are extremely hot, sometimes reaching 50°C. The semi-arid zone has less extreme climate than the desert with rainfall ranging from 300 to 650 mm. The summer temperature can cross 40°C. The altitude of the arid and semi-arid zone ranges from about 350-450 m AMSL in the Aravalli range (in the east) to about 100 m in the south and west and about 20 m in the Rann of Kachchh.

The landforms of this entire region are the predominantly open and sand-covered Thar with sparse vegetation of shrubs and largely devoid of trees. The plains and the hills of the semi-arid country are either under cultivation or support open thorn scrub with small trees (8–10 m). Among the characteristic shrub and tree formations are *Acacia*, *Cassia*, *Calotropis*, *Randia*, *Zizyphus*, *Erythroxylon*, *Euphorbia*, *Prosopis* and *Salvadora* species. There is luxuriant growth of ephemeral herbs and grasses during the rainy season; sewan grass *Lasiurus scindicus* occurs extensively in some tracts of the arid zone in Rajasthan.

Luni is the only river of significance in the region. It originates in the Pushkar valley of the Aravalli range near Ajmer, passes through the southeastern portion of the Thar Desert, and ends in the marshy lands of the Rann of Kachchh in Gujarat. Salt-water lakes of the region include Sambhar, Kuchaman and Didwana in Rajasthan and Kharaghoda in

CHARACTERISTIC BIRDS OF THE DESERT AND SEMI-ARID ZONE



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)



Demoiselle Crane *Anthropoides virgo*

Gujarat. Large areas of the Kachchh get inundated during the monsoon, becoming important habitats for waterbirds and the breeding grounds for the flamingos of the Subcontinent. The habitat here comprises thorn forests, dry deciduous forests, sandy deserts with seasonal salt marshes and mangroves occurring in the estuaries. Large-scale invasion of the exotic *Prosopis juliflora* is a huge problem.

The semi-arid region has one of the oldest mountain ranges in India – the Aravallis – which have tropical thorn forest vegetation. Occurring largely in Rajasthan, the Aravallis runs in a northeast to southwest direction. It is discontinuous at places and stretches over a distance of about 650 km. The northern end of the range continues as isolated hills and rocky ridges into Haryana, ending south of Delhi. In the south, it runs till the borders of Rajasthan with Gujarat. The general elevation of the hills varies from 300 to 900 m AMSL, the highest point being Guru Shikhar (1,722 m) in Mount Abu. Earlier, the Aravallis had dense dry deciduous and thorn forests with evergreen forests along watercourses, but these forests are now degraded except in

protected areas such as Mount Abu Wildlife Sanctuary, Ranthambore National Park, Sariska Tiger Reserve, Kumbhalgarh Wildlife Sanctuary and Asola Bhatti Wildlife Sanctuary. Most of the southern plains of Punjab and Haryana are now irrigated and under cultivation.

Despite being one of the smallest deserts of the world, the Thar has a relatively high diversity of bird species compared to other deserts, with more than 300 bird species recorded from the Indian part of the Thar. Around the same number of species are reported from the bordering semi-arid region, including the Aravalli hills that provide habitat for birds that are partial to thorn forest. Typical species of the desert, either residents or winter migrants, include the Great Indian Bustard *Ardeotis nigriceps*, Asian Houbara *Chlamydotis macqueenii*, Cream-coloured Courser *Cursorius cursor*, White-eared Bulbul *Pycnonotus leucotis*, Spotted Sandgrouse *Pterocles senegallus*, Pintailed Sandgrouse (or White-bellied Sandgrouse) *Pterocles alchata*, Black-bellied Sandgrouse *Pterocles orientalis*, Sykes's Nightjar *Caprimulgus mahrattensis*, Greater Hoopoe-Lark *Alaemon alaudipes*, Black-crowned Sparrow-Lark *Eremopterix nigriceps*, Desert Lark (Bar-tailed Finch-Lark) *Ammomanes deserti*, Rufous-tailed Scrub-Robin *Cerotrachus galactotes*, Isabelline Wheatear *Oenanthe isabellina*, Asian Desert Warbler *Sylvia nana*, besides a variety of other sandgrouse, lark, pipit, wheatear, raptor and vulture species. Endemics/near endemics, or species that have a stronghold in the semi-arid region are the White-browed Bushchat *Saxicola macrorhynchus*, White-naped Tit (or Pied Tit) *Machlolophus nuchalis* and Marshal's Iora (or White-tailed Iora) *Aegithina nigrolutea*.

The plains of southern Rajasthan and Gujarat are major wintering grounds for the Common Crane *Grus grus* and Demoiselle Crane *Anthropoides virgo*. Gujarat is known for its grasslands called *vidis*, occurring mostly in the



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Greater Rann of Kachchh

Kachchh and Saurashtra regions. The Banni grassland at the southern edge of the Great Rann, spanning an area of about 3,500 sq. km is an important habitat for grassland, scrubland and desert species. The Lesser Florican breeds in the grasslands of Velavadar (Saurashtra region), which also supports the largest roost for harriers in the Indian region. Some tracts of this zone are important wintering grounds for the Eastern Imperial Eagle *Aquila heliaca*, Sociable Lapwing

Vanellus gregarius, Greater Short-toed Lark *Calandrella brachydactyla* and Spanish Sparrow *Passer hispaniolensis*. The Kachchh region is the only known regular wintering site in India for the monotypic Hypocolius *Hypocolius ampelinus* of the Middle East.

A major environmental impact for the Thar Desert was the construction of the Indira Gandhi Canal in the 1980s, which originates from the Harike Barrage in Punjab. The Canal, which flows through and irrigates Rajasthan, has negatively impacted desert birds (and other desert wildlife) of the region. The canal has benefitted mesic and waterbird species and resulted in positive socio-economic benefits for the locals. Other than the Canal, there are a number of wetlands – natural or artificial – especially in the semi-arid zone that offer habitat for waterbirds.

Other than the Thar Desert, the Indian Subcontinent has three other deserts, all in Pakistan: Kharan Desert in northwest Balochistan, and the Thal and Cholistan deserts in the Punjab province.



RAJAT BHARGAVA

Mount Abu WLS, Aravallis

CENTRAL HIGHLANDS

The Central Highlands is a biogeographic region in India lying roughly to the north of the Narmada River and formed by the disjunct ranges of the Satpura and Vindhya hills. It serves as a major watershed area for several rivers including Narmada, Chambal, Betwa, Tons, Ken, Sone, Wainganga, Wardha and Tapti (Tapi). The climate is essentially tropical and the region receives rainfall during the southwest monsoon. The forest types are moist mixed deciduous, dry mixed deciduous forest and dry deciduous scrub forests, dominated by sal in the east and teak *Tectona grandis* in the west. The hills and plateau formations of the Central Highlands are:

Vindhyas: The Vindhyas traverse a distance of 1,050 km, roughly stretching from eastern Gujarat in the west to Sasaram, Bihar in the east.

The average elevation of these hills is 450–600 m AMSL, and they rarely cross 700 m. The hills tend to be flat-topped and plateau-like. Amarkantak in Madhya Pradesh is the tallest peak (1,048 m); the Amarkantak area is the meeting point of the Vindhyas and Satpuras. Several tributaries of the Ganga-Yamuna system originate from the Vindhyas and flow northward; these include the Chambal, Betwa and Ken. The southern slopes drain into the Narmada.

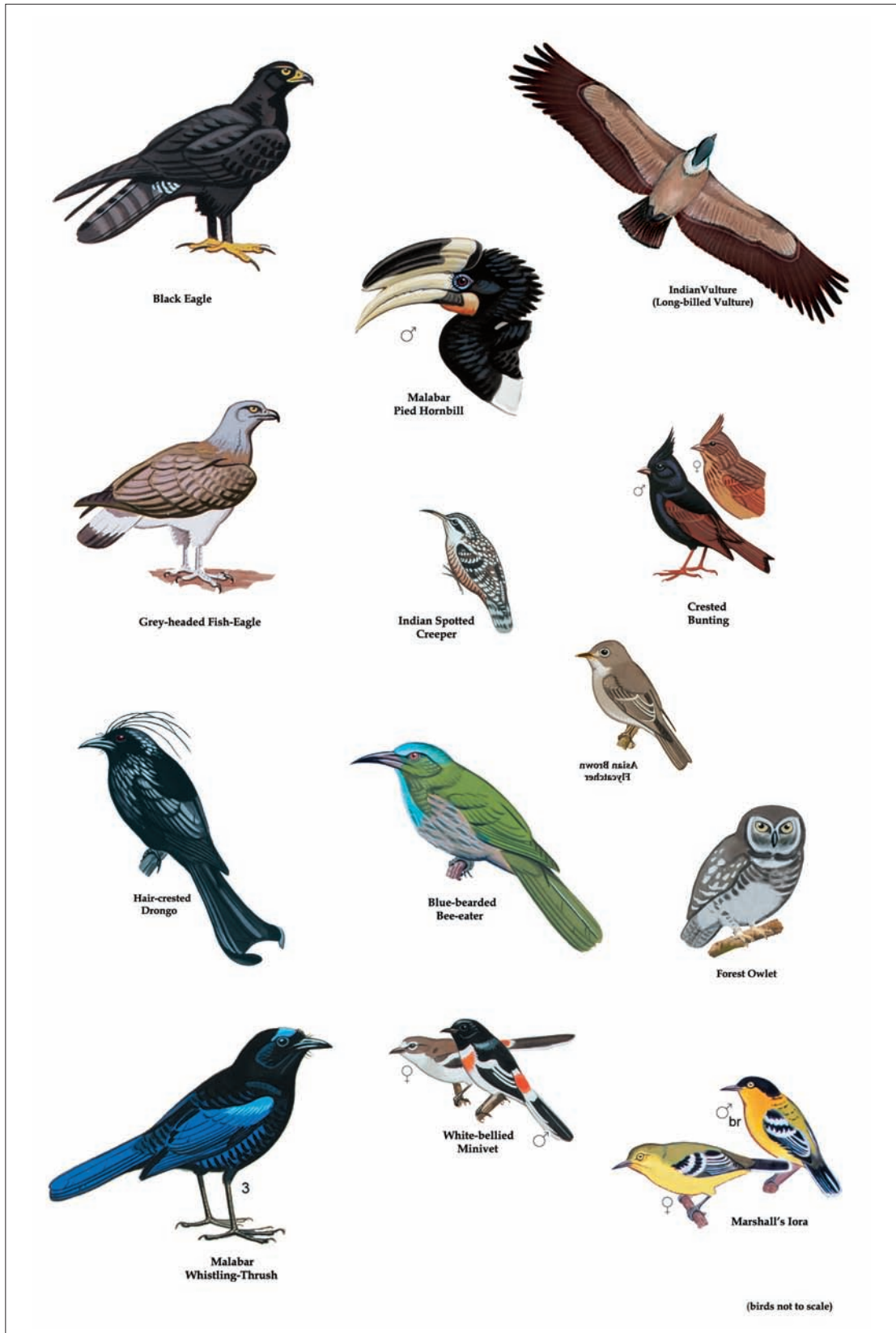
Satpuras: The Satpura range begins in eastern Gujarat and runs east across Maharashtra, Madhya Pradesh and Chhattisgarh. It runs roughly parallel to the Vindhyas to its north and lies between the rivers Narmada in the north and Tapti in the south. The Satpuras extends over a distance of 900 km with a mean elevation of 830 m



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Pachmarhi, Satpuras, Central Highlands

CHARACTERISTIC BIRDS OF THE CENTRAL HIGHLANDS



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)



Forest Owlet *Heteroglaux blewitti*

AMSL; many peaks rise above 1,000 m, the highest being Dhupgarh (1,350 m) in Madhya Pradesh. The major hills are Rajpipla, Nimar, Pachmarhi, Mahadeo, and Maikal. Some of the well-known wildlife sanctuaries of this region are Satpura National Park, Kanha National Park, Bori Wildlife Sanctuary, Bandhavgarh National Park and Pench National Park.

Malwa Plateau: Malwa Plateau, of volcanic origin, is located north of the Vindhya Range, extending from western Madhya Pradesh to southeastern Rajasthan. The average altitude is 500 m AMSL. The Chambal River and its tributaries drain most of the region; the upper reaches of the Mahi River drain the western part. The vegetation is of the savannah type.

Chota Nagpur Plateau: Chota Nagpur Plateau is located in northeastern part of Peninsular India, covering much of Jharkhand and adjacent parts of Odisha, Bihar and Chhattisgarh. It lies entirely

between the basins of the rivers of Ganga and Son in the north and the Mahanadi in the south. Much of the plateau was covered by dry deciduous forests dominated by sal, but large tracts have depleted over the years due to deforestation, mining and cultivation.

The avifauna of the Central Highlands is not as diverse as those of Eastern Himalayas or Western Ghats. More than 400 species are reported from the region, with winter migrants comprising around 25%. The Central Highlands forms roughly the zone where the Red Junglefowl *Gallus gallus* (distributed in the Himalayan foothills east of southwest Kashmir and the northeastern parts of the Subcontinent south till northeast Andhra Pradesh) and the peninsular Grey Junglefowl *G. sonneratii* coexist. It is also roughly the region where the Black Francolin *Francolinus francolinus* of the northern Subcontinent and Painted Francolin *F. pictus* of the Peninsula can be found together, and where the Marshall's Iora *Aegithina nigrolutea* (a near-endemic to the forests of northwest India) and Common Iora *A. tiphia* (occurring throughout the Peninsula and the western part of Subcontinent from the foothills of the Himalayas) coexist. Species that have a stronghold in the Central Highlands (which also occur in other parts of the Subcontinent) are the Grey-headed Fish-Eagle *Ichthyophaga ichthyaeetus*, White-bellied Minivet *Pericrocotus erythropygus*, Asian Brown Flycatcher *Muscicapa dauurica*, Crested Bunting *Emberiza lathami* and Green Avadavat *Amandava formosa*.

Other interesting species of the region are the Malabar Pied Hornbill *Anthracoceros coronatus* and Malabar Whistling-Thrush *Myophonus horsfieldii*, species characteristic of the Western Ghats. Species that occur here and also in the Western Ghats and Himalayas are the Mountain Hawk-Eagle *Nisaetus nipalensis*, Black Eagle *Ictinaetus malaiensis*, Blue-bearded Bee-eater *Nyctyornis athertoni*, Bar-winged Flycatcher-

Shrike (or Pied Flycatcher-Shrike) *Hemipus picatus*, Hair-crested Drongo *Dicrurus hottentottus* and Greater Racket-tailed Drongo *D. paradiseus*. Due to the occurrence of disjunct populations of similar taxa in the Western Ghats and Himalayas, with some also occurring in the Central Highlands, a zoo-geographical hypothesis called the Satpura Hypothesis had been propounded in the past by Sunder Lal Hora of the Zoological Survey of India based on his study on hill-stream fish. According to the hypothesis, the Central Highlands had acted in the historical past as a dispersal highway for the Indo-Malayan elements from the Eastern Himalayas to the Western Ghats. However, this hypothesis has not found favour, and the similarity in fauna between these regions is attributed to convergent evolution.

The forests of the Central Highlands have gained prominence in recent years with the rediscovery of the Forest Owlet *Heteroglaux blewitti*, and more intensive surveys could throw up other interesting records from this ornithologically little-explored region. Other than the early accounts, there is some new information on the birds of some sites/sanctuaries of the region (see references). The Wildlife Institute of India (WII) has undertaken



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Green Avadavat *Amandava formosa*

a survey of the terrestrial birds of the Central Highlands in Madhya Pradesh and has come up with several new breeding records and range-extension records of species.

DECCAN PLATEAU AND THE SOUTHERN PENINSULAR PLAINS



SUJIT NARWADE

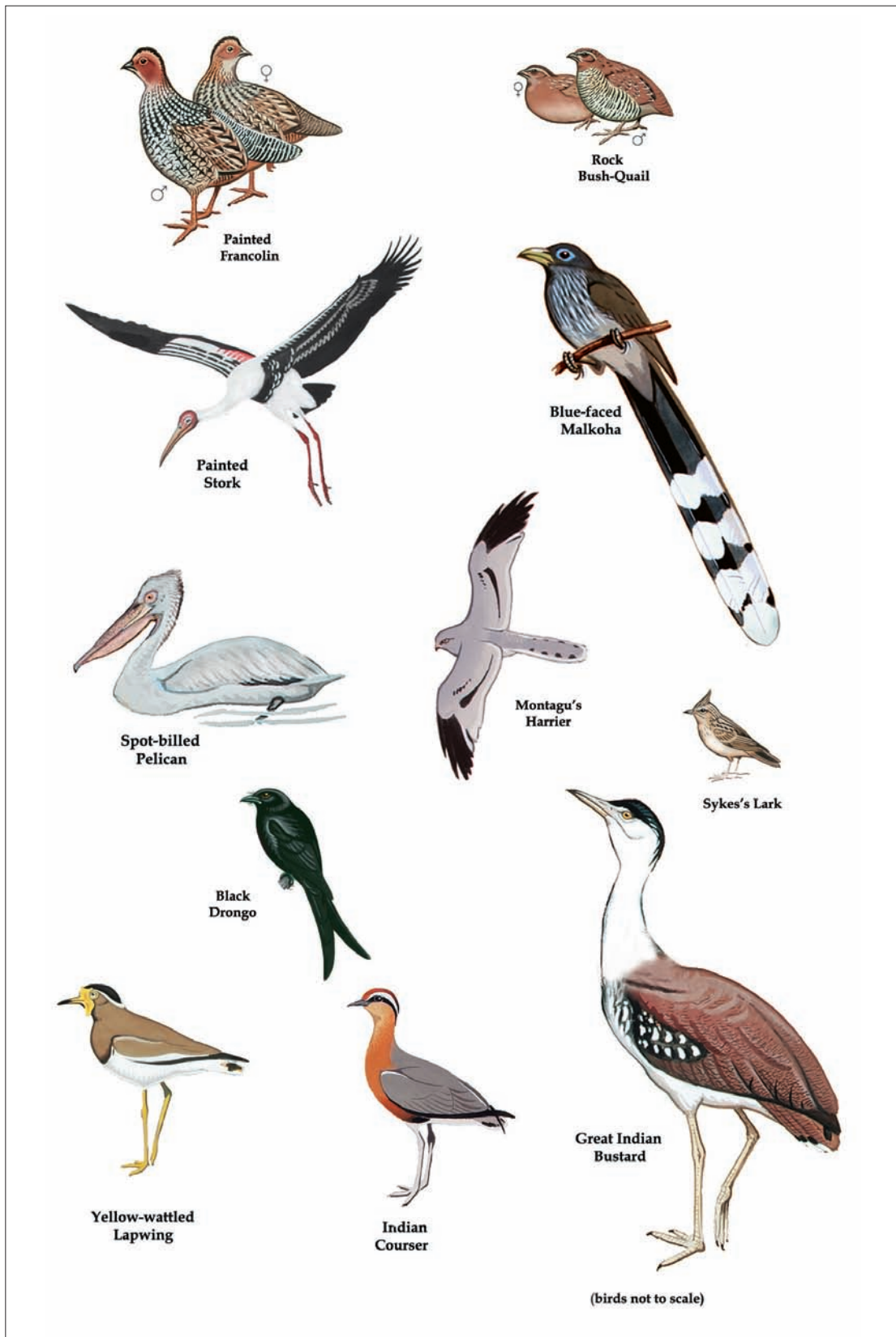
Mamdapur Blackbuck Conservation Reserve, Nashik, Deccan Plateau

The Deccan Plateau is an extensive tableland encompassing a large part of peninsular India lying south of the Narmada. It is largely flat (average elevation of 600 m AMSL) and is separated from the Gangetic Plains in the north by the Satpura and Vindhya ranges. It is bounded on the west by the Western Ghats and on the east by the Eastern Ghats. The Deccan Plateau, though sometimes used to mean all of India south of the Narmada, relates more specifically to the northern part formed by lava flows or igneous rocks (Deccan Traps). The plateau largely covers the states of Maharashtra, Karnataka, Telangana and adjoining areas of Andhra Pradesh, with some portions in Gujarat and Madhya Pradesh. Nevertheless, since the term Deccan tends to usually refer to the entire Indian peninsula plains, the account on the avifauna

discussed henceforth refers to those of the Deccan Plateau and the plains to its south.

This region is mostly semi-arid. The forest had been classified as thorn scrub, bearing patches of the original vegetation of dry deciduous forests. But with increased deforestation and impacts of other anthropogenic factors over the past decades, the vegetation now largely comprises over-grazed grasslands and savannahs. The eastern part of the plateau, as in the Vidarbha region of Maharashtra and parts of Telangana, still has large tracts or patches of deciduous forests. The major peninsular rivers and their tributaries flowing through the plateau are the Mahanadi, Godavari, Krishna, Bhima, Wainganga, Wardha, Indravati, Tungabhadra and Cauvery (Kaveri), all of which directly or indirectly drain into the Bay of Bengal.

CHARACTERISTIC BIRDS OF THE DECCAN PLATEAU



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)



Great Indian Bustard *Ardeotis nigriceps* in Rollapadu Wildlife Sanctuary

As a result of habitat loss and degradation, the characteristic birds of this region are now represented by typical grassland species of the plains such as the larks, pipits, coursers, harriers, sandgrouse (two species), quails, and bustards among others. There are also species that are not obligate grassland species but frequent grasslands as part of a wider array of habitats, such as doves, shrikes, drongos, swallows and munias. Two of the well-known grassland sanctuaries in the Deccan Plateau that have been established for the conservation of the Great Indian Bustard *Ardeotis nigriceps* are Great Indian Bustard Sanctuary (Nannaj, Maharashtra) and Rollapadu Wildlife Sanctuary (Rollapadu, Andhra Pradesh) – however, the species is now extinct/near-extinct in these two refuges. The Deccan is a major wintering ground of the Eastern Short-toed Lark *Calandrella dukhunensis*.

The Deccan lacks endemic species since it lies in the midst of three biogeographical regions (Central Highlands, Eastern Ghats and Western Ghats) and in proximity to the coasts. Resident species with a significant presence in the region include Grey Junglefowl *Gallus sonneratii*, Blue-faced Malkoha *Phaenicophaeus viridirostris*, Sykes's Lark (or Sykes's Crested Lark) *Galerida deva*, Jerdon's Bushlark *Mirafra affinis* and Yellow-billed Babbler (or Pale-headed Babbler) *Turdoides affinis*. The southern part of the Peninsula (along with the Western Ghats and Sri Lanka) is the only region where the Jacobin Cuckoo (or Pied Cuckoo) *Clamator jacobinus* is a breeding resident (subspecies *jacobinus*). Otherwise, the Jacobin Cuckoo is a breeding visitor (subspecies *pica*) to large parts of the sub-Himalayan Subcontinent, arriving with the monsoons from southern Africa.

WESTERN GHATS



ASIF KHAN

Malshej, Western Ghats

The Western Ghats extends from the southern tip of the Peninsula (Tamil Nadu) to south of the Tapti River in the Dang and Tapti districts of Gujarat. With a width of 30–50 km, the range stretches for a length of about 1,600 km; its altitude averages 900–1,500 m AMSL.

The typical topography of the Western Ghats (from west to east) comprises the coastal hills and plateaus, coastal lowlands interspersed with the westward offshoots of the main Western Ghats, the main crest line of the mountain range, and the eastward offshoots interspersed with valleys. The highest point is Anamudi (2,695 m) in Kerala. The Western Ghats includes the Sahyadris, Baba Budangiri, Nilgiris, Anamalais, Palanis, Periyar hills and Agasthyamalai, and associated hills in Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu. Unlike the Eastern Ghats, which is disjointed at a number of places, the Western

Ghats has only one major break — the 30-km wide Palghat Gap between the Nilgiri and Anaimalai hills in southern India. The region acts as a key barrier, intercepting the rain-laden monsoon winds that sweep in from the south-west, and thereby influences the weather pattern during the monsoon season.

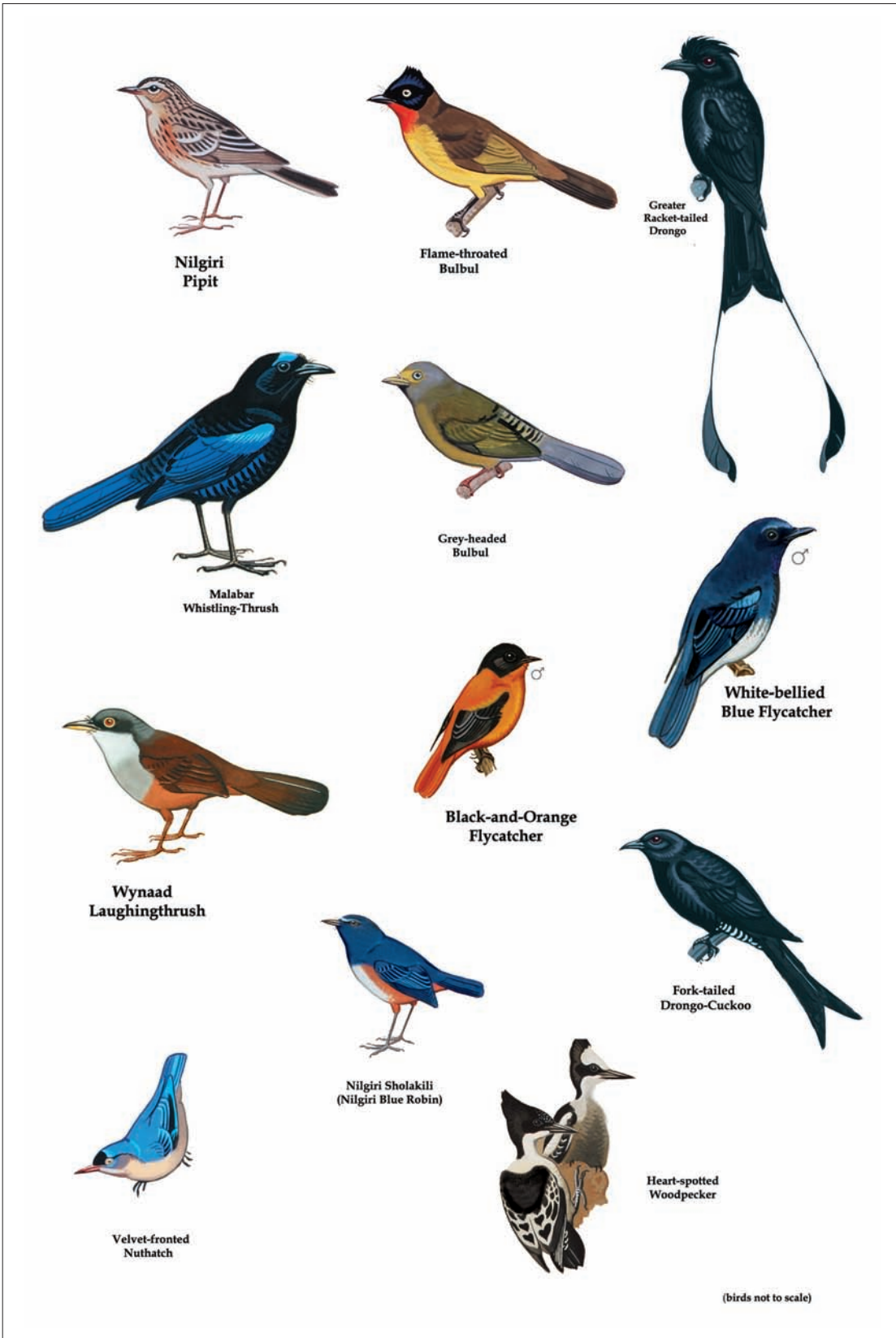
The Western Ghats is amongst the 25 biodiversity hotspots recognized globally. Its forests have some of the best representatives of non-equatorial tropical evergreen forests in the world and the range is known for its high levels of endemism. The forest types found in the range are associated with evergreen, semi-evergreen, moist deciduous and dry deciduous forests from south to north and from west to east. There are also expanses of rolling grasslands in the higher montane regions, known as shola grassland. The Western Ghats in Kerala and Tamil Nadu has

CHARACTERISTIC BIRDS OF THE WESTERN GHATS



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)

CHARACTERISTIC BIRDS OF THE WESTERN GHATS



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)



Nilgiris, Western Ghats

large tracts of tea and coffee plantations. There are a number of wildlife sanctuaries throughout the stretch of the Western Ghats.

There is a similarity between the avifauna of Western Ghats and those of the Eastern Himalayas — and also the avifauna of hill forests of Sri Lanka — mainly with regard to the families of trogons, frogmouths, hornbills, fairy-bluebirds, whistling-thrushes, robins, thrushes, laughingthrushes, flycatchers and spiderhunters. More than 500-odd species of birds (including waterbirds) are reported from the Western Ghats. The Western Ghats has a significant number of endemic or near-endemic species: Nilgiri Woodpigeon *Columba elphinstoni*, Malabar Parakeet *Psittacula columboides*, Malabar Grey Hornbill *Ocyeros griseus*, Flame-throated Bulbul *Rubigula gularis*, Grey-headed Bulbul *Brachypodius priocephalus*, Nilgiri Sholakili (Nilgiri Blue Robin) *Sholicola major*, White-bellied Sholakili (or White-bellied Blue Robin) *Sholicola albiventris*, Nilgiri Thrush *Zoothera neilgherriensis*,

Rufous Babbler *Argya subrufa*, Broad-tailed Grassbird *Schoenicola platyurus*, Nilgiri Pipit *Anthus nilghiriensis*, Wynaad Laughingthrush *Garrulax delesserti*, Black-chinned Laughingthrush *Strophocincla cachinnans*, Palani Chilappan (or Kerala Laughingthrush) *Montecincla fairbanki*, Black-and-Orange Flycatcher *Ficedula nigrorufa*, Nilgiri Flycatcher *Eumyias albicaudatus*, White-bellied Blue-Flycatcher *Cyornis pallidipes* Crimson-backed Sunbird (or Small Sunbird) *Leptocoma minima*, Southern Hill Myna *Gracula indica* and White-bellied Treepie *Dendrocitta leucogastra*.

Other species that are characteristic of the Western Ghats, but also occurring in disjunct localities in the hills of the Peninsula/Eastern Himalayas/Sri Lanka, are Jerdon's Baza *Aviceda jerdoni*, Rufous-bellied Eagle *Lophotriorchis kienerii*, Spot-bellied Eagle-Owl (or Forest Eagle-Owl) *Bubo nipalensis*, Fork-tailed Drongo-Cuckoo *Surniculus dicruroides*, Malabar Trogon *Harpactes*



MADHUMITA PANIGRAHI

Agasthyamalai, Western Ghats

fasciatus, Chestnut-headed Bee-eater *Merops leschenaulti*, White-cheeked Barbet *Psilopogon viridis*, Malabar Pied Hornbill *Anthracoceros coronatus*, Heart-spotted Woodpecker *Hemicircus canente*, White-bellied Woodpecker *Dryocopus javensis*, Yellow-browed Bulbul *Acritillas indica*, Bar-winged Flycatcher-Shrike (or Pied Flycatcher-Shrike) *Hemipus picatus*, Grey-headed Canary-Flycatcher *Culicicapa ceylonensis*, Asian Fairy-Bluebird *Irena puella*, Malabar Whistling-Thrush *Myophonus horsfieldii*, Dark-fronted Babbler (or Black-headed Babbler) *Rhopocichla atriceps*, Malabar Lark (or Malabar Crested Lark) *Galerida malabarica*, Nilgiri Flowerpecker *Dicaeum concolor* and Little Spiderhunter *Arachnothera longirostra*.

The Western Ghats is an important site for winter migrants from the Palearctic/Himalayas, which includes the Black Baza *Aviceda leuphotes*, Eurasian Buzzard (or Common Buzzard) *Buteo buteo*, Lesser Kestrel *Falco naumanni*, Wood

Snipe *Gallinago nemoricola*, Eurasian Woodcock *Scolopax rusticola*, Chestnut-winged Cuckoo *Clamator coromandus*, Large Hawk-Cuckoo *Hierococcyx sparverioides*, Eurasian Crag-Martin *Ptyonoprogne rupestris*, Olive-backed Pipit *Anthus hodgsoni*, Blue-capped Rock-Thrush *Monticola cinclorhyncha*, Verditer Flycatcher *Eumyias thalassinus*, Kashmir Flycatcher *Ficedula subrubra*, Tytler's Leaf-Warbler *Phylloscopus tytleri*, Lesser Whitethroat *Sylvia curruca* and Kashmir Flycatcher. It is the only breeding site of the Common Kestrel *Falco tinnunculus* in the Peninsula, which also breeds in the Himalayas, parts of Pakistan and in the hills of Sri Lanka.

The avifauna of the Western Ghats is getting better documented in recent years, especially in Kerala where birders in collaboration with the Forest Department undertake regular surveys and monitoring programmes in various sanctuaries and regions of the State, including surveys of pelagic birds.

EASTERN GHATS



RANJIT MANAKADAN

Cauvery North Wildlife Sanctuary, Eastern Ghats

The Eastern Ghats comprises a range of hills of peninsular India that generally trend northeast-southwest along the Bay of Bengal for a distance of about 1,750 km. The altitude averages about 600 m AMSL, the highest point being the Mahendragiri Peak (1,600 m) in Ganjam district of Odisha. The hills are vivisected and eroded by the four major rivers, the Mahanadi, Godavari, Krishna and Cauvery (Kaveri).

The Eastern Ghats traverses in a southwest direction from northern Odisha through the states of Andhra Pradesh, Tamil Nadu and Karnataka to end in the Moyar Valley, where it faces the Nilgiris of the Western Ghats across the plains. A stretch of the southern Eastern Ghats, instead

of veering southwest, runs further southwards from Salem (Tamil Nadu) till Tiruchirappalli. To the northwest of the Moyar, the Eastern Ghats section is linked to the Western Ghats through the Biligirirangana Hills, which serves as a forested ecological corridor for the movement of animals between the two ranges. Some are of the opinion that the hill range is part of the Western Ghats that had moved in a northeast direction into the Mysore Plateau. However, in general, geologists consider the Biligirirangana Hills (and also the Male Mahadeshwara hills in Cauvery Wildlife Sanctuary) as *horsts* (raised landmass between two faults) within the Eastern Ghats – as is the case of the Nilgiris in the Western Ghats.



The Cauvery River flowing by the Cauvery Wildlife Sanctuary, Eastern Ghats

Unlike the Western Ghats, the Eastern Ghats is not profusely covered with forests due to lower rainfall and altitude. The vegetation varies from scrub and thorn forest, dry to moist deciduous forest, and dry evergreen forest. The forests face serious pressures for firewood, timber, and other forest products from the numerous villages and towns in the plains all along the stretch. There are a number of protected areas in the Eastern Ghats, like the Cauvery Wildlife Sanctuary, Koundinya Wildlife Sanctuary, Sri Venkateswara Wildlife Sanctuary and National Park, Sri Lankamalleswara Wildlife Sanctuary, Nagarjunsagar-Srisailem Tiger Reserve, Papikonda Wildlife Sanctuary, Satkosia Tiger Reserve, and Simlipal Tiger Reserve.

In general, the forests of the Eastern Ghats have garnered less attention from researchers

than those of the Western Ghats. However, the importance of the Eastern Ghats from the biodiversity point of view is being recognized in recent years as it supports the last tracts of remnant forests and wildlife of the eastern Peninsula. The first survey of the avifauna of the Eastern Ghats was carried out by the BNHS during the Vernay Scientific Survey (1929–30), where the birds of the Shevaroy (Tamil Nadu), Palakonda, Nallamalai and ranges of Visakhapatnam district, (Andhra Pradesh) and ranges of Ganjam and Balasore districts (Odisha) were documented. After this, there was a long gap, but from the 1980s, a number of studies by the BNHS and other organizations have been carried out in some regions encompassing the avifauna in general or individual species in particular.



Shola grassland-forest habitat in Biligiri Rangaswamy Temple Wildlife Sanctuary, Eastern Ghats



Yellow-throated Bulbul *Pycnonotus xantholaemus*

The Eastern Ghats traverses a distance of 1,700 km from northeast India (Odisha) to the southwest Peninsula (Tamil Nadu and Karnataka) and is separated by broad valleys at a number of places. Due to these factors and its relatively low elevation,

its avifauna is influenced by the regions through which it passes: Chota Nagpur Plateau, Odisha and northern Andhra Pradesh in the northern stretches, Deccan Plateau in the middle and south, and the Western Ghats in the southernmost stretch. The species composition in the range is further dependent on the gradient, rainfall, humidity, vegetation and other factors. The only endemic bird species occurring in the Eastern Ghats (foothills) is the Critically Endangered Jerdon's Courser *Rhinoptilus bitorquatus* with records (old or new) from Kadapa (Cuddapah), Anantapur, Sironcha and Bhadrachalam in Andhra Pradesh, and Kolar in Karnataka. Another species with its stronghold in the southern Eastern Ghats is the Yellow-throated Bulbul *Pycnonotus xantholaemus*, mostly occurring in boulder-strewn rocky outcrops with dense undergrowth.

COASTS



RANJIT MANAKADAN

Pulicat lake view from Sriharikota island

The Indian Subcontinent is flanked by a stretch of coastal plains, which vary in their characteristics and structure. The west coast, bordering the Arabian Sea and flanked by the Western Ghats, is relatively rocky and narrow, except around the gulfs of Khambhat and Kachchh. There is a general absence of deltas here unlike the east coast due to the short and swift rivers. However, mangroves occur at a few estuarine sites, some having scenic backwaters and lagoons. The east coast, which borders the Bay of Bengal, is largely sandy and broader due to depositional activities of the east-flowing rivers. Extensive deltas of the Ganga, Mahanadi, Godavari, Krishna and Cauvery (Kaveri) are the characteristic features of

this coast; they support mangrove vegetation. The mangrove forest of the Sundarbans in West Bengal and Bangladesh has the largest part of mangroves in the world. The other major coastal wetlands are Chilika, Pulicat and Great Vedaranyam Swamp. Other than mangroves, a major forest type that occurs along the coast is the Southern Tropical Dry Evergreen Forest. Apart from the Andaman and Nicobar Islands and Lakshadweep archipelago, large coral reef formations on the Indian coasts are found in the Gulf of Mannar, Palk Bay, and Gulf of Kachchh. The birdlife of this region is not dealt with separately in the manuscript as they overlap with those of the bordering biogeographical regions.

LAKSHADWEEP AND THE MALDIVES

Lakshadweep and the Maldives form the northern and central part of the Maldives-Lakshadweep-Chagos Archipelago group of islands, which are the remains of a vast undersea mountain range, the Chagos-Laccadive Ridge.

Lakshadweep consists of 36 major islands (10 inhabited), situated more than 300 km west of the Kerala coast. Lakshadweep is now largely bereft of its native vegetation, and the flora consists of coconut groves, cultivated fruiting trees and some remnants of the native, littoral shrubs and tree species. The Maldives lies about 700 km to the south of Lakshadweep and comprises 26 ring-shaped atolls consisting of up to 2500 coral islands, islets and exposed reefs. Many of the islands have marshes and freshwater ponds. The vegetation

in inhabited islands is made up of planted species including coconut, banana, drumstick, breadfruit and mango trees. The uninhabited islands have bamboo, screwpine, bushes and reeds.

The avifauna of Lakshadweep comprises more than 90 species, 30 of which are terrestrial birds; the rest comprise waterbirds that include maritime species such as sea terns, gulls, skuas, jaegers, petrels, storm-petrels and shearwaters. As most of the native coastal vegetation has been replaced by coconut *Cocos nucifera*, the birdlife tends to be richer and more abundant in uninhabited islands. One of the most common resident terrestrial species is the Indian White-eye *Zosterops palpebrosus*, and the reason for this



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Minicoy, Lakshadweep

CHARACTERISTIC BIRDS OF LAKSHADWEEP, MALDIVES AND CHAGOS



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)



Bangaram Atol, Lakshadweep

is said to be the absence/near-absence of the House Crow *Corvus splendens* in the islands. The more common land birds (either resident or migrant) are those that occur on the Indian mainland, and these include Western Koel *Eudynamis scolopaceus*, Greater Coucal *Centropus sinensis*, Black Kite *Milvus migrans*, Indian Roller *Coracias benghalensis*, Common Kestrel *Falco tinnunculus* and Brown Shrike *Lanius cristatus*. Among the waterbirds, the Grey Heron *Ardea cinerea* is a breeding resident. Pitti Island supports large nesting colonies of Sooty Tern *Onychoprion fuscatus* and Brown Noddy *Anous stolidus* ('State' bird of Lakshadweep). There are reports of sporadic nesting of Greater Crested Tern *Thalasseus bergii* and Bridled Tern *Onychoprion anaethetus*; the Lesser Crested Tern too probably breeds in the area. The islands appear to be the staging grounds for shorebirds from the Palearctic Region such as Lesser Sandplover *Charadrius mongolus*, Ruddy Turnstone *Arenaria interpres* and Common Sandpiper *Actitis hypoleucos* – these foraging on the intertidal shelf of the islands.

More than 190 bird species are reported from the Maldives, of which the occurrence of more than

100 species, mostly of migrant/vagrant waterbirds, is rare and based only on single/few records. Four species are introduced: Red Junglefowl *Gallus gallus*, Rock Dove (or Rock Pigeon) *Columba livia*, Common Myna *Acridotheres tristis* and House Sparrow *Passer domesticus*. Besides ecological impacts and disturbances from developmental activities of tourism, the other threats include the once-rampant direct persecution of birds through egg collection, the rapidly increasing human population, and pet trade (which targets waders and terns).

Among the waterbirds that breed in Lakshadweep and/or the Maldives are the Lesser Frigatebird *Fregata ariel*, White-tailed Tropicbird (or Yellow-billed Tropicbird) *Phaethon lepturus*, Black-naped Tern *Sterna sumatrana*, Sooty Tern, Bridled Tern, Greater Crested Tern, Brown Noddy, Lesser Noddy *Anous tenuirostris* and Wedge-tailed Shearwater *Ardenna pacifica*. All the three species of boobies found in the Indian region breed in some islets of the Chagos (treated as part of the Indian Subcontinent in the Ripley Guide). The Common White Tern *Gygis alba* has been reported to breed in the Maldives and Chagos.

ANDAMAN AND NICOBAR ISLANDS



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Havelock, Andaman and Nicobar Islands

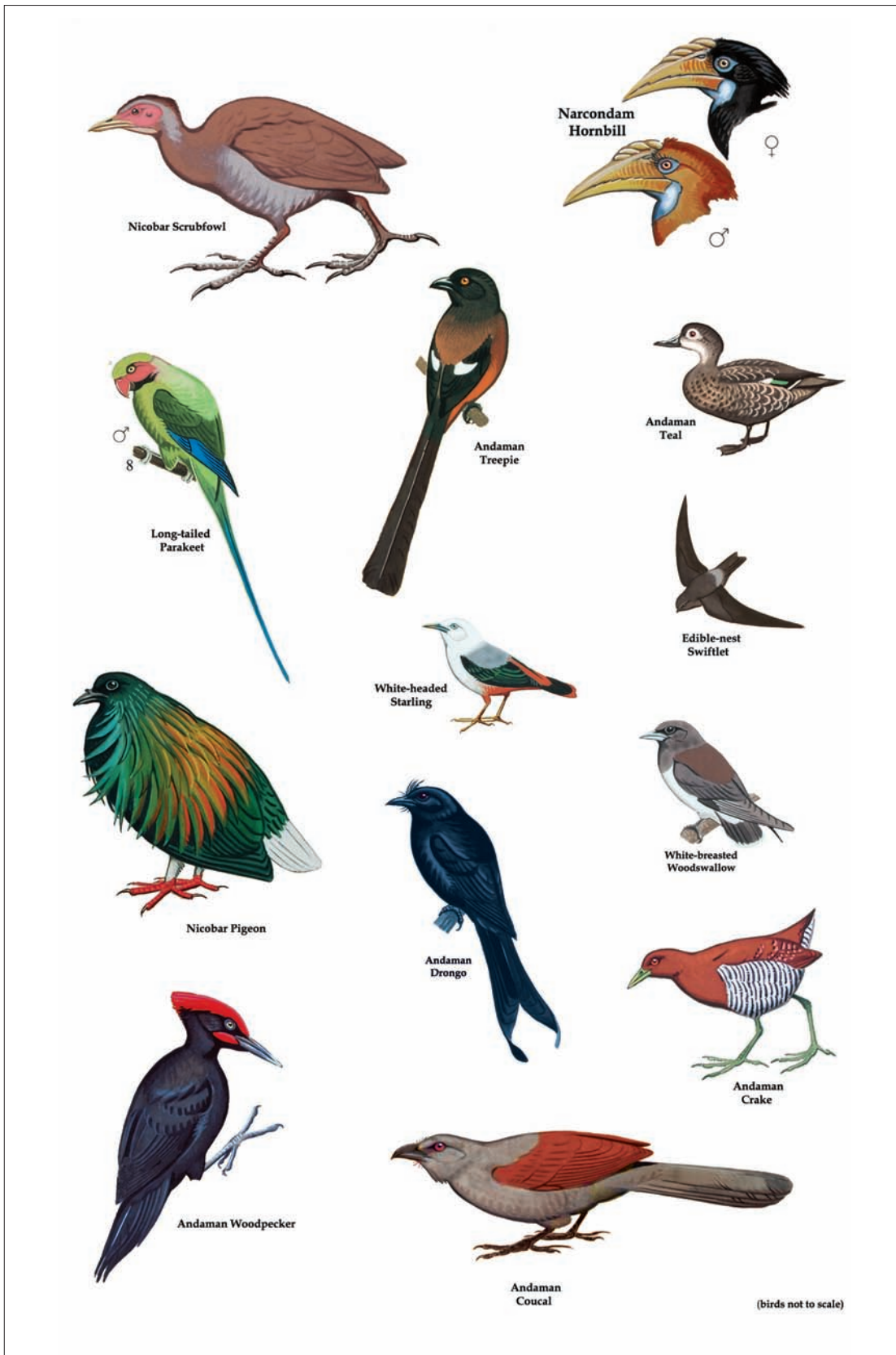
The Andaman and Nicobar Islands comprise a group of 572 islands in the Bay of Bengal with Andaman to the north and Nicobar to the south. The islands are the summits of a mountain range that extends from the eastern Himalayas along the Myanmar border to Arakan, and finally to Sumatra and Lesser Sundas. The islands rise up to a height of 750 m AMSL. Some of the islands are fringed with coral reefs. Only about 38 of the 572 islands are inhabited. The rainfall is heavy, with rains from both the northeast and southwest monsoons. The islands have tropical evergreen and semi-evergreen forests, as well as moist deciduous forests, littoral and mangrove forests, these being one of the best-preserved forests of India.

The Andaman and Nicobar Islands are well known for their rich biodiversity; several unique plants and animals occur in these islands, many of which are endemic. More than 280 species of birds are reported in the islands and waters surrounding

them. These include 61 migratory species, of which 38 are wintering waterbird species. Nineteen bird species have been introduced (either accidental or wanton introductions) into the islands, most of which have not survived. There have also been inter-island introductions of Red-whiskered Bulbul *Pycnonotus jocosus* and White-headed Starling *Sturnia erythropygia*. Nineteen species are endemic to the islands – more endemic species could be listed if taxonomic recommendations for some taxa are accepted in the future, and with more intensive surveys of the islands.

The more well known among the endemics are the Nicobar Scrubfowl (or Nicobar Megapode) *Megapodius nicobariensis* and Narcondam Hornbill *Rhyticeros narcondami*. The Nicobar Scrubfowl is the only representative within our limits of megapods that are largely confined to the Australasian region; they are remarkable for their reptile-like nesting habits. The Narcondam

CHARACTERISTIC BIRDS OF THE ANDAMAN AND NICOBAR ISLANDS

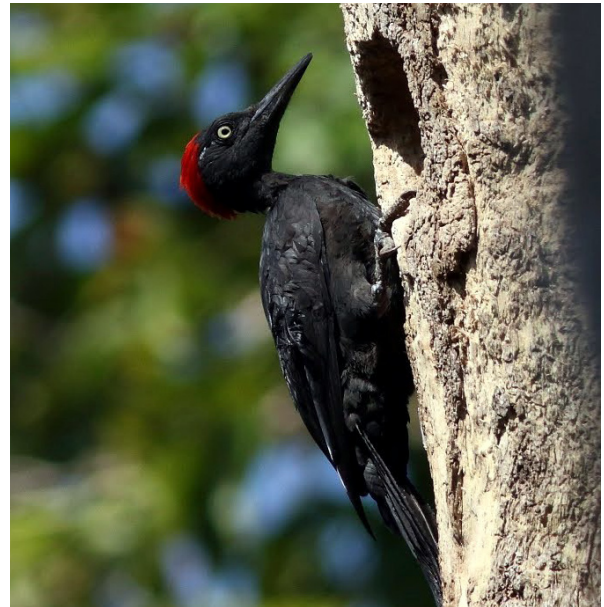


Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)

Hornbill is confined only to the Narcondam Island (6.8 sq. km), and the population is estimated to be less than 400 birds. The other endemic species comprise one species each of sparrowhawk (Nicobar Sparrowhawk *Accipiter butleri*), crake (Andaman Crake *Rallina canningi*), parakeet (Nicobar Parakeet *Psittacula caniceps*), nightjar (Andaman Nightjar *Caprimulgus andamanicus*), coucal (Andaman Coucal *Centropus andamanensis*), woodpecker (Andaman Woodpecker *Dryocopus hodgei*), starling (White-headed Starling *Sturnia erythropygia*), drongo (Andaman Drongo *Dicrurus andamanensis*), boobook/hawk-owl (Hume's Boobook *Ninox obscura*), cuckooshrike (Andaman Cuckooshrike *Coracina dobsoni*), jungle-flycatcher (Nicobar Jungle-Flycatcher *Cyornis nicobaricus*), bulbul (Andaman Bulbul *Brachypodius fuscoflavescens*), shama (Andaman Shama *Kittacincla albiventris*), pigeon (Andaman Green-Pigeon *Treron chloropterus*) and treepie (Andaman Treepie *Dendrocitta bayleii*); and two species each of serpent-eagle (Andaman Serpent-Eagle *Spilornis elgini* and Great Nicobar Serpent-Eagle *Spilornis klossi*) and scops-owl (Andaman Scops-Owl *Otus balli* and Nicobar Scops-Owl *Otus alius*). An interesting aspect of the avifauna of the islands is the absence of babbler species.

The seas around the island provide habitat for pelagic bird species and 17 species have been recorded. This includes the Common White Tern *Gygis alba* that breeds in the Maldives and Christmas Frigatebird *Frigata andrewsi*, a Critically Endangered species endemic to the Christmas Island in the Indian Ocean.

Pioneering surveys and studies on the birds of the Andaman and Nicobar Islands were carried out by the BNHS during the 1960s and 1980s. Since the 1990s, SACON has been documenting the birds of the island, with specific studies carried out on the Nicobar Scrubfowl, Edible-nest Swiftlet *Aerodramus fuciphagus*, Andaman



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Andaman Woodpecker *Dryocopus hodgei*



Narcondam Hornbill *Rhyticeros narcondami*

1984 painting by Carl D' Silva

Teal *Anas albogularis*, Andaman Crake and Narcondam Hornbill. The Zoological Survey of India, which established a regional centre at Port Blair in 1977 to document the fauna of the island, started carrying out exploratory bird surveys of the islands.

SRI LANKA

The island of Sri Lanka is situated at the southern tip of the Indian Subcontinent in the Indian Ocean. The topography comprises largely flat to rolling coastal plains with mountains restricted to the south-central part (Central Highlands), and there is also a coastal belt comprising beaches, estuaries, lagoons and mangroves. Sri Lanka has 16 major rivers that originate in the Central Highlands and flow radially into the numerous lakes and reservoirs of the plains. The southwestern part of the island is the wet zone, with tropical, subtropical and montane forests with increasing altitude. The northwestern and southeastern parts are arid, with scrub forest and dryland forests. Though almost contiguous with the southern part of the mainland of the Subcontinent and sharing many

bird species, Sri Lanka warrants special mention of its avifauna due to the high number of endemic species, besides being a separate entity from the mainland.

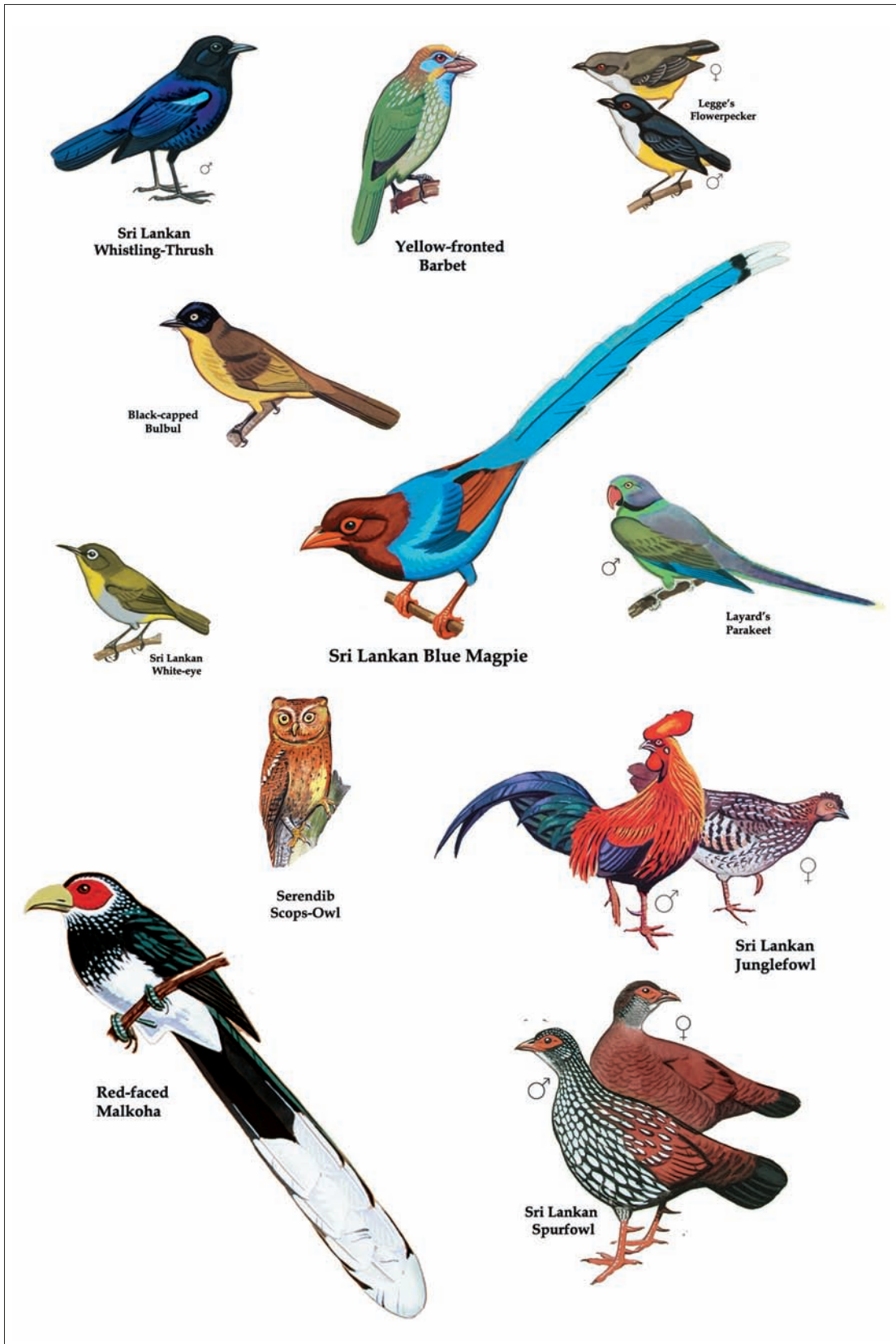
About 463 (taxonomy-dependent) species are reported from the island with about 50% of these being winter migrants, mostly from the Palearctic region. Endemic birds constitute 26 species – some among them earlier treated as subspecies of those occurring in the Indian Subcontinent mainland, but are now given species status after taxonomic revisions. One of the more well-known of the endemics is the Sri Lankan Junglefowl *Gallus lafayettii*. Another is the Red-faced Malkoha *Phaenicophaeus pyrrhocephalus* — the old records of its presence in southern India are considered to be doubtful. The Sri Lankan Grey Hornbill *Ocyeros*



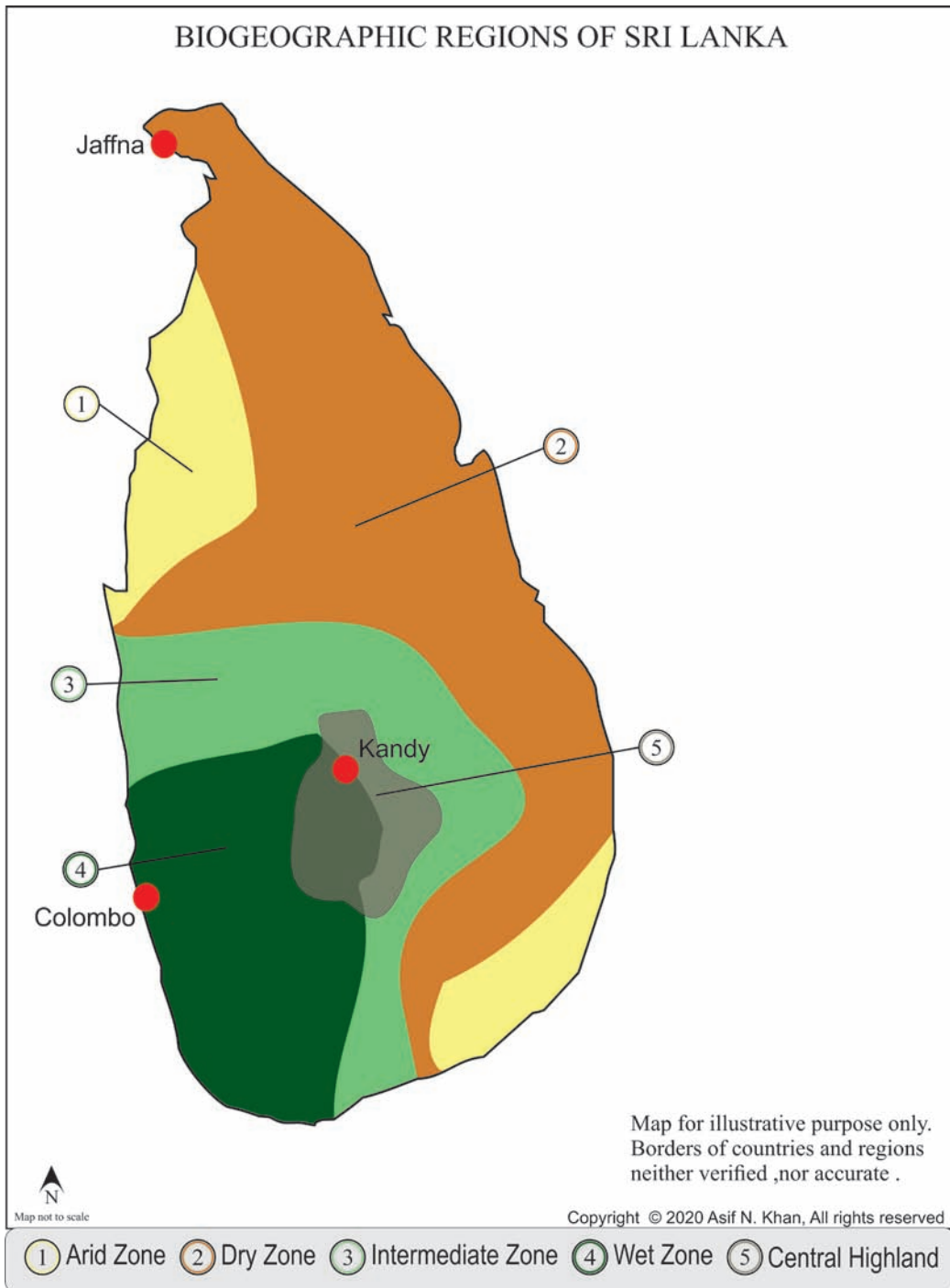
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Sinharaja Forest Reserve, Sri Lanka

SOME ENDEMIC BIRDS OF SRI LANKA



Source: BIRDS OF THE INDIAN SUBCONTINENT: A FIELD GUIDE (BOMBAY NATURAL HISTORY SOCIETY)



gingalensis is a close look-alike of the Malabar Grey Hornbill. Similarly, many Sri Lankan bird species show affinity to those of the Western Ghats. An endemic species that was more recently (2004) discovered from the island is the Serendib Scops-Owl *Otus thilohoffmanni*. The other endemics are

from the groups/families of spurfowl, parakeets, hanging-parrots, wood-pigeons, coucals, bulbuls, barbets, flowerpeckers, white-eyes, whistling-thrushes, thrushes, babblers, scimitar-babblers, laughingthrushes, flycatchers, bush-warblers, starlings, mynas and magpies.

WATERBIRDS OF THE INDIAN SUBCONTINENT

The waterbirds of the Indian Subcontinent roughly comprise around 23% of the 1,300-odd species, and about 50% of these (mainly ducks, plovers and sandpipers) are migrant species. The region's waterbirds consist of taxa that spend a large part of their lives in wetlands, such as waterfowl (ducks, geese and swans), waders/shorebirds (plovers, sandpipers and allies), wading birds (egrets, herons, ibises, spoonbills and storks), marsh-inhabiting birds (rails, crakes and coots) and an assortment of other species that usually prefer open water (divers, grebes, cormorants, pelicans, terns, gulls, skuas and kingfishers), some being pelagic species. Additionally, there are other taxa that are not obligate wetland species but depend on them primarily for food, such as the fish-eating kites, fish-eagles, fish-owls, cranes, forketails, dippers, wagtails, and the marsh and reed inhabiting babblers and warblers.

The Subcontinent has three endemic/near-endemic waterbird species: Andaman Crake *Rallina canningi*, Andaman Teal *Anas albogularis* and White-bellied Heron *Ardea insignis*. Another near-endemic, the Pink-headed Duck *Rhodonessa caryophyllacea* is now considered extinct. Species reported in the Indian region (either residents or migrants) that are Critically Endangered are the White-bellied Heron, Baer's Pochard *Aythya baeri*, Siberian Crane *Leucogeranus leucogeranus*, Sociable Lapwing *Vanellus gregarius* and Christmas Island Frigatebird *Fregata andrewsi* (endemic to the Christmas Island in the Indian Ocean with a few records from the Subcontinent). Species under the Endangered category are Oriental Stork *Ciconia boyciana*, Greater Adjutant *Leptoptilos dubius*, White-headed Duck *Oxyura leucocephala*, White-winged Duck *Asarcornis scutulata*, Masked Finfoot *Heliopais personatus*, Spotted Greenshank *Tringa guttifer*, Great Knot *Calidris tenuirostris* and Black-bellied Tern *Sterna acuticauda*.

Among the coastal wetlands on the east coast, the major wetland habitats for waterbirds are the Great Vedaranyam Swamp (Tamil Nadu), Pulicat Lake (Tamil Nadu and Andhra Pradesh), Coringa mangroves (Andhra Pradesh), Chilika (Odisha), Bhitarkanika mangroves (Odisha) and Sundarban mangroves (West Bengal and Bangladesh). On the west coast are the Vembanad and Ashtamudi wetlands (Kerala), Mahul-Sewri and Uran mudflats (Maharashtra), the Little and Great Ranns of Kachchh (Gujarat), and the gulfs of Kachchh and Khambhat. To the west of Kachchh, the Indus Delta and adjoining coastal habitat in Sindh and Balochistan provinces of Pakistan, comprising tidal mudflats, creeks and lagoons with mangroves, sandy beaches and islands, provide ideal habitats for resident and migratory waterbirds. The Great Rann of Kachchh is the major breeding ground for the Greater Flamingo *Phoenicopterus roseus* in the Indian region — sporadic breeding has been reported from Sambhar Lake (Rajasthan), and there are records of breeding of the Lesser Flamingo *Phoeniconaias minor* in the Little Rann. Among the mangroves of the Subcontinent, the largest is the Sundarbans. It constitutes the largest single block of tidal halophytic mangrove forest



Spot-billed Pelican *Pelecanus philippensis*

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Andaman Teal *Anas albogularis*

in the world, covering an area of approximately 10,000 sq. km. Other than the typical birds that occur in coastal wetlands and mangroves (like egrets, herons, stork, plovers, sandpipers and allies, terns, gulls, kingfishers and passerines partial to marshes), species that are largely confined to the Sundarbans are Mangrove Pitta *Pitta megarhyncha*, Masked Finfoot and Brown-winged Kingfisher *Pelargopsis amauroptera*. The Mangrove Pitta has recently been recorded from

the Bhitarkanika mangroves; it also occurs in Southeast Asia. The Masked Finfoot also occurs in Indochina, Malaysia and Indonesia, and the Brown-winged Kingfisher in Malaysia, Myanmar and Thailand. The Mangrove Pitta and Brown-winged Kingfisher are 'mangrove specialists', while the habitat of the Masked Finfoot is more diverse.

Other than the sandy beaches along the east and west coasts in general, sites on the mainland that are known to be important habitats for waterbirds partial to sandy substrates are the Gulf of Mannar, Palk Strait and Gulf of Kachchh (Pirotan Island). Characteristic species of these habitats are the Sanderling *Calidris alba*, Great Knot *Calidris tenuirostris*, Crab-Plover *Dromas ardeola* and Bar-tailed Godwit *Limosa lapponica*, and marine terns such as Lesser Crested Tern *Thalasseus bengalensis*, Greater Crested Tern *T. bergii* and Sandwich Tern *T. sandvicensis*.

Other than the coastal wetlands, India has a number of inland wetlands, some of these being man-made reservoirs, which are important for waterbirds. Some of the major inland wetlands in India are Keoladeo National Park and Sambhar Lake (Rajasthan), Ropar and Kanjli (Punjab), Sultanpur (Haryana), Patna Bird Sanctuary



White-winged Duck *Asarcornis scutulata*



A.R. AJIMON

Periyar Reservoir, Western Ghats

(Uttar Pradesh), Kabartal (Bihar), Bhoj (Madhya Pradesh), Nalsarovar and Khijadia (Gujarat), Ujjani (Maharashtra), Periyar Lake (Kerala), Ousteri Lake (Puducherry), Harike (Punjab), Deepor Beel (Assam), East Calcutta Wetlands (West Bengal), Kanjia (Odisha), Loktak Lake (Manipur), Wular, Hokera, Pangong Tso and Tso Moriri (Jammu and Kashmir), Pong, Renuka and Chandrataal (Himachal Pradesh). There are many other smaller inland wetlands, some of which also serve as heronries (colonial breeding sites of herons, storks, ibises, spoonbills, pelicans and cormorants). Some of the more well known among them are

Ranganthittu (Karnataka), Nelapattu (Andhra Pradesh), Kundankulam and Vedanthangal (Tamil Nadu), and also Keoladeo (Rajasthan).

Then, there are the resident/migrant/vagrant pelagic birds such as the petrels, storm-petrels, shearwaters, frigatebirds, boobies, tropicbirds, skuas and sea terns that range across the offshore waters of the Subcontinent; the resident species breeding in some of the offshore islands. Considerably much more information on pelagic species is being obtained in the recent years from the region with birding expeditions carried out along the east and west coasts.

BIRD MIGRATION IN THE INDIAN SUBCONTINENT

The migration routes and patterns of most winter migrants in the Indian Subcontinent are still sketchy despite decades of studies on bird migration by the BNHS. Much more precise information on migration has been available in the recent years with the advent of satellite-tracking that provides pinpoint data on the movements of tagged birds on a daily basis.

The migration pathways of birds that winter in the Indian Subcontinent fall predominantly under the Central Asian Flyway. Some species like the Amur Falcon *Falco amurensis* also pass through the West Asian-East African Flyway while flying from northeastern India to their wintering grounds in southern Africa. Similarly, birds travelling along eastern India, Bangladesh, and Andaman and Nicobar Islands such as Red-necked Stint *Calidris ruficollis*, Spoon-billed Sandpiper *Calidris*

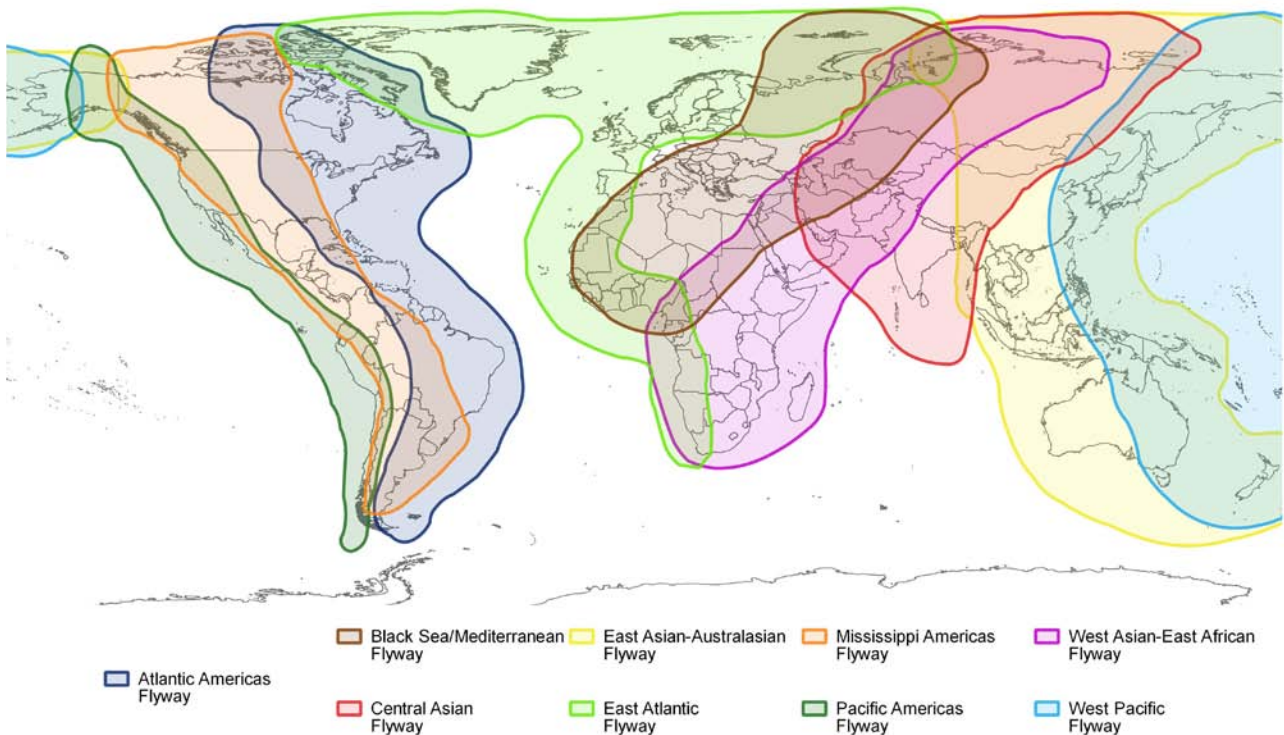
pygmaea, and Spotted Greenshank *Tringa guttifer* also pass through the East Asian-Australasian Flyway.

Some other Palaearctic winter migrants that are assumed to move westwards (prior to their northward migration) towards Africa from the northwestern part of the Subcontinent are the White Stork *Ciconia ciconia*, Lesser Kestrel *Falco naumanni*, Corncrake (or Corn Crane) *Crex crex*, Caspian Plover *Charadrius asiaticus*, European Nightjar *Caprimulgus europaeus*, European Roller *Coracias garrulus*, Red-backed Shrike *Lanius collurio*, Common Whitethroat *Sylvia communis* and Eurasian Golden Oriole *Oriolus oriolus*. The Hypocolius *Hypocolius ampelinus* that visits the Kachchh region is a migrant from the Middle East. Interesting among the migratory birds with connections to Africa is the subspecies



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Waders in flight



Bird migration flyways of the world

pica of the Jacobin Cuckoo *Clamator jacobinus*. It arrives from southern Africa to breed in large parts of the Indian Subcontinent, probably moving across the Arabian Sea from the Middle East. Since it arrives in India with the monsoon, it is termed as a monsoon breeder (and not a winter migrant). The East Asian-Australasian Flyway is used by migrants travelling along eastern India, Bangladesh and Andaman and Nicobar Islands to Southeast Asia and Australia; e.g., Red-necked Stint *Calidris ruficollis* and Spotted Greenshank *Tringa guttifer*.

The most formidable barrier for migrating birds of the Central Asian Flyway into the Indian Subcontinent is the 2,400 km Himalayan mountain range with more than 100 peaks higher than 7,000 m. Other than this are the Tibetan Plateau (4,500 m AMSL) to the north, the Karakoram and Hindu Kush mountains to the northwest, and Namcha Barwa, a mountain in the Tibetan part of the Himalayas that lies east

of the Yarlung Tsangpo River that flows into the Tsangpo Gorge towards the south. For this and various other reasons, it had been assumed that there are primarily two routes for the entry and exit of winter migrants in the Subcontinent. The birds of Siberia and Central Asia enter the Subcontinent via valleys/passes in the Pamir and Hindu Kush ranges, and the birds from northeast Asia enter via the Tsangpo-Brahmaputra river valley in the northeast or east of the Tibetan Himalayas.

Birds from Siberia and Central Asia migrating along the northwest route are augmented by migrants arriving from the Caspian-Aral region through Iran. Birds from these two main pathways arrive in waves through both ends of the Himalaya and either fly into the plains of the northern part of the Subcontinent or travel further southwards into the Peninsula, spreading out as they advance and trickle into Sri Lanka. East to west movement of migrants

south of the Himalayas after entering through the northeast migratory route also occurs, as is reported in raptors. On return migration, birds in the Indian Subcontinent return via the same entry routes, but some waders/shorebirds (e.g., Curlew Sandpiper *Calidris ferruginea*) undertake a 'loop migration' pattern, i.e., migrating into the Subcontinent through the northwest to winter in southern India and then moving northwards during return migration, travelling along the east coast of the Subcontinent.

Apart from these two routes, some birds fly over the Himalayas – this has been conclusively documented for the Bar-headed Goose *Anser indicus* through satellite-tracking studies. Other birds, especially the high-soaring raptors and fast-flying ducks also cross the Himalayas.

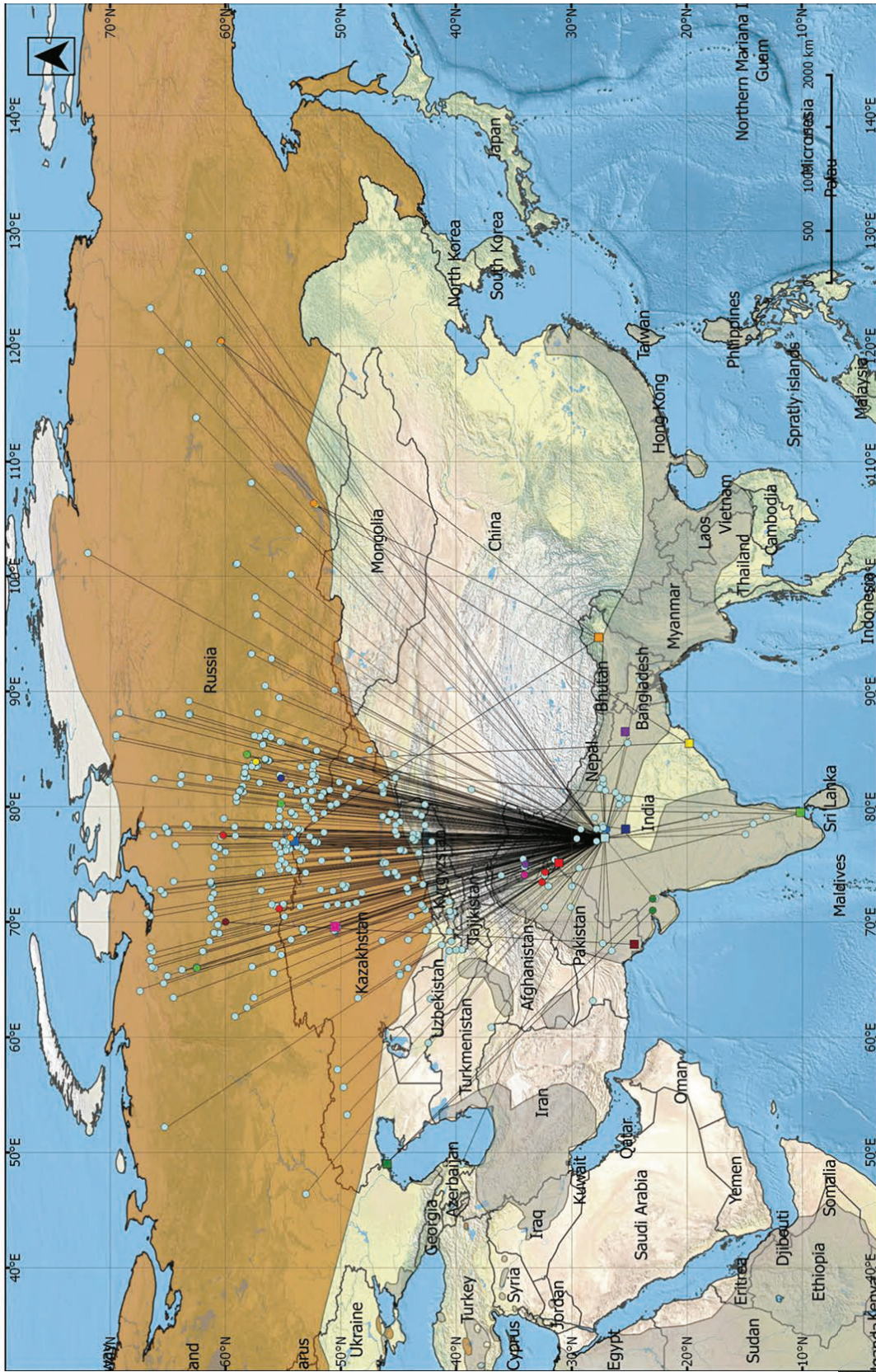
Mountaineers have reported seeing birds flying or found carcasses (evidently perished in blizzards), these comprising geese, ducks, cranes, eagles and passerine birds. More recently, migrant watches in the Himalayas and findings of satellite-tracked birds have conclusively shown that many bird species and groups do cross over the Himalayas, largely along the passes.

The findings of migration studies of more than 100 species of Indian birds, involving bird ringing/banding by the BNHS from 1927 and satellite, geolocator and other tagging studies by BNHS and other organizations, have been brought out in a book form, titled INDIAN BIRD MIGRATION ATLAS. Three examples of ringing recoveries of bird species sourced from this publication are given in the following pages.



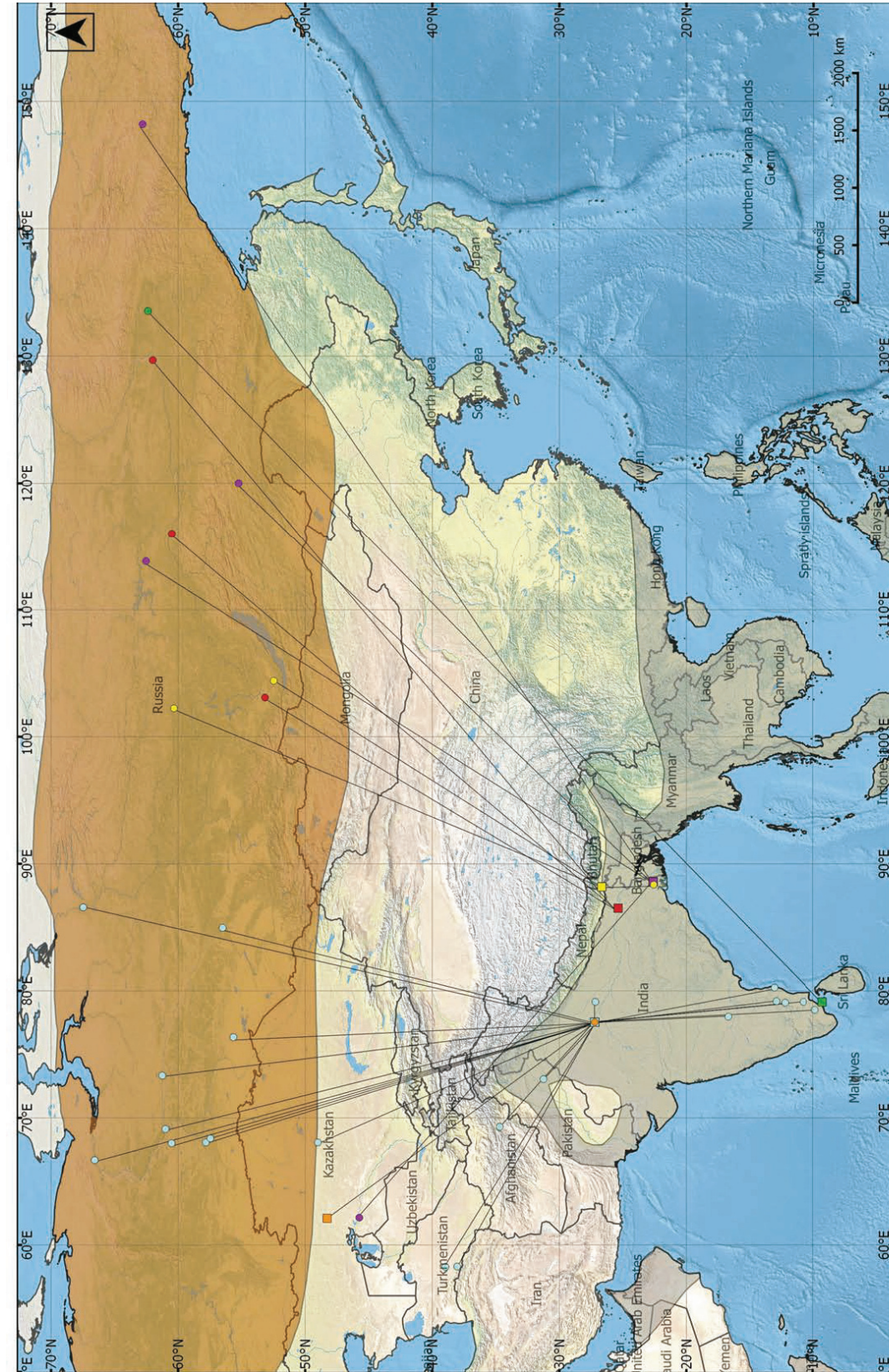
BNHS PHOTO LIBRARY

Sálim Ali and team ringing waterbirds in Keoladeo National Park, Bharatpur, Rajasthan in the 1980s



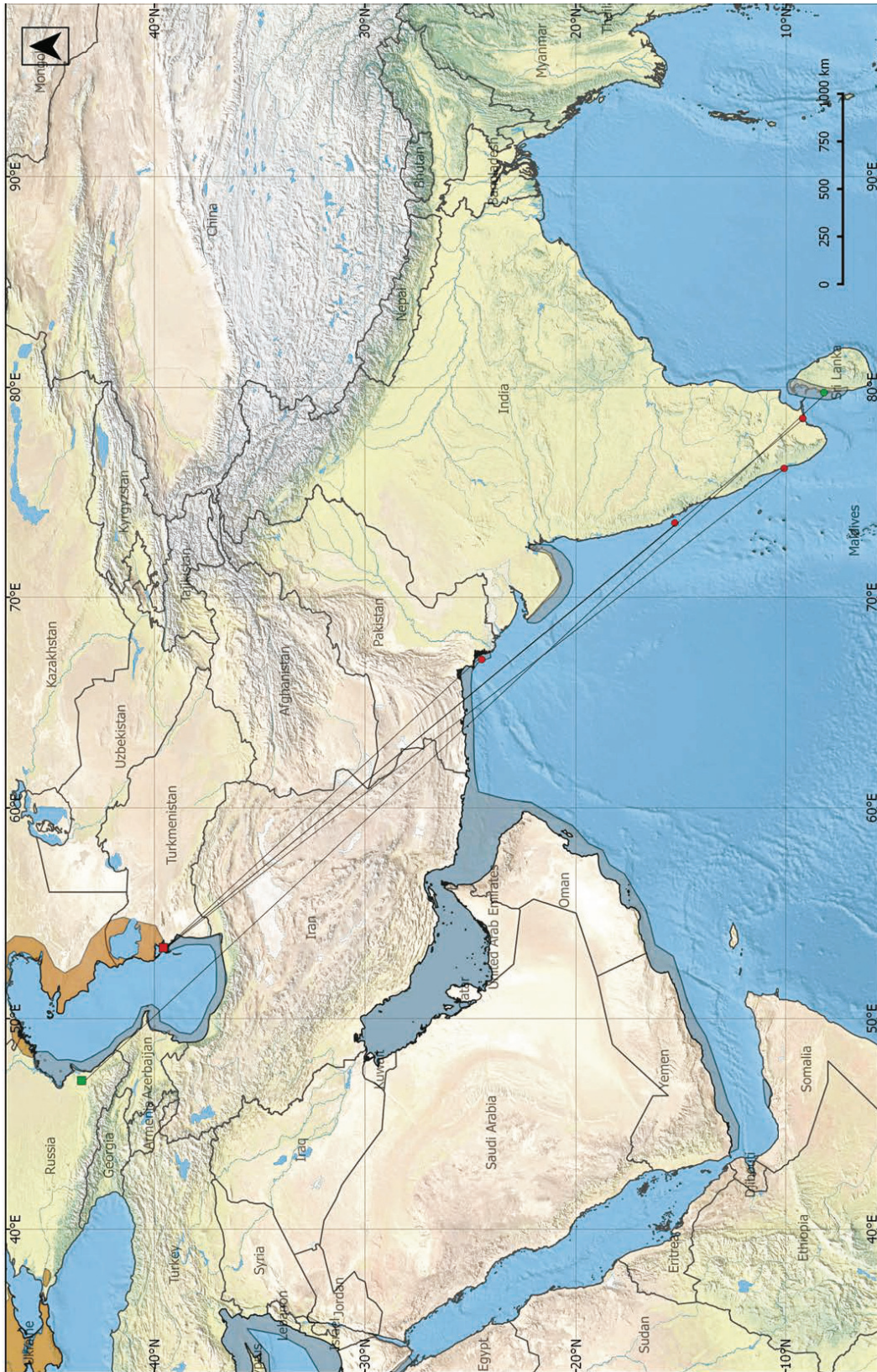
Source: Indian Bird Migration Atlas, BNHS & Oxford University Press.

Recoveries of Northern Pintail



Source: Indian Bird Migration Atlas, BNHS & Oxford University Press.

Recoveries of Wood Sandpiper



Source: Indian Bird Migration Atlas. BNHS & Oxford University Press.

- Astrakhan, Russia
- Turkmenbashi Bay, Turkmenistan
- Breeding Range
- Non-breeding Range

Recovering of Sandwich Tern

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